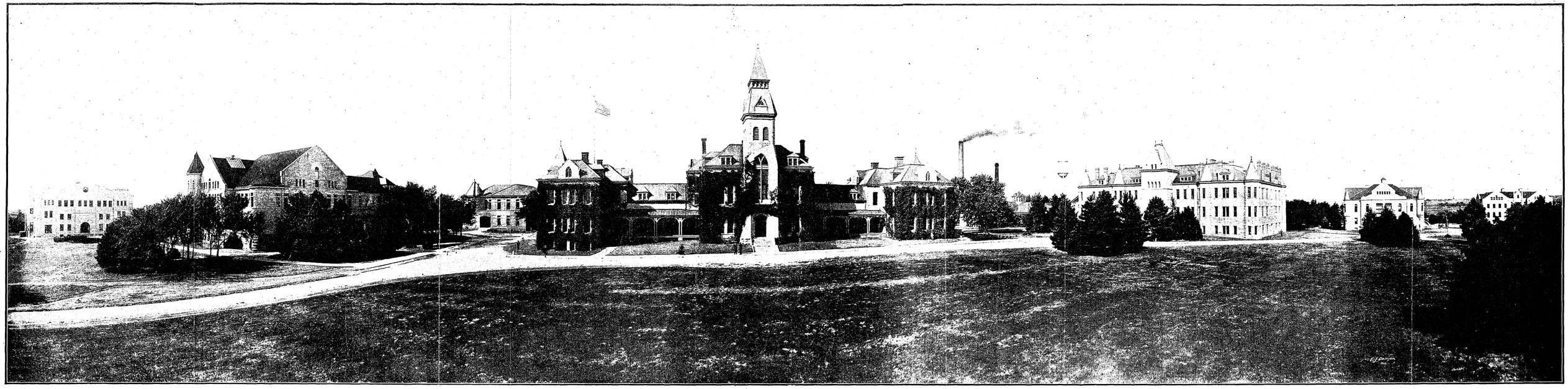

PANORAMIC VIEW OF BUILDINGS AT THE KANSAS STATE AGRICULTURAL COLLEGE.

Kansas State Agricultural College

CATALOGUE

Forty-Seventh Session
1909-'10

Manhattan

THE INDUSTRIALIST, Vol. XXXVI, No. 40.

Entered at the post office, Manhattan, Kansas, as second-class matter. Act of July 16, 1894.

CALENDAR.

1910.

JULY.

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SEPTEMBER.

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DECEMBER.

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COLLEGE CALENDAR.

1910.

SEPT. 21, Wednesday.—Examination for admission, at nine A. M.
SEPT. 22, Thursday.—Fall term of thirteen weeks begins.
SEPT. 22, Thursday.—Short course for housekeepers begins.
NOV. 5, Saturday.—Mid-term examination.
NOV. 24 to 26, Thursday to Saturday.—Thanksgiving vacation.
DEC. 22, 23, Thursday and Friday.—Examinations at close of term.

1911.

JAN. 2, Monday.—Examination for admission, at nine A. M.
JAN. 3, Tuesday.—Winter term of twelve weeks begins.
JAN. 3, Tuesday.—Short courses in agriculture and dairying begin.
FEB. 11, Saturday.—Mid-term examinations.
MAR. 23, 24, Thursday and Friday.—Examinations at close of term.

MAR. 27, Monday.—Examination for admission, at nine A. M.
MAR. 28, Tuesday.—Spring term of eleven weeks begins.
MAY 6, Saturday.—Mid-term examinations.
MAY 16, Tuesday.—Summer course in home economics begins.
JUNE 11 to 15, Saturday to Thursday.—Exercises of commencement week.
JUNE 13, 14, Tuesday and Wednesday.—Examinations at close of term.
JUNE 15, Thursday.—Commencement, at ten A. M.
JUNE 16 to September 20.—Summer vacation.

SEPT. 20, Wednesday.—Examination for admission, at nine A. M.
SEPT. 21, Thursday.—College year begins.

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

THE BOARD OF REGENTS.

HON. W. E. BLACKBURN (1911), *President,*
Anthony, Harper county.

HON. J. O. TULLOSS (1911), *Vice President,*
Sedan, Chautauqua county.

HON. EDWIN TAYLOR (1911),
Edwardsville, Wyandotte county.

HON. W. A. HARRIS,[1]
Lawrence, Douglas county.

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

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

HON. TOM BLODGETT[2] (1913),
Wichita, Sedgwick county.

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

MARGARET BUTTERFIELD, *Assistant Secretary.*

1. Died December 20, 1909.
2. To fill unexpired term of Hon. W. A. Harris, deceased.

The Board of Instruction.

HENRY JACKSON WATERS, B. S. A.,

President of the College.

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

Office *A 30; Res. 500 Houston St.

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

Professor of Architecture and Drawing.

Student, High School, Bucheggberg, Switzerland, 1860-1863; Student, College of Solothurn, Switzerland, 1863-1867; 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—; D. A., ibid., 1908.

Office A 55; Res. 508 Bluemont St.

JULIUS TERRASS WILLARD, D. Sc.,

Dean of Science, Professor of Chemistry.

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

Office C 30; Res. 1211 Moro St.

JOSHUA DOUGLAS RICKMAN,

Superintendent of Printing.

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

Office K 28; Res. 504 Laramie St.

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* Buildings are designated by letters, as follows:

A—Anderson Hall (Main).
C—Physical Science Hall.
D—Dairy Hall.
F—Fairchild Hall (Library).
G—Agricultural Hall.
H—Horticultural Hall.
K—Kedzie Hall (Printing).
L—Domestic Science and Art Hall.
M—Auditorium.
R—Armory.
S—Machine Shops.
V—Veterinary Hall.
W—Women's Gymnasium.
X—Horticultural Laboratory.

BENJAMIN LUCE REMICK, PH. M.,

Professor of Mathematics.

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

Office A 71; Res. 613 Houston St.

BENJAMIN FRANKLIN EYER, E. E.,

Professor of Electrical Engineering.

Professor of Physics and Electrical Engineering, Kansas State Agricultural College, 1900-1908; on Leave of Absence, 1901-1902; B. S., Armour Institute of Technology, 1902; Professor of Electrical Engineering, Kansas State Agricultural College, 1908—.

Office C 33; Res. 523 Fremont St.

HERBERT FULLER ROBERTS, M. S.,

Professor of Botany.

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

Office H 58; Res. 1920 Poyntz Ave.

WILLIAM ARCH McKEEVER, PH. M.,

Professor of Philosophy.

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

Office F 27; Res. 7 Park Road.

EDMUND BURKE McCORMICK, B. S.,

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

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

Office S 57; Res. 800 Houston St.

ALBERT DICKENS, M. S.,

Professor of Horticulture.

B. S., Kansas State Agricultural College, 1893; Assistant in Horticulture, ibid., 1899-1901; M. S., ibid., 1901; Acting Professor of Horticulture, ibid., 1901-1902; Professor of Horticulture, ibid., 1902—.

Office H 33; Res. 509 Manhattan Ave.

CLARK MILLS BRINK, PH. D.,

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

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

Office A 27; Res. 9 Park Road.

ALBERT MOORE TENEYCK, M. S.,

*Professor of Farm Management, Superintendent of Fort Hays Branch Agricultural Experiment Station.**

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

Office G 28; Res. College Hill.

RALPH RAY PRICE, A. M.,

Professor of History and Civics.

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

Office F 57; Res. 826 Houston St.

JULIUS ERNEST KAMMEYER, A. M.,

Professor of Economics and Director of Public Speaking.

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

Office A 52; Res. 901 Bluemont Ave.

JOHN VANZANDT CORTELYOU, PH. D.,

Professor of German.

B. A., University of Nebraska, 1897; Assistant Principal, Humboldt (Nebraska) High School, 1897-1898; Principal, ibid., 1898-1899; A. M., University of Nebraska, 1901; Ph. D., University of Heidelberg, 1904; Professor of German, Kansas State Agricultural College, 1904—.

Office F 59; Res. 5 Park Road.

OLOF VALLEY, B. M.,

Professor of Music.

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

Office M 30; Res. 725 Osage St.

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* Beginning June 1, 1910.

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

Professor of Veterinary Medicine.

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

Office V 30; Res. 603 Houston St.

ROLAND JACOB KINZER, B. S. A.,

Professor of Animal Husbandry.

B. S. A., Iowa State College, 1901; Farm Superintendent, Iowa State College, 1901-1903; Assistant in Dairying and Animal Husbandry, Kansas State Agricultural College, 1903-1905; Professor of Animal Husbandry, ibid., 1905—.

Office G 30; Res. 618 N. Eleventh St.

JACOB HAROLD MILLER, A. M.,

Superintendent of Agricultural Extension.

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

Office A 36; Res. 829 Fremont St.

WALTER EDWARD KING, A. M.,

Professor of Bacteriology.

B. A., Cornell University, 1905; Instructor in Biology, Crawfordsville (Indiana) High School, 1900-1902; Assistant in Bacteriology, Cornell University, 1902-1905; Research Bacteriologist, Department of Experimental Medicine, Parke, Davis & Co., Detroit, 1905-1907; Professor of Bacteriology, Kansas State Agricultural College, 1907—.

Office V 54; Res. 915 Fremont St.

THOMAS J HEADLEE, PH. D.,

Professor of Entomology and Geology.

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

Office F 51; Res. 815 Fremont St.

CHARLES HENRY BOICE,

First Lieutenant U. S. A., Professor of Military Science.

First Lieutenant, Seventh Cavalry, U. S. A.; Professor of Military Science, Kansas State Agricultural College, 1907—.

Office R 54; Res. 1125 Poyntz Ave.

JOHN CHESTER KENDALL, B. S.,

Professor of Dairy Husbandry.

B. S., New Hampshire College, 1902; Assistant Professor of Dairy Husbandry, in charge of Dairy Husbandry, North Carolina College of Agriculture and Mechanic Arts, 1902-1907; State Dairy Commissioner of Kansas, 1907-1908; Professor of Dairy Husbandry, Kansas State Agricultural College, 1908—.

Office D 30; Res. 621 Houston St.

JOHN ORR HAMILTON, B. S.,

Professor of Physics.

B. S., University of Chicago, 1900; Instructor in Science, Mount Barbara Military Academy (Salina), 1900-1901; Assistant Professor of Physics, Kansas State Agricultural College, 1903-1908; Professor of Physics, ibid., 1908—.

Office C 57; Res. 6 Park Road.

MARY PIERCE VANZILE,

Professor of Domestic Science and Dean of Women.

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

Office L 29; Res. 1011 Osage St.

EDWIN HARRISON WEBSTER, M. S.,

Director of Agricultural Experiment Station and Dean of Agriculture.

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

Office A 33; Res. 800 Poyntz Ave.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering.

B. S., Cornell College (Iowa), 1904; C. E., ibid., 1906; Instructor in Civil Engineering, Lehigh University, 1906-1908; M. S., ibid., 1908; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-1909; Professor of Civil Engineering, 1909—.

Office S 58; Res. 603 Houston St.

ANTONETTA BECKER,

Professor of Domestic Art.

Graduate, Domestic Art Course, Drexel Institute, Philadelphia, 1899; Instructor, Night Classes, ibid., 1904-1906; Graduate, Normal Domestic Art Course, ibid., 1906; Superintendent of Domestic Art, Kansas State Agricultural College, 1906-1909; Professor of Domestic Art, ibid., 1909—.

Office L 55; Res. 309 N. Juliette Ave.

CHARLES A. SCOTT, B. S.,

State Forester.

B. S., Kansas State Agricultural College, 1901; Graduate Student, Yale University, 1901-1902; Forester, Iowa Agricultural Experiment Station, 1902-1909; Kansas State Forester, 1909—.

Office ——; Res. ——.

LESLIE ARTHUR FITZ, B. S.,

In Charge of Department 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—.

Office A 33; Res. 1014 Houston St.

EDWIN LEE HOLTON, A. B.,

Professor of Rural Education, Extension Department.

Graduate, Indiana State Normal School, 1900; Principal, Lapel (Indiana) Consolidated Schools, 1900-1903; A. B., University of Indiana, 1904; Superintendent, Holton Public Schools, 1904-1907; Superintendent, Noblesville (Indiana) Public Schools, 1907-1909; Supervisor, C. A. S. Industrial School, New York city, 1909-1910; Professor of Rural Education, Extension Department, Kansas State Agricultural College, 1910—.

Office A 36; Res. 503 Houston St.

ANDREY ABRAHAM POTTER, B. S.,

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

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

Office S 57; Res. 616 Bluemont Ave.

ROY ANDREW SEATON, B. S.,

Professor of Applied Mechanics and Hydraulics.†

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

Office S 63; Res. 109 S. Juliette Ave.

_____,

Professor of Agronomy.

_____,

Professor of Heating and Sanitation.

MARGUERITE EMMALINE BARBOUR,

Director of Physical Training.

Student, Wesleyan College (Wilbraham, Mass.), 1898; Student, Sargent's Normal School of Physical Training (Cambridge, Mass.), 1900; Director of Physical Training, Kansas State Agricultural College, 1904—.

Office W 27; Res. 601 Humboldt St.

GERTRUDE A BARNES,

Librarian.

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

Office F 32; Res. 211 Walnut St.

JAMES WILLIAM SEARSON, A. M.,

*Associate Professor of English.**

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

Office ——; Res. ——.

*Beginning September 1, 1910.

† On leave of absence during season, 1910-1911.

JACOB LUND, B. S.,

Superintendent of Heat and Power Department.

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—.

Office S 34; Res. 116 Fairchild Ave.

ROBERT HENRY BROWN, B. M., B. S.,

Assistant Professor of Music.

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

Office M 27; Res. 517 Leavenworth St.

GEORGE ADAM DEAN, M. S.,

Assistant Professor of Entomology.

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

Office F 52; Res. 511 Juliette Ave.

WILLIAM HIDDLESON ANDREWS, A. B.,

Assistant Professor of Mathematics.

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

Office A 63; Res. 630 Moro St.

GEORGE CARPENTER WHEELER, B. S.,

Lecturer on Farm Management, Agricultural College Extension Department.

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

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

ROBERT EDWARD EASTMAN, M. S. A.,

Assistant Professor of Forestry.

B. S., Kansas State Agricultural College, 1900; M. S. A., Cornell University, 1902; with Alleghany Orchard Company (Cumberland, Md.), Summer, 1902; Instructor, Hampton Institute (Hampton, Va.), 1902-1903; Assistant in Horticulture, Kansas State Agricultural College, 1903-1907; Instructor in Horticulture, ibid., 1907-1908; Assistant Professor of Forestry, ibid., 1908—.

Office H 3; Res. 1026 Poyntz Ave.

LELAND EVERETT CALL, B. S. A.,

Assistant Professor of Soils.

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

Office G 37; Res. 617 Houston St.

PLEASANT CRABTREE,

Lecturer on Farm Management, Agricultural College Extension Department.

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

Office A 36; Res. 1026 Bluemont Ave.

KIRK WHITNEY STOUDER, D. V. M.,

Assistant Professor of Veterinary Medicine.

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

Office V 31; Res. 1007 Houston St.

LEONARD WHITTLESEY GOSS, D. V. M.,

Assistant Professor of Veterinary Medicine.

D. V. M., Ohio State University, 1905; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-1907; Instructor in Veterinary Science, ibid., 1907-1909; Assistant Professor of Veterinary Science, ibid., 1909—.

Office V 56; Res. 113 S. Sixth St.

ULA MAY DOW, B. S.,

Assistant Professor of Domestic Science.

B. S., Kansas State Agricultural College, 1905; Teacher's Diploma, Massachusetts State Normal School, 1906; Assistant in Domestic Science, Kansas State Agricultural College, 1906; Instructor in Domestic Science, ibid., 1906-1909; Assistant Professor of Domestic Science, ibid., 1909—.

Office L 30; Res. R. R. No. 1.

HERBERT HIRAM KING, A. M.,

Assistant Professor of Chemistry.

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

Office C 56; Res. 916 Humboldt St.

JOHN BENNETT WHELAN, A. M.,

Assistant Professor of Chemistry.

A. B. and Ped. B., Hillsdale College, 1903; Instructor, Pawpaw (Illinois) High School, 1903-1905; Instructor, Rensselaer (Indiana) High School, 1905-1906; Instructor, Lincoln (Nebraska) High School, 1906-1908; Fellow, University of Nebraska, 1907-1908; M. A., ibid., 1908; Instructor in Chemistry, Kansas State Agricultural College, 1908-1909; Assistant Professor of Chemistry, ibid., 1909—.

Office C 41; Res. 816 N. Juliette Ave.

CHARLES OSCAR SWANSON, M. AGR.,

Assistant Professor of Agricultural Chemistry.

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

Office C 6; Res. 981 Bluemont Ave.

ROBERT JOHN BARNETT, B. S.,

Assistant Professor of Mathematics.

B. S., Kansas State Agricultural College, 1895; Graduate, Kansas State Normal School, 1896; Instructor, Republic County Public Schools, 1897-1898; Instructor, Riley County Public Schools, 1898-1899; Principal, Manhattan High School, 1899-1900; Principal, Olathe High School, 1900-1901; Assistant Postmaster, Manhattan, 1901-1907; Principal, Preparatory Department, Kansas State Agricultural College, 1907-1909; Assistant Professor of Mathematics, ibid., 1909—.

Office A 69; Res. 1020 Houston St.

LEWIS HENRY BEALL, A. B.,

Assistant Professor of English Language and Literature.

A. B., Denison University, 1902; Principal, Rockwell City (Iowa) High School, 1902-1904; Principal, Ellsworth High School, 1905-1906; Assistant in English, Kansas State Agricultural College, 1907-1908; Instructor in English, ibid., 1908-1909; Assistant Professor of English, ibid., 1909—.

Office K 58; Res. 609 N. Ninth St.

GEORGE EBEN BRAY, M. E.,

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

M. E., University of Minnesota, 1894; Instructor in Manual Training, Logan High School, Minneapolis, Minn., 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, Ill., 1903-1909; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Superintendent of Shops, ibid., 1909—; Assistant Professor of Shop Methods and Practice, ibid., 1910—.

Office S 62; Res. 519 Laramie St.

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany.

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

Office H 57; Res. 927 Leavenworth St.

FRANKLIN GEORGE KING, B. S. A.,

Assistant Professor of Animal Husbandry.

B. S. A., University of Missouri, 1907; Assistant in Animal Husbandry, ibid., 1907-1908; Live Stock Assistant, Missouri State Board of Agriculture, 1908-1909; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1909—.

Office G 30; Res. 800 Poyntz Ave.

CLARENCE VICTOR HOLSINGER,

Lecturer on Horticulture, Agricultural College Extension Department.

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

Office A 36; Res. 620 Moro St.

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* Beginning September 1, 1910.

FRANCES LANGDON BROWN, B. S.,

Lecturer on Domestic Science, Agricultural College Extension Department.

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

Office A 36; Res. 931 Bluemont St.

CLAUDE HARRISON HINMAN, A. B.,

Lecturer on Dairying, Agricultural College Extension Department.

A. B., University of Nebraska, 1904; Farmers' Institute Lecturer, University of Nebraska, 1904-1905; in the Creamery Business, 1905-1909; Lecturer on Dairying, Extension Department, Kansas State Agricultural College, 1909—.

Office A 36; Res. 617 Kearney St.

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

Highway Engineer, Agricultural College Extension Department.

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

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

ADA RICE, B. S.,

Instructor in English.

B. S., Kansas State Agricultural College, 1895; Assistant in English, ibid., 1899-1905; Life Teachers' 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—.

Office A 61; Res. 917 Osage St.

ELLA WEEKS, A. B.,

Instructor in Drawing and in Color and Design.

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

Office A 68; Res. 1011 Osage St.

DAISY DOROTHY ZEININGER, A. B.,

Instructor in Mathematics.

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

Office A 58; Res. 530 Humboldt St.

THEOPHILUS H SCHEFFER, A. M.,

Instructor in Zoölogy.

A. B., University of Kansas, 1895; Principal, Delphos High School, 1895-1902; A. M., Cornell University, 1903; Assistant in Zoölogy, Kansas State Agricultural College, 1903-1907; Instructor in Zoölogy, ibid., 1907—.

Office F 55; Res. 4 Park Road.

LELAND DAVID BUSHNELL, B. S.,

Instructor in 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; Assistant in Bacteriology, Kansas State Agricultural College, 1909—.

Office V 52; Res. 621 Houston St.

MICHAEL FRANCIS AHEARN, B. S.,

Instructor in Horticulture.

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

Office H 32; Res. 507 Laramie St.

BURTON RAY ROGERS, D. V. M.,

Instructor in Veterinary Science.

D. V. M., Iowa State College, 1889; Graduate Student, McKillip Veterinary College, Chicago, 1899-1900; House Physician and Demonstrator of Anatomy in Veterinary Department Iowa State College, 1900; Inspector in Bureau of Animal Industry, United States Department of Agriculture, 1900-1905; Student, Dearborn Night Medical College, Chicago, 1905-1906; Instructor in Veterinary Science, Kansas State Agricultural College, 1906—.

Office V 32; Res. 1006 Laramie St.

KIRK HAROLD LOGAN, A. B.,

Instructor in Physics.

A. B., University of Kansas, 1902; Professor of Physical Science, Friends University, 1902-1903; Graduate Student, Kansas University, Summer Session, 1903; Assistant in Physics, Bradley Institute, 1903-1905; Graduate Student, University of Chicago, Summer Session, 1904; Tester, General Electric Company, 1905-1906; Telephone Engineer, New York Telephone Company, 1906-1907; Development Engineer, Western Electric Company, Summers 1908 and 1909; Instructor in Physics, Kansas State Agricultural College, 1907—.

Office C 57; Res. 830 Humboldt St.

CLARA WILLIS, B. S.,

Instructor in Domestic Science.

Student in Europe, 1896-1898; Teacher's Diploma, Mary Hemenway Department of Household Arts, Massachusetts State Normal School, 1906; B. S., Kansas State Agricultural College, 1908; Assistant in Domestic Science, ibid., 1906-1909; Instructor in Domestic Science, ibid., 1909—.

Office L 42; Res. 910 Fremont St.

INA FOOTE COWLES, B. S.,

Instructor in Domestic Art.

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

Office L 56; Res. 920 Fremont St.

GERTRUDE STUMP, B. S.,

Instructor in Domestic Art.

B. S., Kansas State Agricultural College, 1896; Graduate Student, ibid., 1902-1908; Assistant in Domestic Art, ibid., 1906-1909; Instructor in Domestic Art, ibid., 1909—.

Office L 65; Res. 1206 Vattier St.

ANNETTE LEONARD, A. B.,

Instructor in English.

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

Office K 52; Res. 1020 Vattier St.

WILLIAM LEONARD HOUSE,

Instructor in Woodwork, Foreman of Carpenter Shop.

Apprentice with J. Adams & Sons Company, Amherst, Mass., 1863-1868; with the Newton Wagon Works, Batavia, Ill.; Foreman, Carpenter Shop, Atchison, Topeka & Santa Fe Railway Company, Las Vegas, N. M., 1880-1883; Cabinetmaker with The Howell Company, Sioux City, Iowa, 1883-1888; Instructor in Woodwork, Foreman of Carpenter Shop, Kansas State Agricultural College, 1888—.

Office S 28; Res. 608 Moro St.

LOUIS WABNITZ,

Instructor in Machine Tool Work, Foreman of Machine Shop.

Apprentice with Usher & Russell, Lawrence, Kan., 1883-1887; with Usher & Russell, Omaha, 1887-1888; with Kimball Foundry Company, Lawrence, Kan., 1888-1890; with Santa Fe Railway Company, 1890-1892; with Kansas City Elevated Railway Company, 1892-1893; Foreman of Machine Shop, Lawrence (Kansas) Wire Mill Company, 1893-1895; Foreman of Machine Shop, Fowler Packing Company, Kansas City, Kan., 1895-1899; Instructor in Machine Tool Work, Foreman of Machine Shop, Kansas State Agricultural College, 1899—.

Office S 31; Res. 831 Osage St.

AMBROSE ELLIOT RIDENOUR, B. S.,

Instructor in Molding, Foreman of Foundry.

B. S., Kansas State Agricultural College, 1896; with Blue Valley Manufacturing Company, Manhattan, Kan., 1897-1899; Farmer, 1899-1901; Foreman of Foundry, Kansas State Agricultural College, 1901—; Instructor in Molding, ibid., 1909—.

Office S 42; Res. 623 Manhattan Ave.

JEREMIAH HAFFER HOLLAR,

Instructor in Forging, Foreman of Blacksmith Shop.

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

Office S 38; Res. 1209 Vattier St.

RAYMOND GARFIELD TAYLOR, A. B.,

*Instructor in History and Civics.**

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

Office ——; Res. ——.

INA EMMA HOLROYD, B. S.,

Assistant in Mathematics.

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

Office W 26; Res. 1001 Moro St.

AMANDA KATHARIN TINKEY,

Assistant Librarian.

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

Office F 32; Res. 1230 Laramie St.

* Beginning September 1, 1916.

EARL NATHANIEL RODELL, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1903; Assistant in Printing, Kansas State Agricultural College, 1903—.

Office K 29; Res. 216 S. Fourth St.

CHARLES YOST,

*Foreman of Boiler Room.**

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

Office S 34; Res. 1230 Laramie St.

EARLE BERTRAND MILLIARD,

Assistant in Machine Shop.

Student, Kansas State Agricultural College, 1899-1901; Apprentice, ibid., 1901-1903; with Smith Automobile Company, Topeka, 1902-1903; Foreman of Blacksmith Shop, Kansas State Agricultural College, 1905-1908; Assistant in Machine Shop, ibid., 1908—.

Office S; Res. 920 Raton St.

JOHN THOMPSON PARKER,

Assistant in Woodwork.

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

Office S 28; Res. 926 Vattier St.

EDGAR GEORGE MEINZER, A. M.,

Assistant in German.

A. B., Beloit College, 1903; Principal, Idaho Falls (Idaho) High School, 1903-1904; Principal, Hopkinton (Iowa) High School, 1904-1905; Assistant in German, Kansas State Agricultural College, 1906—; Graduate Student, University of Chicago, Summer, 1907; M. A., Olivet College, 1909.

Office A 72; Res. 600 Osage St.

HUGH OLIVER,

Assistant in Heat and Power Department.

Apprentice, Heat and Power Department, Kansas State Agricultural College, 1902-1908; Assistant in Heat and Power Department, ibid., 1906—.

Office S 34; Res. 1126 Kearney St.

CHARLAINE FURLEY, A. B.,

Assistant in English.

B. A., Fairmount College, 1906; Assistant in English, Kansas State Agricultural College, 1906—.

Office K 56; Res. 724 Houston St.

JESSIE ANNABERTA REYNOLDS, A. B.,

Assistant in History.

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, Summer, 1907; Assistant in History, Kansas State Agricultural College, 1906—.

Office H 28; Res. 135 Anderson St.

WILLIAM CARL LANE, B. S.,

Assistant in Electrical Engineering.

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

Office C 33; Res. 122 N. Eleventh St.

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* Beginning September 1, 1910.

FLORA CORNELIA KNIGHT, A. B.,

Assistant in English.

A. B., University of Wyoming; Graduate Student, University of Chicago, two years; Assistant in English, Kansas State Agricultural College, 1907—.

Office A 61; Res. 1016 Leavenworth St.

GRACE HOOKER WOODWARD,

Assistant in Domestic Science.

Student, Hill Institute, 1905-1906; Instructor, Dennison Settlement House, 1906-1907; Student, Boston School of Domestic Science, 1907; Assistant in Domestic Science, Kansas State Agricultural College, 1907—; Institute Demonstrator and Lecturer, ibid., Summers 1908 and 1910; Domestic Science Library Study, Northampton (Massachusetts), Summer, 1909.

Office L 43; Res. 411 Houston St.

MARGARET ANNA MACK,

Assistant in History and Civics.

Graduate, Illinois State Normal University, 1886; Principal, Wilsey Public Schools, 1886-1888; Instructor, Newton City Schools, 1888-1890; Instructor, Eureka City Schools, 1890-1892; Superintendent, Council Grove Schools, 1892-1895; Assistant Principal, Junction City High School, 1895-1901; Assistant Principal, Clay County High School, 1901-1904; Instructor, Leavenworth High School, 1904-1907; Graduate Student, University of Colorado, 1907-1908; Graduate, Kansas State Normal School, 1909; Assistant in History, Kansas State Agricultural College, 1907—.

Office H 26; Res. 1005 Humboldt St.

CHESTER ALLEN ARTHUR UTT, B. S.,

Assistant in Food Analysis.

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

Office C 56; Res. 501 Laramie St.

JAMES ARTHUR MILHAM, B. S.,

Assistant in Animal Husbandry, Fort Hays Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1907; Assistant in Animal Husbandry, Fort Hays Branch Agricultural Experiment Station, 1907—.

Office and Res. Hays, Kan.

ANNA WILKINSON GORDON, A. B.,

Assistant in History.

A. B., Iowa College, 1904; Instructor, Public Schools, Iowa, 1904-1905; Assistant in History, Kansas State Agricultural College, 1907—.

Office H 28; Res. 901 Leavenworth St.

SAMUEL WILSON McGARRAH, A. M.,

Assistant in Mathematics.

Student, Grove City College (Pennsylvania), 1881-1885; Principal, Lamertine (Pennsylvania) High School, 1885-1886; Principal, Millerstown (Pennsylvania) High School, 1886-1887; Principal, Halstead High School, 1887-1891; Instructor, Kansas County Normal Institute, Summers 1888-1901; Superintendent, Anthony Public Schools, 1891-1893; A. M., Grove City College, 1893; Superintendent, Olathe Public Schools, 1895-1901; Editor and Proprietor, Manhattan *Nationalist*, 1901-1908; Assistant in Mathematics, Kansas State Agricultural College, 1908—.

Office A 57; Res. 607 Houston St.

HARRISON ELAZER PORTER, B. S.,

Assistant in Mathematics.

B. S., Kansas State Agricultural College, 1907; Assistant in Mathematics, ibid., 1908—.

Office A 70; Res. 1024 Houston St.

JOHN BERNARD PARKER, A. M.,

Assistant Entomologist.

A. B., Ohio State University, 1898; Fellow and Assistant in English, ibid., 1898-1900; A. M., ibid., 1900; Instructor in Natural History and English, South High School, Cleveland, Ohio, 1900-1906; Graduate Student, Ohio State University, 1906-1908; Assistant Entomologist, Kansas State Agricultural Experiment Station, 1908—.

Office F 62; Res. 510 Moro St.

ALLEN GRIFFITH PHILIPS, B. S.,

Assistant in Charge of Poultry Husbandry.

B. S., Kansas State Agricultural College, 1907; Graduate Student, Cornell University, 1907-1908; Assistant in Charge of Poultry Husbandry, Kansas State Agricultural College, 1908—.

Office D 29; Res. 607 Houston St.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Agronomist, Fort Hays Branch Agricultural Experiment Station.

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; Agronomist, Fort Hays Branch Agricultural Experiment Station, 1908—.

Office and Res., Hays, Kan.

GERTRUDE CANNON,

Assistant in Music.

Graduate, School of Music, Bethany College (Lindsborg), 1904; Student, Oberlin (Ohio) Conservatory of Music, 1904-1905; Assistant in Music, Kansas State Agricultural College, 1908—.

Office M 29; Res. 601 Humboldt St.

BERTHA BISBEY,

Assistant in Mathematics.

Student, Kansas State Normal School, 1894-1895; Instructor, Alma City Schools, 1899-1903; Instructor, Manhattan City Schools, 1903-1908; Student, University of Chicago, Summer, 1908; Assistant in Mathematics, Kansas State Agricultural College, 1908—.

Office K 52; Res. 810 Pierre St.

FRED MONTREVILLE HAYES, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1908; Assistant in Veterinary Science, ibid., 1908—.

Office V 27; Res. 1007 Houston St.

BERTHA LILIAS DONALDSON,

Assistant in Domestic Art.

Instructor, Logan (Iowa) Public Schools, 1901-1904; Student, University of Missouri, 1904-1905; Instructor, Independence (Missouri) Public Schools, 1905-1907; Student, University of Chicago, 1907-1908; Diploma in Textiles and Sewing, University of Chicago, 1908; Assistant in Domestic Art, Kansas State Agricultural College, 1908—.

Office L 64; Res. 1027 Houston St.

CHRISTIAN JENSEN,

Assistant State Forester, Fort Hays Branch Agricultural Experiment Station.

Graduate, Public Schools, Aaso, Denmark, 1886; Student and Apprentice in Gardening, Nursery Work, Landscape and Floriculture, 1886-1900; Student, Technical Night School, Winter Terms, 1886-1902; Postgraduate Course in Floriculture and Nursery Work, Elsinore, Denmark, 1890-1892; with Landscape Department, Omaha Exposition, 1897-1898; Special Course in Forestry, Biltmore Forest School, Biltmore, N. C., 1904-1905; Superintendent, Oscar Johnson Estate, Holly Springs, Miss., 1906-1907; Landscape Architect, State Industrial Institute, Columbus, Miss., 1908; Assistant State Forester, Fort Hays Branch Agricultural Experiment Station, 1908—.

Office and Res., Hays, Kan.

HIRAM R. REED, B. S.,

Superintendent Garden City Coöperative Experiment Station.

B. S., Kansas State Agricultural College, 1907; Farmer, Centralia, Kan., 1907-1908; Superintendent Garden City Coöperative Experiment Station, 1908—.

Office and Res., Garden City, Kan.

BURTON SYLVESTER ORR, B. S.,

*Assistant in Power and Experimental Engineering.**

B. S., Kansas State Agricultural College, 1907; in Engineering Department, Swift & Co., St. Joseph, Mo., 1907-1908; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1908-1910; Assistant in Power and Experimental Engineering, ibid., 1910—.

Office S 61; Res. 728 Poyntz Ave.

ELMER JOHNSON, B. S.,

*Assistant in Power and Experimental Engineering.**

B. S., Kansas State Agricultural College, 1908; Assistant in Mechanical Engineering, ibid., 1908-1910; Assistant in Power and Experimental Engineering, ibid., 1910—.

Office S 61; Res. 728 Poyntz Ave.

ELIZABETH WILSON PUTNAM,

Assistant in Drawing.

Graduate, Art Institute of Chicago, 1907; Instructor, ibid., 1907-1908; with the Roycrofters, East Aurora, N. Y., 1908; Instructor, Art Institute of Chicago, Summer, 1909; Assistant in Drawing, Kansas State Agricultural College, 1908—.

Office A 67; Res. 1011 Osage St.

LUTHER EWING PETTY, A. B.,

Assistant in Mathematics.

A. B., Wabash College, 1907; Scholar, University of Illinois, 1908; Assistant in Mathematics, Kansas State Agricultural College, 1908—.

Office A 54; Res. 109 S. Juliette Ave.

JULES COOL CUNNINGHAM, B. S.,

Assistant in Horticulture.

B. S., Kansas State Agricultural College, 1905; Foreman, Crete Nurseries, Crete, Neb., 1905-1907; Manager, Elenora Fruit and Poultry Farm, Centralia, 1907-1909; Assistant in Horticulture, Kansas State Agricultural College, 1909—.

Office H 32; Res. 608 Osage St.

ANNIE ELSIE LINDSEY,

Assistant in Domestic Science.

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

Office L 35; Res. 1027 Houston St.

JOHN ELIPHALET SMITH, B. S.,

Assistant in Botany.

B. S., Oregon Agricultural College, 1902; Instructor in Mathematics and Science, Roseburg (Oregon) High School, 1904-1905; Instructor in Botany and Physiography, Salem (Oregon) High School, 1905-1908; Graduate Student, University of Washington, Summer, 1907; Graduate Student, University of Chicago, Summers, 1908 and 1909; Assistant in Botany, Kansas State Agricultural College, 1908—.

Office H 57; Res. 203 N. Juliette Ave.

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* Beginning September 1, 1910.

RAYMOND CLIFFORD WILEY, B. S.,

Assistant in Chemistry.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-1908; Assistant Chemist, Agricultural Experiment Station, Kansas State Agricultural College, 1908—.

Office C 3; Res. 711 Humboldt St.

THOMAS POWELL HASLAM, B. S.,

Assistant in Veterinary Science, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1908; Assistant Instructor in Chemistry, University of Kansas, 1908-1909; M. S., ibid., 1910; Assistant in Veterinary Science, Agricultural Experiment Station, 1909—.

Office V 2; Res. 718 N. Tenth St.

AMY ALENA ALLEN, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1904; with Printing Department, ibid., 1904-1909; Assistant in Printing, ibid., 1909—.

Office K 28; Res. 280 Fairchild Ave.

PORTER JOSEPH NEWMAN, B. S.,

Assistant in Chemistry.

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

Office C 64; Res. 917 Fremont St.

CHARLES EDWARD GRIFFIN, M. S.,

Assistant in Chemistry.

A. B., University of Denver, 1902; Instructor in Chemistry, ibid., 1902-1904; Instructor in Science, Otero County (Colorado) High School, 1904-1908; City Chemist, La Junta, Colo., 1905-1908; Principal, Otero County High School, 1906-1908; M. S., University of Michigan, 1909; Assistant in Chemistry, Kansas State Agricultural College, 1909—.

Office C 64; Res. 717 Humboldt St.

CLARENCE WARD NASH, B. S.,

Assistant in Crops.

B. S., Iowa State College, 1905; Assistant Agronomist, Maryland Experiment Station, 1905-1909; Assistant in Crops, Kansas State Agricultural College, 1909—.

Office G 28; Res. 611 Humboldt St.

CHARLES JAMES THOMAS DORYLAND, B. S.,

Assistant in Soils.

B. S., Kansas State Agricultural College, 1908; Graduate Student, ibid., 1909-1910; Assistant in Soils, ibid., 1909—.

Office G 28; Res. R. F. D. No. 3.

RAYMOND CHARLES THOMPSON, B. S.,

Assistant in Chemistry, and Assistant Chemist Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1908; with Department of Chemistry, Kansas State Agricultural College, 1908-1909; Assistant in Chemistry and Assistant Chemist in Agricultural Experiment Station, ibid., 1909—.

Office C 3; Res. 620 Osage St.

ROBERT HUGH WILSON, D. V. M.,

Assistant in Bacteriology.

D. V. M., Kansas State Agricultural College, 1909; Assistant in Bacteriology, ibid., 1909—.

Office V 53; Res. 1216 Vattier St.

HELEN KNOSTMAN HUSE, B. S.,

Assistant in Domestic Science.

B. S., Kansas State Agricultural College, 1908; Graduate Student in Domestic Science, ibid., 1908; Student Assistant in Domestic Science, ibid., 1909; Assistant in Domestic Science, ibid., 1909—.

Office L 42; Res. 919 Humboldt St.

EDISON FRANK KUBIN, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1909; Assistant in Veterinary Science, ibid., 1909—.

Office V 27; Res. 1007 Houston St.

AMER BENJAMIN NYSTROM, B. S.,

Assistant in Experimental Dairying.

B. S., Kansas State Agricultural College, 1907; Graduate Student, Cornell University, 1908; Graduate Student, Ohio State University, 1909; Assistant in Experimental Dairying, Kansas State Agricultural College, 1909—.

Office D 30; Res. ——.

ATSUSHI MIYAWAKI, M. S.,

Assistant in Experimental Dairying.

B. S., Kansas State Agricultural College, 1907; Graduate, School of Agriculture, Cornell University, Summer, 1908; M. S., Kansas State Agricultural College, 1909; Assistant in Dairy Husbandry, ibid., 1909—.

Office D 2; Res. 1018 Laramie St.

ETHEL BYERLY,

Assistant in Domestic Art.

Student, Pennsylvania State Normal School, 1899-1904; Instructor, Philadelphia Mission School, 1905-1907; Student, Drexel Institute (Philadelphia), 1907-1909; Assistant in Domestic Art, Kansas State Agricultural College, 1909—.

Office L 55; Res. 309 N. Juliette Ave.

THOMAS GEORGE PATERSON, B. S. A.,

Assistant in Animal Husbandry.

Graduate, School of Agriculture, University of Minnesota, 1902; Graduate Student, ibid., 1902-1905; Assistant in Animal Husbandry, ibid., 1905-1909; B. S. Agr., University of Minnesota, 1909; Assistant in Animal Husbandry, Kansas State Agricultural College, 1909—.

Office G 33; Res. 919 Humboldt St.

JESSIE GULICK,

Assistant Librarian.

Instructor, Kansas Public Schools, 1899-1901 and 1903-1905; Instructor, Virginia Public Schools, 1901-1903; Chief Clerk, Extension Office, Kansas State Agricultural College, 1907-1909; Assistant in Library, ibid., 1909—.

Office F 32; Res. 211 Walnut St.

MARY MUDGE, B. S.,

Assistant in Library.

B. S., Kansas State Agricultural College, 1905; Assistant in Library, ibid., 1907—.

Office F 32; Res. 928 Bertrand St.

ESTELLA MAY BOOT, A. M.,

Assistant in English.

A. B., University of South Dakota, 1901; Graduate Student, University of Iowa, 1905; A. M., Northwestern University, 1909; Assistant in English, Kansas State Agricultural College, 1909—.

Office L 22; Res. 1019 Vattier St.

JAMES RUSSELL JENNESS, B. S.,

Assistant 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—.

Office C 57; Res. 601 Manhattan Ave.

HARRY EVANS, B. S. AGR.,

Assistant in Entomology.

Student, University of Wooster, 1903-1904; B. S. Agr., Ohio State University, 1909; Assistant in Entomology, Kansas State Agricultural College, 1909—.

Office F 62; Res. 431 Leavenworth St.

ADA MARIE BAUM,

Assistant in Music.

Student, Chicago Musical College, 1899 and 1903-1904; Assistant in Music, Kansas State Agricultural College, 1909—.

Office M 53; Res. 426 Leavenworth St.

ETHEL KATE MAY PING,

Assistant in Music.

Graduate, Sherwood Music School, Chicago, 1909; Assistant in Music, Kansas State Agricultural College, 1909—.

Office M 52; Res. 611 Humboldt St.

EVERETT PARKER JOHNSTON, A. B.,

Assistant in Public Speaking.

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

Office A 72; Res. 608 Bluemont Ave.

DEAN HUMBOLDT ROSE, A. M.,

Assistant in Botany.

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

Office H 54; Res. 1819 Humboldt St.

JULIA ANNA MONROE, B. S.,

Assistant in Botany.

B. S., Kansas State Agricultural College, 1904; Instructor, Richland Public Schools, 1904-1905; Graduate Student, University of Chicago, 1906-1907; Plant Breeding Work, Kansas Agricultural Experiment Station, 1907-1909; Assistant in Botany, Kansas State Agricultural College, 1909—.

Office H 57; Res. 814 Fremont St.

MADGE KAY, B. S.,

Assistant in Mathematics.

Principal of North Schools, Broken Bow, Neb., 1903-1904; Graduate, Nebraska State Normal School, 1905; Principal, O'Neill (Nebraska) High School, 1905-1906; Superintendent, Atkinson (Nebraska) Public Schools, 1906-1907; B. S., University of Chicago, 1908; Instructor in Mathematics, Chicago City Schools, 1908-1909; Assistant in Mathematics, Kansas State Agricultural College, 1909—.

Office W 26; Res. 105 S. Juliette Ave.

CHESTER ARTHUR JACKSON, B. S.,

Assistant in Mathematics.

B. S., Purdue University, 1909; Assistant in Mathematics, Kansas State Agricultural College, 1909—.

Office A 70; Res. 203 N. Juliette Ave.

DON OLMSTED STONE, C. E.,

Assistant in Civil Engineering.

Student, Allegheny College, 1904-1905; C. E., Cornell University, 1909; Assistant in Civil Engineering, Kansas State Agricultural College, 1909—.

Office S 63; Res. 607 Houston St.

PAUL WEIDEMEYER GRAFF, B. S.,

Assistant in Botany.

B. S., Connecticut State Agricultural College, 1907; Assistant in Botany, Connecticut State Agricultural College, Summer School 1905-1907; Austin Teaching Fellow in Botany, Harvard University, 1907-1909; Assistant in Botany, Connecticut Agricultural Experiment Station, Summers of 1907, 1908 and 1909; Assistant in Botany, Kansas State Agricultural College, 1909—.

Office H 57; Res. 927 Leavenworth St.

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

Assistant in Animal Husbandry.

B. S. Agr., University of Missouri, 1909; Assistant in Animal Husbandry, Kansas State Agricultural College, 1909—.

Office G 30; Res. 1919 Humboldt St.

LEW ALLEN CHASE,

Assistant in History.

Student, University of Michigan, 1904-1908; Superintendent of Coleman (Michigan) Schools, 1908-1909; Assistant in History, Kansas State Agricultural College, 1909—.

Office ——; Res. 502 Moro St.

HENRY WAGNER,

Assistant in Heat and Power.

Assistant in Heat and Power, Kansas State Agricultural College, 1909—.

Office S 34; Res. ——.

ALFRED EVERETT WHITE, M. S.,

Assistant in Mathematics.

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

Office A 54; Res. 813 Poyntz Ave.

HANFORD WISNER EDSON, A. M.,

Assistant in English.

A. B., Williams College, 1890; Instructor in Mathematics, Robert College (Constantinople), 1890-1893; Instructor in Oratory and English, Williams College, 1893-1896; A. M., Harvard University, 1909; Assistant in English, Kansas State Agricultural College, 1909—.

Office K 51; Res. 1106 Laramie St.

CHARLOTTE AUGUSTA MORTON, B. S.,

Assistant in Drawing.

B. S., Kansas State Agricultural College, 1908; Assistant in Drawing, ibid., 1909—.

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

JENNIE FLORENCE RIDENOUR, B. S.,

Assistant in Domestic Art.

B. S., Kansas State Agricultural College, 1904; Superintendent of Sewing, United States Government School, Rosebud, S. D., 1904-1905; Assistant in Domestic Art, Kansas State Agricultural College, 1905-1907; Graduate Student, Drexel Institute, 1907-1908; Special work in Tailoring, Topeka, 1908-1909; Assistant in Domestic Art, Kansas State Agricultural College, 1909—.

Office L 65; Res. 527 Laramie St.

MYRON RALPH BOWERMAN, B. S.,

Assistant in Machine Design.

B. S., Michigan Agricultural College, 1909; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Assistant in Machine Design, ibid., 1910—.

Office S 63; Res. 1017 Poyntz Ave.

FRANK CLYDE HARRIS, B. S.,

Assistant in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1908; City Engineer, Manhattan, Kan., 1907-1909; Supervising Engineer, W. K. Palmer Company, Engineers, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909—.

Office A 79; Res. 616 Osage St.

JAMES HENRY BURT, V. S.,

Assistant in 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 Science, Kansas State Agricultural College, 1909—.

Office V 27; Res. 500 Houston St.

FLORENCE WARNER, A. B.,

Cataloguer in Library.

A. B., University of Illinois, 1906; Cataloguer in Library, Kansas State Agricultural College, 1909—.

Office F 32; Res. 319 N. Fifth St.

ADA HERR, A. M.,

Assistant in History.

A. B., Southwestern College (Winfield, Kan.), 1907; Instructor, Augusta High School, 1907-1908; A. M., University of Michigan, 1909; Assistant in History, Kansas State Agricultural College, 1909—.

Office ——; Res. 1127 Bluemont Ave.

JOHN WILLARD CALVIN, B. S.,

Assistant in Animal Nutrition.

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

Office C 3; Res. 511 Juliette Ave.

CARL FRED CHASE, B. S.,

Assistant in Agronomy.

Graduate, Nebraska School of Agriculture, 1904; Student Assistant in Agronomy, University of Nebraska, 1908-1910; B. S., ibid., 1910; Assistant in Agronomy, Kansas State Agricultural College, 1910—.

Office G 28; Res. 1026 Poyntz Ave.

EDWARD STAAT ESTEL, B. S.,

Assistant in Dairying.

B. S., Iowa State College, 1910; Assistant in Dairying, Kansas State Agricultural College, 1910—.

Office D 30; Res. 909 Humboldt St.

CLARA ORTON SMITH, B. S.,

Assistant in Domestic Science.

B. S., Ohio State University, 1908; Fellow in Domestic Science, ibid., 1908-1909; Instructor in Domestic Science, ibid., 1909-1910; Assistant in Domestic Science, Kansas State Agricultural College, 1910—.

Office L 43; Res. 500 Houston St.

ELLA FRANCES MILES,

Assistant in Domestic Science.

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

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

ALANSON L. HALLSTED, B. S.,

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

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

Office and Res., Hays, Kan.

VIRGINIA LEE MEADE, B. S.,

Assistant in Domestic Science.

B. S., Kansas State Agricultural College, 1909; Assistant in Domestic Science, ibid., Fall Term, 1909.

Res., ———.

GEORGE AUGUST WESTPHALINGER,

Chief Musician U. S. Army (retired), Band Leader.

Bandmaster, Fortieth United States Volunteer Infantry, 1899-1901; Bandmaster, Eleventh United States Cavalry, 1905-1909; Band Leader, Kansas State Agricultural College, 1909—.

Office M 2; Res. 424 Laramie St.

IDA ETHEL RIGNEY, B. S.,

Assistant in Domestic Science.

B. S., Kansas State Agricultural College, 1909; Dietitian, Ensworth Hospital, St. Joseph, Mo., 1909-1910; Assistant in Domestic Science, Kansas State Agricultural College, 1910—.

Office L 30; Res. 1207 Poyntz Ave.

MARGARET ANNA BUTTERFIELD,

Secretary.

Instructor in Public Schools of Kansas and Nebraska, 1889-1903; Bookkeeper, Kansas State Agricultural College, 1904-1909; Secretary, ibid., 1909—.

Office A 29; Res. 1114 Houston St.

WILLIAM RILEY LEWIS,

Custodian.

Head Janitor, Kansas State Agricultural College, 1899-1908; Custodian, ibid., 1908—.

Office A 47; Res. on College Campus.

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

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 R 54; Res. ——.

FLOYD HOWARD,
Farm Foreman.

KARL NYSTROM,
Dairy Herdsman.

WILLIAM ASA LAMB,
Superintendent of Poultry.

ALEXANDER EDGAR,
Herdsman.

Agricultural Experiment Station.

Officers of the Station.

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

ADMINISTRATION—

ED. H. WEBSTER, Director.
J. T. WILLARD, Vice Director.
MARGARET BUTTERFIELD, Secretary.
ETHEL ROBBINS, Executive Clerk.

AGRONOMY—

ALBERT M. TENEYCK,* in Charge.
L. E. CALL, Soils.
CHAS. DORYLAND, Assistant in Soils.
——— ———, Crops.
C. W. NASH, Assistant in Crops.
C. F. CHASE, Assistant in Farm Mechanics.
FLOYD HOWARD, Foreman of Experimental Farm.

ANIMAL HUSBANDRY—

ROLAND J. KINZER, in Charge.
F. G. KING, Experimental Feeding.
T. G. PATERSON, Assistant in Experimental Feeding.
TURNER R. H. WRIGHT, Assistant in Animal Nutrition.
ALEX EDGAR, Herdsman.

BACTERIOLOGY—

WALTER E. KING, in Charge.
L. D. BUSHNELL, Dairy Bacteriology.
R. H. WILSON, Assistant in Soil Bacteriology.

BOTANY AND PLANT BREEDING—

HERBERT F. ROBERTS, in Charge.
PAUL W. GRAFF, Assistant in Plant Pathology.
ANNA MONROE, Assistant in Plant Breeding.
D. H. ROSE, Assistant in Seed Control.

CHEMISTRY—

J. T. WILLARD, in Charge.
C. O. SWANSON, General Chemical Investigations.
J. W. CALVIN, Assistant in Animal Nutrition.
R. C. THOMPSON, Assistant in Animal Nutrition.
R. C. WILEY, Inspector Feed and Fertilizer Control.
H. C. MCLEAN, Assistant in Soil Analysis.

DAIRY HUSBANDRY AND POULTRY—

JOHN C. KENDALL, in Charge.
A. B. NYSTROM, Assistant in Dairy Manufactures.
——— ———, Assistant in Dairy Production.
A. MIYAWAKI, Assistant in Dairying.
E. S. ESTEL, Assistant in Dairying.
A. G. PHILIPS, Poultry.
W. A. LAMB, Superintendent Poultry.
K. F. NYSTROM, Dairy Herdsman.

* After May 31, 1910, A. M. TenEyck becomes superintendent Fort Hays Branch Station.

ENTOMOLOGY AND ZOOLOGY—
THOMAS J HEADLEE, in Charge.
GEO. A. DEAN, Assistant in Insect Control.
J. B. PARKER, Assistant in Staple Crop Insect Investigations.
H. P. EVANS, Assistant in Fruit Insect Investigations.
T. H SCHEFFER, Assistant in Zoölogical Investigations.

FORESTRY—
C. A. SCOTT, in Charge.
R. E. EASTMAN, Assistant in Forestry.
H. W. BAKER (Dodge City Forestry Station), Assistant in Forestry.
F. J. TURNER, Foreman Ogallah Forestry Station.

HORTICULTURE—
ALBERT DICKENS, in Charge.
J. C. CUNNINGHAM, Assistant in Horticulture.

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

VETERINARY SCIENCE—
F. S. SCHOENLEBER, in Charge.
T. P. HASLAM, Assistant in Pathology.
F. M, HAYES, Assistant in Hog Cholera Serum Manufacture.
E. F. KUBIN, Assistant in Hog Cholera Serum Manufacture.

Fort Hays Branch Station.

A. M. TENEYCK, Superintendent.*
GEO. K. HELDER, Assistant Superintendent.
J. A. MILHAM, Assistant in Animal Husbandry.
C. C. CUNNINGHAM, Assistant in Agronomy.
CHRISTIAN JENSEN, Assistant in Horticulture and Forestry.
A. L. HALLSTED, Assistant in Dry Farming.

Garden City Branch Station.

HIRAM R. REED,† Assistant in Dry Farming.

* From June 1, 1910.

† In the service of the United States Department of Agriculture.

Engineering Experiment Station.

Officers of the Station.

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

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

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

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

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

CIVIL ENGINEERING—
L. E. CONRAD, in Charge.
D. O. STONE, Assistant.

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

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

MACHINE DESIGN—
M. R. BOWERMAN, Assistant.

PHYSICS—
J. O. HAMILTON, in Charge.
K. H. LOGAN, Assistant.

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

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

The College Cadet Corps.

The following is a roster of the commissioned and noncommissioned officers of the Corps of Cadets of the Kansas State Agricultural College for the year 1909-'10:

COMMANDANT OF CADETS,

FIRST LIEUTENANT CHARLES HENRY BOICE, Seventh U. S. Cavalry, Professor of Military Science and Tactics.

Assistant to the Commandant,

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

Field and Staff.

GUY C. REXROAD, Cadet Lieutenant Colonel.
C. E. CASSEL, Cadet Major First Battalion.
J. G. LILL, Cadet Major Second Battalion.
F. O'CONNER, Cadet Captain and Regimental Adjutant.
J. E. JENKINS, Cadet Captain and Regimental Quartermaster.
H. W. MCFADDEN, Cadet First Lieutenant and Adjutant First Battalion.
C. G. FRY, Cadet First Lieutenant and Adjutant Second Battalion.
W. D. MOORE, Cadet Regimental Sergeant Major.
R. I. DAVIS, Cadet Regimental Color Sergeant.
F. SIDORFSKY, Cadet Quartermaster Sergeant.
J. E. WILLIS, Chief Trumpeter.
W. A. HEPLER, Cadet Sergeant Major First Battalion.
SEWELL LOFINK, Cadet Sergeant Major Second Battalion.

RANK.	Company A.	Company B.
Captain	T. E. Nafziger	R. A. Branson.
First Lieutenant	Chester Turner	R. W. Getty.
Second Lieutenant	G. L. Campbell	Rae Anderson.
First Sergeant	Earl Springer	W. H. Grinter.
Sergeants	L. A. Tombaugh	L. E. Hutto.
	E. Pingree	C. W. Hill.
	W. R. Estes	M. D. Collins.
	A. D. Anderson	O. E. McNeal.
Corporals	P. G. Davis	F. Buzzard.
	L. C. Hubbell	D. Atkins.
	Will Roark	A. J. Ashell.
	C. E. Grube	J. L. Larner.
	C. O. Johnson	Arthur Young.
	G. E. Nelson	D. F. Mossman.

RANK.	Company C.	Company D.
Captain	F. E. Wilson	R. Schuyler.
First Lieutenant	W. W. Casteel	W. N. Kelly.
Second Lieutenant	O. C. Tucker	K. R. March.
First Sergeant	T. R. Bartlett	C. A. Leech.
Sergeants	M. L. Keithline	G. R. Fickle.
	E. W. Pierce	R. Kerr.
	W. T. Perry	A. R. Davidson.
	Q. Campbell	G. A. Fickle.
Corporals	R. A. Baldwin	R. E. Weisman.
	Earnest Keith	R. E. Karper
	E. T. Keith	J. T. Steele.
	N. L. Reicher	C. E. Lyness.
	L. O'Brien	E. A. Vaughn.
	W. A. Moss	

RANK.	Company E.	Company F.
Captain	Frank Weber	R. R. Hand.
First Lieutenant	T. G. Campbell	H. O'Brien.
Second Lieutenant	R. F. Cooper	O. M. Ransopher.
First Sergeant	D. A. Wise	J. C. Jones.
Sergeants	N. A. Gish	W. E. Stanley.
	Merton Cozine	A. F. Kiser.
	C. F. Boucher	G. H. Railsbach.
	C. H. Archibald	R. A. Moore.
Corporals	G. W. Pray	C. Arbuthnot.
	L. T. Perrell	J. H. Chesbro.
	R. R. Campbell	E. Willoughby.
	D. G. Tepfer	W. R. McCoy.
	C. H. Scholer	D. Mossman.
	J. M. Baker	D. Coburn.

College Band.

The following is a list of the College Band for the year 1909-'10:

BAND LEADER.

GEORGE A. WESTPHALINGER, Chief Musician, U. S. A. (retired).

Drum Major: F. W. FOWLER.

Principal Musician: W. H. SHANK.

Sergeants: H. BEGGS, D. M. PERRILL, F. E. DAVIS, L. L. HOWENSTINE.

Corporals: L. FLANDERS, G. W. HOUT, V. FLORRELL, M. S. COLLINS, H. W. GRIBBLE, C. A. DAVIS, L. B. BAROFSKY, E. J. WALTERS.

Clarinets:
T. E. Davis.
H. Beggs.
G. W. Hout.
E. J. Walters.
A. Adams.
O. M. Franklin.
P. E. Ketchersid.

Flutes:
E. W. Denman.
R. S. Hawkins.

Cornets:
C. A. Davis.
N. B. Needham.
R. Whitney.
G. H. Peterson.
R. L. Barnum.
C. C. Wolcott.
E. McDonald.
L. H. Gould.
J. G. Blunt.
C. P. Teague.

Saxophones:
B. O. Warren.

Altos:
F. H. Fate.
Geo. Barnard.
O. Parker.
J. W. Bolinger.
C. L. Rexroad.

Trombones:
M. S. Collins.
V. Florrell.
E. H. Smies.
L. J. Unruh.
O. F. McKittrick.
J. B. Miller.

Baritones:
L. B. Barofsky.
L. B. Wolcott.
A. Hall.
J. Slabach.
D. M. Perrill.

Basses:
F. H. Gill.
L. L. Howenstine.

Drums:
H. W. Gribble.
L. Flanders.
G. S. Gillespie.

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 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 purposes of the same. This measure was, however, vetoed by Governor Robinson.

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

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

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

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are quite 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 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 latest act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds is the very significant provision specifically 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 of agriculture and the mechanic arts."

The Development of the Kansas Agricultural College.

The president and faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the state and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin and mathematics as the chief fundamentals. Its transfer to the state, and its conversion into the State Agricultural College, involved at the time merely a change in name. The president and faculty, and the curriculum, remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years, and although this course was strengthened from time to time, yet the classical studies 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 six years' woman's course. 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. At all events, the institution became in fact what it had hitherto been in name only—an "agricultural" college. At this time the faculty consisted of the president, five professors, and six instructors of lesser rank, with a student body of 207. During this time the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

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

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

In 1909, the number of heads of departments and full professors was 27, while the entire board of instruction and employees numbered 145.

The student enrollment for this year was 2308. During the decade 1899-1909, additional buildings to the value of about $250,000 had been erected on the campus.

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

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

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

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

The present time, therefore, finds the College and its inseparable coadjutor, the Experiment Station, occupying the 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, history, civics, and such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with actual practical things, and is educated toward rather than away from an interest in industry and manual exertion. All history and experience demonstrate the necessity to the race of the habit of work, of respect for physical labor, and of a widespread capacity among men for using the brain through the hands. The general training which the College offers, therefore, aims 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, botany, bacteriology, entomology and mechanics, the student is brought to understand the relation of man to the world around him, and to utilize natural forces for the protection and improvement of his own life.

In the practical arts of agriculture, horticulture, engineering and home economics opportunity and inducement are offered every student to enter a productive occupation which will both insure his direct usefulness in

the world and at the same time offer him an attractive and profitable calling.

The College trains directly toward these productive occupations along a considerable number of specialized lines. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. He may follow mechanical, electrical or civil engineering, architecture or printing. For the young women, training in domestic science, domestic art, home furnishing, home decoration, etc., is offered.

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

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

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

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

The Experiment Stations.

The Agricultural Experiment Station.

THE Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, commonly known as the "Hatch act," and which 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 "in order 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 provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with $5000, and increasing each year by $2000 over the preceding year for five years, after which time the annual appropriation is 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 to provide men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture. At present, nine such investigations, called "projects," have been thus approved, and are being conducted under the Adams act.

In addition to these there are now in progress, under the Hatch act and the state fund, a total of fifty lines of investigation and experiment, covering all phases of agricultural investigation.

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

In 1908 the legislature of Kansas appropriated the sum of $15,000 a year for the next biennium, for the further support of the Experiment Station. The income of the Experiment Station for the year 1909-'10 is therefore derived as follows:

Hatch fund (federal)	$15,000
Adams fund (federal)	13,000
State appropriation	15,000
Total	$43,000

The work of the Experiment Station is published in the form of "bulletins," which record the results of investigations along agricultural lines. These bulletins are of three sorts: technical bulletins, which record the results of researches of a purely scientific character, provided for under the Adams act; farm bulletins, which present the data of the technical bulletins in a simplified form, suitable for the general reader, and include also all other bulletins in which a brief, condensed and popular presentation is made of data which call for immediate application, and cannot await publication in the regular bulletin series.

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

To date the publications of the Station number 167 bulletins, 183 press bulletins and 6 circulars.

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

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

PUBLIC WORK OF THE STATION.

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

One of the most important of these adjunct offices is that of state dairy commissioner, for which an appropriation of $6000 a year was made for the biennium 1909-'10. This official, appointed by the Board of Regents, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237) "to inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the state, at least once a year, or oftener if possible."

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

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

Another important state function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established "to suppress and eradicate San Jose scale and other dangerous insect pests and plant diseases throughout the state of Kansas."

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

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

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

For the expenses of the work of the commission $5000 was appropriated for the fiscal year ending June 30, 1909, and $2000 for each of the two following years.

Connected with the live-stock interests of the state is the State Live-stock Registry Board, concerning which it is provided (Laws of 1909, ch. 168):

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

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

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

Another provision for encouraging the improvement of live stock is embodied in an act of the legislature (Laws of 1909, ch. 46) "providing for experimental and demonstration work with live stock at the Kansas

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

Stock thus acquired can be sold by the Board of Regents, when in their judgment 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 forestry" at the Agricultural College is also provided for, in the following terms:

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

For carrying into effect the provisions of this act there was appropriated, for the year ending June 30, 1909, $1000; and for the fiscal years 1910 and 1911, $2000 each.

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

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

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

The latest important addition to the Experiment Station is the recently established Department of Milling Industry. The great economic importance of the wheat and milling interests of this state, and the difficult nature of the problems connected with the milling and baking quality of wheat, render it imperative that scientific researches on the subject be conducted. To this end the Board of Regents have appropriated the sum of $5000 for the establishment of a Department of Milling Industry in the Experiment Station, on condition that the milling and

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

The Board of Regents have proceeded further by the employment of a superintendent, under whom there is now being conducted a complete study of growing, handling and marketing methods, and their relation to the milling value of wheat; of systems of grading, and their effect upon the market value of grain; of insect enemies of wheat in the field and in storage, and of flour and its by-products. There will also be conducted a comprehensive study of the effects of climate and soil upon the chemical composition of wheat and upon its subsequent milling and baking quality.

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

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, 1889, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7200 acres to the state of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress, without avail, until the fifty-sixth Congress, when through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purposes of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President March 28, 1900. By act of the state legislature, approved February 7, 1901, the act of Congress donating this land and imposing the burden of 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 located on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, irrigation and 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 with limited rainfall, the origination of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry suited to this region. A systematic study of the value of trees as preventive 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 proven in actual test to be most productive in the western portion of the state.

This station is supported entirely by state funds and 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.

Garden City Co-operative 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, and located on the unirrigated upland.

This land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," and is being operated in conjunction with the United States Department of Agriculture for the purpose of determining the methods of culture, crop varieties and crop rotation best suited for the southwestern portion of the state, under dry-land farming conditions.

The Forestry Stations.

The two state Forestry Stations, at Ogallah and Dodge City, which have been the property of the state for twenty-one years and have been operated under the legal control of the Executive Council, were transferred in 1909 (Laws of 1909, ch. 49) to the care of the Agricultural College and Experiment Station. The distribution of forest trees is to be continued, to which is added experimental forestry and forestry demonstration work. These stations are operated under the direct management of the state forester and the general supervision of the director of the Experiment Station. For the maintenance of the two Forestry Stations the sum of $4400 each is appropriated for the present biennium.

Engineering Experiment Station.

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

For the past four years cement and concrete tests have been carried on, using Kansas-made cements principally, and such materials for the aggregate in the concrete as can be found in different localities in the state. In connection with this series of tests a study is being made of waterproofing and coloring cement building blocks.

There are now under way tests of Kansas coals. The coals are being tested by hand firing and by firing under three different types of mechanical stokers. These tests include mine run, slack, nut, screened, lump, and washed pea coals. The object sought is not only to determine the relative values of the different coals for steam generation, but more particularly to determine the best methods of firing the coals of each locality and the relative values of the different kinds of coal from any one

mine. So far the tests have been conducted using natural draft with one of the stokers. The Station has purchased an induced-draft equipment and economizer. This will be installed this coming summer (1910) and, by next fall, tests using mechanical draft will be made.

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

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

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

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

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

The first of a series of pipe-covering tests was completed last fall. These tests are for the purpose of determining relative values of the different pipe coverings for high- and low-pressure steam, both as compared with each other and as compared with bare pipe. These tests are made when the pipe is first covered, and later when the covering has been subjected to hard usage.

Other experiments that are now under way have to do with: (1) Lubricants and bearings. (2) Power required for driving machine tools. (3) Loss of power in transmission by shaft, bearings, chains and gears. (4) Relative adaptability, efficiency and cost of gasoline, kerosene and denatured alcohol for internal-combustion engines. (5) Cost of compressing air and the efficiency of compressed air for power purposes. (6) Endurance tests of paints. As applied to roofs these have been in progress for five years. They will be extended to include other classes of exposure to weather. The study is especially directed to the relation of the durability to the chemical nature of the pigments and the oils employed as indicated by analysis.

Among the projected experiments are: (1) Underground water flow in various parts of the state, and methods of developing same for irrigation. (2) An investigation of the possibilities of developing water power for small plants; to be used on farms and in isolated communities;

for driving machinery, either direct or by electric transmission, and for lighting. This will include the drawing up and publishing of plans for these plants. (3) Continuation of the investigations of the strength of structural details in timber, metal, and reënforced concrete. (4) Studies of the tractive effect or efficiency of draft of horses. (5) Tests on small gasoline-electric units. (6) Methods of cooling condensed water. (7) Tests of Kansas brick and other road material.

As fast as a series of tests is completed, the results will be published in bulletin form and may be had on application to the director. Besides the results of investigations, compilations of engineering data and important principles will be made from various sources and will be published in bulletins so as to aid engineers, mechanics and others in their line of work.

Grounds, Buildings and Equipment.

THE College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized and well-shaded avenues lead to all parts of the grounds. Cement walks connect all of the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 748 acres of land, valued at $185,000, and rents 50 acres in addition. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings, and needed for drives and ornamental planting, is devoted to orchards, forest and fruit nurseries, vineyards and gardens. A number of fields in the northern and western portion of the campus are used for general experimental work by various departments.

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

AGRICULTURAL HALL. Erected, 1900; cost, $25,000; dimensions, 90x95 feet; two stories and basement. Occupies the original site of the president's house, destroyed by lightning in 1896. Contains the laboratories, classrooms and offices of the department of agronomy (east half) and the department of animal husbandry (west half). Value of equipment and apparatus: Agronomy, $18,978.06; animal husbandry, $29,136.75.

ANDERSON (MAIN) HALL. Erected, 1879; cost, $79,000; dimensions, 152x250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the College post office, the offices of the department of agricultural extension, and the offices and classrooms of the departments of mathematics, English, architecture and drawing, and economics and public speaking. Value of equipment and apparatus, $16,833.94.

ARMORY. Erected, 1870; cost, $11,250; dimensions, 46x95 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, has been used by the department of military science for many years as an armory. The second floor is now used for band practice and for various class purposes. Value of equipment, department of military science, $172.10.

AUDITORIUM. Erected, 1904; cost, $40,000; dimensions, 113x125 feet. Seating capacity, 3000. Contains also the offices and music rooms of the department of music. Value of equipment, department of music, $4151.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, $70,000; dimensions, 92x175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, 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 and apparatus: Domestic science, $7542.43; domestic art, $2028.73.

DAIRY BARN. Erected, 1900; cost, $4000; dimensions, 40x175 feet. Fitted with modern swinging stalls for eighty head of cows and arranged in two rows with driveway between.

DAIRY HALL. Erected, 1904; cost, $15,000; dimensions, 72x103 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 and apparatus, $13,921.06.

FAIRCHILD (LIBRARY) HALL. Erected, 1894; cost, $67,750; dimensions, 100x140 feet; two stories, basement and attic. On the first floor are the College library and reading rooms, the general museum, and the rooms of the department of philosophy. On the second floor are the offices, classrooms and laboratories of the departments of zoölogy, entomology and geology, German and history. The museums of natural history are placed here also. On the basement floor are the assembly rooms of several of the literary societies. Value of equipment and apparatus, $93,428.26.

FARM BARN. Erected, 1878-1886; cost, $10,831; a double, connected stone structure, dimensions, 50x75 feet and 48x96 feet, with an addition of sheds and experiment pens 40x50 feet. The south wing, 48x96 feet, is the stock-judging room, with a seating capacity of 350. A basement underlies the entire building.

GRANARY. Erected, 1906; cost, $5000; dimensions, 40x50 feet; two stories, basement and attic. Contains an office, threshing floor, drying room, and grain bins for the many varieties of corn, wheat, oats and various small grains.

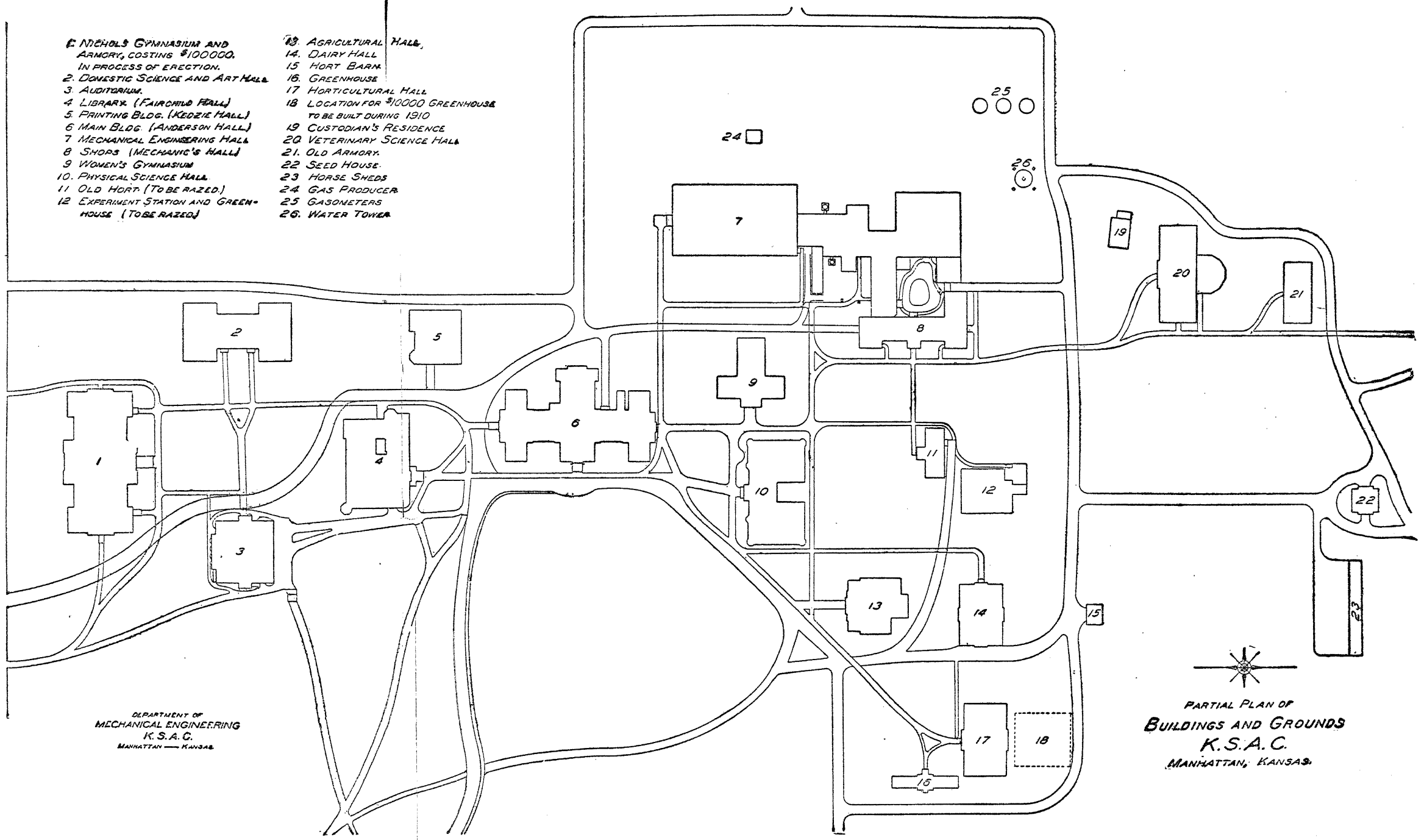
HORTICULTURAL BARN. Erected, 1880; cost, $1000. Contains storeroom, granary, and stable room for several horses.

HORTICULTURE HALL. Erected, 1907; cost, $50,000; dimensions, 72x116 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 for horticulture and forestry, $22,000; for botany, $19,000.

HORTICULTURAL LABORATORY. Erected, 1888; cost, $5000; dimensions, 30x30 feet; one story and basement. Originally built as an Experiment Station building. Used for many years by the department of horticulture and entomology, then by the former alone when made a separate department. Contains an office, laboratory and work room. Five propagating houses are connected with it.

KEDZIE HALL. Erected, 1897; cost, $16,000; dimensions, 70x84 feet; two stories and basement. The first floor and basement are occupied by

1. Nichols Gymnasium and Armory, costing $100000. In process of erection.
2. Donestic Science and Art Hall
3. Auditorium.
4. Library (Fairchild Hall)
5. Printing Bldg. (Kedzie Hall)
6. Main Bldg. (Anderson Hall)
7. Mechanical Engineering Hall
8. Shops (Mechanic's Hall)
9. Women's Gymnasium
10. Physical Science Hall
11. Old Hort. (To be razed.)
12. Experiment Station and Greenhouse (To be razed)
13. Agricultural Hall
14. Dairy Hall
15. Hort Barn
16. Greenhouse
17. Horticultural Hall
18. Location for $10000 Greenhouse to be built during 1910
19. Custodian's Residence
20. Veterinary Science Hall
21. Old Armory.
22. Seed House.
23. Horse Sheds
24. Gas Producer
25. Gasometers
26. Water Tower



Department of
Mechanical Engineering
K. S. A. C.
Manhattan — Kansas

Partial Plan of
Buildings and Grounds
K. S. A. C.
Manhattan, Kansas.

the department of printing; the second floor is divided into general classrooms. Originally constructed as a building for domestic science. Used for present purposes since 1908. Value of equipment and apparatus, $6376.88.

MECHANICAL ENGINEERING HALL consists 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 been made at intervals until the present group is the result. The various buildings are as follows: A woodworking shop; dimensions, 40x103 feet; two stories. On the upper floor are the offices and drafting rooms of the departments of mechanical, civil, and steam and gas engineering. The lower floor contains benches for 220 students, completely equipped with woodworking machinery and tools. Adjoining is the shop for iron work (40x50 feet), supplied with benches and the usual bench tools, and amply equipped with machine tools for iron work; the blacksmith shop (40x50 feet) contains 40 forges of modern type, connected with a power blast and ventilator. Adjoining is a lecture hall, with demonstration forge and equipment. An iron foundry (40x50 feet), a brass foundry (16x30 feet), a pipe-fitting and work room (19x40 feet), a power room (35x40 feet), and a boiler room (40x75 feet), complete the series of shops. Connected with these is the new mechanical engineering laboratory just completed at a cost of $80,000. Cost of entire group of buildings, $113,125. Value of equipment and apparatus, $126,435.90.

NICHOLS GYMNASIUM. This building is now under construction, at a cost of $100,000. It will be the largest on the campus and will provide quarters for the department of military science as well as for the physical training of all students. Rooms for the literary societies are also to be set apart in it.

PHYSICAL SCIENCE HALL. Erected, 1902; cost, $70,000; dimensions 96x166 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 and apparatus: Chemistry, $19,444.05; electrical engineering, $15,581.52; physics, $6434.25.

VETERINARY HALL. Erected, 1908; cost, $70,000; dimensions, 133x155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms and offices of the departments of veterinary medicine and of bacteriology. Value of equipment and apparatus: Veterinary medicine, $11,342.65; bacteriology, $2240.55.

WOMEN'S GYMNASIUM. Erected, 1877; cost, $8000; dimensions, 35x110 and 46x75 feet, in the form of a cross. Originally erected as a chemical laboratory; occupied by the department of chemistry until 1900, when a fire destroyed the interior. The building was reconstructed in 1902, at a cost of $5000, for the purpose for which it is now occupied. It contains a drill room, 46x75 feet; dressing room, toilet, and ten bathrooms, cloakroom and classroom. Value of gymnasium equipment, $777.45.

THE COLLEGE LIBRARY.

The library is located in Fairchild Hall and contains 35,064 bound volumes and approximately 18,000 pamphlets. The bound volumes are classified according to the Dewey decimal system and shelved in the stack

room, to which all readers have access, a privilege that is perhaps granted in no other library of its size in the country. The Agricultural Experiment Station library is also located in Fairchild Hall and contains 2600 bound volumes.

The chief purpose of the library is to be useful in supplementing classroom instruction, and the books have been selected with special reference to the needs of the various departments of the College. Naturally is has developed more especially in the lines of agriculture, science and engineering, although it contains excellent collections on other subjects. As a depository it receives the documents and publications of the United States government.

All books are indexed in a card catalogue, which shows the author, title and subject, also the location. Subject to certain restrictions, officers of the College and students may draw out books for home use, and the library is open freely to the public for reference.

Reading Room.—The reading room contains the general reference books, such as encyclopedias, dictionaries, etc. The leading literary, scientific and agricultural journals are subscribed for and the principal Kansas daily and weekly papers, besides a large number of periodicals, dissertations and scientific contributions of the leading educational institutions of the country, are received.

Relation of Library to Departments.—All books and periodicals are under the management of the library department, but every possible privilege is granted to professors and students. The several departments of the College are allowed departmental libraries and, in addition to this, space is given in the annex to the reading room for special reference books.

The library is open daily, except on legal holidays, from 7:30 A. M. to 5:30 P. M., and during this period the librarian and the assistants are in constant attendance to assist those who use the books.

Requirements for Admission.

PERSONS, to be admitted to any department of the College, must be fourteen years of age or over. Eight units are required for admission to the freshman class, or two full years of high-school work, as follows:

ENGLISH. Two units. Required of all students.

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

PHYSICAL SCIENCE. Physics, one unit; chemistry, one unit; physical geography, one unit or one-half unit. A maximum of two units may be presented from subjects in this group.

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

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

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

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

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

A unit is defined to be the work done in an accredited high school or academy in five recitation periods per week for one school year.

DEFICIENCIES.

For the benefit of those students whose facilities for obtaining a high-school education are limited, the College maintains a subfreshman course, based upon the work of the eighth grade. Students, therefore, who are unable to meet the foregoing entrance requirements will have the opportunity of enrolling in this department and making up the subjects in which they are deficient. For details of the subfreshman course, see page 59.

All such entrance deficiencies, however, must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all deficiencies of the preceding year have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the spring term of the senior year. No student is considered a candidate for graduation the next June who is deficient more than three full subjects in addition to his regular assignment at the beginning of the

fall term. No student having failed in any subject, or whose grade in any subject falls below "G" in any term, is allowed to carry extra work during the succeeding term.

ADVANCED CREDIT.

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

METHODS OF ADMISSION.

Examinations for admission are held at the College on Wednesday, September 21, 1910; Monday, January 2, 1911, for the winter term, and Monday, March 27, 1911, for the spring term.

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

SPECIAL STUDENTS.

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

Special students will be assigned by the dean of the division in which occur the major subjects to be pursued.

Requirements for Graduation.

UNDERGRADUATE DEGREES.

THE degree of bachelor of science (B. S.) is conferred upon those completing the four-year courses in agronomy, horticulture, animal husbandry, dairy husbandry, mechanical engineering, electrical engineering, civil engineering, architecture, printing, home economics and 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, and 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, acceptable reports of their work and progress.

CERTIFICATE.

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

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

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

A certificate is granted to those teachers completing the two-year summer courses of ten weeks each in home economics.

ADVANCED DEGREES.

The degree of master of science will be conferred upon graduates of the College who have received eighteen credits in an approved graduate course, each credit being equivalent to a full unit study pursued for one term.

Graduate courses leading to the degree of master of science will be approved which are in harmony with any one of the regular undergraduate courses, and which include at least six credits in the biological or the physical sciences or mathematics, at least six credits in technical or industrial branches, and the completion of a satisfactory thesis.

The principal course shall be designated as the major study, and another secondary course as the minor study. As nearly as may be, one-third of the time is to be given to the minor and two-thirds to the major study, including in the latter such scientific, mathematical or technical branches as contribute directly to it. The minor study must fill a logical

* Under certain conditions and restrictions, students of mature years who cannot 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 agriculture, as may be especially adapted to their needs; but in no case can courses based on prerequisites not yet completed be undertaken.

place in the scheme, so that the work as a whole may possess unity. Three minor credits may be presented in a modern language.

Applications for entrance upon graduate study and for changes in major or minor subjects must be presented to the council of deans within the first week of the College term.

Applications for graduate study shall be passed upon by the council of deans, and if approved the candidate shall obtain an assignment at the beginning of each term for the subjects intended to be pursued during the ensuing term. At the close of each term examinations shall be given in all subjects, as for undergraduates.

Students *in absentia* will be required to send to the professors in charge of the departments of their major and minor subjects full and complete reports, at the middle and end of each term, of the work accomplished within that period. Failure to comply with this requirement will cause the student to be dropped from the roll of graduate students, to be reinstated only upon approval of the Faculty. At the end of each term the date, place and manner of the examination of nonresident students shall be determined by the instructors concerned.

The subject of the thesis must be presented to the council of deans for approval by the 1st day of January preceding the commencement at which the degree is desired.

Upon the completion of the required work, and by the 15th day of May of the year in which the degree is desired, each candidate shall present to the council of deans, typewritten and in duplicate, a satisfactory thesis involving original work along the lines of his major subject. Thereupon a special examining committee of three shall be appointed from the Faculty, of which one member shall represent the major subject and another the minor, who shall examine the candidate orally on the subject matter of his thesis and report the result of such examination to the Faculty. Upon receipt of the report of this committee the Faculty will take action concerning the recommendation of the candidate for the degree.

The degree of master of science may also be conferred upon the graduates of other colleges, provided the applicant shall first satisfy the Faculty of his proficiency in the studies distinctive of this institution, and subject to the following conditions:

The applicant for the master's degree must be a graduate of at least three years' standing, and must have pursued a course of graduate study for two years, at least one of which shall have been in residence at this institution.

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 the formation of high standards of personal honor and ideals of conduct, are given by the various Christian organizations of the College and 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 eleven literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. The College branch of the American Institute of Electrical Engineers, the Agricultural Association and the Architectural Club admit to their membership young men interested in the fields indicated by their names. Of the strictly literary and debating clubs, the Alpha Beta and Franklin are open to both sexes; the Ionian and Eurodelphian are women's societies, and the Webster, Hamilton and Athenian admit only young men to membership.

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

A students' assembly is held in the auditorium, under the direction of the Faculty, for fifteen minutes before the beginning of the College classes in the forenoon, at which a brief program is rendered, consisting of devotional exercises, music, and short addresses from the president, members of the Faculty and others.

EXPENSES.

Tuition is free. An incidental fee of $3 per term is charged all students resident in Kansas. For nonresidents of the state a matriculation fee of $10 upon entrance, and an incidental fee of $10 per term, are

charged. Receipts for these fees must be presented before enrollment in the College classes. Rooms and board are not furnished by the College. Table board in private families and at boarding houses varies from $3 to $4 per week, the average being about $3.25. Room rent ranges from $6 to $12 per room, the highest priced rooms including light, heat and bath.

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

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

Young men of the freshman and sophomore years will be required to have military uniforms, costing about $15, and the young women of the freshman year must have a physical-training suit, costing about $4. Ordinary expenditures, aside from clothing and traveling expenses, range from $175 to $200 per year.

SELF-SUPPORT.

The courses of instruction are based upon the supposition that the student is here for study, and 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 studies. Students with 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 if 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 necessary to make acquaintances and to learn where suitable work may be obtained.

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

Students are assisted to obtain employment by means of the employ-

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

BUSINESS DIRECTIONS.

General information concerning the College may be obtained from the president or the secretary.

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

Applications for farmers' institutes should be made as early in the season as possible to the department of agricultural extension and farmers' institutes. Applications for the publications of the Agricultural Experiment Station should be addressed to the director of the Station.

Donations to the library should be addressed to the librarian, and donations to the museum to the curator of the museum.

COLLEGE PUBLICATIONS.

The official organ of the College is *The Industrialist*, published weekly, and edited by the president and Faculty. Its pages are filled with articles of interest, information concerning the work of the College and the investigations of the Experiment Station, local and alumni news, etc. *The Industrialist* will be sent free to any citizen of the state. Contributions to its columns, and requests to be placed upon the mailing list, should be addressed to the editor of *The Industrialist*.

The department of Agricultural College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members. Two journals are managed, edited and published by student corporations: the *Students' Herald*, a semiweekly local paper in the interest of the students at large, and the *Alumnus*, a monthly publication in the special interest of the alumni.

EXAMINATIONS.

Examinations are held twice each term as announced in the calendar. Conditional examinations are held on the first Monday of each term. Students who have received the grade of "conditioned" may be entitled to take such special conditional examinations, provided the instructor be notified of the student's desire to take such examination, not later than the Thursday evening preceding the Monday set for the examinations. No other arrangements with respect to time or place may be made, except by a two-thirds vote of the Faculty. If a conditioned subject is not made up at the first opportunity, the grade is changed from "conditioned" to "failed." No student who has failed in any subject is entitled to take a conditional examination in that subject, but must make up the failure in class. A student receiving a grade of "conditioned" may, in the judgment of his assigner, be assigned to a dependent related subject. Should he fail to make up the condition within the specified time he is required to drop the dependent subject, and is not entitled to receive a grade for the work already done in that subject. In industrial subjects the instructor will report as "deficient" any student whose work, while satisfactory in quality, is lacking in the quantity required. The condition in such cases is removed when the student completes the required quantity of work in a satisfactory manner. With the consent of the instructor, a deficiency may be made up outside of

class, but if it be not made up by the end of the second week of the term immediately following the term in which the deficiency occurred the student's grade is changed from "conditioned" to "failed," and he is required to make up the deficiency by repeating the work in a regular class.

Permission for examination in subjects not taken in class must be obtained from the dean of the division in which the student is assigned, and on recommendation of the professor in charge, at least two months before the examination is held. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES.

Student grades are based upon the completed work of a term, and are designated by letters having the following significance and order of rank:

E, signifying "Excellent."
G, signifying "Good."
P, signifying "Passed."
C, signifying "Conditioned."
F, signifying "Failed."

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

Conditional examinations are reported simply as "P" (passed) or "F" (failed), and conditional examinations not taken, or taken and not passed, are recorded "F" (failed).

Only grades "C" (conditioned) and "F" (failed) are reported at the mid-term.

HONORS.

A system of honors is established as follows:

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

To not exceeding five per cent of the senior class having the highest standing for the College year, "senior honors" are awarded at commencement. In the case of any student achieving senior honors, he shall be entitled to receive *one* credit toward the master's degree; and in case the same student shall have achieved both junior and senior honors, he shall be entitled to receive *three* credits toward the master's degree.

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

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

Provided, that when grade "C" (conditioned) shall be subsequently changed by the conditional examination to grade "P" (passed) or grade "F" (failed) the points shall be changed accordingly.

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

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

The Subfreshman Course.

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

Subfreshman Course.

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

FIRST YEAR.

FALL TERM.	WINTER TERM.	SPRING TERM.
Advanced Grammar 4 (4-0)	English Readings 4 (4-0)	Elementary Composition 4 (4-0)
Algebra I 4 (4-0)	Algebra II 4 (4-0)	Algebra III 4 (4-0)
Ancient History 3 (3-0)	Medieval History 3 (3-0)	Modern History I 3 (3-0)
Elementary Botany I 3 (2-2)	Elementary Botany II 3 (2-2)	Elementary Botany III 3 (2-2)
Sewing I* 4 (1-6)	Sewing II* 4 (1-6)	Sewing III* 4 (1-6)
Woodwork I† 2 (0-4)	Woodwork II† 2 (0-4)	Blacksmithing I† 2 (0-4)
Stock Judging I† 2 (0-4)	Grain Judging I† 2 (0-4)	Stock Judging II (Dairy)† 2 (0-4)

SECOND YEAR.

English Classics 4 (4-0)	Paragraph Writing 4 (4-0)	Elementary Rhetoric 4 (4-0)
Plane Geometry I 4 (4-0)	Plane Geometry II 4 (4-0)	Solid Geometry 4 (4-0)
Modern History II 3 (3-0)	The American Nation 3 (3-0)	Bookkeeping† 3 (3-0)
Physics I 3 (3-0)	Physics II 3 (2-2)	Physics III 3 (2-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Cookery I* 2 (0-4)	Cookery II* 3 (0-6)	Cookery III* 4 (2-4)
Fruit Judging† 2 (0-4)	Blacksmithing II† 2 (0-4)	Grain Judging II† 2 (0-4)
	Poultry Judging† 1 (0-2)	

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

INDUSTRIAL SUBJECTS.

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

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* For young women. † For young men.

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

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

Division of Agriculture.

THE teaching of a rational, practical system of agriculture is fundamental to industrial development in a state whose whole resource comes from agricultural pursuits. Kansas depends upon her farmers; they are the creators of her wealth. The state has permanent prosperity in direct proportion to the producing capacity of her lands. The unit of production is the acre. The successful farmer is the one who can produce the maximum quantity of the highest quality of wheat, or corn, or beef, or pork, or other product, per acre, at a minimum cost.

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

A man may get many of these things through practical experience and become the exponent of modern farming, but the cost is usually enormous. The Agricultural College furnishes a systematic and thorough means of training the young man for the farm.

EQUIPMENT.

The facilities for such training are unexcelled. The College owns 740 acres of land, every acre of which is used for instruction and demonstration to the various classes in agriculture. The campus, which comprises 130 acres, affords one of the best examples in the state of ornamental tree planting and forestry. Students working daily amid such surroundings can scarcely fail to get an appreciation and love for the beautiful. To the work in agronomy 320 acres are devoted. This tract of land was purchased with an appropriation made by the legislature of 1909. For horticulture and forestry work 80 acres are used, for dairy, about 70 acres, and for animal husbandry work 140 acres. The herds and flocks contain all the important breeds of dairy and beef cattle, hogs, horses and sheep, among which are found the world's champion steers of the last international show at Chicago, and many animals that have won championships at local and state fairs during the past five years. With this class of stock available for judging work, the student is supplied with the best the world affords. He becomes familiar with the best types by actually handling the stock.

The College has one of the finest equipped veterinary schools in the West. It is rated in class "A" by the United States Department of Agriculture, which places it as one among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their place in society

and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. They must be more than veterinary technicians; they must have a broad groundwork in cultural and ethical training which will win them the confidence and respect of their community. Success is measured in something more than dollars and cents. The man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in all its courses in agriculture seeks to emphasize the value of the man as a man as much as his value as a specialist in agriculture.

COURSES OF STUDY.

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

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

DEGREES AND CERTIFICATES.

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

The degree of bachelor of agriculture may be conferred upon students who have completed the freshman and sophomore work in the four-year course in agriculture and who have been conspicuously successful in farming for a period of five years, under the direct supervision of the Faculty of the College, and have made acceptable reports of their work and progress to the Faculty, through the dean.

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

The four-year courses, with the exception of the course in veterinary medicine, are designed to meet the needs primarily of the student who expects to return to the farm. However, the student who completes any of the courses offered will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such posi-

tions offer attractive opportunities for men who by nature and training are adapted to such work. The United States Department of Agriculture, the state schools of agriculture, the state departments of agriculture, high schools, private schools of secondary and college rank, and a great variety of commercial interests, are demanding as never before men trained in agriculture.

The young man who expects to make farming his life work can be started out with no better asset than that of a thorough training in practical and scientific agriculture such as is afforded by any one of the four-year courses. The American farmer needs more of the skill that comes through the training of the hand in order that he may do the work of farming better; 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 it is plowed with utter disregard to the moisture conditions which prevail, the result may be failure. To understand the conditions which should determine when and how to plow is the work of the trained mind—the other is the work of the trained hand. The farmer and the teacher in farming must possess both kinds of training, and the courses of study have been revised with this in view, and so arranged that *the student begins his practical training in agriculture from the first day he enters College and continues it throughout the course.*

SUBFRESHMAN WORK.

The student who enters College through the two years of subfreshman work which fills the gap between the common school and the freshman year of College will get, in addition to his academic work (see page 59), the first year, two terms of stock judging, one term of grain judging, two terms of woodwork, one term of blacksmithing; and in the second year, one term of fruit judging, one term of grain judging, one-half term of poultry judging, one term of blacksmithing, and two and one-half terms of drawing.

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

COLLEGE WORK.

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

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much of agriculture to be taught that it

becomes necessary for the student to choose in which of the general lines—agronomy, animal husbandry, dairy husbandry, or horticulture—he will find that which best suits his needs or his liking, and the time is spent in fully developing one subject rather than in trying to gain a partial knowledge of several.

THE COURSE IN AGRONOMY.

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

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

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

THE COURSE IN HORTICULTURE.

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

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

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

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

THE COURSE IN ANIMAL HUSBANDRY.

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

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

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

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

THE COURSE IN DAIRY HUSBANDRY.

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

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

The course in dairy husbandry offered is planned primarily for the man who is operating a dairy farm, or one who expects to make dairying a considerable part of his farm work. The fundamental subjects of breeding and feeding, and the study of the care and sanitation and diseases of animals are given the same prominence as they are in the course in animal husbandry. Special emphasis is given to dairy bacteriology and dairy chemistry, for the reason that these subjects are fundamental to the production of pure dairy products. The ultimate product from cattle or hogs is meat, while the ultimate product from the dairy herd is milk, or some of its various manufactured forms, and the dairyman must necessarily know much about the handling of milk and its products in order to market successfully the produce of his herd.

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

Course in Agronomy.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Live Stock I 3 (1-4)	Poultry I 2 (1-2)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (2-4)	Blacksmithing III Ag. 3 (0-6)
Methods of Study 1 (1-0)		

SOPHOMORE.

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

JUNIOR.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	Physics XI 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	Forestry I 4 (3-2)	Irrigation and Drainage 4 (2-4)
Plant Pathology I 4 (2-4)	Civics 4 (4-0)	Farm Mechanics III 4 (2-4)
Elective 2 (-)	Elective 2 (-)	Elective 2 (-)

SENIOR.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	American History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Exptl. Plant Breeding 4 (4-0)
Farm Crops IV 4 (1-6)	Grain Products 4 (3-2), *or*	Farm Crops V 4 (1-6), *or*
Soils III 4 (1-6)	Soils IV 4 (0-8)	Soils V 4 (2-4)
Elective 2 (-)	Elective 6 (-)	Seed Testing 2 (0-4)
		Elective 4 (-)

Course in Agronomy,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Woodwork I 2 (0-4)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry A 2 (2-0)
Methods of Study 1 (1-0)	Physics I 4 (3-2)	Physics II 4 (3-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Live Stock I & II 3 (1-4)	Farm Crops I & II 3 (1-4)	Surveying 1 (0-2)

SOPHOMORE, 1911-'12.

Rhetoric I 4 (4-0)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 4 (2-4)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 2 (0-4)
Dairying I 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III (Dairy) 2 (0-4)	Blacksmithing I 2 (0-4)	Live Stock IV 3 (1-4)

JUNIOR, 1912-'13.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	English Literature 4 (4-0)
Farm Mechanics I & II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	College Rhetoric 4 (4-0)	Irrigation and Drainage 4 (2-4)
Plant Pathology I 4 (2-4)	Civics 4 (4-0)	Farm Mechanics III 4 (2-4)
Elective 2 (-)	Elective 2 (-)	Elective 2 (-)

SENIOR, 1913-'14.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	American History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Exptl. Plant Breeding 4 (4-0)
Farm Crops IV 4 (1-6)	Grain Products 4 (3-2), *or*	Farm Crops V 4 (1-6), *or*
Soils III 4 (1-6)	Soils IV 4 (0-8)	Soils V 4 (2-4)
Elective 2 (-)	Forestry I 4 (3-2)	Physics XI 4 (4-0)
	Elective 2 (-)	Elective 2 (-)

Course in Horticulture.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Live Stock I 3 (1-4)	Poultry I 2 (1-2)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (2-4)	Blacksmithing III Ag. 3 (0-6)
Methods of Study 1 (1-0)		

SOPHOMORE.

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

JUNIOR.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	Physics XI 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	Forestry I 4 (3-2)	Irrigation and Drainage 4 (2-4)
Plant Pathology I 4 (2-4)	Civics 4 (4-0)	Small Fruits 2 (2-0)
Pomology I 2 (0-4)	Elective 2 (-)	Forestry II 2 (2-0)
		Elective 2 (-)

SENIOR.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	American History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Exptl. Plant Breeding 4 (4-0)
Soils III 4 (1-6)	Entomology IV (Economic) 2 (2-0)	Market Gardening 3 (2-2)
Pomology II 4 (3-2)	Spraying 1 (0-2)	Landscape Gardening II 3 (2-2)
Elective 2 (-)	Orcharding 3 (3-0)	Elective 4 (-)
	Elective 4 (-)	

Course in Horticulture,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Woodwork I 2 (0-4)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry A 2 (2-0)
Methods of Study 1 (1-0)	Physics I 4 (3-2)	Physics II 4 (3-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Live Stock I & II 3 (1-4)	Farm Crops I & II 3 (1-4)	Surveying 1 (0-2)

SOPHOMORE, 1911-'12.

Rhetoric I 4 (4-0)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 4 (2-4)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 2 (0-4)
Dairying 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III (Dairy) 2 (0-4)	Blacksmithing I 2 (0-4)	Live Stock IV 3 (1-4)

JUNIOR, 1912-'13.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	English Literature 4 (4-0)
Farm Mechanics I & II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	College Rhetoric 4 (4-0)	Irrigation and Drainage 4 (2-4)
Plant Pathology I 4 (2-4)	Forestry I 4 (3-2)	Small Fruits 2 (2-0)
Pomology I 2 (0-4)	Elective 2 (-)	Forestry II 2 (2-0)
		Elective 2 (-)

SENIOR, 1913-'14.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	American History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Exptl. Plant Breeding 4 (4-0)
Soils III 4 (1-6)	Entomology IV (Economic) 2 (2-0)	Market Gardening 3 (2-2)
Pomology II 4 (3-2)	Spraying 1 (0-2)	Landscape Gardening II 3 (2-2)
Elective 2 (-)	Orcharding 3 (3-0)	Physics XI 4 (4-0)
	Civics 4 (4-0)	

Course in Animal Husbandry.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Live Stock I 3 (1-4)	Poultry I 2 (1-2)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (2-4)	Blacksmithing III Ag. 3 (0-6)
Methods of Study 1 (1-0)		

SOPHOMORE.

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

JUNIOR.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	Physics XI 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	Forestry I 4 (3-2)	Civics 4 (4-0)
General Anatomy I 4 (1-6)	General Anatomy II 4 (2-4)	Animal Physiology 4 (3-2)
Pedigrees 2 (0-4)	History of Breeds 2 (2-0)	Advanced Judging I 2 (0-4)

SENIOR.

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

Course in Animal Husbandry,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Woodwork I 2 (0-4)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry A 2 (2-0)
Methods of Study 1 (1-0)	Physics I 4 (3-2)	Physics II 4 (3-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Live Stock I & II 3 (1-4)	Farm Crops I & II 3 (1-4)	Surveying 1 (0-2)

SOPHOMORE, 1911-'12.

Rhetoric I 4 (4-0)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 4 (2-4)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 2 (0-4)
Dairying I 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III (Dairy) 2 (0-4)	Blacksmithing I 2 (0-4)	Live Stock IV 3 (1-4)

JUNIOR, 1912-'13.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	English Literature 4 (4-0)
Farm Mechanics I & II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	College Rhetoric 4 (4-0)	Civics 4 (4-0)
General Anatomy I 4 (1-6)	General Anatomy II 4 (2-4)	Animal Physiology 4 (2-3)
Pedigrees 2 (0-4)	History of Breeds 2 (2-0)	Advanced Judging I 2 (0-4)

SENIOR, 1913-'14.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	Diseases of Farm Animals and Obstetrics, 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Animal Breeding 4 (4-0)
Advanced Judging II 2 (0-4)	Evolution of Dom. Animals 1 (1-0)	Horse Production 2 (2-0)
Zoölogy IX (Embryology) 4 (3-2)	Mutton & Pork Production 3 (3-0)	Beef Production 2 (2-0)
American History 4 (4-0)	Meats 2 (1-2)	Live Stock Management 2 (2-0)
	Forestry I 4 (3-2)	Physics XI 4 (4-0)

Course in Dairy Husbandry.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Live Stock I 3 (1-4)	Poultry I 2 (1-2)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (2-4)	Blacksmithing III Ag. 3 (0-6)
Methods of Study 1 (1-0)		

SOPHOMORE.

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

JUNIOR.

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

SENIOR.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	Diseases of Farm Animals and Obstetrics, 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Animal Breeding 4 (4-0)
Dairy Bldgs. and Equipment 2 (0-4)	Butter Mkg. and Cr'y Mgt. 3 (1-4)	Pure-bred Dairy Herd 2 (1-2)
Zoölogy IX (Embryology) 4 (3-2)	Milk Prod. and Herd Mgt. 3 (1-4)	Cheese & Ice Cream Making 4 (2-4)
American History 4 (4-0)	Elective 4 (-)	Elective 4 (-)

Course in Dairy Husbandry,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Woodwork I 2 (0-4)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry A 2 (2-0)
Methods of Study 1 (1-0)	Physics I 4 (3-2)	Physics II 4 (3-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Live Stock I & II 3 (1-4)	Farm Crops I & II 3 (1-4)	Surveying 1 (0-2)

SOPHOMORE, 1911-'12.

Rhetoric I 4 (4-0)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 4 (2-4)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 2 (0-4)
Dairying I 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III (Dairy) 2 (0-4)	Blacksmithing I 2 (0-4)	Live Stock IV 3 (1-4)

JUNIOR, 1912-'13.

General Bacteriology 4 (2-4)	Geology I 4 (4-0)	English Literature 4 (4-0)
Farm Mechanics I & II 4 (2-4)	Soils I 4 (2½-3)	Soils II 4 (2½-3)
Farm Crops III 4 (3-2)	College Rhetoric 4 (4-0)	Civics 4 (4-0)
General Anatomy I 4 (1-6)	Dairy Bacteriology 4 (2-4)	Animal Physiology 4 (3-2)
Chemistry D-I 2 (0-4)	Chemistry D-II 2 (0-4)	Dairy Inspection 2 (0-4)

SENIOR, 1913-'14.

Entomology I 4 (3-2)	Agricultural Economics 4 (4-0)	Diseases of Farm Animals and Obstetrics, 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Animal Breeding 4 (4-0)
Dairy Bldgs. & Equipment 2 (0-4)	Butter Mkg. & Cr'y Mgt. 3 (1-4)	Pure-bred Dairy Herd 2 (1-2)
Zoölogy IX (Embryology) 4 (3-2)	Milk Prod. & Herd Mgt. 3 (2-2)	Cheese & Ice Cream Making 4 (2-4)
American History 4 (4-0)	Forestry I 4 (3-2)	Physics XI 4 (4-0)

Department of Agronomy.

Professor TENEYCK, Agronomy.*
Assistant Professor CALL, Soils.
Assistant Professor ————————, Crops.
Assistant SCHAFER, Crops.
Assistant C. F. CHASE, Farm Mechanics.
Assistant NASH, Crops.
Assistant DORYLAND, Soils.

FACILITIES FOR TEACHING.—The agronomy farm consists of 320 acres of medium rolling upland, well adapted to experimental and demonstration work, and well equipped with all classes of farm machinery necessary in crop production. The general fields and experimental plots are used to illustrate the methods of crop production as conducted under climatic and soil conditions that exist in the region about Manhattan.

A well-appointed seed house, in which farm seeds of all descriptions are stored, graded and prepared for distribution, gives excellent facilities for teaching the student the best methods of doing this kind of work.

A large and well-equipped laboratory for soil physics and soil fertility work is maintained for regular use of the students.

Laboratories for grain and crop judging are maintained for students in these courses. Material for use by the student is gathered in quantities, and he is taught not only to determine which are the best grains and forages, but to give the reason for his selection.

The department has a large amount of material for demonstrative and illustrative purposes in farm mechanics. Quantities of farm machinery are supplied for the farm mechanics laboratories by implement manufacturers, thus giving the student the benefit of all the latest devices and designs in farm equipment.

The department of agronomy offers courses in grain judging, crop production, soil physics, soil fertility, soil surveying, farm mechanics, and farm management.

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

COURSES IN FARM CROPS.

1. **Grain Judging I.** Subfreshman, first year, winter term. Laboratory, four hours. Two credits. Required of all subfreshman students.

This is a study of Indian corn, the work being confined largely to the practical judging and scoring of corn, according to recognized standards of perfection for pure-bred varieties and according to commercial standards. This course will also include the testing of the vitality of seed corn, etc., being planned largely to inform and train the student in the selection of the best seed ears. Textbook, Agronomy Department Grain Judging Guide, and score cards.

2. **Grain Judging II.** Subfreshman, second year, spring term. Laboratory, four hours. Two credits. Required of all subfreshman students.

This is a continuation of grain judging, in which other standard grains —wheat, oats, barley, rye, Kafir corn, etc.—are studied, judged and

* Until June 1, when he became professor of farm management, and superintendent of the Fort Hays Branch Experiment Station. A professor of agronomy is to be appointed.

scored after a similar manner and for the same purpose as already described for corn under grain judging I. Textbook, Agronomy Department Grain Judging Guide, and score cards.

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

This begins the study of the principal cereal crops—corn, wheat, oats, barley, rye, rice, etc.—and includes a careful study of each crop as regards botanical characteristics, methods of breeding, methods of selecting seed, preparation of the soil, planting, cultivation, harvesting, storing, marketing and uses of the various grains.

Laboratory.—The laboratory work consists in judging and scoring corn according to commercial standards and recognized standards of perfection for pure-bred varieties. Some laboratory study is also made of the corn plant and of the physical parts of the corn kernel, in order that the student may become fully acquainted with the botanical characters of the plant and the structure and composition of the important parts of the corn kernel. Textbooks, Agronomy Department Grain Judging Guide, and Hunt's Cereals in America.

4. **Farm Crops II.** Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required of students in all agricultural courses.

This is a continuation of crops I, in which the small grains receive the principal attention. The general subjects of soil fertility, rotation of crops, use of manures and fertilizers, and the prevention and destruction of noxious weeds, insect pests and diseases, also receive attention in connection with the study of the different crops. Many varieties of each of the standard crops are grown upon the College farm, so that the student may see them, or at least see samples in the classroom, and thus become familiar with the variety types and characteristics.

Laboratory.—The work in the laboratory consists largely in judging and scoring the common cereal grains according to commercial standards and recognized standards of perfection for pure-bred varieties. Some laboratory study is also made of the plant, especially of the fruit of the plant, as the spike, ear and kernel, in order that the student may become acquainted with the characteristics of the different types and varieties of the several groups of cereals. Textbooks, Agronomy Department Grain Judging Guide, and Hunt's Cereals in America.

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

This is a study of forage crops used for special purposes, as hay, pasture, silage, soiling, green manure, cover crops, etc. The study will include not only methods of culture of grasses, clover, alfalfa, and annual forage crops, but also methods of making and preserving hay, other dry forage, and silage. The care and management of the pasture will be given special attention. Plans for rotation of soiling crops adapted to different sections of the state will also receive special attention. Practical notes will be made upon the adaptation of grasses and other crops for growing under different climatic and soil conditions, etc.

Laboratory.—The laboratory work consists in part of a careful examination of specimens of the standard varieties of grasses, clovers, and other forage plants, in order that the student may become familiar with the botanical characteristics of the plants which constitute the different groups. A definite outline of form is used by the student in study-

ing and describing the different specimens. A study is made of grass, clover and alfalfa seeds with reference to quality, purity and freedom from adulterants and weed seeds. Textbook, Shaw's three books, "Grasses," "Clovers," and "Forage Crops Other Than Grasses," and Agronomy Department Forage Judging and Seed Grading Guide.

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

Advanced work in the study of cereal grains and crop improvement methods. The class work consists of lectures and the assignment to each student of general reading and investigation of the work of authorities on this subject. Prerequisite, farm crops III.

Laboratory.—The work in the laboratory will be in part a continuation of the work in cereal grain judging. Work regarding the structure of grains, the moisture content and vitality of seed, etc., will also be given in connection with the judging work.

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

Advanced work in forage crops, being in part a continuation of farm crops III. Besides lectures, the student is given an outline for general reading and study of the authorities on this subject.

Laboratory.—The laboratory work consists of definite studies in cutting, curing, storing and preserving forage of different kinds. Definite work in the field and in the laboratory will be required of each student.

COURSES IN SOILS.

8. **Soils I.** Junior year, winter term. Class work, two and one-half hours; laboratory, three hours. Four credits. Required in the agricultural courses.

This course comprises a study of the physical nature of soils and treats the subject as follows: The origin of soils and their formation; soil texture as influencing aeration, capillarity and diffusion; soil moisture and means of conservation; the washing of soils and means of prevention; the effect of different methods of cultivation upon the liberation of plant foods, soil moisture and soil temperature; the use of tillage implements and their effect on the physical condition of the soil. Prerequisite, chemistry I, II and III.

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

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

A study of the food requirements of plants and the effect of different amounts and combinations of plant food upon plant growth; the effect of different crops and different systems of farming upon the depletion of soil fertility; the use of barnyard manure as to proper methods of handling, preserving and applying; a determination of the needs of the soil for commercial fertilizers and the kind of fertilizers to apply; and the effect of crop rotation and green manuring upon soil fertility. Prerequisites, agricultural chemistry and soils I.

Laboratory.—The laboratory supplements the class work in demonstrating the effect of fertilizers and manures upon plant growth. Determinations are made of the lime requirements of soils and fixation of plant food in the soil. The effect of continuous cropping upon

depletion of plant food is illustrated. One hundred and twenty one-tenth-acre plots devoted to soil fertility work on the Station farm are used for illustration work in this course.

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

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

Laboratory.—The laboratory is a continuation of the work begun in soils I and consists of a detailed study of special soils as shown by mechanical analysis. It includes field work on the effect of rolling, and methods of cultivation upon the temperature and moisture of the soil. It also embraces a study of the methods used by the Bureau of Soils of the United States Department of Agriculture, in conducting both laboratory and field investigations in the physical properties of soils.

11. **Soils IV—Advanced Work in Soils.** Senior year, winter term. Laboratory, eight hours. Four credits. Optional with grain products in courses in agronomy.

The student taking this course carries out a definite line of laboratory work in soil physics or soil fertility. The work is principally in the greenhouse and laboratory with assigned readings. Prerequisites, six hours of advanced agricultural chemistry elected through the junior year and soils I, II and III.

12. **Soils V—Soil Survey.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Optional with farm crops V in course in agronomy.

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 adaptability of different crops to these soil classes. A study is also made of the soil surveys of different states and especially to the soil survey of Kansas. Prerequisite, soils I.

Laboratory.—Field work in mapping soils.

COURSES IN FARM MECHANICS.

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

A beginning course in farm mechanics, taking up certain important definitions and mechanical principles, force, work, power, the lever, eveners, tackles, etc. Study of power transmission, belting, splicing, etc. Strength of materials. Tillage machinery; history, development and construction of plows, harrows, rollers, subsurface packers, cultivators, etc. Text, Farm Machinery and Farm Motors.

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

Farm machinery. Study of seeding, grading, harvesting, haying, fertilizing, threshing, corn grinding, transportation and pumping machin-

ery and value and care of same. Text, Farm Machinery and Farm Motors. Prerequisite, farm mechanics I.

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

Study of farm motors, as the horse, windmill, gas engine, steam engine, water wheels, electric motors, etc. Text, Farm Machinery and Farm Motors. Prerequisite, farm mechanics I.

16. **Farm Mechanics IV.** Irrigation and drainage. Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture.

Study of the principles underlying irrigation and drainage, with practical work in laying out system, etc.

17. **Farm Mechanics V.** Farm buildings. Senior year, fall term. Laboratory, four hours. Two credits. Elective.

Study of houses, barns, granaries, sheds, water systems for the farmstead, etc. Work in planning and design.

18. **Farm Mechanics VI.** Farm buildings, continued. Senior year, winter term. Laboratory, four hours. Two credits. Elective.

Taking up a study of buildings more in detail. Drawing up complete plans and specifications of certain buildings, at the option of the student.

19. **Farm Mechanics VII.** Concrete construction. Senior year, spring term. Laboratory, four hours. Two credits. Elective.

Study of materials used in the construction of concrete. Practical work in making posts, troughs, etc., of concrete.

COURSE IN FARM MANAGEMENT.

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

The purpose of the course is a general summing up and putting together of the various facts and principles gained throughout the College course in such a way as to enable the student to apply himself in the best possible way to the management of a farm. Special lectures are given on such topics as "Choosing and Laying Out the Farm," "Soil Management," "Crop Management," "General Management of the Farm Equipment," "Labor Problem," "Farm Records and Accounts," "Rural Improvement," "Farmer as a Citizen," etc. Each student is required to formulate general plans for carrying on some farm which he shall choose, and to prepare a complete set of farm account books, covering the business operations on such farm for one year. Text, Card's Farm Management.

Department of Animal Husbandry.

Professor KINZER.
Assistant Professor KING.
Assistant PATERSON.
Assistant WRIGHT.

FACILITIES FOR TEACHING. The department of animal husbandry occupies about 140 acres of land devoted largely to pasture and alfalfa. The herds and flocks are made up of the best types of pure-bred horses, cattle, sheep and hogs, and contain many prize winners of national and international reputation.

Feed yards and barns are well arranged for experimental feeding and maintenance of the herds. The laboratory of the animal husbandry student is the feed yard and the animal. He studies the animal from the standpoint of the breeder and feeder and learns to concentrate the needs of each and to find each exemplified in the perfect animal.

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

COURSES IN ANIMAL HUSBANDRY.

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

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

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

This work is similar to stock judging I, except that sheep and cattle are used.

3. **Live Stock I.** Freshman year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in all agricultural courses.

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

Laboratory.—Practice in judging.

4. **Live Stock II.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in all agricultural courses.

A study of the market types and classes of sheep and cattle, both feeder and fat included. It is also a study of the different grades and classes of wool.

Laboratory.—Practice in judging.

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

This course consists of a study of the different breeds of domestic animals. A study is made of the history and development of each breed; the breed characteristics, environments under which the breeds have been developed, and their adaptability to conditions in this state.

Laboratory.—Practice in judging.

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

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

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

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

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

This takes up the judging of market classes as well as all the different breeds of pure-bred animals, judging in groups of four to six animals, the same as would be done at county or state fairs. Prerequisite, live stock I and II.

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

A continuation of advanced judging I. During this term's work various trips are made to the best live-stock farms of the state, where the students have an opportunity to judge and observe the management of herds and flocks as handled by the most successful men in the state. Prerequisites, live stock I and II and advanced judging I.

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

This is a study of the digestive system and purposes of nutrition, the theory of practical economy of rations for both fattening and maintaining all classes of farm animals. Prerequisite, agricultural chemistry.

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

A systematic study of the most successful and economical methods of growing and finishing hogs and sheep both for breeding purposes and for pork and mutton production. Prerequisite, principles of feeding.

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

Includes the killing, dressing, cutting and curing of beef, pork and mutton. Prerequisite, principles of feeding.

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

This work is a combination of live stock I, II and IV, with two hours devoted to pedigree work. Market classes will be taken up briefly and the remainder of the time put on breeding classes.

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

A study of the most successful and economical methods of producing beef cattle for market. Various rations, comparisons of long and short feeds, advisability of grain and grass feed, and all questions pertaining to the production of beef are considered. Prerequisite, principles of feeding.

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

A study of the most successful methods of growing and developing young horses and of the most satisfactory rations for light- and medium-weight horses, together with a study of the best methods of preparing horses for market. Prerequisite, principles of feeding.

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

This takes up the practical side of the care and management of horses, cattle, sheep and hogs, the arrangement of yards, barns, feed lots, etc.

17. **Animal Breeding.** Senior year, spring term. Class work, four hours. Two credits.

This course is required in all the agricultural courses, and in the course in veterinary medicine. It embraces the general study of the principles of breeding, selection, variation, heredity, atavism, etc.

Department of Dairy Husbandry.

Professor KENDALL.
Assistant Professor ————, Milk Production.
Assistant ESTEL, Milk Production.
Assistant NYSTROM, Butter Making.
Assistant PHILIPS, Poultry.

The College dairy farm consists of about 70 acres of medium upland, including the buildings and yards. This land is used for producing corn and alfalfa and other crops, such as cowpeas, field peas, sorghum and pasture used by the dairy herd.

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

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire and Holstein. These animals are pure bred and a number have been entered in the advanced registry of their respective breeds. It is the purpose of the dairy department to keep one animal for each acre in cultivation, raising all the corn for silage and alfalfa necessary for the animal one year and furnishing pasture necessary for the young stock.

The dairy building houses the creamery, cheese rooms, classrooms and offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a small refrigerating machine and ice plant installed in the building. These facilities of barn, herd and laboratories are in constant use by the students in 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 as such.

The poultry section is equipped with different types of incubators, brooders, poultry houses, runs, and with flocks of the leading breeds of fowls. Instruction in poultry husbandry has been carried on in this institution for two years. The demand for general education in this branch of live stock, combined with the ever-increasing call for capable investigators, instructors and lecturers, has led the College authorities to introduce various courses in poultry husbandry. The subjects which follow will give the student an accurate idea of the nature of class and laboratory work and the relative amount of time devoted to each.

COURSES IN DAIRY HUSBANDRY.

1. **Stock Judging II.** (Dairy.) Subfreshman, first year, spring term. Laboratory, two hours. One credit. Required of all subfreshman students.

This is an elementary course in dairy stock judging. The work is taken up from the utility standpoint. Animals are judged and selected

on the basis of their apparent merits as economical producers in the dairy.

2. **Dairying I.** (General.) Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in all the courses in agriculture.

A general course in dairying, dealing, as completely as time will permit, with the most important and fundamental branches of dairy husbandry and their relation to farming operations on dairy farms, general farms, grain farms, stock farms, etc. Lectures, suplemented by textbook, Milk and Its Products, by H. H. Wing.

Laboratory.—Operation and care of hand and power separators, farm butter making, preparing milk for the retail trade, farm practice, and testing dairy products. Laboratory Manual required.

3. **Live Stock III.** (Dairy.) Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the courses in agriculture and in the course in veterinary medicine.

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 representatives of breeds or for breeding purposes. No textbook required. Types and Breeds of Farm Animals, by C. S. Plumb, and Breed Association literature, used as reference.

4. **Dairy Inspection I.** Junior year, spring term. Laboratory, four hours. Two credits. Required in the course in dairy husbandry.

Advanced work is given in testing 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 city, state or government inspector or commissioner, outlining state and city ordinances governing the handling and public sale of dairy products. Textbook, Testing Milk and Its Products, by Farrington and Woll. Prerequisites, general bacteriology, dairy bacteriology, and chemistry D, I and II.

5. **Dairying II.** Dairy buildings and equipment. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in dairy husbandry.

Drawing plans for the construction of dairy barns, storage barns, silos, milk rooms, dairies, ice houses, fences, shelters, and planning and laying out dairy plants for special purposes. Testing the practicability and efficiency of dairy equipment and appliances. Prerequisite, dairy inspection.

6. **Dairying III.** Milk production and herd management. Senior year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required in course in dairy husbandry.

This course deals with the economical production of milk and the most approved methods of handling a dairy herd. Special attention is given to breeding, feeding and keeping herd records, test associations and organized methods of improving the quality of dairy cattle at home and abroad. Prerequisite, principles of feeding.

Laboratory.—Barn practice is given in weighing feed, making rations, feeding dairy animals, and testing and keeping records of the herd.

7. **Dairying IV.** Butter making and creamery management. Senior year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in dairy husbandry.

A careful study of the details of the manufacture of butter on the

farm, in the dairy, and in the factory. Creamery accounting and the business side of the creamery work is given special emphasis in this course. Textbook, Creamery Buttermaking, by John Michels. Prerequisites, chemistry D, I and II, and dairy bacteriology.

Laboratory.—Methods of separating and ripening cream; preparation and use of starters in pasteurized and raw cream; the manufacture of sweet-cream butter; churning, washing, salting and packing butter, and keeping complete records of each operation; making salt, curd, fat, and moisture determinations of the finished product, judging and scoring butter at frequent intervals, noting its keeping qualities and the effects of different methods of manufacture upon its commercial value. Practice is given in the keeping of creamery records and the general management and business operations of the creamery.

8. **Dairying V.** Cheese and ice-cream making. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in dairy husbandry.

Making cheese on the farm for home use and for sale. The commercial manufacture of cheddar cheese, comprising each detail from receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the term, and ice-cream making is given during the last part. Lectures are given on the manufacture of ice cream and ices for retail and wholesale trade. Textbook, The Science and Practice of Cheese Making, by Van Slyke-Publow. Prerequisites, chemistry D, I and II, and dairy bacteriology.

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

9. **Dairying VI.** Pure-bred dairy cattle. Senior year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in dairy husbandry.

This period is devoted to lectures on the origin, history and development of breeds of dairy cattle, their distribution and distinctive characteristics.

Laboratory.—Practice in the keeping of records of pure-bred dairy cattle, making out the various forms and blanks used by the different breed associations, tracing and making pedigrees, and practice in making and keeping advanced registry records.

10. **Market Milk.** Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective.

This is planned for advanced work in the production, handling and marketing of milk and cream. It includes, in addition to a general review of the subject, a detailed study of the question of city milk and cream supplies. Prerequisites, chemistry D, I and II, and dairy bacteriology.

Laboratory.—Testing the efficiency and practicability of aerators, coolers, pasteurizers, and exercises in standardizing milk and cream, testing for adulterations and making centrifugal and microscopic examination for filth, bacteria and leucocytes.

11. **Dairying VII.** Manufacture of special dairy products. Elective, winter term. Laboratory, four hours. Two credits.

This is a laboratory course in the making of condensed milk, powdered milk, casein, lactose, milk beverages, different types of soft and hard

cheese, fancy creams and ices. Prerequisites, chemistry D, I and II, and dairy bacteriology.

12. **Dairy Inspection II.** Elective, winter term. Laboratory, four hours. Two credits. Required in the course in veterinary medicine.

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

13. **Dairy Seminar.** Elective, spring term. Class work, two hours; laboratory, four hours. Four credits.

Lectures on the history and development of the dairy industry in foreign countries and in the United States, including a study of the agencies that have been instrumental in its development. This course includes a review of dairy periodicals, books and other literature, the teaching of dairy husbandry, and experimental investigations along dairy lines.

Laboratory.—A list is made of the periodicals, books, bulletins and other published works devoted entirely or in part to the advancement of dairying, or that have had to do with the development of this subject.

COURSES IN POULTRY HUSBANDRY.

14. **Poultry Judging.** Subfreshman, second year, winter term. Laboratory, two hours. One credit. Required of subfreshman students.

This is a course in the judging of poultry from the utility and fancy standpoints, in which the prominent breeds are judged with a view to finding the good and bad qualities of all poultry. Reference book, American Standard of Perfection.

15. **Poultry I.** Freshman year, winter term. Lectures, one hour; laboratory, two hours. Two credits. Required in the agricultural courses.

This is a general course dealing with the value and importance of the industry, the different breeds, and how to feed, house, market and handle them. No textbook.

Laboratory.—The different breeds of fowls are judged for their fancy and utility points, and demonstrations are given in picking, killing, dressing and packing poultry, and in running incubators and handling brooders.

16. **Poultry II.** Elective, senior year, winter term. Lectures, two hours; laboratory, four hours. Four credits.

The subjects of incubation, brooding, feeding and breeding are treated. No textbook. Prerequisites, embryology, agricultural chemistry, principles of feeding, and poultry I.

Laboratory.—To be spent in the incubator cellar handling incubators, four weeks; in the fields handling chicks in brooders, four weeks; and judging fancy poultry, four weeks.

17. **Poultry III.** Elective, senior year, spring term. Lectures, two hours; laboratory, four hours. Four credits.

The subjects of housing, marketing, management and diseases are discussed. No textbook. Prerequisite, poultry I.

Laboratory.—To be spent in the poultry plant, feeding chickens, and marketing eggs and poultry.

Department of Forestry.

Forester SCOTT.
Assistant Professor EASTMAN.

The department of forestry, established by authority of an act of the legislature of 1909, is in charge of the forestry extension and investigations throughout the state, and of the instruction in these subjects.

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

COURSES IN FORESTRY.

1. **Forestry I.** Farm forestry. Junior year, winter term. Class work, three hours; laboratory, two hours per week. Four credits. Required in all agricultural courses.

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

2. **Forestry II.** Silviculture. Junior year, spring term. Class work, two hours. Two credits. Required in the horticulture course, and elective in others.

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

Department of Horticulture.

Professor DICKENS.
Assistant AHEARN.
Assistant CUNNINGHAM.

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, and in the orchard plantations, and in the greenhouses. The new greenhouses in course of erection will add largely to the possibilities of instructive laboratory work.

The horticultural grounds consist of 80 acres of land devoted exclusively to horticultural and forestry work and gardens and nurseries on the campus. Orchards and vineyards are maintained for experimental and demonstrative work. A full equipment of tools, spraying machinery and special apparatus used in horticulture, floriculture and gardening are available for the use of the students. The College grounds

furnish one of the finest laboratories for the study of landscape gardening that can be obtained in the state.

The subjects taught by the department of horticulture are fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and landscape gardening. The following description gives a statement of these in detail.

COURSES IN HORTICULTURE.

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

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

2. **Plant Propagation.** Sophomore year, spring term. Class work, three hours; laboratory, four hours. Five credits. Required in all the agricultural courses.

A discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; treatment given 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 and seed testing, preparation of seed beds, and the use of seeding machinery; transplanting, grafting, budding, and the general nursery practice.

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

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

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

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.

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

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

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

The small fruits of commercial importance are considered with reference to their requirements of soil, fertilizers, cultivation and protection; management of small areas designed for furnishing a supply for home use and of commercial plantations is considered. Prerequisite, plant propagation.

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

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

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

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

Practice in preparing spray mixtures, and the use of spraying machinery. Prerequisites, chemistry I and II.

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

A discussion of the conditions necessary for success with orchards. Location, improvement of soil, application of fertilizers, pruning, prevention of loss from frost, marketing and storage. Textbook, Principles of Fruit Growing, by L. H. Bailey. Prerequisites, plant propagation and advanced pomology.

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

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

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

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

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

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

Department of Milling Industry.

LESLIE A. FITZ, in Charge.

The department of milling industry was established by the Board of Regents primarily to take up investigations in the handling and milling of wheat. Every student of agronomy should have some knowledge of this and of other grain products. A full and complete knowledge of the needs of grain growing as an industry necessarily must include the utilization of grains in the manufacture of foods and numerous articles of commerce. The following course is offered to supply this information to the student:

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

A course dealing with commercial methods of grading, handling, storing and marketing all kinds of grains and hay, including deterioration

and loss in storage or transit. It will also include a brief study of the manufacture of the various food products from the grains.

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

Short Winter Courses in Agriculture and Dairying.

The Agricultural College offers primarily four-year courses in agriculture, which give the student a fundamental training in the sciences relating to agriculture, and their application to the production of crops and stock and farming in general. Such a course not only equips a man to become a successful farmer, but makes of him a better citizen and a leader in the broader duties of life.

Not all young men who choose to farm have the time or the means to spend the necessary four years in getting a college training. For such, who are eighteen years of age or more, the Agricultural College offers a short, practical course in agriculture and dairying, given in two terms. The entire time of the student will be occupied in learning how to do the various things which are necessary for the production of good crops and good stock, and for the business management of the farm. The subjects taught in such a course cover as much as can be given in the time, and are made intensely practical in the presentation. The student is taught *why* and *how* to do the various farm operations.

DESCRIPTION OF SHORT COURSES.

AGRICULTURE AND DAIRYING.

The student may select either agriculture or dairying, or a combination of the two, as may best suit his individual needs. All students are required to take crop production, live-stock production, poultry and woodwork the first year, and breeding and feeding of live stock, live-stock sanitation, agricultural botany, soil physics and blacksmithing the second year. Other subjects offered are elective, enough being taken to make up a full course of 15 hours' class work and 28 hours' laboratory work per week.

The work in crop production and live-stock production gives the student a knowledge of these subjects in a very practical way. The student not having taken scientific work is not able to study these subjects from the standpoint of one versed in chemistry, physics, zoölogy, etc., but can get from his study in class and laboratory the art of doing these things properly. The same is true of dairying and horticulture. The farmer needs to know how to select stock and crops that will be best adapted to his environment. The short courses train him to do this. He needs to know how to prepare his soil for the reception of the seed, or his feed for making greatest gains in feeding his live stock. These things are taught successfully to short-course students.

Farm mechanics, as it relates to general farming or dairying and practice in woodwork, is taught in such a way as to make the student capable of handling tools and machinery with proper skill.

The students who can return for the second winter's work are given more advanced work along the same lines as studied the first year.

The problems of breeding and feeding, diseases of live stock, soil and crop management, and the building up of pure-bred herds, are studied from the standpoint of the purchaser, breeder or farmer.

SUBJECTS TAUGHT IN FIRST YEAR.

GENERAL AGRICULTURE.

Crop Production	Class.
Live-stock Production	"
Horticulture and Forestry	"
Stock Judging	Lab.
Grain Judging	"
Poultry Judging and Management	"
Horticultural Practice	"
Farm Mechanics	"
Woodwork	"

DAIRY FARMING.

Crop Production	Class.
Live-stock Production	"
Dairying	"
Stock Judging	Lab.
Dairy Barn Practice	"
Poultry Judging and Management	"
Dairy House Practice	"
Dairy Buildings and Mechanics	"
Woodwork	"

SUBJECTS TAUGHT IN SECOND YEAR.

GENERAL AGRICULTURE.

Breeding and Feeding Live Stock	Class.
Live-stock Sanitation	"
Soil Management and Crop Improvement, *or*	
Market Gardening and Orcharding, *or*	
Pure-bred Herd other than Dairy	Class.
Agricultural Botany	Lab.
Soil Physics	"
Stock Judging	"
Crop Judging	"
Farm Management	"
Blacksmithing	"

DAIRY FARMING.

Breeding and Feeding Live Stock	Class.
Live-stock Sanitation	"
Pure-bred Dairy Herd	"
Agricultural Botany	Lab.
Soil Physics	"
Dairy Stock Judging	"
Dairy Management	"
Blacksmithing	"

MANUFACTURE OF DAIRY PRODUCTS.

The course is offered for young men who wish to become butter or cheese makers or handlers of market milk and ice cream. It is a technical course, offered to those who have had experience in creamery or other dairy work, or to those who have taken the dairy farming course. The subjects taught are as follows:

Creamery Management.
Dairy Mechanics and Refrigeration.
Butter and Cheese Making.
Dairy Chemistry.
Dairy Bacteriology.
Marketing Milk.
Ice-cream Making.
Judging Dairy Products.

COURSE IN TESTING DAIRY PRODUCTS.

This course is offered to those who are buying milk or cream and wish, in a short time, to gain skill and accuracy in the use of the various tests necessary to use in such work. The state law requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the state dairy commissioner. This course is designed to meet the needs of those who find they have not sufficient knowledge of the subject to pass such an examination.

In addition to a study of the Babcock test the student is given a few lectures on ordinary sanitation and is taught the methods necessary to keep his place of business in strictly sanitary condition. Exercises are given in grading milk and cream and in methods of handling it so as to keep it in condition until it is used or delivered at the railway station. This course will be offered at different periods throughout the year, dates to be announced a few days previous to opening of each period.

Students over twenty years of age will be admitted to these courses without examination, provided they can show that they have had a common-school education. A statement from their teachers in last school attended, or a county school diploma showing the work finished, should be presented when the student applies for admission.

All students entering short courses will be required to be present at the beginning of the term and will not be admitted later.

There will be issued a special catalogue describing short courses in much greater detail than given above, announcing the date when term begins, the number of weeks required, expenses, etc. Anyone interested in this subject should address Pres. H. J. Waters, Manhattan, Kan.

Summer Course for Teachers.

The greatest hindrance at the present time to the general introduction of agriculture into the high schools and the grades 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 a summer course in agriculture, with especial emphasis laid upon the subject matter and methods adapted to secondary and primary schools.

The work consists of lectures and laboratory exercises in soils and plants, including farm crops, orchard and small fruits, vegetables and ornamental plants. The course also includes budding and grafting, and the judging of corn, small grain and fruits. Instruction is also given in farm animals, including practice in judging cattle, horses, sheep and swine, the manufacture of butter and cheese, the judging and management of poultry, etc.

A special circular giving details of this course, as well as of special courses for teachers in manual training and domestic science, will be ready for distribution in the spring of 1911, and may be had upon application to the president of the College.

The Course in Veterinary Medicine.

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

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

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

The course in veterinary medicine at the Agricultural College was

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

To better fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in stock feeding, stock breeding, stock judging, pedigrees, milk inspection, vertebrate zoölogy, embryology, and agricultural economics, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture and 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 Veterinary Medicine.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

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

SOPHOMORE.

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

JUNIOR.

Pathology II 4 (2-4)	Pathology III 4 (2-4)	Pathology IV 4 (2-4)
Surgery I 2 (1-2)	Surgery II 4 (2-4)	Surgery III 2 (1-2)
Zoölogy IX (Embryology) 4 (2-4)	Medicine I 4 (4-0)	Medicine II 4 (4-0)
Materia Medica I 4 (4-0)	Materia Medica II 4 (4-0)	Pathological Bacteriology 4 (2-4)
Constitutional History 4 (4-0), *or*	Business Law 2 (2-0), *or*	Agricultural Economics 4 (4-0), *or*
German I 4 (4-0)	German II 4 (4-0)	German III 4 (4-0)
Clinic*	Clinic.*	Clinic*

SENIOR.

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

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

Course in Veterinary Medicine.

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Methods of Study 1 (1-0)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Anatomy I 6 (1-10)	Anatomy II 4 (1-6)	Anatomy III 4 (1-6)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Public Speaking 4 (4-0)
	Histology I 6 (3-6)	Histology II 2 (1-2)

SOPHOMORE, 1911-'12.

Comparative Physiology I 2 (2-0)	Comparative Physiology II 6 (4-4)	Pathology I 4 (4-0)
Anatomy IV 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 3 (1-4)
Histology III 4 (2-4)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	Physics VI 4 (3-2)	Physics VII 4 (3-2)
Rhetoric I 4 (4-0)		Free-hand Drawing 2 (0-4)

JUNIOR, 1912-'13.

Pathology II 4 (2-4)	Pathology III 4 (2-4)	Pathology IV 4 (2-4)
Surgery I 2 (1-2)	Surgery II 4 (2-4)	Surgery III 2 (1-2)
General Bacteriology 4 (2-4)	Medicine I 4 (4-0)	Medicine II 4 (4-0)
Materia Medica I 4 (4-0)	Materia Medica II 4 (4-0)	Pathological Bacteriology 4 (2-4)
Constitutional History 4 (4-0), *or*	Business Law 2 (2-0), *or*	Agricultural Economics 4 (4-0), *or*
German I 4 (4-0)	German II 4 (4-0)	German III 4 (4-0)
Clinic*	Clinic*	Clinic*

SENIOR, 1913-'14.

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

Department of Veterinary Medicine.

Professor SCHOENLEBER.
Assistant Professor STOUDER.
Assistant Professor GOSS.
Instructor ROGERS.
Assistant BURT.
Assistant HAYES.
Assistant KUBIN.

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 everyday 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 seating over 300 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 the 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 results in a thoroughly scientific veterinary education.

COURSES IN ANATOMY.

An entirely new method of anatomical instruction was inaugurated a few years ago, hitherto untried in any school of human or veterinary medicine, and its success was so marked that it has become a permanent feature. This department follows the zoölogical basis, and anatomy I and dissection I take up the bones of the trunk, *i. e.*, the vertebræ, ribs,

sternum and pelvis. The ligaments which hold these bones together are next taken up, and followed immediately by the muscles of the trunk, which enclose the abdominal and thoracic cavities. The student is now ready to fill in, and properly locate and thoroughly study, the important organs in these two body cavities. This is immediately followed by the blood supply to these organs, and this by the nerve supply controlling them, including the spinal cord, the vessels and nerves being carried to their point of exit from the trunk.

After the completion of anatomy I of this course, the student has actually seen and dissected every essential organ in its gross features, as well as those bordering on the microscopic, and is now thoroughly prepared for the study of histology, after which follows physiology, or the functions of these organs and the minute cells of which they are composed.

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

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

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

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

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

The dissecting subjects are preserved by the injection of a formaldehyde solution, followed by a red starch solution that hardens within and fills the arteries. The veins are also injected, but with a bluish colored material. They are further preserved by immersion in a large concrete tank containing 15,000 pounds of solution specially prepared for this purpose.

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

Consists of supplemental lectures, demonstrations and quizzes upon the bones, ligaments, muscles, splanchology, angiology, and neurology of the trunk, including the introductory work to each of these divisions of systematic anatomy. Textbook, Osteology and Anatomy of the Horse, by McFadyean.

2. **Anatomy II.** Freshman year, winter or spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

Consists of a review of anatomy I and of lectures, demonstrations and quizzes upon the bones, ligaments, myology, neurology and angiology of the anterior limb, including the foot except the digital vessels.

Dissection.—The course includes a laboratory study of the bones and a dissection of the ligaments, muscles, vessels and nerves of the anterior limb.

3. **Anatomy III.** Freshman year, winter or spring term. Class work, one hour; dissections, six hours. Four credits. Required in the course in veterinary medicine.

Both the class work and the dissection deal with the posterior limb in a manner exactly similar to anatomy II, but include the circulation of the foot.

4. **Anatomy IV.** Sophomore year, fall term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

Deals first with the osteology, followed with the muscles of the head and neck, after which the angiology and then the neurology, including the brain.

Dissection.—The course includes a very thorough laboratory study of the bones of the head, collectively and individually, special reference being given to the teeth, sinuses, cavities and foramina. The cephalic muscles, pharnyx, gutteral pouches, ear, eye and tongue are then dissected, together with the brain.

5. **Anatomy V.** Sophomore year, winter term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

Consists of a correlative review of the entire subject, taking first all the bones, all the ligaments, all the muscles, all the viscera, all the blood vessels and all the nerves, in the order named. The locomotor, respiratory, digestive, urinary and reproductive apparatuses are then dealt with. The index of the text is reviewed alphabetically, so that a picture of each structure will immediately come to the student's mind, and he will be able to describe it.

Dissection.—In the dissection room, each division of systematic anatomy is taken up as a whole, each dissecting subject being preceded by regional and flap dissections of the principal operative areas, and the isolation of the structures operated upon. Includes a mapping out with chalk of the important structures beneath the skin of a dark-colored horse.

6. **Anatomy VI.** Sophomore year, spring term. Class work, one hour; dissection, four hours. Three credits. Required in the course in veterinary medicine.

Consists of a comparative study and dissection of the principal structural differences in the ox, sheep, hog, dog and chicken, from the facts learned concerning the horse in anatomy I, II, III, IV and V. No text.

Chauveau's and Sisson's Comparative Anatomies are used as reference books.

7. **General Anatomy I.** Junior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the courses in dairy and animal husbandry.

The course is intended to give the agricultural students a general idea of the anatomy of domestic farm animals, to aid in understanding conformation by studying and dissecting the structures beneath the skin and at the same time to observe the muscles of locomotion and speed, draughting, and the various levers of the locomotory apparatus; to study the foot thoroughly so as to understand shoeing, to study the digestive organs so as to understand thoroughly the physiologico-anatomical phases of digestion and nutrition, are the fundamental points kept in mind. Textbook, Osteology and Anatomy of the Horse, by McFadyean.

Laboratory.—Consists in a study of the principal bones, and a dissection of the muscles and other important structures of both limbs and an observation study of demonstrations on prodissected abdominal and thoracic organs.

8. **General Anatomy II.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in animal husbandry.

This is a continuation of general anatomy I, but is taken up from a more practical standpoint, the parts dissected in the previous term being specifically studied, and applied upon the living animal. Special attention is given to variations, and especially as they concern unsoundnesses and purpose. Textbook, Exterior of the Horse, by Gabouix and Barrier.

Laboratory.—This comprises a careful examination of the Azoux model and the living horse, with frequent visits to the dissecting room for comparison.

COURSES IN HISTOLOGY.

Lectures and recitations cover the work which is done in laboratory. During the lectures the projectoscope is used to illustrate the tissues which are studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope, the microscopical structure of the normal animal tissues, methods of fixing, embedding, sectioning, staining and mounting tissues. This course prepares the foundation for pathological histology, and each student must prepare a full set of slides from which he makes high- and low-power drawings, all of which will be of value for future use.

9. **Histology I.** Freshman year, winter term. Class work, three hours; laboratory, six hours. Six credits. Required in the course in veterinary medicine.

The first part of the term is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fiber, bubbles of air and drops of oil, to enable the student to recognize these when they are accidentally mounted with the tissue. The fundamental tissues are next studied; epithelial with regard to form, structure, arrangement and location; connective tissue with regard to structure and location, including bone development, teeth and their development; muscular tissue—voluntary, involuntary and cardiac; nerve tissue, its structure and forms of cells, medullated and nonmedul-

lated nerve fibers; spinal cord; blood vessels, heart, and lymphatic vessels; blood and its corpuscles, with regard to size, shape and structure, including each kind of white corpuscle, and the detection of blood by the examination for hæmin crystals; blood-forming organs, as bone marrow, lymph glands and spleen. The histology of the digestive tract is next studied, beginning with the mouth, tongue, and taste buds; parotid, submaxillary and sublingual, thyroid and thymus glands, and the pharynx. In this term the student studies and mounts seventy-five slides, some of which are teased, and many are sectioned in paraffin and celloidin. Textbook, Histology, by Stohr. Prerequisite, anatomy I.

10. **Histology II.** Freshman year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This is a continuation of histology I, beginning with the esophagus, the stomach of the dog, horse and ox, the small intestines—duodenum, jejunum and ileum; large intestines—cæcum, colon, rectum and anus. During this term the student stains, mounts and studies with the microscope and makes drawings of the above-mentioned tissues, which comprise twenty-five slides, some of which are sectioned in paraffin, the remainder in celloidin. Some of the tissues studied are injected with gelatin mass to bring out the blood vessels. Textbook, Histology, by Stohr.

11. **Histology III.** Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

This is a continuation of histology II, and includes the microscopic study of the liver, pancreas, respiratory tract—nasal mucous membrane, larynx, trachea, lungs, and bronchi; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs, skin and its appendages, suprarenal gland, medulla, cerebellum, cerebrum, eye and ear, which will comprise thirty slides. Textbook, Histology, by Stohr.

COURSES IN PHYSIOLOGY.

This subject is divided into human physiology, comparative physiology and animal physiology.

12. **Comparative Physiology I.** Sophomore year, fall term. Class work, two hours. Two credits. Required in the course in veterinary medicine.

The subject is taught to the veterinary students. The course treats of the physiology of the domestic animals, beginning with the study of the blood, heart, blood vessels, ductless glands and internal secretions, respiration and digestion. Textbook, Veterinary Physiology, by Fred Smith. Prerequisites, anatomy I, chemistry I, II and III, histology I and II.

13. **Comparative Physiology II.** Sophomore year, winter term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in veterinary medicine.

The work this term is a continuation of comparative physiology I, and treats of the liver, pancreas and absorption; the chemical constituents of the body; skin, urine, nutrition, animal heat, muscular and nervous systems. Textbook, Veterinary Physiology, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the lecture room. The saliva, gastric juice, bile and pancreatic juice, and their digestive actions, will be studied in

detail. The composition and properties of blood and the chemical, microscopic and spectroscopic methods of studying blood will be studied.

14. **Comparative Physiology III.** Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

This term's work concludes the course in comparative physiology and embraces the study of the special senses, locomotor apparatus, the foot, generation and development, growth and decay. Textbook, Smith's Veterinary Physiology.

Laboratory.—The laboratory work consists of the examination of normal urine. The tests for the detection of abnormal constituents, as bile, blood, albumen, sugar, etc., will be applied to normal and also to pathological urine. Microscopic examinations will be made for casts, blood, deposits, etc. The phenomena associated with respiratory, muscular and nervous systems are studied and graphic records made.

15. **Human Physiology.** Sophomore year, spring term. Class work, four hours. Four credits. Required in the courses in printing and home economics and elective in the course in general science.

The instruction consists in a study of the composition of the bones, blood, lymph and all secretions of the body, with their functions; the functions of the tissues and glands; also the structure and functions of the digestive tract, respiratory tract, skin, nervous system and organs of special sense. The lecture room is equipped with skeletons, papier-mâché manikins and models of the eye, ear, etc. Practical demonstration will be made as often as practicable, relative to the subject under discussion. Textbook, Human Physiology, by Thornton. Prerequisites, chemistry I, II and III.

16. **Pharmacy.** Sophomore year, spring term. Laboratory, two hours. One credit. Required in the course in veterinary medicine.

This is principally a laboratory course, in which the student is taught pharmaceutical processes, official preparations and how to prepare them, and the nonofficial preparations used in veterinary practice. Chemical, physical and physiological incompatibilities are demonstrated in the laboratory and hospital. Thorough drill in the principles of prescription writing; a study of tables of weights and measures and their relation is given. Students are required to make tinctures, liquors, blisters, liniments, plasters, compounds, etc., which are used in the College practice. The United States Pharmacopœia is used as a guide.

17. **Pathology I.** Sophomore year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; causes, course and termination of disease; circulatory disturbances—cardiac, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances of metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, calcification and concrement formation; the process of repair, new formations and functional disturbances. Textbook, Comparative General Pathology, by Kitt. Prerequisites, histology, physiology, and bacteriology I.

18. **Pathology II.** Junior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

This course is devoted to the pathological technique, as collecting, fixing, hardening, embedding in celloidin and paraffin, and sectioning of

fresh, frozen and embedded tissues; also the methods of preserving gross specimens. Considerable time is devoted to stains and methods of staining. This is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, liver, kidney, bladder and pancreas. The students stain, mount, study and make drawings of the above-mentioned tissues. Textbook, Pathological Histology, by Gaylord and Aschoff.

19. **Pathology III.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

This is a continuation of pathology II, beginning with the study of the pathological conditions to which the following tissues are subject: lungs, mucous membranes, serous membranes, vascular system, lymph nodes, spleen and bone.

20. **Pathology IV.** Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

This is a continuation of pathology III, taking up the study of the pathological conditions of the skin, nervous system, male and female genital organs, and the pathological histology of infectious diseases, tumors and blood. Textbook, Pathology of Infectious Diseases, by Moore.

21. **Animal Physiology.** Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in animal husbandry and dairy husbandry.

This course embraces the study of chemical constituents of the body. The composition and functions of the blood, the functions of the liver, pancreas, and the other glands that assist in digestion, absorption, nutrition, the production of animal heat, the locomotor apparatus, generation and development will be fully discussed. Textbook, Veterinary Physiology, by Fred Smith. Prerequisites, chemistry I, II and III, and general anatomy I.

Laboratory.—In the laboratory the student obtains a practical knowledge of the subjects taught in the classroom. The laboratory is well equipped with skeletons, models, microscopes and other apparatus necessary for this work. The composition of saliva, gastric juice, pancreatic juice, and other digestive secretions and their digestive actions, are studied. In order that the student may more fully understand the functions of the various organs, a study is made of their microscopic structure.

COURSES IN SURGERY.

The courses in surgery, which continue throughout the junior and senior years, are taught by lectures and recitations, together with an abundance of laboratory work furnished by the live stock on the College farm, the free clinic and the out-practice. All senior students are given opportunity to put into practice the principles taught in the lecture room by performing operations on the cases presented, under the direction of the professor in charge. A commodious modern operating amphitheater, equipped with every appliance and instrument for up-to-date aseptic surgery, is in use. The hospital is furnished with single and box stalls, a soak tank, stocks and medicine room, and is ample to care for convalescent patients. Much attention is given to perfecting methods of technique, which will insure asepsis during operations and facilitate recovery. The daily dressing of cases operated upon gives the student op-

portunity for the study of the methods of repair and growth of tissues after injury.

22. **Surgery I.** Junior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course is an introduction to general surgery. Apparatus used in surgery, and methods of restraint, are studied, together with their practical application. The use of anesthetics and antiseptics is discussed, also the general principles in closing wounds, controlling hemorrhage, bandaging, massage, etc. Text, Fleming, volume I.

23. **Materia Medica I.** Junior year, fall term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The student is taught the terms employed in the science, the mode of action of drugs and their method of administration. The comparative action of drugs on different animals is given much attention. The inorganic drugs are studied during this term by lectures and demonstrations.

24. **Materia Medica II.** Junior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

A continuation of materia medica I, dealing principally with the organic drugs used in veterinary medicine. Much attention is paid to the source, character and indication for the drugs, and excellent opportunities are afforded the student for noting the action of these drugs in the hospital, where ample opportunity occasions the use of practically all drugs studied. Textbook, Veterinary Materia Medica and Therapeutics, by Winslow.

25. **Surgery II.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

During this term the causes, symptoms and treatment of the surgical diseases of the head and neck, salivary glands, guttural pouches, larynx and trachea are given especial attention. Text, Mohler.

26. **Surgery III.** Junior year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course is principally devoted to the structure of the teeth and their growth and replacement, their diseases and irregularities and how to treat them. The clinic and out-practice furnish a large number of cases to illustrate floating, cutting, extraction, repulsion, and trephining. Text, Merillat.

27. **Surgery IV.** Senior year, fall term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

A continuation of surgery II and III, giving especial attention to the surgical diseases of the abdomen, limbs and feet, and their relief. Taught by lectures and laboratory practice.

28. **Surgery V.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This course deals with the shoeing of horses, the relation of the foot to the limb, the functions of the foot, the study of lameness, and the shoeing of normal and diseased feet. Taught by lectures and laboratory work. Text, Dollar.

29. **Surgery VI.** Senior year, spring term. Laboratory, eight hours. Four credits. Required in the course in veterinary medicine.

A general review of all of the surgery, conducted by having each student operate upon the living animal and cadaver, performing all of the operations which are ever called for in the relief of disease. This is a very comprehensive course, with reviews by quizzes and practice of the subjects of anatomy, dissection and surgery. Each student should prepare himself with a set of surgical instruments for this work. These may be used in his practice after leaving College. Text, Williams.

30. **Clinic.** Junior and senior years, one to six hours daily.

This course is conducted as other laboratory work. Free clinics are held daily, and the surrounding country, containing a vast amount of live stock of all species, furnishes ample material for the work. Cases presented at the hospital are recorded, the history taken, and the animal assigned to a senior student. Lectures and demonstrations are given on such cases to the entire class and a quizz held. Students are required to diagnose and prognose the case as well as prescribe treatment, which is discussed, and corrected as needed by the professor in charge. Daily, and if necessary hourly, attention is given to the patient, by the student to whom it has been assigned. The College has a large out-clinic, or calls into the surrounding country and towns, and students are always taken along to see the cases and get accustomed, in a practical way, to performing work outside the hospital and meeting clients in a professional capacity. Arrangements with the local practitioner for a student to accompany him on all calls assures the students getting absolutely all cases presented for treatment in this vicinity. Good train service gives the classes excellent opportunity to visit practitioners in neighboring towns when cases of especial interest are presented. Blanks for recording of case history, diagnosis, treatment and results constitute the notebook for this laboratory.

COURSES IN MEDICINE.

A study of internal medicine begins with the winter term of the junior year, after the student has acquired a thorough knowledge of the foundation studies—anatomy, physiology, histology, pathology, bacteriology and materia medica, and extends throughout the remainder of the course. The subject is taught by lectures and recitations, supplemented by the study of special cases as they are found in the College practice. Here and in the regular clinic the student becomes thoroughly conversant with the causes, symptoms, diagnosis, treatment and prognosis of disease.

31. **Medicine I.** Junior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The diseases of the respiratory and circulatory systems are thoroughly studied during this session.

32. **Medicine II.** Junior year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This term's work is devoted to the study of the diseases of the organs of digestion. Especial stress is laid upon the different forms of indigestion and colics, their causes, differential diagnosis, and treatment.

33. **Medicine III.** Senior year, fall term. Class work, four hours. Four credits.

A thorough discussion of the diseases of the urinary and generative organs, skin, eye and nervous systems takes up the greater portion of the student's time during this session.

34. **Infectious Diseases.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This includes the study of infectious diseases, sanitary science and police. The methods of diagnosis, control and eradication and the laws governing general and special contagious diseases are discussed exhaustively.

35. **Obstetrics.** Senior year, winter term. Class work, three hours; laboratory, as cases present themselves, an equivalent of two hours per week. Four credits. Required in the course in veterinary medicine.

This course considers fully the obstetrical anatomy, physiology and pathology. All of the physiological functions, as well as the diseases and accidents of gestation and parturition, are considered. The diseases of the young are thoroughly discussed. The lecture room is equipped with skeletons and models of the horse and other domestic animals, as well as charts and reference books bearing on the subject.

Laboratory.—The laboratory work is conducted in the hospital and at the cases as they are presented throughout the surrounding country in the out-clinic. Textbook, Veterinary Obstetrics, by Fleming.

36. **Medicine IV.** Senior year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This session's work consists of a general review of the whole subject of internal medicine, with especial reference to differential diagnosis and therapeutics.

37. **Meat Inspection.** Senior year, spring term. Class work, three hours. Three credits. Required in the course in veterinary medicine.

The course in meat inspection is designed to prepare experts for national, state and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthful animals, the diseases discernible at the time of slaughter, the disposition of the condemned from hygienic and sanitary standpoints, the different preparations and methods of preparation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are considered. Several members of the Faculty have had practical experience in the federal inspection service, and one of these teaches the subject in a practical way. Visits are made to the local slaughtering establishments and to the large packing plants in Topeka, Kansas City, or Wichita. Textbook, Edelman's Meat Hygiene, translated by Mohler and Eichorn.

38. **Diseases of Farm Animals, and Obstetrics.** Senior year, spring term. Class work, four hours. Four credits. Required in the courses in animal husbandry and dairy husbandry.

This course is devoted to the study of the common diseases of farm animals and to obstetrics. The subjects treated include wounds and their treatment, examining farm animals for disease, the diagnosis and treatment of disease, contagious diseases, their causes and treatment. Sanitary and other measures necessary for their eradication and prevention are also studied. The instruction in obstetrics embraces a comparison of the soft and bony structures of the pelvis in the different animals relative to normal and difficult parturition. The causes of sterility are discussed and the necessary remedies suggested. Attention is given to the accidents and diseases incidental to normal and difficult parturition. The diseases following parturition and the diseases affecting the offspring are also dealt with. Textbook, The Farmer's Veterinarian, by Burkett. Prerequisites, general anatomy I and animal physiology.

Division of Mechanic Arts.

MECHANIC ARTS includes courses in mechanical engineering, electrical engineering, civil engineering, architecture, and printing, each leading to the degree of bachelor of science in the profession selected.

The freshman year is the same in all courses, except that in printing; the sophomore year is the same for mechanical and electrical engineering, and, with the exception of surveying substituted for shop work, is the same for civil engineering, while for the course in architecture the sophomore year is modified somewhat more.

The course in printing necessarily differs from the others throughout because the nature of the work for which the young men are trained is far different.

While the courses offered are believed to be sufficient to cover the needs of the average young man of Kansas, yet it is possible, and in special cases permission will be granted, 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. Also, 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.

However, it is believed that the courses, as tabulated, give the best preparation for students expecting to follow general work in the profession selected, and for those who are not absolutely certain what branch of their profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the young man desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

COURSE IN MECHANICAL ENGINEERING.

The course in mechanical engineering is designed to fit men for positions of authority and responsibility in this profession. It prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc., and for the design and erection of mill and engineering buildings.

The course of study has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but also give him a broad grasp of the fundamental principles of his profession.

It is not the intention in this course to give the young man training similar to that received in serving an apprenticeship, but rather to instruct him in the technical and theoretical principles upon which the art of mechanical engineering is based, and without a thorough knowledge of which a man cannot rise to a position of responsibility in this profession. The advantages of combining a practical application of principles with theoretical instruction, and at the time these principles are being impressed upon the student by classroom work, are well known.

The course in shop work, being purely educational in its character, is designed to teach the student the various methods of performing shop work, the operations that may be performed upon the different machines, and upon what machines certain operations can be performed most economically. Also, to teach the student what may be expected not only from the machines, but from the men operating them. In order to secure this knowledge it is necessary that the student should perform a large variety of operations. To secure this result, an appreciable proportion of the course consists of graded exercises, but wherever possible the student is assigned to work on apparatus and machinery being built for use in the engineering or other departments of the College, a large amount of which is constantly under way in the shops.

Each student in the course in mechanical engineering is required to present before graduation a satisfactory thesis that will show the results of original research along engineering lines.

COURSE IN ELECTRICAL ENGINEERING.

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. The professional work of this course begins in the third year and continues throughout the 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 in 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 supplemented by laboratory practice. The course provides a liberal training in wood- and ironworking, mechanical drawing and machine-shop practice. The laboratory experiments selected for the student are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the state.

In connection with the regular work of the classroom and laboratory, extensive references are given to leading books and current literature on technical engineering. In connection with the laboratory work a certain

amount of library work is required. During the year 1908 a College branch of the American Institute of Electrical Engineers was organized. The branch meets the first Tuesday of each month. At these meetings the instructors meet with the students for the discussion of technical subjects in engineering. Consulting engineers and central-station managers are invited to present papers at these meetings.

COURSE IN CIVIL ENGINEERING.

The aim of the course in civil engineering, as outlined in the catalogue, is to give to the young men taking the course the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years of the course are devoted almost entirely to general culture studies and the sciences, including mathematics. This follows the arrangements generally found in the engineering courses of American colleges. It finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. In recognition of the mechanical trend of the age, liberal provision is made in the course for class and laboratory work in mechanical and electrical engineering.

Manhattan is located at the junction of the Kansas and Big Blue rivers, so that there are several bridges in the vicinity which serve as examples of practical construction for students of structural engineering. The proximity of the rivers also makes it possible for the students to work on problems of river hydraulics on a practical scale. The topography of the country surrounding the College is particularly favorable to field practice in the various branches of surveying, and as much time as possible is devoted to actual field operations with the common engineer's surveying instruments.

In view of the growing importance of municipal problems, such as paving, sewerage, and water supply, the course in civil engineering includes a required course in municipal engineering, supplemented by courses in sanitary biology and chemistry.

The work in highway engineering, coming as it does at the end of the senior year, affords time for an unusually thorough course in this subject, which is of such great importance at the present time.

A liberal course in drainage and irrigation engineering is introduced for those who may wish to take up this line of work, which is so rapidly coming into prominence.

COURSE IN ARCHITECTURE.

The course in architecture at the Kansas State Agricultural College was organized in 1904 to meet an urgent demand for designers and builders, a demand caused by the rapidly increasing wealth of the state, which showed itself in every county by the erection of modern residences, large business blocks and substantial public buildings. It was manifest that there was a lack of properly trained architects and contractors, while there was not a technical institution within several hundred miles of Manhattan that had made provisions for the study of architecture and its basic sciences. The first class of students graduated from the newly organized course in 1905, and since that year there have been a number of graduates every spring, while many more have taken partial courses.

The freshman year of the course in architecture is identical with that of the other courses of the division of mechanic arts. The other three years are devoted to the study of pure and applied mathematics, mechan-

ics, physics, history of architecture, municipal improvements, modern steel and cement construction, landscape architecture, and especially of drawing and drafting. The course aims to develop the creative powers of the student in the fields of original composition. From ten to sixteen hours per week, for the last three years of the course, are given to work of this kind over the drawing table. During the summer months the student is expected to work at one of the building trades in order to study the "anatomy" of building structures.

The College is well equipped for the maintenance of a course in architecture. Its mechanical workshops are the most extensive west of the Missouri river; its science laboratories are provided with an abundance of modern scientific apparatus; it owns a rapidly growing collection of several hundred plaster casts, tile and terra cotta samples, marble specimens, etc. It has a fine collection of models of the classic orders; a collection of blue prints of over fifty residences, schoolhouses and churches, and 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,* also 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 of any institution in America, furnish excellent illustrative material.

COURSE IN PRINTING.

For some time it has been apparent that a broader education of the printing craft is needed. The people are awakening to an appreciation of what is truly artistic and beautiful, and there is a growing demand for a higher class of printing. Notwithstanding this demand, the opportunity for the apprentice is less to-day than ever before.

The average printing office does not provide a thorough training for the apprentice; nor does it give the young man an education such as a printer needs. Unless he is given a chance to supplement his composing-room instruction with art he will remain a mere mechanical tool. His instruction in the pressroom should be supplemented by work in the machine shops and the handling of gasoline engines and electric motors. The day when the "learning of the trade" was all that was necessary is past. The successful printer of to-day must have a broader knowledge than is obtained through a routine of everyday work.

The all-around printer is becoming a thing of the past. Men who are capable of "running" a country newspaper are growing scarcer every day. The country newspaper man should be a compositor, a job printer, a good "stone" man, a pressman—in fact, should be an all-around man—not so much to do the work himself as to know when it is properly done and to be able to direct intelligently and profitably those in his employ.

Students in this course will receive instruction in the everyday work of the office, and this will be supplemented by classroom work in scientific and cultural studies, intended to broaden the intellect and sharpen the appetite for that higher knowledge which always brings its reward financially as well as intellectually. It is not expected that at graduation a student will be an expert in any line, but he will have a broad foundation upon which to build, and will be far better able to cope with the problems of life than would be possible otherwise.

Those wishing to specialize in any branch of the technical work of the course may take graduate work.

Course in Mechanical Engineering.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE.

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 2 (0-4)	Foundry 3 (1-4)	Woodturning and Pattern Making 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR.

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Steam Engineering I (Valve Gears) 2 (2-0)	Steam Engineering II (Thermodynamics) 4 (3-2)	Steam Engineering III (Thermodynamics) 4 (3-2)
Kinematics II 3 (2-2)	Machine Design I 3 (1-4)	Machine Design II 3 (1-4)
	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)

SENIOR.

Applied Mechanics IV 4 (3-2)	Gas Engineering 3 (2-2)	Heating and Ventilation 5 (3-4)
Steam Engineering IV 4 (3-2)	Mill Engineering 5 (2-6)	Power Plant Engineering 5 (2-6)
Electrical Engineering M-I 4 (3-2)	Electrical Engineering M-II 4 (3-2)	Refrigeration 2 (2-0)
Machine Shop III 3 (1-4)	Machine Shop IV 3 (0-6)	Machine Shop V 2 (0-4)
Hydraulic Motors 3 (2-2)	Thesis 3 (-)	Thesis 4 (-)

Course in Mechanical Engineering,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 2 (0-4)	Foundry 3 (1-4)	Wood Turning and Pattern Making 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR, 1912-'13.

Integral Calculus 4 (4-0)	Economics 4 (4-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Steam Engineering I (Valve Gears) 2 (2-0)	Steam Engineering II (Thermodynamics) 4 (3-2)	Steam Engineering III (Thermodynamics) 4 (3-2)
Kinematics II 3 (2-2)	Machine Design I 3 (1-4)	Machine Design II 3 (1-4)
College Rhetoric 4 (4-0)	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)
		Graphic Statics 2 (0-4)

SENIOR, 1913-'14.

Applied Mechanics IV 4 (3-2)	Gas Engineering 3 (2-2)	Heating and Ventilation 5 (3-4)
Steam Engineering IV 4 (3-2)	Mill Engineering 5 (2-6)	Power Plant Engineering 5 (2-6)
Electrical Engineering M-I 4 (3-2)	Electrical Engineering M-II 4 (3-2)	Refrigeration 2 (2-0)
Machine Shop III 3 (1-4)	Machine Shop IV 3 (0-6)	Machine Shop 2 (0-4)
Hydraulic Motors 3 (2-2)	Thesis 3 (-)	Thesis 4 (-)

Course in Electrical Engineering.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE.

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 2 (0-4)	Foundry 3 (1-4)	Wood Turning and Pattern Making 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR.

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Electrical Instruments and Calibration 3 (2-2)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Chemistry E 3 (0-6)
Mechanical Drawing IV 2 (0-4)	D-C Machines I, ½ term 3½ (5-4)	Direct Current Machines II 7 (5-4)
Theory of Electricity I 3 (2-2)	Theory of Elect. II, ½ term 3½ (5-4)	Machine Shop II 2 (0-4)
	Machine Shop I 2 (0-4)	

SENIOR.

Alternating C. Machines I 6 (4-4)	Alternating C. Machines II 6 (4-4)	Alternating C. Machine Design 2 (2-0)
Steam and Gas Eng. E-I 5 (4-2)	Steam and Gas Eng. E-II 5 (4-2)	Power Plant Specifications 3 (3-0)
Direct C. Machine Design 2 (1-2)	Illuminating Eng. or Telephone Eng. or Electric Traction Practice 5 (4-2)	Generation and Distribution of Electrical Energy 5 (5-0)
Machine Shop III 2 (0-4)	Thesis 2 (-)	Inspection Trips 2 (-)
Hydraulic Measurements 2 (1-2)		Thesis 6 (-)

Course in Electrical Engineering,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 2 (0-4)	Foundry 3 (1-4)	Wood Turning and Pattern Making 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR, 1912-'13.

Integral Calculus 4 (4-0)	Economics 4 (4-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Chemistry EE 3 (0-6)
Mechanical Drawing IV 2 (0-4)	D-C Machines I, ½ term 3½ (5-4)	Direct Current Machines II 7 (5-4)
Theory of Electricity I 3 (2-2)	Theory of Elect. II, ½ term 3½ (5-4)	Electrical Instruments and Calibration 3 (2-2)
College Rhetoric 4 (4-0)	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)

SENIOR, 1913-'14.

Alternating C. Machines I 6 (4-4)	Alternating C. Machines II 6 (4-4)	Alternating C. Machine Design 2 (2-0)
Steam and Gas Eng. E-I 5 (4-2)	Steam and Gas. Eng. E-II 5 (4-2)	Power Plant Specifications 3 (3-0)
Direct C. Machine Design 2 (1-2)	Illuminating Eng. or Telephone Eng. or Electric Traction Practice. 5 (4-2)	Generation and Distribution of Electrical Energy 5 (5-0)
Machine Shop III 2 (0-4)	Thesis 2 (-)	Inspection Trips 2 (-)
Hydraulic Measurements 2 (1-2)		Thesis 6 (-)

Course in Civil Engineering.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE.

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Surveying II 2 (1-2)	Surveying III 3 (1-4)	Surveying IV 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR.

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Sanitary Biology I 3 (1-4)	Sanitary Biology II 3 (1-4)	Geology II 6 (4-4)
Civil Engineering Drawing I 2 (0-4)	Chemistry C-I 3 (1-4)	Chemistry C-II 3 (0-6)
	Municipal Engineering 3 (3-0)	

SENIOR.

Bridge Stresses 4 (4-0)	Structural Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam and Gas Eng. C 4 (3-2)	Railway Engineering I 3 (3-0)	Railway Engineering II 4 (0-8)
Drainage & Irrigation Eng. 4 (4-0)	Masonry and Concrete 4 (3-2)	Geodesy 4 (2-4)
Civil Eng. Drawing II 3 (0-6)	Spherical Trigonometry and Astronomy 3 (3-0)	Highway Engineering 2 (2-0)
Hydraulic Motors 3 (2-2)	Surveying V 2 (2-0)	Thesis 4 (-)

Course in Civil Engineering,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)
Constitutional History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Surveying II 2 (1-2)	Surveying III 3 (1-4)	Surveying IV 3 (1-4)
		Industrial History 2 (2-0)

JUNIOR, 1912-'13.

Integral Calculus 4 (4-0)	Economics 4 (4-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Sanitary Biology I 3 (1-4)	Sanitary Biology II 3 (1-4)	Geology II 6 (4-4)
Civil Engineering Drawing I 2 (0-4)	Chemistry C-I 3 (1-4)	Chemistry C-II 3 (0-6)
College Rhetoric 4 (4-0)	Municipal Engineering 3 (3-0)	Graphic Statics 2 (0-4)

SENIOR, 1913-'14.

Bridge Stresses 4 (4-0)	Structural Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam and Gas Eng. C 4 (3-2)	Railway Engineering I 3 (3-0)	RailwayEngineering II 4 (0-8)
Drainage & Irrigation Eng. 4 (4-0)	Masonry and Concrete 4 (3-2)	Geodesy 4 (2-4)
Civil Eng. Drawing II 3 (0-6)	Spherical Trigonometry and Astronomy 3 (3-0)	Highway Engineering 2 (2-0)
Hydraulic Motors 3 (2-2)	Surveying V 2 (2-0)	Thesis 4 (-)

Course in Architecture.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE.

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Constitutional History 4 (4-0)	Residences 4 (4-0)	Extempore Speaking 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 3 (0-6)
Descriptive Geometry III 2 (0-4)	Shades and Shadows 2 (0-4)	Linear Perspective I 2 (0-4)
		Industrial History 2 (2-0)

JUNIOR.

Linear Perspective II 2 (0-4)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	College Rhetoric 4 (4-0)
History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Architectural Drawing IV 3 (0-6)	Water Color Rendering 2 (0-4)	Cast and Life 2 (0-4)
	Architectural Composition I 3 (0-6)	Architectural Composition II 3 (0-6)

SENIOR.

Materials of Construction 5 (2-6)	Electrical Engineering A 4 (3-2)	Electrical Wiring & Lighting 2 (2-0)
Heating and Plumbing 5 (5-0)	Trusses 5 (2-6)	Landscape Architecture 5 (2-6)
Mural Decoration 2 (0-4)	Specifications 4 (4-0)	Seminar 4 (4-0)
Architectural Composition III 3 (0-6)	Architectural Composition IV 5 (0-10)	Thesis 7 (-)
Municipal Improvement 3 (3-0)		

Course in Architecture,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

College Algebra 4 (4-0)	Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)
Constitutional History 4 (4-0)	Residences 4 (4-0)	Extempore Speaking 2 (2-0)
Physics VIII 5 (3-4)	Physics IX 5 (3-4)	Physics X 5 (3-4)
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 3 (0-6)
Descriptive Geometry III 2 (0-4)	Shades and Shadows 2 (0-4)	Linear Perspective I 2 (0-4)
		Industrial History 2 (2-0)

JUNIOR, 1912-'13.

Integral Calculus 4 (4-0)	Economics 4 (4-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	College Rhetoric 4 (4-0)
History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Architectural Drawing IV 3 (0-6)	Water Color Rendering 2 (0-4)	Cast and Life 2 (0-4)
Linear Perspective II 2 (0-4)	Architectural Composition I 3 (0-6)	Architectural Composition II 3 (0-6)
		Graphic Statics 2 (0-4)

SENIOR, 1913-'14.

Materials of Construction 5 (2-6)	Electrical Engineering A 4 (3-2)	Electric Wiring and Lighting 2 (2-0)
Heating and Plumbing 5 (5-0)	Trusses 5 (2-6)	Landscape Architecture 5 (2-6)
Mural Decoration 2 (0-4)	Specifications 4 (4-0)	Seminar 4 (4-0)
Architectural Composition III 3 (0-6)	Architectural Composition IV 5 (0-10)	Thesis 7 (-)
Municipal Improvement 3 (3-0)		

Course in Printing.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year. Physical training is required of all young women in this course below the junior year.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Projection Drawing 1 (0-2)	Object Drawing II 2 (0-4)	Object Drawing III 2 (0-4)
Composition I 3 (0-6)	Composition II 5 (0-10)	Composition III 6 (0-12)
Woodwork I 2 (0-4)	Blacksmithing I 2 (0-4)	Machine Shop I 2 (0-4)
Algebra IV 4 (4-0)	Methods of Study 1 (1-0)	

SOPHOMORE.

College Rhetoric 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Economics 4 (4-0)	Physics VI 4 (3-2)	Physics VII 4 (3-2)
Reportorial Work I 2 (1-2)	Reportorial Work II 2 (1-2)	Reportorial Work III 2 (1-2)
Steam Engineering P 2 (1-2)	Gas Engineering P 2 (1-2)	Electric Motors P 2 (1-2)
Ad. Composition and Dist. 4 (0-8)	Job Composition and Dist. 4 (0-8)	Tabular Composition 4 (0-8)
Distribution 2 (0-4)	Correcting Proofs 2 (0-4)	Make-up and Imposition 2 (0-4)

JUNIOR.

Reportorial Work IV 2 (1-2)	Reportorial Work V 2 (1-2)	Ad. Writing 2 (1-2)
Civics 4 (4-0)	American History I 4 (4-0)	American History II 4 (4-0)
Job Presswork I 4 (0-8)	Job Presswork II 3 (0-6)	Job Presswork III 3 (0-6)
Sociology 4 (4-0)	Wage Problems 2 (2-0)	Public Finance 2 (2-0)
General Bacteriology 4 (2-4)	Business Organization 2 (2-0)	Banks and the Mechanism of Exchange 2 (2-0)
	International Law 2 (2-0)	Human Physiology 4 (4-0)
	Cutting Stock 1 (0-2)	Trimming and Tabbing 1 (0-2)
	Business Law 2 (2-0)	

SENIOR.

Psychology 4 (4-0)	Philosophy 4 (4-0)	English History 4 (4-0)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Public Speaking 4 (4-0)
Editorial Writing I 2 (1-2)	Editorial Writing II 2 (1-2)	Editorial Writing III 4 (2-4)
Cylinder Presswork I 3 (0-6)	Cylinder Presswork II 3 (0-6)	Color Comp. and Press. 2 (0-4)
Estimating Jobs 1 (0-2)	Papers, Rollers and Inks 1 (0-2)	Methods and Management 2 (0-4)
History of Printing 2 (0-4)	Modern Europe 4 (4-0)	
Editing Copy 2 (0-4)		

Course in Printing,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. Military drill is required of all young men in this course below the junior year. Physical training is required of all young women in this course below the junior year.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Methods of Study 1 (1-0)	Advanced Composition 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Free-hand Drawing 2 (0-4)	Geometrical Drawing 1 (0-2)	Object Drawing I 2 (0-4)
Composition I 2 (0-4)	Composition II 6 (0-12)	Composition III 6 (0-12)
Woodwork I 2 (0-4)	Blacksmithing I 2 (0-4)	Machine Shop I 2 (0-4)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	

SOPHOMORE, 1911-'12.

Rhetoric I 4 (4-0)	College Rhetoric 4 (4-0)	Civics 4 (4-0)
Economics 4 (4-0)	Physics VI 4 (3-2)	Physics VII 4 (3-2)
Reportorial Work I 2 (1-2)	Reportorial Work II 2 (1-2)	Reportorial Work III 2 (1-2)
Steam Engineering P 2 (1-2)	Gas Engineering P 2 (1-2)	Electric Motors P 2 (1-2)
Ad. Composition and Dist. 4 (0-8)	Job Composition and Dist. 4 (0-8)	Tabular Composition 4 (0-8)
Distribution 2 (0-4)	Correcting Proofs 2 (0-4)	Make-up and Imposition 2 (0-4)

JUNIOR, 1912-'13.

General Bacteriology 4 (2-4)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Reportorial Work IV 2 (1-2)	Reportorial Work V 2 (1-2)	Ad. Writing 2 (1-2)
American History I 4 (4-0)	Business Law 2 (2-0)	American History II 4 (4-0)
Job Presswork I 4 (0-8)	Job Presswork II 3 (0-6)	Job Presswork III 3 (0-6)
Sociology 4 (4-0)	Wage Problems 2 (2-0)	Public Finance 2 (2-0)
	Business Organization 2 (2-0)	Banks and the Mechanism of Exchange 2 (2-0)
	International Law 2 (2-0)	Trimming and Tabbing 1 (0-2)
	Cutting Stock 1 (0-2)	

SENIOR, 1913-'14.

Psychology 4 (4-0)	Philosophy 4 (4-0)	English History 4 (4-0)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Public Speaking 4 (4-0)
Editorial Writing I 2 (1-2)	Editorial Writing II 2 (1-2)	Editorial Writing III 4 (2-4)
Cylinder Presswork I 3 (0-6)	Cylinder Presswork II 3 (0-6)	Color Comp. and Press. 2 (0-4)
Estimating Jobs 1 (0-2)	Papers, Rollers and Inks 1 (0-2)	Methods and Management 2 (0-4)
History of Printing 2 (1-2)	Modern Europe 4 (4-0)	
Editing Copy 2 (0-4)		

Department of Applied Mechanics and Hydraulics.

Professor SEATON.

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of the determination of stresses in the parts of structures and machines, and the fundamental principles of the design of these parts to meet specified conditions. The course is intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems involving these principles is required both in 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 requirements of the several courses in respect to subjects described below are as follows:

1. **Applied Mechanics I.** Junior year, fall term. Class work, four hours; laboratory, two hours. Five credits. Required in the courses in engineering and architecture.

Analytical mechanics treating of composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work, energy and power. Graphical solutions of problems in statics. Textbook, Church, Mechanics of Engineering. Prerequisites, differential and integral calculus and physics X.

Laboratory.—See "Power and Experimental Engineering," 3.

2. **Applied Mechanics II.** Junior year, winter term. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in engineering and in the course in architecture.

Behavior of materials subjected to tension, compression, and shear. Riveted joints. Torsion. Shafts and the transmission of power. Strength and stiffness of beams and cantilevers. Bending moments and shear forces in beams. Design of beams of wood, cast and wrought iron, steel and reinforced concrete. Design of built-up beams and box girders. Resilience of beams. Stresses in columns and hooks. Design of columns of wood, cast iron and steel. Analytical treatment of linear arches. Textbook, Church, Mechanics of Engineering. Cambria Steel Company's Cambria steel. Prerequisite, applied mechanics I.

Laboratory.—See "Power and Experimental Engineering," 5.

3. **Applied Mechanics III.** Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in mechanical and civil engineering.

Stresses in continuous and built-in beams. Masonry arches and arch ribs. Properties of materials for reinforced concrete. Mechanical bond. Rectangular and T beams. Double reinforced beams. Web reinforcing. Columns reinforced with bars and hoops. Reinforced concrete in building construction. Design of slabs, beams, girders and columns. Textbooks, Church, Mechanics of Engineering; Turneaure and Maurer, Principles of Reinforced Concrete Construction. Prerequisite, applied mechanics II.

Laboratory.—See "Power and Experimental Engineering," 6.

4. **Graphic Statics.** Junior year, spring term. Drafting-room practice, supplemented by lectures, four hours. Two credits. Required in the courses in mechanical and civil engineering and architecture.

The graphical solution of the stresses existing in a number of typical bridge and roof trusses, with a detail design of one of the simpler forms of roof trusses. Prerequisite, applied mechanics II (may be taken simultaneously).

5. **Hydraulics.** Junior year, spring term. Class work, three hours. Three credits. Required in all the courses in engineering and in the course in architecture.

Fluid pressure, stress in containing vessels and pipes, center of pressure, stability of walls and dams. Retaining walls for earth. Immersion and flotation. Bernoulli's theorem, with applications. Flow through orifices, weirs, short and long pipes. Loss of head due to various causes. Flow of water in open channels, and measurement of same. Kutter's formula. Impulse and reaction of a jet. Power of jets. Plates moving in fluids. Textbook, Church, Mechanics of Engineering. Prerequisite, applied mechanics I.

6. **Applied Mechanics IV.** Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

Dynamics of machinery; friction, lubrication and lubricants. Textbooks, to be selected. Prerequisite, applied mechanics III.

Laboratory.—See "Power and Experimental Engineering," 9.

7. **Hydraulic Motors.** Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the courses in mechanical and civil engineering.

Elements of water power. Design, construction and operation of gravity motors, impulse wheels and turbines. Regulation of water motors. Testing of impulse wheels and turbines. Centrifugal, turbine and reciprocating pumps. Pressure engines, accumulators and hydraulic rams. Textbook, Church, Hydraulic Motors. Prequisite, hydraulics.

Laboratory.—See "Power and Experimental Engineering," 10.

8. **Hydraulic Measurements.** Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in electrical engineering.

Conditions affecting quantity of discharge from streams. Instruments and methods for its determination. Data and calculations. Suitability of streams for hydraulic power purposes. Textbook, Hoyt and Grover, River Discharge. Prerequisite, hydraulics.

Laboratory.—See "Power and Experimental Engineering," 13.

Department of Architecture and Drawing.

Professor WALTERS.
Instructor WEEKS.
Assistant PUTNAM.
Assistant MORTON.
Assistant HARRIS.

Drawing is the language of form and the key to every artistic and nearly every industrial pursuit. The educational and practical value of a systematic course in its various branches 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 pre-

liminary training required for the practice of architecture and to prepare the student to pass the examinations required of architects by many cities and states. It recognizes the fact that this instruction must have a threefold object: First, the teaching of sound modern building construction; second, the teaching of the different methods of graphic representation; and third, the development of correct taste.

The first is attained, in connection with the work in other departments, by lectures, and by extended laboratory work in heating, plumbing, concrete construction, steel construction and electric lighting, also by preparing building specifications and making investigations of the legal and ethical relations of architect, owner and contractor. The second end involves the teaching of correct perception and analysis of form. Not less than four hours per week throughout the first three years are given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, etc. The development of correct taste is probably the most difficult to accomplish. Even with the talented student its acquisition requires extended and persistent efforts of a greatly varied character. This is sought by offering much work in sketching and rendering, mural decoration, landscape architecture, architectural criticism and architectural composition. A year's work is devoted to the study of the fundamental principles of design and classic styles of the past.

1. **Free-hand Drawing.** Subfreshman, second year, fall term. Four hours, two credits. Required of all students in the subfreshman course, and two hours with one credit in the freshman year in the engineering and architectural courses for those students who have not had it previously.

Exercises in drawing simple figures illustrating the effects of geometric arrangement, radiation, repetition, symmetry, proportion, harmony and contrast. Exercises in drawing conventional plant ornaments. Free-hand lettering.

2. **Geometrical Drawing.** Subfreshman, second year, winter term. Two hours, one credit. Required of all students in the subfreshman course, and four hours with two credits in the freshman year in the engineering and architectural courses for those students who have not had it previously.

Construction of perpendiculars, parallels, angles, polygons, tangent connections, etc. Construction of the ovoid, oval, conic section curves, and the spiral. Use of T-square, triangles, drawing board, and India ink.

3. **Object Drawing I.** Subfreshman, second year, winter or spring term. Four hours, two credits. Required of all students in the subfreshman course, and in the freshman year in the engineering and architectural courses for those students who have not had it previously.

Drawing from models and simple objects. Exercises in shading from the object and from imagination. Prerequisite, geometrical drawing.

4. **Projection Drawing.** Freshman year, fall term. Two hours, one credit. For students in the course in general science and the course in printing.

Principles of orthographic projection; the section plane; rotation in space; development of surfaces; interpenetration of geometric solids.

5. **Object Drawing II.** Freshman year, fall and winter terms. Four hours, two credits. For students in the courses in home economics, general science and printing.

Drawing from models and casts; shading with the pencil and with crayon; free-hand perspective. Prerequisite, object drawing I.

6. **Object Drawing III.** Freshman year, winter or spring terms. Four hours, two credits. For students in the courses in general science, home economics and printing.

Drawing from natural objects; various methods of shading with the pen and the brush. Prerequisite, object drawing II.

7. **Descriptive Geometry I.** Freshman year, winter term. Four hours, two credits. Required of all engineering and architectural students.

Projection, rotation and measurement of the straight line and the angle in space; change of ground line; oblique projection; the plane and its traces; various problems pertaining to the straight line and the plane. Prerequisite, geometrical drawing.

8. **Descriptive Geometry II.** Freshman year, spring term. Four hours, two credits. Required of all engineering and architectural students.

The single and double curved surfaces of revolution; their tangents and tangent planes; development of surfaces of revolution; sections, interpenetrations of the cylinder, cone and sphere; construction and sections of the hyperboloid of revolution. Prerequisite, descriptive geometry I.

9. **Descriptive Geometry III.** Sophomore year, fall term. Four hours, two credits. Required of architectural students.

Theory of ruled surfaces; the parabolic hyperboloid and the hyperbolic paraboloid; the conoid and the cylinderoid; the helix and the helicoid. Isometric projection. Prerequisite, descriptive geometry II.

10. **Working Drawings.** Sophomore year, fall term. Two hours per week, one credit. Required of students in the course in home economics, and elective in the course in general science.

Designing and drawing residence plans to scale. Detail drawings of furniture and various modern conveniences.

11. **Architectural Drawing I, II, III and IV.** This work begins in the fall term of the sophomore year and covers six hours per week for four consecutive terms. Three credits each term. Required of students in the course in architecture.

The first term is given to the study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blue prints. The second term takes up the analysis and study of standard forms of the five orders. The third is devoted to the study of the modern cottage and residence, and the fourth to a study of public buildings, such as schoolhouses, churches and post-office buildings. No textbook required. Prerequisite, descriptive geometry I.

12 and 13. **Color and Design I and II.** Sophomore year, fall term, four hours, two credits; winter term, six hours, three credits. Required of students in the course in home economics.

Discussion of the nature and influence of color, its use and abuse, and the principles that underlie good design and consistent, harmonious color combinations. Original designs in construction and decoration as applied to fabrics, dress and articles of common use in the home, that young women may recognize and appreciate that which is beautiful and appropriate, and may become more discriminating as purchasers.

14. **Shades and Shadows.** Sophomore year, winter term. Four hours, two credits. Required of architectural students.

Shadows upon the planes of projection; shadows upon oblique planes and curved surfaces; shades; exercises in brush shading. Prerequisite, descriptive geometry II.

15. **Residences.** Sophomore year, winter term. Four hours, four credits. Required of architectural students.

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.

16. **Home Decoration.** Sophomore year, spring term. Four hours, two credits. Required in the course in home economics.

A study of design in its application to the home, its plan, furniture, and decorations. Emphasis is laid upon the refining and educating influence of well-chosen and appropriate decoration, the importance of simplicity being urged. Lectures on fine arts and the handicrafts, teaching that the home should show that fine art and industrial art are not to be considered separately. Problems in planning and decorating houses.

17. **Linear Perspective I.** Sophomore year, spring term. Four hours, two credits. Required of architectural students.

Vanishing points; vanishing traces; measuring points; cylindric perspective and perspective corrections. Various exercises in representing geometric solids. Prerequisite, geometrical drawing.

18. **Linear Perspective II.** Junior year, fall term. Four hours, two credits. Required of architectural students.

Shades and shadows in perspective; perspectives of buildings and ornamental details; rendering in ink; studio methods. Prerequisite, linear perspective I.

19. **History of Architecture I.** Junior year, fall term. Four hours, four credits. Required of architectural students.

This study is taught by lectures illustrated by photographs, plaster models, and stereopticon views. It comprises the study of the development of the styles of architecture of the ancient Egyptians, Chaldeans, Greeks, and Romans. Textbook, International Instruction Pamphlets Nos. 269-A-2 and 269-B-2.

20. **History of Architecture II.** Junior year, winter term. Four hours, four credits. Required of architectural students.

Study of the styles of architecture of the medieval and Renaissance periods; the Romanesque, the Byzantine, the Gothic, the Moorish, the Renaissance and the new Greek. Textbook, International Instruction Pamphlets Nos. 1085-C and 1085-D. Prerequisite, history of architecture I.

21. **Water Color Rendering.** Junior year, winter term. Four hours, Two credits. Required of architectural students.

Representation in ink and water-color washes of buildings and their landscape environments. Prerequisite, linear perspective II.

22. **Architectural Composition I, II, III and IV.** This work begins with the winter term of the junior year and extends through four consecutive terms of six hours per week, three credits per term. Required of architectural students.

The first term is given to the planning of a residence and involves the preparation of a complete set of plans, elevations, sections and detail drawings. The second term takes up the planning and drawing of a Gothic church. The third is devoted to the planning and drawing of a small public building in the Romanesque style. The fourth is given to the preparation of drawings for a modern public building in the Renaissance style. Sets of blue prints of all composition drawings must be left with the department, if required by the professor in charge of this work.

No textbook required. Prerequisites, descriptive geometry III and architectural drawing IV.

23. **Cast and Life.** Junior year, spring term. Four hours, two credits. Required of architectural students.

Pencil and crayon studies of the human form, from plaster casts, lithographs and life. Prerequisites, object drawing I and perspective I.

24. **History of Architecture III.** Junior year, spring term. Four hours, four credits. Required of architectural students.

Lectures and study of the growth of modern, and especially of American, architecture; the colonial, modern, Romanesque, mission, etc. No textbook is required. Prerequisite, history of architecture II.

25. **Mural Decoration.** Senior year, fall term. Four hours, two credits. Required of architectural students.

Each student is required to make a series of large water-color studies of interior wall-decoration schemes, including original designs for borders, centerpieces, etc.

26. **Heating and Plumbing.** Senior year, fall term. Five hours, five credits. Required of architectural students.

Discussion of the phenomena and laws of heat generation and propagation. Systems of heating by means of air, water, and steam. Modern methods of ventilation. Dry closets; water supply; plumbing; sewer construction; sewage disposition. This subject is taught by lectures. Prerequisites, graphic statics and hydraulics.

27. **Materials of Construction.** Senior year, fall term. Class work, two hours, laboratory, six hours. Five credits. Required of architectural students.

Stone and brick walls, terra cotta work, foundations, reënforced concrete construction, cast iron and steel columns, wood and steel beams. Prerequisite, graphic statics.

28. **Municipal Improvements.** Senior year, fall term. Three hours, three credits. Required of architectural students.

Construction of culverts, gutters, sewers, curbing, sidewalks, street pavements, parkways, and other public improvements. No textbook is required. Prerequisite: materials of construction is to be taken with this subject if not before.

29. **Trusses.** Senior year, winter term. Class work, two hours; laboratory six hours. Five credits. Required of architectural students.

Methods of construction and graphic analysis of standard wood and steel trusses. Textbooks, Kidder's Handbook for Architects, Nos. 97-A and 657-B of the International Textbooks. Prerequisite, materials of construction.

30. **Specifications.** Senior year, winter term. Four hours, four credits. Required of students in the course in architecture.

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 relations 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. No textbook required.

31. **Landscape Architecture.** Senior year, spring term. Class work,

two hours; laboratory, six hours. Five credits. Required of architectural students.

Discussion and study of the principles of landscape design, location and construction of roads and walks, the disposition of trees, shrubs, lawns and water as landscape features, etc.

Laboratory.—Each student is required to draw and finish in water color a set of plates representing his original designs for a home lot, a public square, a campus and a small park. No textbook is required.

32. **Seminar.** Senior year, spring term. Four hours, four credits. Required of architectural students.

Critical study of public buildings, such as the Manhattan library, the Riley county courthouse, the buildings of the College, etc. Study and discussion of the work of American architects, such as Smithmeyer, Upjohn, and Richardson. Critical study of the competitive designs for St. John's cathedral in New York, the State University of California, etc. No textbook is required.

33. **Clay Modeling.** Senior year, spring term. Four hours laboratory work. Two credits. This is required in the manual-training elective of the course in general science and may be elected by students in other courses. In includes clay and plaster modeling of architectural details, historic ornaments and decorative statuary; also methods of making plaster casts.

34. **Thesis.** Senior year, spring term. Fourteen hours, seven credits. Required of architectural students before graduation.

In the winter and spring of the senior year the student prepares a thesis, consisting of a set of original drawings, complete with details and specifications, for a public building. This work must be done in the drafting room of the department and under the supervision of the professor of architecture, who decides on the cost limit and style of the building and the size and number of plates required. Students taking the course in architecture are expected to devote their summer vacations to practical work in actual building operations.

Department of Civil Engineering.

Professor CONRAD.
Assistant STONE.

The instruction in civil engineering is given by means of lectures and recitations, and by practice in the field, the drawing room and the laboratory. The professional work begins in the spring term of the freshman year, in which the work in surveying is started, to be continued through four succeeding terms. The heaviest professional work of the course falls in the junior and senior years, during which, in addition to studies in other departments, courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railway and highway engineering, spherical trigonometry, astronomy, and geodesy. During the spring term of the senior year considerable time is devoted to thesis work.

In addition to the laboratory equipment found in the mechanical and electrical engineering laboratories, which is available to civil engineering students as well, the civil engineering department possesses a good assortment of transits, levels, plane tables, tapes, chains, etc.

1. **Surveying I.** Freshman year, spring term. Four hours field work per week. Two credits. Required of young men in courses in engineering and architecture.

This is a short elementary course in the use of surveying instruments. Practice is given in the use of surveyor's and engineer's chains and tapes, and in the use of the compass, engineer's level, and transit. The time is devoted mostly to field practice, though some time must of necessity be given to classroom instruction and the working of problems. No text is required. Prerequisite: Trigonometry must accompany or precede this course.

2. **Surveying II.** Sophomore year, fall term. One hour recitation a week, and two hours practice per week. Two credits. Required in the course in civil engneering.

Practice with engineer's levels and the transit. Care, adjustment and use of engineer's surveying instruments. Textbook, J. B. Johnson's Theory and Practice of Surveying. Prerequisite, surveying I.

3. **Surveying III.** Sophomore year, winter term. One hour recitation and four hours in drafting room per week. Three credits. Required in the course in civil engineering.

Land surveying and plotting. Textbook, J. B. Johnson's Theory and Practice of Surveying. Prerequisites, surveying I and II.

4. **Surveying IV.** Sophomore year, spring term. One hour recitation and four hours field work per week. Three credits. Required in the course in civil engineering.

Practice in the use of the stadia and plane table in topographic surveying. Textbook, J. B. Johnson's Theory and Practice of Surveying. Prerequisites, surveying I, II and III.

5. **Civil Engineering Drawing I.** Junior year, fall term. Four hours drafting-room exercises per week. Two credits. Required in the course in civil engineering.

Stereotomy, shades and shadows, isometric drawing, and perspective. The time will be devoted to the application of the elementary principles of the subjects enumerated above. These principles will be explained to the student by such short lectures as seem necessary for that purpose. No textbook is used. Prerequisites, mechanical drawing I and II.

6. **Municipal Engineering.** Junior year, winter term. Three hours recitations per week. Three credits. Required in the course in civil engineering.

This course will take up water supply, sewerage and paving. Considerable library work will be assigned to supplement the textbook work. Textbook, McCullough's Engineering Works in Towns and Cities. Prerequisite: Sanitary biology II must accompany or precede this course.

7. **Civil Engineering Drawing II.** Senior year, fall term. Six hours per week of work in the drafting room. Three credits. Required in the course in civil engineering.

This is a continuation of the preceding course in graphic statics. Considerable time is spent during the latter part of the term in working up the design of a simple roof truss. No textbook is used. Prerequisite, graphic statics.

8. **Bridge Stresses.** Senior year, fall term. Four hours recitations per week. Four credits. Required in the course in civil engineering.

A study of the algebraic method of computing stresses in roofs and bridges, leading up to the subject of structural design in the following

term. Textbook, Ketchum's Design of Highway Bridges. Prerequisite, graphic statics.

9. **Drainage and Irrigation Engineering.** Senior year, fall term. Four hours recitations per week. Four credits. Required in the course in civil engineering.

A study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground water supplies for irrigation. Any senior engineering student may enter the course. Textbook, Wilson's Irrigation Engineering. Prerequisite, hydraulics.

10. **Surveying V.** Senior year, winter term. Two hours per week, recitations and lectures. Two credits. Required in the course in civil engineering.

Hydrographic and mine surveying, and computation of volumes. Textbook, J. B. Johnson's Theory and Practice of Surveying. Prerequisites, surveying I, II, III and IV.

11. **Structural Design.** Senior year, winter term. Three hours class exercises per week, and six hours drafting-room exercises per week. Six credits. Required in the course in civil engineering.

A study of the design of timber and metal structures. Textbook, Ketchum's Design of Highway Bridges. Prerequisites, bridge stresses, applied mechanics II, and civil engineering drawing II.

Laboratory.—In the drafting room the time will be mostly devoted to working out the details of a plate girder and of a railroad or highway bridge.

12. **Masonry and Concrete.** Senior year, winter term. Three hours recitations and two hours laboratory per week. Four credits. Required in the course in civil engineering.

In this course it is aimed to acquaint the student with the fundamental principles of masonry and concrete construction as at present practiced. The course in masonry and concrete proper is preceded by a short lecture and library course in foundations. This course may be taken by any senior engineering student. Textbook, to be selected. Prerequisite, applied mechanics II.

13. **Spherical Trigonometry and Astronomy.** Senior year, winter term. Three hours recitations per week. Three credits. Required in the course in civil engineering.

This course is given to civil engineering students as a preparation for geodesy in the following term. The course, as given, is a practical one, aimed to familiarize the student with methods of determining latitude, longitude and azimuth with the ordinary engineer's instruments. Textbooks, Wentworth's Plane and Spherical Trigonometry, and Johnson's Theory and Practice of Surveying. Prerequisites, plane trigonometry and surveying IV.

14. **Railway Engineering I.** Senior year, winter term. Three hours recitations per week. Three credits. Required in the course in civil engineering.

A short course in the theory of railroad engineering. Textbooks, William G. Raymond's Elements of Railroad Engineering, and Nagle's Field Manual for Railroad Engineers. Prerequisites, surveying V and civil engineering drawing II.

15. **Railway Engineering II.** Senior year, spring term. Eight hours

of drafting-room or field exercises per week. Four credits. Required in the courses in civil engineering.

A continuation of the preceding course. The time will be devoted principally to field and office work of railway engineering. In the field a reconnoissance and survey of a short line will be made, and the office work will consist in working up the maps, profiles and estimates from the survey. Textbooks, William G. Raymond's Elements of Railroad Engineering, and Nagle's Field Manual for Railroad Engineers. Prerequisites, railroad engineering I.

16. **Geodesy.** Senior year, spring term. Two hours recitations, and four hours field work per week. Four credits. Required in the course in civil engineering.

A study of precise methods of surveying and leveling. In the field the time will be devoted to practice with the plane table, base-line measurement, triangulation, and precise leveling. Textbook, J. B. Johnson's Theory and Practice of Surveying. Prerequisites, surveying V, and spherical trigonometry and astronomy.

17. **Highway Engineering.** Senior year, spring term. Two hours per week. Two credits. Required in the course in civil engineering.

The time will be devoted to recitation, library, and lecture work dealing with the principles underlying the economical location and construction of highways. Attention will be given to the design and construction of bridges and culverts, as well as to methods of constructing and maintaining earth, gravel and stone roads. Other forms of improved road surfaces will also be considered, such as sand clay, burnt clay roads, oiled roads, etc. Textbook, to be selected. Prerequisite, railroad engineering I.

18. **Thesis.** Senior year, spring term. Four credits.

Each student in the course in civil engineering is required to present, before graduation, a thesis on some subject connected with his work or profession. This thesis is to be a report on an original investigation conducted by the student.

Department of Electrical Engineering.

Professor EYER.
Assistant LANE.

Instruction in the course is given by textbook, lectures and laboratory work. The classroom work is carefully illustrated by means of lecture-table apparatus and the projection lantern. The course is designed to provide the necessary preparation for young men who desire to engage in the practical work of electrical engineering. The course also gives an excellent preparation for men who desire to take up the work of the central station as managers, superintendents, or as consulting engineers.

The electrical laboratory for the work of the third year is well provided with standard instruments of measurement, including standards of resistance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters and galvanometers are 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 k. w. 2300-volt polyphase alternating-current generator, a 15 k. w. 125-volt alternating current generator, a 7½ k. w. synchronous converter, single and three-phase induction motors, a 5½ h. p. phase-wound induction motor, a 20 h. p. auxiliary pole 220-volt direct-current motor, a 26 h. p. 220-volt direct-current motor, a 15 k. w. 125-volt generator, a 4½ k. w. 125-volt direct-current generator, a Wood arc machine, 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, a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

1. **Electric Motors P.** Sophomore year, spring term. Two hours class work during the first half term; last half term the work is divided between class work and laboratory. Two credits. For students in printing.

Textbook, Sheldon's Direct-current Machines.

2. **Theory of Electricity I.** Junior year, fall term. Two hours per week recitations and lectures, and two hours per week electrical laboratory. Three credits. For electrical engineering students.

This course is an extension of the work in electricity given in physics X, and is a prerequisite to the 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 given to the ultimate importance to the student of a thorough understanding of these subjects. Textbook, Elementary Treatise on Electricity and Magnetism, by Foster and Porter, founded on Joubert's Treatise. Prerequisites, college physics III and integral calculus.

Laboratory.—The laboratory course continues the work of the classroom in the application of the fundamental principles, the experiments being arranged to follow the theoretical development of the subject.

3. **Theory of Electricity II.** Junior year, winter term, first half. Five hours recitation and lectures, and four hours electrical laboratory. Three and one-half credits. For electrical engineering students.

A continuation of the work begun in the fall term. Treats primarily of the general principles of electromagnetic induction, and an elementary treatment of alternating currents, including effect of inductance and capacity. Textbook, Elementary Treatise on Electricity and Magnetism, by Foster and Porter, founded on Joubert's Treatise. Prerequisite, theory of electricity I.

Laboratory.—This laboratory course consists of a series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

4. **Direct-current Machines I.** Junior year, winter term, second half. Five hours recitation or lectures and four hours laboratory per week. Three and one-half credits. For electrical engineering students.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The classroom work is planned to coördinate with the electrical engineering laboratory. Textbook, Franklin and Estey, Elements of Electrical Engineering, vol-

ume I. Prerequisites, integral calculus, and theory of electricity I and II.

Laboratory.—A series of experiments is outlined for this work, designed to require careful, accurate measurement. The student is required to make all electrical connections with the necessary instruments in the circuit and to record the required data. From the laboratory record a written report is required for each experiment or test. The laboratory exercises include, among others, tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies.

5. **Direct-current Machines II.** Junior year, spring term. Five hours lectures or recitations and four hours electrical engineering laboratory per week. Seven credits. For electrical engineering students.

This course is a continuation of direct-current machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. The latter part of the course is devoted to a detailed study of the different methods of testing generators and motors and the special application of the different classes of machines to commercial uses. Textbook, Franklin and Estey, Elements of Electrical Engineering, volume I. Prerequisite, direct-current machines I.

Laboratory.—Special attention is given in this course to the different methods of determining generator and motor efficiencies and the proper tabulation and interpretation of results.

6. **Electrical Instruments and Calibration.** Junior year, spring term. Two hours per week lectures and recitations, and two hours per week calibration laboratory. Three credits. For electrical engineering students.

A study of the different types of electrical measuring instruments and their application to electrical engineering testing.

Laboratory.—Includes the calibration of both direct- and alternating-current measuring instruments and their uses in measuring current, potential power, resistance, inductance and capacity. Textbook, Electric and Magnetic Measurements, by Roller, supplemented by lectures. Prerequisites, theory of electricity I and II.

7. **Direct-current Machine Design.** Senior year, fall term. One hour per week lectures and two hours computation per week. Two credits. For electrical engineering students.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Prerequisite, direct-current machines II.

8. **Alternating-current Machines I.** Senior year, fall term. Four hours recitations or lectures and four hours laboratory per week. Six credits. For electrical engineering students.

The term's 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. Textbook, Franklin and Estey, Elements of Electrical Engineering, volume II. Prerequisites, integral calculus, and theory of electricity I and II.

Laboratory.—It is the aim of this course to provide a series of experiments illustrating the theoretical work of the classroom. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

9. **Electrical Engineering M-I.** Senior year, fall term. Three hours lectures or recitations, two hours laboratory. Four credits. For mechanical engineering students.

This course aims to cover the subject of direct-current machines with reference to the fundamental laws of the electric circuit; the principles of direct-current machinery, and the more important commercial tests. Textbook, Sheldon's Direct-current Machines.

Laboratory.—Practice is given in the proper use of electrical measuring instruments. The experiments given include a variety of tests requiring accurate observation and a knowledge of the theory of dynamo machines. The various standard characteristic and efficiency tests are given. A written report on each test is required.

10. **Electrical Engineering M-II.** Senior year, winter term. Three hours lectures and recitations and two hours laboratory per week. Four credits. For mechanical engineering students.

This term's work aims to cover briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to operation and adaptability to different classes of service. Textbook, Sheldon's Alternating-current Machines. Prerequisites, physics V and integral calculus.

Laboratory.—The experimental work in this course includes practice in the use of alternating-current instruments; standard tests of alternators, motors and transformers, and methods of operating the different types of alternating-current machinery.

11. **Alternating-current Machines II.** Senior year, winter term. Four hours recitations or lectures and four hours laboratory per week. Six credits. For electrical engineering students.

This is a continuation of alternating-current machines I. The work 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 use and application of the different types of machinery to industrial work. Textbook, Franklin and Estey, Elements of Electrical Engineering, volume II. Prerequisite, alternating-current machines I.

12. **Illuminating Engineering.** Senior year, winter term. Four hours lectures or recitations and two hours laboratory per week. Five credits. For electrical engineering students.

The term's work is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied.

13. **Telephone Engineering.** Senior year, winter term. Class work, four hours; laboratory, two hours. Five credits. For electrical engineering students. Optional with illuminating engineering or electric railway practice.

This course consists of a study of the principles of acoustics and alternating phenomena involved in telephone practice. A detailed study is made of telephone apparatus and circuits with reference to their adaptation to various kinds of telephone service. This is followed by a study of the design and maintenance of telephone lines and central-office apparatus, central-office methods, selection of apparatus and methods of handling telephone traffic. Textbook, Abbot's Telephony.

14. **Electric Traction Practice.** Senior year, winter term. Class work, four hours; laboratory, two hours. Five credits. For electrical engineering students. Optional with illuminating engineering or telephone engineering.

A course of recitations and lectures, designed to cover briefly the design of direct-current and alternating-current systems of railway operation, and the adaptation of each to different classes of service. Practical tests are made on the Manhattan City and Interurban Railway during the course.

15. **Electrical Engineering A and C.** Senior year, winter and spring terms, respectively. Three hours recitations or lectures, and two hours laboratory practice. Four credits. For courses in architecture and civil engineering.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current machinery. Emphasis is laid upon the proper installation and operation of the different classes of machines.

Laboratory.—The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. Written reports of each laboratory test is required. Prerequisites, physics V and integral calculus.

16. **Alternating-current Machine Design.** Senior year, spring term. Two hours per week lectures and computing. Two credits. For electrical engineering students.

Embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine. Prerequisite, alternating-current machines II.

17. **Generation and Distribution of Electrical Energy.** Senior year, spring term. Five hours per week recitations or lectures. Five credits. For electrical engineering students.

This course is designed to cover station operation and management, methods of power transmission and systems of distribution. Each student is assigned an important electrical power station, upon which a detailed written report is required.

18. **Power Plant Specifications.** Senior year, spring term. Three hours per week recitations and reports. Three credits. For electrical engineering students.

This work relates to the design and equipment of a modern power plant. Complete specifications for the necessary machinery and apparatus, with drawings showing plan of building and location of machinery and apparatus, are required.

19. **Electric Wiring and Lighting.** Senior year, spring term. Two hours class work per week. Two credits. For architectural students.

This work is planned to cover briefly the principles of illumination, the proper distribution of lighting units, photometric measurements, and inspection work, as based on the "National Electrical Code."

20. **Inspection Trips.** Senior year, spring term. Two credits. For electrical engineering students.

Visits are made to the different power stations in the vicinity of Manhattan, and in Kansas City, Mo., where special problems in central-station work are studied. A written report of each inspection trip is required.

21. **Thesis.** Senior year, spring term. Six credits. Required of electrical engineering students before graduation.

The selection of a subject for thesis work, in consultation with the head of the department, is made at the beginning of the winter term. The work is continued during the winter and spring terms. Every opportunity is given the student to work out original ideas as to design or operation.

Department of Mechanical Drawing and Machine Design.

Professor SEATON.
Assistant BOWERMAN.

The instruction given in this department begins in the sophomore year and extends throughout the remaining years of the course in mechanical engineering and into the junior year in the courses in electrical and civil engineering. In addition to this is taken up the work that is given to students in the course in general science who are specializing in manual training. The object of the course is to ground the students thoroughly in the rudiments of drafting, lettering, titling, etc., rather than to give them speed in execution. The course includes lettering, titling, arrangement of views in machine drawing, the making of detailed working drawings for a complete machine, drawings for factories and power plants, and instruction and practice in the blue-printing and other copying processes.

1. **Mechanical Drawing I.** Sophomore year, fall term. One hour lectures and recitations and four hours drafting-room practice per week. Three credits. For students in courses in mechanical, electrical and civil engineering.

The fundamental principles of lettering, with a detailed study of the proportions and construction of the inclined Gothic system of letters and figures. Use and care of drawing instruments. Simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance and to the subject matter and layout of titles and notes. Supplies required: Triangles, T square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies till after consulting with the instructor. Textbook, Adams's Mechanical Drawing. Prerequisite, descriptive geometry.

2. **Kinematics I.** Sophomore year, winter term. Four hours lectures and recitations per week. Four credits. For students in the courses in mechanical, electrical and civil engineering.

An analysis of the motions and forms of the parts of machines. 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 their velocity diagrams; quick returns, straight-line motions and other special forms of linkages; conjugate curves for gear teeth, cycloidal and involute systems of gearing, spur, annular and bevel gears, and special forms of gearing. The solution of a large number of graphical and mathematical problems is required in this course. Textbook, Schwamb and Merrill's Elements of Mechanism. Prerequisite, trigonometry.

3. **Mechanical Drawing II.** Sophomore year, winter term. Drafting-room practice, supplemented by occasional lectures, four hours per week.

Two credits. For students in the courses in mechanical, electrical and civil engineering.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. Proper selection of views to give the necessary information in a convenient form, and the proper dimensioning of the drawings, are given special emphasis. Textbook, Adams's Mechanical Drawing. Prerequisite, mechanical drawing I.

4. **Mechanical Drawing III.** Sophomore year, spring term. Four hours drafting-room practice per week. Two credits. For students in the courses in mechanical, electrical and civil engineering.

The design of cams, gears and quick returns to fulfill specified conditions. Center-line drawings are first made, embodying the solution of the problem, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and drawn from templates prepared by the student. Prerequisites, kinematics I and mechanical drawing II.

5. **Kinematics II.** Junior year, fall term. Two hours lectures and recitations and two hours drafting-room practice per week. Three credits. For students in course in mechanical engineering.

A continuation of kinematics I, consisting of a consideration of the following subjects: Mechanisms for producing intermittent motion, such as clicks, ratchets and escapements; wheels in trains, and combinations of mechanisms. Textbook, Schwamb and Merrill's Elements of Mechanism. Prerequisite, kinematics I.

6. **Mechanical Drawing IV.** Junior year, fall term. Four hours drafting-room practice per week. Two credits. For students in the course in electrical engineering.

A continuation of the work in mechanical drawing III, together with the design of other machine elements not requiring a knowledge of mechanics of materials. Prerequisite, mechanical drawing III.

7. **Machine Design I.** Junior year, winter term. One hour recitations and lectures and four hours drafting-room practice per week. Three credits. For students in course in mechanical engineering.

Solution of a problem on the slide valve by the Zeuner diagram, followed by the design of the cylinder, piston, steam chest and valve of a steam engine. Textbooks: Machine design text to be selected; also, for reference, Kent's Mechanical Engineer's Pocketbook.

8. **Machine Design II.** Junior year, spring term. One hour recitations and lectures and four hours drafting-room practice per week. Three credits. For students in course in mechanical engineering.

The design of the crosshead, guides, connecting-rod crank shaft, fly wheel governing mechanism and frame for the engine whose design is begun in machine design I. In both of these courses full working drawings are made of the parts designed.

9. **Manual Training Drawing I.** Senior year, fall term. Two hours per week. Four credits. For students in manual training option in course in general science.

Perspective sketches of simple details of construction. Projection drawings with tracings and blue prints of exercises, models and projects made in woodworking III G.

10. **Manual Training Drawing II.** Senior year, winter term. Eight hours drawing per week. Four credits. For students in manual training option in course in general science.

Cabinet and projection drawings of articles made in woodworking IV G wood turning, and pattern making.

11. **Manual Training Drawing III.** Senior year, spring term. Four hours drawing per week. Two credits. For students in manual training option in course in general science.

Isometric and projection drawings of articles made in blacksmithing and in machine-shop practice.

Department of Power and Experimental Engineering.

Professor MCCORMICK.
Assistant ORR.
Assistant JOHNSON.

The work given in this department is intended to supplement the courses given in applied mechanics, hydraulics, machine design, and steam and gas engineering. The instructor aims to show the application of theoretical principles to actual problems, to teach the methods of carrying on commercial tests, and to encourage original experimental investigation. The student is required to hand in a complete report for each experiment performed. This report will include such charts, tables and conclusions as would be embodied in a report given by a consulting engineer in commercial work.

In addition to the equipment bought especially for experimental purposes, all of the heat, power, ventilating and pumping equipment of the College is installed for the purpose of being used for experimental work.

There are available for boiler tests three 125-horsepower high-pressure boilers identical in construction and setting, but equipped with different mechanical stokers, one having an underfeed stoker, another a chain grate, and a third a rocking grate. Besides the three high-pressure boilers there are eight low-pressure boilers equipped with underfeed stokers and so arranged that they can be run independently or in batteries. These boilers have full equipment of auxiliaries and, in connection with the engines and dynamos, permit of a wide range of experimental work being done.

The laboratories contain five steam engines, ranging from 6 to 100 horsepower, and a 300-horsepower DeLaval steam turbine. One of these engines and the turbine are direct connected to generators. Another of the engines is belted to a generator, while the others are run in connection with absorption brakes.

The department owns two modern traction engines which are occasionally used for testing purposes.

Several types of gas engines are in the laboratories, ranging from three to ten horsepower, and in addition a four-cycle gasoline tractor which will develop thirty-five horsepower.

A small compressed-air plant is installed in the laboratories. This plant consists of an eight-by-eight Ingersoll-Sargent air compressor, driven by an electric generator, and in turn driving a small motor whose power is absorbed by a brake.

For experimental work with fans and draft, the College has eight

fans, of which two are belt driven, four are direct connected to motors, and two are driven by a steam engine.

The thermodynamic and hydraulic laboratories are thoroughly equipped with auxiliary apparatus, such as gauges, thermometers, brakes, calorimeters, etc.

There is a 100-horsepower producer-gas plant which is used for experimental purposes.

In the strength-of-materials laboratory there is a 100,000-pound Riehle tension and compression machine, upon which transverse specimens six feet in length can be tested; a beam-testing apparatus, built at the College, which will test reënforced concrete culvert and bridge sections up to two feet in width and fourteen feet in span, and will test beams of timber or reënforced concrete up to ten inches by fourteen inches in cross-section and fourteen feet in length. There is a full equipment of cement and concrete testing machinery and apparatus; a rumbler and other appliances for testing paving brick and other road materials.

The transmission laboratory contains transmission and traction dynamometer, oil- and bearing-testing machine, belt-testing apparatus, etc.

1. **Steam Engineering P Laboratory.** Sophomore year, fall term. Two hours per week. One credit. For students in printing.

Practice in the operation and care of small steam engines and boilers, with particular attention paid to methods of adjustments and emergency repairs. Prerequisite, machine shop I.

2. **Gas Engineering P Laboratory.** Sophomore year, winter term. Two hours laboratory practice per week. One credit. Required in the course in printing.

Practice in the operation, adjustment and repair of small gasoline engines and exercises in aligning shafting, babbitting bearings, lacing belts, etc. Prerequisite, machine shop I.

3. **Applied Mechanics I Laboratory.** Junior year, fall term. Two hours per week. One credit. For students in the courses in mechanical, electrical and civil engineering, and architecture. Taken in connection with applied mechanics I.

This course covers laboratory instruction in subjects as follows: Use and the determination of accuracy of micrometers, planimeters, slide rules and calculating machines. Calibration of gauges, thermometers, planimeters, indicator springs, dynamometers, platform scales and tachometers. Efficiency tests on hoists and jacks. Textbook, Carpenter's Experimental Engineering.

4. **Steam Engineering II Laboratory.** Junior year, winter term. Two hours per week. One credit. For students in the course in mechanical engineering. Taken in connection with steam engineering II.

This course begins with the study of the construction and care of steam engines, steam turbines and internal-combustion engines. This is followed by valve setting and by indicator practice on steam and gas engines. Prerequisites, applied mechanics I laboratory, and steam engineering I.

5. **Applied Mechanics II Laboratory.** Junior year, winter term. Two hours per week. One credit. For students in the courses in mechanical, electrical and civil engineering, and architecture. Taken in connection with applied mechanics II.

This course covers the following experiments: Compression tests of

various woods and metals; tensile tests with cast iron, wrought iron and steel; transverse tests of various woods and metals under concentrated and eccentric loads; tests of welds, hooks and chains; preparation of standard tensile and compression cement specimens; the use of cement-testing machines. Prerequisite, applied mechanics I laboratory.

6. **Applied Mechanics III Laboratory.** Junior year, spring term. Two hours per week. One credit. For students in mechanical and civil engineering. Taken in connection with applied mechanics III.

Tests of cements, sands and concretes, such as the determination of fineness, soundness, time of set, tensile, transverse and compressive strengths, proper proportioning and mixing of concretes. The use of cement mixers and cement-block machines and the efficiency of the various reënforcing materials. Abrasion, freezing, absorption, compression, and transverse tests of brick and stone. Torsion tests on metals. Tests of road materials. Prerequisite, applied mechanics II.

7. **Steam Engineering III Laboratory.** Junior year, spring term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with steam engineering III.

A continuation of the work given in steam engineering II laboratory, and includes testing of steam engines, steam turbines and gas engines; the use of several different kinds of steam calorimeters and injectors; tests of air compressors and air motors. Prerequisite, steam engineering II.

8. **Steam Engineering IV Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with steam engineering IV.

This term's work includes the handling and care of boilers, stokers and pumps; boiler testing; condenser testing; pump and fan testing; analysis of solid fuels and of flue gases. Prerequisite, steam engineering III.

9. **Applied Mechanics IV Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with applied mechanics IV.

Tests of bearings and lubricants; impact tests; foundations for machines; road tests with traction dynamometer; measurements of power in transmission, and of slippage of belts. Prerequisite, applied mechanics III.

10. **Hydraulic Motors Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical and civil engineering. Taken in connection with hydraulic motors.

Tests to determine the coefficients of weirs, orifices, tubes and pipes; use and calibration of water meters; tests on water wheels, water motors, rams and pumps. Prerequisites, hydraulics and applied mechanics I laboratory.

11. **Steam and Gas Engineering E-I Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with steam and gas engineering E-I.

Construction and care of steam engines, steam turbines, internal-combustion engines; indicator practice and valve setting; analysis of liquid and gaseous fuels by the Junker's calorimeter; the use of different kinds of steam calorimeters. Prerequisite, applied mechanics I laboratory.

12. **Steam and Gas Engineering C Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in civil engineering. Taken in connection with steam and gas engineering C.

Construction and care of steam and internal-combustion engines; indicator practice and valve setting; use of steam calorimeters; use of the Junker's gas calorimeter; tests of steam and gas engines; air compressor and compressed-air motor tests. Prerequisite, applied mechanics I laboratory.

13. **Hydraulic Measurements.** Senior year, fall term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with class work in hydraulic measurements.

Measurement of the flow of water by means of weirs, orifices, tubes, pipes and water meters; stream measurements for water and water supply. Prerequisite, hydraulics.

14. **Gas Engineering Laboratory.** Senior year, winter term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with gas engineering.

This course includes the handling and care of gas producers; proximate and ultimate analyses of liquid and gaseous fuels; determination of the boiling point of kerosene, gasoline and alcohol, and the variation of same with the specific gravity of the fuel; proportions for explosive mixtures; pressure due to explosion; experimental determinations of conditions affecting the mean effective pressure of internal-combustion engines; comparative values of gasoline, kerosene and alcohol, in the same internal-combustion engine; effect of jacket temperature on thermal efficiency; complete producer and gas-engine tests. Prerequisite, steam engineering IV.

15. **Steam and Gas Engineering E-II Laboratory.** Senior year, winter term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with steam and gas engineering E-II.

Testing of steam engines, steam turbines and internal-combustion engines; use and calibration of injectors; tests of condensers, pumps and fans; tests of air compressors and air motors. Prerequisite, steam and gas engineering E-I.

16. **Mill Engineering.** Senior year, winter term. Two hours lectures and recitations; six hours drafting-room work. Five credits. For students in mechanical engineering.

This course considers the selection of a locality and site for shops and manufacturing establishments; the grouping and design of the buildings, including the study of slow-burning and fireproof construction; systems of illumination; equipment for the different departments; the methods of handling the raw material, from the point of its receipt through the several departments to the completion of the finished product, with the least amount of doubling back; methods of manufacturing. Each student makes a complete design of a factory or shop, outlining the method of organization, system of cost, accounting, marketing, etc. Textbooks, Kent's Mechanical Engineer's Pocketbook and Arnold's Factory Manager. Prerequisite, applied mechanics IV and business organization.

17. **Heating and Ventilation.** Senior year, spring term. Three hours lectures and recitations; four hours laboratory and drafting-room work. Five credits. For students in mechanical engineering.

This course is planned to acquaint the student with the fundamental principles of the subject, and the following topics are considered: Direct and indirect systems; hot water, hot air, live steam and exhaust steam systems of heating; points to be considered in the design of heating systems for shops, factories, power plants, schools, churches and dwellings;

sizes of air ducts, radiators and heating surface required for the various systems; fan computation and testing; vacuum system; reducing valves, air valves, water expansion tanks, thermostats; efficiencies of various heating systems and analysis of the systems in use at the College; the design of a system of heating for a special case with specifications and bill of material. Textbook, to be selected. Prerequisites, steam engineering II, III and IV.

18. **Power Plant Engineering.** Senior year, spring term. Two hours lectures and recitations; six hours laboratory and drafting-room work. Five credits. For students in mechanical engineering.

This course consists of drafting-room work, power-plant tests, and such lectures, recitations and inspection trips as may be needed to make the course practical and effective. The work includes the laying out of a complete plant for assigned units, and the making of such drawings as are necessary to show the location of boilers, stokers, engines, auxiliaries, piping, chimneys, fans, coal-handling machinery, etc. The student makes a careful study of load conditions, location of plant and other details. No attempt is made to design apparatus, but standard makes are selected and the student shows in detail the methods of assembling and installing all the machinery and equipment used. The same problem is assigned to the entire class, but during any one term there will be designs of several plants under way. The usual features of each design are taken up before the entire class, so that each student derives benefit from his neighbor's work as well as from his own. Textbook, to be selected. Prerequisites, steam engineering IV, applied mechanics IV, hydraulic motors and gas engineering, taken simultaneously.

Department of Printing.

Superintendent RICKMAN.
Assistant RODELL.
Assistant ALLEN.

The department of printing has been given a permanent home in a building set aside for it. This is 70 x 84 feet, two stories and basement, and contains twelve work rooms, six offices and three lavatories. The department at present occupies thirteen of these rooms, and more will be added as needed. The shop is a model one. Work on two stated publications and the varied "jobs" for the several departments of the College gives practical experience on a wide range of work.

The department operates a well-equipped printing office. The equipment consists of a Babcock Optimus, three Chandler & Price Gordons, perforator, stitcher, and other modern machines, all run by electric power; a large assortment of job faces, all in series and in cabinets, and enough body type to keep two regular publications going, besides the numerous pamphlets, bulletins, etc., constantly on hand.

1. **Composition I.** Freshman year, fall term. Laboratory, six hours. Three credits. Required in the course in printing.

The student is taken to the case, shown the "lay," and explanation is made why so arranged. As soon as he is familiar with the boxes most used he is given a list of short sentences, each of which contains all the letters of the alphabet, and he begins typesetting. The importance of accuracy and clean proofs is impressed upon him, and each day's work is graded with this point in view rather than the amount of type set.

Within a short time he is given copy for one of the regular publications, beginning with newspaper width (13 ems) and later taking up book work (26 ems).

2. **Composition II.** Freshman year, winter term. Laboratory, ten hours. Five credits. Required in the course in printing.

Continuation of composition I. Careful justification and even spacing are emphasized as the student progresses. Prerequisite, composition I.

3. **Composition III.** Freshman year, spring term. Laboratory, twelve hours. Six credits. Required in the course in printing.

Continuation of composition I and II. Prerequisites, composition I and II.

4. **Distribution.** Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the course in printing.

Distribution of straight matter. Prerequisites, composition I, II and III.

5. **Reportorial Work I, II, III, IV and V.** Begins fall term of sophomore year and runs five consecutive terms. One hour class work, two hours laboratory. Two credits each term. Required of students in the course in printing.

By means of lectures and the study of books on journalism and newspaper making, the student is taught the rudiments of reporting, beginning at first with small news items and gradually enlarging his scope. Regular assignments are given out, covering events happening on the campus or in Manhattan. Special feature stories are given to the dailies for publication.

6. **Advertisement Composition and Distribution.** Sophomore year, fall term. Laboratory, eight hours. Four credits. Required in the course in printing.

At first the student is given copy accompanied by a "draft," or style. Proper selection of type, distribution of white space, relative length and position of lines, etc., are explained. His proofs are critically examined and the defects pointed out. After corrections are made he takes a "revise" and notes effect of changes by comparison. As soon as competency justifies he is told to make his own "draft." After sufficient practice at this he sets his ads. without "draft." During this term he gets considerable drill in the point system. Prerequisites, composition I, II and III.

7. **Job Composition and Distribution.** Sophomore year, winter term. Laboratory, eight hours. Four credits. Required in the course in printing.

Many of the important features of a well-balanced job having been learned while working on ads., the student soon becomes proficient. At first he is given reprint copy for reproduction, later taking up manuscript copy. Careful distribution of the job faces is insisted upon, with the result that the job man always finds a "clean" case. The student keeps a record of the time occupied on the various jobs, which fits him to later on take up estimating of jobs. Prerequisites, composition I, II and III, and advertisement composition and distribution.

8. **Correcting Proofs.** Sophomore year, winter term. Laboratory, four hours. Two credits. Required in the course in printing.

Consists of correcting galleys of straight matter. Prerequisites, composition I II and III.

9. **Make-up and Imposition.** Sophomore year, spring term. Laboratory, four hours. Two credits. Required in the course in printing.

This is taught at first by explaining the systems of "work and turn," "work and back," etc., cardboard pages being used for demonstration when type pages are not at hand. Then the student learns to "cut out" pages and lay an eight-page or sixteen-page form. He also "lines up" on the stone for a perfect register, and is taught to figure margins, before and after trimming. Prerequisites, composition, distribution, and correcting proofs.

10. **Tabular Composition,** Sophomore year, spring term. Laboratory, eight hours. Four credits. Required in the course in printing.

The student is taught to "cast up" his tables and reduce them to any desired size. Everything is reduced to the point system. Prerequisites, composition I, II and III, distribution, correcting proofs, and ad. and job composition.

11. **Job Presswork I, II and III.** Junior year, fall term, laboratory eight hours, four credits; winter term, laboratory six hours, three credits; spring term, laboratory six hours, three credits. Required in the course in printing.

Actual work is taken up in the beginning. The student is given the easy "feeds" at slow speed, the speed being increased as he becomes familiar with his work. Running at a moderate speed and "hitting the gauges every time" is considered the best work. Overlays and underlays, quantity and quality of ink, rigidity and evenness of impression, etc., are all impressed upon the student. With the job presswork, instruction is given in the grades, weights and sizes of paper, especially linens, flats, ledgers, etc., and also in the care of rollers. Cutting stock, trimming and tabbing, stapling, folding, inserting, etc., are all taken up while working on the presses.

12. **Cutting Stock.** Junior year, winter term. Laboratory, two hours. One credit. Required in the course in printing.

This includes getting out stock and cutting ready for press, allowing margins before and after trimming.

13. **Trimming and Tabbing.** Junior year, spring term. Laboratory, two hours. One credit. Required in the course in printing.

In stock cutting the student gets instruction in margins, but in trimming and tabbing the proper proportion of margins and neatest and most effective tabbing are emphasized. Prerequisite, cutting stock.

14. **Advertisement Writing.** Junior year, spring term. Class work one hour per week and laboratory two hours per week. Two credits. Required in the course in printing.

Takes up first the classification of advertising, the article, the selling forces, the market, the medium, etc., enabling the student to comprehend the details involved in selling through publicity; then a study of advertisements covering every phase of advertising work; and, finally, through practice and instruction, in the preparation of copy. Prerequisite, advertisement composition.

15. **Editing Copy.** Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in printing.

While setting type the student is told to watch the editing of his copy. The marks on his proofs are also a help. Construction and punctuation are some of the main features taken up. The upper classmen will oftentimes do the editing of the copy of the lower classmen. The work is all

practical. Prerequisites, composition I, II and III, and the English work in the course.

16. **Estimating Jobs.** Senior year, fall term. Laboratory, two hours. One credit. Required in the course in printing.

Having had most of his experience in all the work of a printing office, and taught the value of keeping time tickets on himself, he is then given practical instruction in estimating on the actual jobs put through the department, which, after completion, are compared with the student's estimates. Prerequisites, sufficient composing-room and pressroom work to give the student an idea of how much time it would require a compositor or pressman, according to wages paid, to handle the job.

17. **Cylinder Presswork I and II.** Senior year, fall term, laboratory six hours, three credits; winter term, laboratory six hours, three credits. Required in the course in printing.

A Babcock No. 5 Optimus is used in the printing department, and the student gets experience in printing book forms, half-tones, rule work, posters—in fact, all the work done on a cylinder press. Here he learns more about papers, rollers and inks, care of machines, motors, etc.

18. **History of Printing.** Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in printing.

Many interesting books on the history and development of printing are placed at the student's disposal. For the present this is largely library work.

19. **Editorial Writing I, II and III.** Senior year, fall, winter and spring terms, respectively. In fall and winter terms, one hour class work and two hours laboratory, two credits each term; in the spring term, two hours class work and four hours laboratory, four credits.

The student is taught the general principles underlying editorial work in its various phases. This is supplemented by a study of the editorial pages of the various newspapers and magazines. The student is given topics for comment ranging from critical interpretation of current news to articles embracing social and political history, etc., and he will be required to make extensive use of the College library with its exceptional supply of late and bound magazines, books of reference, encyclopedias, etc., in this course. Prerequisites, reportorial work I, II, III, IV and V.

20. **Papers, Rollers and Inks.** Senior year, winter term. Laboratory, two hours. One credit. Required in the course in printing.

Much of the instruction along this line is given while the student is taking his instruction on job and cylinder presses. Prerequisites, all presswork.

21. **Color Composition and Presswork.** Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in printing.

Having had composing-room and pressroom instruction, this work consists largely of dividing forms for color work and selecting pleasing and attractive colors. Mixing inks and matching tints or shades are also taken up. Prerequisites, all composing-room and pressroom work.

22. **Methods and Management.** Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in printing.

This includes the business end of the office, methods of handling employees, buying stock and material, keeping tab on the output of the shop, and the job-tracer system, by which, when a job is completed, the cost to a penny may be known with little outlay of time or expense.

Cleanliness, keeping the stones clear and the dead type in cases, are emphasized by examples. Most of the work in the course should be completed, so that the student may more thoroughly understand the nature of the work.

Department of Shop Methods and Practice.

Assistant Professor BRAY.
Instructor HOUSE.
Instructor WABNITZ.
Instructor RIDENOUR.
Instructor HOLLAR.
Assistant PARKER.
Assistant MILLIARD.

The work in the shops is planned to meet the needs of three classes of students: (1) Those in the courses in agriculture who expect to use the skill gained in the shops in their after work on the farm. (2) Those in the manual training option of the course in general science who need to secure a sufficient knowledge of the principles undelying shop work and sufficient skill in the performance of various operations to instruct others in this work. (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; the machines best suited for the different purposes; the amount of work that may be expected of the different machines and from the workmen under different conditions. With these students it is a secondary consideration to secure skill in the performance of the various operations.

In order to secure these different results, it is considered desirable to separate these students, especially after the first few terms of elementary work.

The equipment of the department is set forth to a certain extent below.

Wood Shop.—This room is 40 x 90 feet; contains 220 separate sets of tools, and benches for forty-four students in each class.

Pattern Shop.—This room is 45 x 81 feet; contains twenty ten-inch by four-and-one-half-inch wood turning lathes and one eighteen-inch by twelve-foot J. A. Fay & Co. pattern makers' lathe, fully equipped with tools and chucks; eight pattern makers' double benches, equipped with rapid acting vises and a complete set of tools.

Woodworking Machinery Room.—This room is 35 x 42 feet, and contains one Dietzwell wood planer, one Coodesman Meyer friezer, one thirty-four-inch band saw, one Beach jig saw, one Fay combination circular saw, one Fay & Egan power mortiser, one Fay & Egan sandpapering machine, besides the necessary grindstones and work benches.

Machine Shop.—This room is 40 x 116 feet, and contains thirteen engine lathes, as follows: One fourteen-inch Hendey-Norton lathe, two fourteen-inch Flather lathes, one thirteen-inch Lodge & Davis lathe, one sixteen-inch Lodge & Shipley combination engine and turret lathe, two fourteen-inch Reed lathes, five fourteen-inch K. S. A. C. lathes, and one twenty-eight-inch by twenty-foot American lathe equipped with blocks to raise it to sixty-inch swing, one K. S. A. C. speed lathe, one Brown & Sharp No. 2 universal milling machine, one K. S. A. C. (Hendey-Norton patterns) shaper, one K. S. A. C. (Pratt & Whitney patterns) shaper, one Gray twenty-six-inch by six-foot planer, one Niles fifty-one-inch vertical turning and boring mill, one Baker Bros. key seater, one Barns thirty-four-inch self-feed drill press, one Rogers twelve-inch sensitive drill press, two K. S. A. C. twelve-inch sensitive drill presses, one K. S. A. C. (Bemis

Millers patterns), twenty-inch double traverse quick return shaper, two Morse & Dexter valve reseating machines, one Walker universal grinder, one K. S. A. C. special drill grinder, one Emerson direct connected motor polishing machine, one bolt machine, one pipe machine, benches and tools for fifty students, and a tool room completely stocked with the finest modern tools.

Blacksmith Shop.—This room is 50 x 100 feet, equipped with thirty-three Buffalo down-draft forges for students' use, and two large special Buffalo forges for general use. Each forge has anvil and complete set of forging tools and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop, there is also installed a drill press, punch and shear, emery grinder, power cold saw, and a number of pieces of special apparatus built by the department.

Iron Foundry.—This room is 27 x 100 feet, equipped with a two-ton Collan cupola, one-and-one-half-ton K. S. A. C. steel crane, core oven five by six by seven feet, arranged so that it can be heated with either coke or gas, one car, track and turntable, one two-by-three-foot K. S. A. C. rumbler, one K. S. A. C. emery grinder, an exceptionally large number of flasks, both wood and iron, ladles, etc.

Brass Foundry.—This room is 24 x 34 feet, equipped with one twenty-one by thirty-six-inch brass furnace, crucibles, flasks, molding tubs, benches, cases, racks, and all necessary tools for bench and floor molding.

Amphitheater.—This room is 54 x 54½ feet, adjacent to blacksmith shop and iron and brass foundries; equipped with forge anvil and forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

Locker Room.—This room is 36 x 40 feet, conveniently located, and equipped with 344 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory.

1. **Woodwork I.** Subfreshman, first year, fall term. Shop work, supplemented by frequent lectures, four hours per week. Two credits. Required of all male students in the subfreshman years, and of students in the courses in engineering, architecture and printing in the freshman year.

A graded set of problems in joinery is given, together with practice in working to dimensions and the proper use and care of bench tools. Tools required, two-foot pocket folding rule. No prerequisite.

2. **Woodwork II.** Subfreshman, first year, winter term. Shop work, supplemented by frequent lectures, four hours per week. Two credits. Required of all male students in the subfreshman years, and of students in the courses in engineering and architecture in the freshman year.

This work is a continuation of woodwork I with the application of joinery to cabinet construction. A study is made of the various woods used, methods of holding parts together, and the methods of staining, rubbing and polishing both hard and soft woods. Prerequisite, woodwork I.

3. **Blacksmithing I.** Subfreshman, first year, spring term. Shop work, supplemented by lectures and demonstrations, four hours per week. Two credits. Required of all male students in the subfreshman year, and of students in the courses in engineering, architecture and printing in the freshman year.

A course in the forging of iron designed to teach the operations of drawing, upsetting, welding, twisting, splitting and punching. A study is made of the construction, care and management of the forge, together

with a study of the smelting of iron ore and the manufacturing of iron and steel. Tools required: Two-foot rule, one pair of five-inch outside calipers. Prerequisite, woodwork II.

4. **Blacksmithing II.** Subfreshman, second year, winter term, and sophomore year, fall term. Four hours shop. Two credits. Required in the subfreshman course and in the courses in mechanical and electrical engineering and in manual training option of course in general science.

Advanced work in the forging of iron and the manufacture of steel tools. Instruction is given in tempering, case-hardening, and annealing. Tools required: Two-foot rule, one pair of five-inch outside calipers. Prerequisite, blacksmithing I.

5. **Blacksmithing III Ag.** Freshman year, spring term. Six hours shop work per week. Three credits. For agricultural students.

The shop work given in this course is primarily the work in wagon and implement smithing, and instruction in the shaping and fitting of horseshoes; this latter part of the course being intended to supplement the work given in the veterinary department on the structure of the horse's hoof and the methods of shoeing to overcome certain faults or to bring out desired results. This course is based on the supposition that the students have had either the work in the shop given in the subfreshman years, its equivalent in work pursued in other schools, or experience gained in a shop or on the farm. Those who show that they have not the necessary training successfully to carry on this work will be required to substitute the elementary shop. Prerequisite, blacksmithing I.

6. **Foundry.** Sophomore year, winter term. One hour lecture and four hours shop work per week. Three credits. Required in courses in mechanical and electrical engineering and in manual training option of the course in general science.

Practice is given in both floor and bench molding, in core making, and in casting in iron, brass and special alloys. Castings are made for complete machines and machine parts which are built in the machine shop. A study is also made of modern foundry construction, equipment, materials and methods.

7. **Wood Turning and Pattern Making.** Sophomore year, spring term. One hour lecture and four hours shop work per week. Three credits. Required of students in the courses in mechanical and electrical engineering.

Sufficient work is given in wood turning to enable the student to become familiar with turning lathes and tools, so that he can use the lathes when necessary in pattern construction. The course in pattern making comprises a series of exercises embodying the principles governing pattern construction in making plain and split patterns, including core prints and core boxes, after which practical patterns are made of machines and machine parts. Prerequisite, foundry practice.

8. **Woodwork III G.** Junior year, fall term. Lectures and recitations two hours, shop work eight hours per week. Six credits. For students in manual training option of course in general science.

A course is given in woodworking suitable for use in the upper grammar and high-school grades. Each student completes a set of exercises suitable for those grades. Models showing progressive steps are made for the purpose of illustrating the proper methods of procedure in working out the different exercises. A study is made of the selection and cost of the equipment and materials used in this work. Prerequisite, woodwork II.

9. **Woodwork IV G.** Junior year, winter term. Lectures and recitations one hour, shop work four hours per week. Three credits. For students in manual training option of course in general science.

A continuation of woodwork III G, with a study of cabinet construction best adapted to high-school grades. This term's work includes a course in wood carving designed to develop skill in the use of carving tools, in sinking backgrounds and in modeling curved surfaces; including study of the proper application of carving in ornamenting articles of use. Prerequisite, woodwork III G.

10. **Wood Turning G.** Junior year, winter term. Lectures and recitations one hour, shop work four hours per week. For students in manual training option of course in general science.

Exercises are first given in turning cylinders, cones, beads, convex and concave curves, which involve the use of different wood-turning tools. The course involves turning between centers, on faceplates, and by means of hollow chucks. Some of the articles made are tool handles, dumb-bells, napkin rings, towel rings, bowls, typical vase forms, cups, goblets, etc. Tools required: One two-foot rule, one pair three-inch dividers, one pair five-inch outside calipers, one pair five-inch inside calipers. Prerequisite, woodwork III G.

11. **Machine Shop I.** Junior year, winter term. Shop work, four hours per week. Two credits. Required in courses in mechanical engineering, electrical engineering and printing, and elective in course in general science.

Practice in chipping, filing, scraping, and laying out work from drawings. Tools required, one nine-inch combination square. Prerequisite, foundry work.

12. **Machine Shop II.** Junior year, spring term. Shop work, supplemented by lectures, four hours. Two credits. For students in courses in mechanical and electrical engineering and in manual training option of course in general science.

A course in metal working, involving the use of the lathe, shaper and drill press. A study of cutting edges and tool adjustment best suited for different metals, together with a study of cutting speeds and feeds. Tools required: One nine-inch combination square, one pair three-inch dividers, one pair five-inch outside calipers, one pair five-inch inside calipers, one center gauge, one center drill. Prerequisite, machine shop I.

13. **Machine Shop III.** Senior year, fall term. One hour lectures, four hours shop work. Three credits. For students in the courses in mechanical and electrical engineering.

Advanced work on lathes, planers and milling machines. Exercises in turning tapers, cutting threads and gears, in making reamers, drills, taps, and special tools. Prerequisite, machine shop II.

14. **Blacksmithing III G.** Senior year, winter term. Lectures and recitations, one hour per week; shop work, four hours per week. Three credits. For students in manual training option of the course in general science.

Special drill in forge work is given in order to impart skill in the different operations. Progressive steps of difficult exercises are worked out in order to illustrate the method of their construction. Tools required: Two-foot rule, one pair five-inch outside calipers. Prerequisite, blacksmithing II.

15. **Machine Shop IV.** Senior year, winter term. Shop work, sup-

plemented by lectures, six hours per week. Three credits. For mechanical engineering students.

The time of this term is devoted to the construction of complete machines and machine parts, from drawings and blue prints. Prerequisite, machine shop III.

16. **Blacksmithing IV G.** Senior year, spring term. Lectures and recitations, one hour per week; shop work, two hours per week. Two credits. For students in manual training option of the course in general science.

A study of ornamental forge work in designing and making articles such as jardiniere stands, andirons, hinges, escutcheons, etc. A portion of the time is devoted to hammered metal work. Problems are worked out in copper and brass, which bring into use typical tools and operations in the handling of sheet metal. Prerequisite, blacksmithing III G.

17. **Machine Shop III G.** Senior year, spring term. Lectures and recitations, one hour per week; shop work, four hours per week. Three credits. For students in the manual training option in the course in general science.

The completion of a course in machine shop metal working adapted to the conditions frequently found in high schools. A study is made of the selection of machines, tools and general supplies; the proper arrangement of the shop, the location of shafting, and other shop problems. Prerequisite, machine shop II.

18. **Machine Shop V.** Senior year, spring term. Shop work, supplemented by lectures, four hours per week. Two credits. Required in the course in mechanical engineering.

A continuation of machine shop IV, with the construction of jigs and forms for the rapid duplication of parts. Supplementary instruction is given in shop arrangement and management, a study of special machines, also a study of sources, properties and prices of materials used. Prerequisite, machine shop IV.

Department of Steam and Gas Engineering.

Professor POTTER.

The object of the subjects offered in this department is to give the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, engines and turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery. These subjects are developed by thorough courses in thermodynamics, steam and gas engineering, and are supplemented in the fourth year by courses in other departments—in power-plant engineering, refrigeration, and heating and ventilation. The classroom instruction of every course is paralleled by work in the drafting room and experimental laboratory.

1. **Steam Engineering P.** Sophomore year, fall term. Lectures and recitations, one hour; laboratory, two hours. Two credits. For students in the course in printing.

A study of small steam engines and boilers; their classification, details of construction, design, operation and management. Fundamental formulas and calculations.

Laboratory.—See "Power and Experimental Engineering," 1.

2. **Gas Engineering P.** Sophomore year, winter term. Lectures and recitations, one hour; laboratory, two hours. Two credits. For students in the course in printing.

This course includes small gas and petroleum engines, transmission machinery and hydraulic motors. It takes up two- and four-cycle gas engines, their important details when using gas, gasoline, or crude petroleum; care and management of gas engines; power transmission by gears, belts, chains and ropes; calculation of sizes of pulleys; classification, construction, care and principles of operation of water motors; selection and adaptability of the various engines and motors for the driving of printing machinery. Prerequisite, steam engineering P.

Laboratory.—See "Power and Experimental Engineering," 2.

3. **Steam Engineering I.** (Valve gears.) Junior year, fall term. Lectures and recitations, two hours. Two credits. For students in course in mechanical engineering.

This course takes up the study of the steam engine mechanism and includes plain slide valves, double valves, radial valves and drop cutoff valves, with special reference to that of the Corliss engine; link motions as applied to locomotives; the methods of governing steam engines; various valve diagrams, including the Zeuner and Bilgram, with applications to the various types of valves; the methods of setting the various valve gears. Textbook, Peabody's Valve Gears. Prerequisite, kinematics I.

4. **Steam Engineering II.** (Thermodynamics.) Junior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. For students in the course in mechanical engineering.

A detailed mathematical study of the laws governing the transformation of heat into work; the thermodynamics of gases, saturated and superheated vapors; thermal lines on pressure-volume and entropy-temperature coördinates; the heat engine cycle and the application of the properties of gases to the study of the thermodynamic cycles of internal-combustion engines, hot-air engines, compressed air and air-refrigerating machines. Textbooks: Peabody's Thermodynamics, Peabody's Tables of Steam and other Vapors, Robinson's Gas and Petroleum Engines, volumes I and II. Prerequisites, steam engineering I, differential and integral calculus.

Laboratory.—See "Power and Experimental Engineering," 4.

5. **Steam Engineering III.** (Thermodynamics.) Junior year, spring term. Lectures and recitations, three hours; laboratory, two hours. Four credits. For students in course in mechanical engineering.

A continuation of the work as given in steam engineering II. Gas and oil engines; properties of explosive mixtures for internal-combustion engines; carburetors and vaporizers for liquid fuels; the application of the laws of vapors to the study of the vapor cycles, including steam engines and vapor-refrigerating machines; the flow of vapors and the design of steam nozzles; the thermodynamic design of the reciprocating steam engine and of the impulse and reaction steam turbine; influence of cylinder condensation, reëvaporation, steam jackets, superheating and compounding on economy. Textbooks, same as for steam engineering II. Prerequisite, steam engineering II.

Laboratory.—See "Power and Experimental Engineering," 7.

6. **Steam Engineering IV.** Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

A study of the functions, forms and principles of operation of boilers, reciprocating steam engines and steam turbines; fire-tube, water-tube,

marine and locomotive boilers; boiler settings and foundations; methods of staying boilers; boiler accessories; the care of boilers; water purification; smoke prevention; effect of scale and corrosion on economy; boiler inspection; fuels for boilers and analysis of same; theory of combustion; air for combustion; power of boilers; materials for boilers; boiler explosions; strength tests of boilers; evaporative tests of boilers (A. S. M. E. standard methods); boiler design; steam-engine details and calculations for simple, compound, condensing and noncondensing engines; the jet, surface and barometric condenser; circulating pumps, dry- and wet-air pumps; regulations of engines; steam-turbine details; tests of reciprocating steam engines and steam turbines and a study of data based on commercial tests. Textbooks: Peabody and Miller's Steam Boilers, Heck's Steam Engine. Prerequisite, steam engineering III.

Laboratory.—See "Power and Experimental Engineering," 8.

7. **Steam and Gas Engineering E-I.** Senior year, fall term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering.

This course takes up the general laws of thermodynamics as applied to gases, saturated and superheated steam, thermal lines with gases and vapors; heat-engine cycles, including those of internal-combustion engines, hot-air engines, compressed air, steam engines and refrigerating machines; the steam engine—simple, compound, condensing and noncondensing—from the thermodynamic standpoint; the functional study of the steam turbine and of the gas engine; the use of steam and entropy tables and charts and solution of problems on throttling, nozzle design, flow of steam, and injectors. Textbooks; Kinealy's Steam Engines and Boilers, Mehrten's Gas Engine Theory and Practice. Prerequisites, kinematics, differential and integral Calculus.

Laboratory.—See "Power and Experimental Engineering," 11.

8. **Steam and Gas Engineering C.** Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in civil engineering.

This course takes up the study of steam boilers, engines and turbines; fundamental thermodynamic laws underlying the operation of heat engines; classification of steam engines; valve gears; compound steam engines and condensers; fuel and combustion; construction of fire-tube and water-tube boilers; boiler accessories. The impulse and reaction steam turbine; construction of two- and four-stroke gas engines, using liquid and gaseous fuels; the indicator card as a measure of work and basis for the analysis of operation of engines; methods of testing boilers, steam engines, steam turbines and internal-combustion engines. Textbooks: Kinealy's Steam Engines and Boilers, Mehrten's Gas Engine Theory and Practice. Prerequisites, kinematics, differential and integral calculus.

Laboratory.—See "Power and Experimental Engineering," 12.

9. **Gas Engineering.** Senior year, winter term. Lectures and recitations, two hours; laboratory, two hours. Three credits. For students in the course in mechanical engineering.

A detailed study of solid, liquid and gaseous fuels; crude petroleum and its distillates; methods of refining as used in America and in Europe; physical tests for petroleum; petroleum as fuel for internal-combustion engines; gaseous fuels; natural gas; gas manufacturing processes as applied to coal gas, carbureted coal gas, oil gas, water gas, carbureted water gas, wood gas, acetylene gas, blast-furnace gas and producer gas; the thermal and physical properties of commercial gases; a careful study of the apparatus required in the manufacture of the various commercial

gases, including scrubbers, purifiers and other auxiliaries; gaseous fuels for internal-combustion engines and for heating and lighting purposes; economy of gas, alcohol, crude petroleum, kerosene and gasoline engines and comparisons with steam prime-movers. Textbook, Robinson's Gas and Petroleum Engines, volumes I and II. Prerequisites, steam engineering III and chemistry.

Laboratory.—See "Power and Experimental Engineering," 14.

10. **Steam and Gas Engineering E-II.** Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. For students in the course in electrical engineering.

This is a continuation of the work as given in steam and gas engineering E-I, and the different forms of prime-movers are considered, with special reference to the requirements of the modern electric power plant; steam-engine types and the variations in the construction of their most important parts; valve gears and valve diagrams; fuels and combustion; simple, compound, condensing and noncondensing engines; condensers and condenser auxiliaries; boiler types and the study of the construction and management of fire-tube and water-tube boilers; feed-water heaters and economizers; stokers; feed-water purification; boiler explosions; steam-turbine types and their adaptability for electrical power generation; details of construction of the leading types; methods of testing engines, turbines and boilers; internal-combustion engines with liquid and gaseous fuels and the functional and structural details of same; carburetors and vaporizers for liquid fuels and the gasification of solid fuels by means of gas producers; methods of testing internal-combustion engines; selection of prime-movers for central stations; relative cost, efficiency and durability of the different types. Textbooks: Kinealy's Steam Engines and Boilers, Mehrten's Gas Engine Theory and Practice. Prerequisite, steam and gas engineering E-I.

Laboratory.—See "Power and Experimental Engineering," 15.

11. **Refrigeration.** Senior year, spring term. Lectures and recitations, two hours. Two credits. Required in the course in mechanical engineering.

Analysis of the compression and absorption systems; relative equipment, space economy, fuel and water per ton of refrigeration; details of construction and care of compressors, brine pumps, condensers, tanks, coils, expansion valves and pipe fittings; cam and plate systems of ice making; refrigerating rooms; cold storage; insulation; carbonic acid and anhydrous systems; cylinder horsepower per ton of refrigeration; commercial refrigerating plants. Textbook, to be selected. Prerequisite, steam engineering III.

Trade Courses.

In addition to the professional engineering courses, as scheduled, trade courses are offered as follows: (1) Foundry and pattern making; (2) blacksmithing; (3) machine-shop and drafting-room practice; (4) boiler and engine operation.

These courses are not designed to be in any way substitutes for the four-year courses. They are open to such young men only as are graduates of accredited high schools, or who are twenty-one years of age at the time of entering upon the course.

The school years in these courses consist of eleven months and students are required to be in attendance regularly during that time. The month of August is the vacation period.

Students may enter this course at practically any time during the year after having made arrangements for doing so with the dean of mechanic arts; but after a student has once enrolled, continuous attendance is expected.

In each course three half-days per week are devoted to academic work and drawing. The academic work consists of trade lectures, written reports on shop and factory methods, and practice and work on the theory and computations pertaining to the special trade sought by the student. The drawing work consists of preliminary projection drawing and lettering, and as soon as the student becomes proficient, work in making shop drawings and machine details is given.

The practice work naturally varies with the course pursued, and in any one course will vary somewhat from year to year, but in general the following outline will be followed:

1. **Foundry and Pattern Making.** Eight half-days per week throughout two years. This work consists of practice in the iron and brass foundries, setting up molds, core making, cupola operations, and in all classes of work usually found in a high-grade foundry. The pattern work of this course is not taken up until the student has had several months of practice in molding. The first work in the pattern shop consists of such exercises as will familiarize the student with the use and care of the pattern maker's tools. This is followed by the construction of patterns, ranging from simple to intricate designs, and which will afterwards be used in the foundry; oftentimes to be used by the student who makes them.

2. **Blacksmithing.** Eight half-days per week throughout two years. The greater proportion of the student's time is put in in the blacksmith shop, with considerable practice in the foundry to give him a better knowledge of the processes of producing forge iron and steel, and a slight amount of work in the machine shop to show him the uses to which steel and iron forgings are put after passing from the blacksmith's hands. The work in the blacksmith shop consists of forging and welding common iron, mild steel, and high-carbon steel. The work done ranges from simple exercises, designed to teach methods, up through wagon work, tool making and dressing, chisel, tap, reamer, drill, ax and knife tempering, to exercises in ornamental iron forging and design.

3. **Machine Shop.** Eight half-days per week throughout three years. The student taking the course in machine shop devotes considerable time to work in the foundry and blacksmith shop in order to impress upon him the nature of the materials with which he works in the machine shop and also to enable him when he gets out in practice to do such work if an emergency arises. At least two of the three years is devoted to work in the machine shop. The variety of work done in the College shops is such that an opportunity is offered for a young man who is earnest in his desire and a hard worker to become an all-around machinist.

4. **Boiler and Engine Operation.** Nine half-days per week throughout three years. The students in this course are given a slight amount of experience in the machine and blacksmith shops, but at least four-fifths of the time is devoted to engine and boiler operations, dynamo tending, and pipe fitting. With the variety of machinery owned and operated by the College, a young man can secure experience in practically all branches of power-plant operation, and, if he faithfully attends to his work while taking the course, should be competent, upon its completion, to take charge of a small plant or to act as assistant in a large one.

Owing to the fact that the College plant is operated for long hours and oftentimes boilers are run twenty-four hours per day for several months at a stretch, the student's hours will be arranged in accordance with what seems to be the best method as far as both the needs of the plant and the needs of the student are concerned.

Because of the fact that the number of students that can be taken in these courses is limited, those that are in attendance will be expected to attend strictly to business and make the most of their opportunities. In case a student fails to do this, he will be requested to withdraw and make room for some one else.

Summer Courses for Teachers.

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 a summer course for teachers in manual training, agriculture and domestic science.

The work in manual training consists of shop practice and woodwork, including bench work and cabinet making, with lectures on methods of teaching this subject in graded and high schools. Instruction is also given in molding, including the making of molds and cores and cupola practice. Special attention will be paid to the use of alloys such as can be readily employed in average high schools for making casts, etc. Blacksmithing is also included in the course, with instruction and practice in forming and welding wrought iron and with sufficient instruction in the use of high-carbon steels to give the student skill in making and tempering the tools needed in this and other branches of manual training in high schools. Instruction in this course will be intended primarily to fit persons to teach the work with such facilities as the average high school can readily provide.

A special circular giving details of all this work, as well as the courses in agriculture and domestic science for teachers, will be ready for distribution in the spring of 1911, and may be had upon application to the president of the College.

Division of Home Economics.

THE philosophy which so 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 a 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 home economics courses.

The courses are designed to fit young women to be home makers and capable women in whatever sphere their life work may be. The training is both specific and general. While it emphasizes primarily the practical and material side of life, it does not stop here. The young women are constantly reminded that life is not all drudgery; that technical knowledge and scientific skill, even, fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor is the crowning dignity of life, grace, refinement and self-poise are the highest ingredients of true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles used in the home, including food; 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 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 importance of this training for our girls cannot be overestimated, for out of this movement will come the uplifting of the home ideal, the rearing of finer and stronger men into freer and fuller lives of usefulness and happiness.

Three courses are offered in home economics.

A four-year course, leading to the degree of bachelor of science.

A six-month housekeepers' course, for which a certificate of proficiency is granted.

A twenty-week summer course for teachers, 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, art, history, economics and psychology are also given due prominence. The time of the student is about equally divided between the purely technical subjects, the fundamental sciences and the cultural studies. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the senior year opportunity is given for choice of electives. This makes it possible for the student to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or 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, 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 credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. All young women in this course below the junior year, unless excused by the dean of women, take physical training four hours per week, except that this may be replaced by music in the sophomore year. All young women entering below the junior year must take at least one year of physical training unless given credit therefor on account of similar work elsewhere.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Physics IV 4 (4-0)	Physics V 4 (4-0)
Methods of Study 1 (1-0)	Domestic Science I 2 (0-4)	Domestic Science II 3 (1-4)
Domestic Art I 3 (1-4)	Domestic Art II 2 (0-4)	Domestic Art III 3 (1-4)
Object Drawing II 2 (0-4)	Object Drawing III 2 (0-4)	

Course in Home Economics—*continued.*

SOPHOMORE.

College Rhetoric 4 (4-0)	English Literature 4 (4-0)	Public Speaking 4 (4-0)
Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)	Zoölogy IX 4 (3-2)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Human Physiology 4 (4-0)
Color and Design I 2 (0-4)	Color and Design II 3 (0-6)	Home Decoration 2 (0-4)
Domestic Art IV 3 (0-6)	Domestic Art V 3 (1-4)	Domestic Art VI 2 (0-4)
Working Drawings 1 (0-2)		Domestic Science III 2 (2-0)

JUNIOR.

German I 4 (4-0)	German II 4 (4-0)	German III 4 (4-0)
General Bacteriology 4 (2-4)	Household Bacteriology 2 (0-4)	Civics 4 (4-0)
Household Chemistry 4 (1-6)	Landscape Gardening I 2 (2-0)	Kitchen Gardening 2 (2-0)
Human Nutrition 4 (4-0)	Domestic Science IV 6 (3-6)	Domestic Science V 8 (3-10)
Domestic Art VII 2 (2-0)	Psychology 4 (4-0)	

SENIOR.

American History I 4 (4-0)	American History II 4 (4-0)	Economics 4 (4-0)
Domestic Science VI 6 (3-6)	Domestic Science VII 4 (4-0)	Domestic Science VIII 3 (3-0)
Electives 8 (-)	Entomology V (Economic) 2 (2-0)	Domestic Science IX 3 (0-6)
	Electives 8 (-)	Electives 8 (-)

ELECTIVES.

Domestic Science X 4 (4-0)	Domestic Science XI 4 (2-4)	Domestic Science XII 4 (2-4)
Domestic Art VIII 4 (0-8)	Domestic Art IX 4 (0-8)	Domestic Art X 4 (0-8)
Physiological Chemistry I 4 (4-0)	Physiological Chemistry II 4 (4-0)	Hygienic Bacteriology 4 (2-4)
German IV 4 (4-0)	German V 4 (4-0)	German VI 4 (4-0)
Rhetoric of Oratory 2 (2-0) *and*	The Drama 4 (4-0)	American Literature 4 (4-0), *or*
Argumentation and Debate 2 (2-0)		19th Century Literature 4 (4-0)
Music 4 (4-0)	Music 4 (4-0)	Music 4 (4-0)
French History 4 (4-0)	Modern Europe 4 (4-0)	English History 4 (4-0)

History of Education, Philosophy of Education, Methods of Teaching, School Management and School Law are required by Kansas state law of all who are candidates for a state teacher's certificate. These courses are offered by the College and may be taken as electives. See elective groups, course in general science.

Course in Home Economics,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. All young women in this course below the junior year, unless excused by the dean of women, take physical training four hours per week, except that this may be replaced by music in the sophomore year. All young women entering below the junior year must take at least one year of physical training unless given credit therefor on account of similar work elsewhere.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Physics IV 4 (4-0)
Sewing I 2 (0-4)	Sewing II 2 (0-4)	Sewing III 2 (0-4)
Free-hand Drawing 2 (0-4)	Object Drawing I 2 (0-4)	Object Drawing II 1 (0-2)
Geometrical Drawing 1 (0-2)	Domestic Science I 2 (0-4)	Domestic Science II 3 (1-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

College Rhetoric 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Physics V 4 (2-4)	Zoölogy IV 4 (2-4)	Zoölogy V 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Human Physiology 4 (4-0)
Color and Design I 2 (0-4)	Color and Design II 3 (0-6)	Home Decoration 2 (0-4)
Domestic Art IV 3 (0-6)	Domestic Art V 3 (1-4)	Domestic Art VI 2 (0-4)
Working Drawings 1 (0-2)		Domestic Science III 2 (2-0)

JUNIOR, 1912-'13.

German I 4 (4-0)	German II 4 (4-0)	German III 4 (4-0)
General Bacteriology 4 (2-4)	Household Bacteriology 2 (0-4)	Civics 4 (4-0)
Zoölogy IX 4 (3-2)	Landscape Gardening I 2 (2-0)	Kitchen Gardening 2 (2-0)
Human Nutrition 4 (4-0)	Domestic Science IV 6 (3-6)	Domestic Science V 8 (3-10)
Domestic Art VII 2 (2-0)	Psychology 4 (4-0)	

SENIOR, 1913-'14.

American History I 4 (4-0)	American History II 4 (4-0)	Economics 4 (4-0)
Domestic Science VI 6 (3-6)	Domestic Science VII 4 (4-0)	Domestic Science VIII 3 (3-0)
Household Chemistry 4 (1-6)	Entomology V (Economic) 2 (2-0)	Domestic Science IX 3 (0-6)
Elective 4 (-)	Public Speaking 4 (4-0)	Electives 8 (-)
	Elective 4 (-)	

Department of Domestic Art.

Professor BECKER.
Instructor COWLES.
Instructor STUMP.
Assistant DONALDSON.
Assistant BYERLY.
Assistant RIDENOUR.

Since the study of clothing is no longer taught in the home, it must be given a place for the girls in the schools and colleges. Under a system which is carefully planned and properly carried out, learning to sew may be as educational a process as any other of the industrial arts. It develops a thrifty disposition and encourages neatness, cleanliness, order, management and industry.

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials, their growth and process of manufacture, the characteristics of the textile fabrics, the quantity of material needed, its cost and suitability. It also gives a practical knowledge of all the varieties of hand and machine sewing and the principles of dressmaking, with as much practice in their application as time will allow. It is not only valuable to those who wish to make their own dresses, but also affords an opportunity to those who wish to become practical dressmakers.

Materials for the models in sewing I are furnished to the student, but she must furnish her own thread, thimble, needles and tape measure. In courses II, III, IV and V the student furnishes her own materials and makes her own garments. Printed notes are supplied by the department for a small sum. A written examination is held at the close of each term.

1. **Sewing I: Hand Sewing.** Subfreshman, first year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required of all subfreshman young women.

This course deals with the history and manufacture of needles, pins, machines, scissors and tape measures.

Laboratory.—A number of models are made by the students, covering a full course in hand sewing, different kinds of stitches, seams, hems, tucks, gathering, overhanding, darning, patching and making buttonholes; also the making of a fancy sewing apron and a work bag.

2. **Sewing II: Machine Sewing.** Subfreshman, first year, winter term. Class work, one hour; laboratory, six hours. Four credits. Required of all subfreshman young women.

Discussion of appropriate materials and trimmings for undergarments. Lecture on cotton, its growth and manufacture. Care and use of machine and attachments.

Laboratory.—Making a cooking apron, corset cover and nightdress.

3. **Sewing III: Making Undergarments.** Subfreshman, first year, spring term. Class work, one hour; laboratory, six hours. Four credits. Required of all young women in the subfreshman course.

Lectures on estimated cost and amount of material suitable for undergarments; embroideries, laces and other trimmings.

Laboratory.—Drafting, cutting and making of underskirt and drawers. Materials used, muslin, longcloth, cambric, or nainsook.

4 and 5. **Domestic Art I and II** in the freshman year cover the same ground as sewing I, II and III in the subfreshman year, and are meant for those who have not had sewing before entering College. Required in the course in home economics.

6. **Domestic Art III: Making Shirt-waist Suit.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics.

Study of color and design as applied to dress. Growth and manufacture of flax, wool and silk.

Laboratory.—Drafting and making an unlined dress. Materials used, madras, gingham, linen, lawn, or percale.

7. **Domestic Art IV: Drafting and Designing.** Sophomore year, fall term. Six hours. Three credits. Required in the course in home economics and elective for young women in the course in general science.

A laboratory course consisting of taking measures, drafting, designing, and making paper patterns and crinoline models in copied and original designs.

8. **Domestic Art V: Dressmaking.** Sophomore year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics and elective for young women in the course in general science.

Review of the selection of materials, also of colors and their combinations. Instruction in the use of bought patterns. Directions for removal of ink, iron rust and grease spots by liquid and dry cleaning.

Laboratory.—The work of this term is devoted to the fundamental principles of dressmaking. Each student will be required to take measures, draft and make a cloth dress. Prerequisites, domestic art I, II, III and IV.

9. **Domestic Art VI: Advanced Dressmaking.** Sophomore year, spring term. Four hours. Two credits. Required in the course in home economics and elective for young women in the course in general science.

A laboratory course consisting of designing, drafting and making an elaborate street, house or evening dress; emphasizing the artistic side of line and decoration in dress.

10. **Domestic Art VII: Textiles.** Junior year, fall term. Class work, two hours. Two credits. Required in the course in home economics.

The study of textiles and their beginning in the art of primitive people. The making of a simple loom. Weaving and designing. The history of costume.

11. **Domestic Art VIII: Tailoring.** Senior year, fall term. Eight hours. Four credits. Elective in the course in home economics.

A laboratory course in making jackets and coats; also instructions in tailoring as applied to dress.

12. **Domestic Art IX: Millinery.** Senior year, winter term. Eight hours. Four credits. Elective in the course in home economics.

A laboratory course which gives the student elementary instruction in the making of buckram and wire frames and covering them with velvet, silk or straw. Also the making of fitted and shirred facings, puffed edges, folds, bows and rosettes.

13. **Domestic Art X: Art Needlework.** Senior year, spring term. Eight hours. Four credits. Elective in the course in home economics.

A laboratory course which aims to give the students the necessary stitches in decorative art, and at the same time to cultivate artistic feeling and judgment in the choice of design and color, and in the decoration of fancy dress waists, collars, undergarments and household articles.

Department of Domestic Science.

Professor VANZILE.
Assistant Professor DOW.
Instructor WILLIS.
Assistant WOODWARD.
Assistant LINDSEY.
Assistant HUSE.
Assistant SMITH.
Assistant MILES.
Assistant MEADE.
Assistant RIGNEY.

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, of physics as applied to heating and lighting. Since the home is dependent upon the sciences of chemistry, physiology, bacteriology and hygiene, direct applications of the principles of these sciences are 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 placed 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.

1. **Cookery I.** Subfreshman, second year, fall term. Laboratory course, four hours. Two credits. Required of all young women in the subfreshman course.

2. **Cookery II.** Subfreshman, second year, winter term. Laboratory course, six hours. Three credits. Required of all young women in the subfreshman course.

The purposes of courses I and II in cookery are to familiarize the student with laboratory methods and to give practical training in cookery. They deal with cooking largely as hand work, the aim being to give practice in fundamental cookery processes in order to develop skill and efficiency in handling materials, household apparatus, stoves and fuels.

3. **Cookery III.** Subfreshman, second year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required of all young women in the subfreshman course.

Foods are studied as to source, composition and value as food.

Laboratory.—This is a continuation of courses I and II.

4. **Domestic Science I.** Freshman year, winter term. Four hours. Two credits. Required in the course in home economics.

A laboratory course similar in purpose and method to cookery I and II in the subfreshman year. Students with subfreshman assignments will not be admitted to domestic science I and II.

5. **Domestic Science II.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics.

Foods are classified according to similarities in composition which divide them into groups representative of the five food principles—carbohydrate, fat, protein, mineral matter and water, and are studied as to source, composition and value as food.

Laboratory.—Principles underlying the cookery of foods are illustrated in the preparation of representative foods.

6. **Domestic Science III: Food Production.** Sophomore year, spring term. Class work, two hours. Two credits. Required in the course in home economics.

A study of food materials, their growth, the conditions under which they are matured and marketed, and the problems which relate to their storage and transportation. Lectures given and reference work required.

7. **Domestic Science IV: Food and Nutrition.** Junior year, winter term. Class work, three hours; laboratory, six hours. Six credits. Required in the course in home economics and elective for young women in the course in general science.

A study of food and its relation to the body, composition of the body, and daily income of nutrients required and output of waste. Carbohydrates are then considered as to classification, composition, occurrence and general properties; followed by a study of typical carbohydrate foods. Fats and proteins are studied in the same way. Food values and costs are emphasized throughout the course. Lectures given and reference work required. Prerequisites, general bacteriology and human nutrition.

Laboratory.—Experimental cookery. This is a study of carbohydrates, fats and proteins by experimental work. The knowledge is then applied to the preparation of foods of known composition.

8. **Domestic Science V: Food and Nutrition Continued.** Junior year, spring term. Class work, three hours; laboratory, ten hours. Eight credits. Required in the course in home economics and elective for young women in the course in general science.

A review of the chemistry and physiology of digestion, a study of fermentation in its relation to preservation of fruits and vegetables. Lectures given and reference work required. Prerequisite, domestic science IV.

Laboratory.—Marketing and serving, and fruit preservation. This course gives an opportunity for practice in home cookery. It includes the study, planning, preparation and serving of meals, and practice in canning fruits and vegetables.

9. **Domestic Science VI: Dietetics.** Senior year, fall term. Class work, three hours; laboratory, six hours. Six credits. Required in the course in home economics.

A study of the fundamental principles of human nutrition applied to the feeding of individuals under varying physiological, economic and social conditions; of the metabolism of carbohydrates, fats and proteins, and a discussion of dietary standards. Lectures given and reference work required.

Laboratory.—A practical comparison of the nutritive values of the common foods is made by computing, preparing and serving dietaries of specific costs, furnishing specified nutrients. Prerequisites, domestic science IV and V.

10. **Domestic Science VII: Household Sanitation.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in home economics.

This course includes the study of the conditions which determine the healthfulness of the house, and the application of principles of sanitation to its care. Sanitary construction, ventilation, heating, lighting, plumbing of the house, are subjects studied. Lectures given and reference work required.

11. **Domestic Science VIII: Home Nursing.** Senior year, spring

term. Class work, three hours. Three credits. Required in the course in home economics.

This course covers the furnishing and care of the sick room, the giving of baths, administration of medicines, record of symptoms, first aid to the injured, and the intelligent use of antiseptics and disinfectants. Abnormal conditions of digestion, assimilation and metabolism, alterations of secretions and destruction of tissue due to germ diseases, are studied, together with the diets adapted to the conditions and needs of the system. Textbook, Weeks-Shaw's Textbook of Nursing. Prerequisite, domestic science VI.

12. **Domestic Science IX: Therapeutic Cookery.** Senior year, spring term. Six hours. Three credits. Required in the course in home economics.

A laboratory course consisting of the preparation of many and easily digested foods suitable for the sick, and the arrangement of trays for invalids.

13. **Domestic Science X: Home Management.** Senior year, fall term. Class work, four hours. Four credits. Elective in the course in home economics.

Place of home and home maker in the economic world, economical and artistic household furnishing, judicious expenditures of incomes and the keeping of household accounts, marketing, care of the home, removal of stains, are the topics treated. Lectures given and reference work required.

14. **Domestic Science XI: Theory of the Presentation of Domestic Science.** Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics.

This is a study of laboratories, laboratory equipment, cost of equipment, and cost of supplies. Outlines of lessons are prepared and practice teaching is required of each member of the class.

15. **Domestic Science XII: Bread Making.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics.

Yeasts are studied under the microscope. The milling of wheat is carefully considered and mills are visited. All the conditions that may affect the quality of bread are investigated. Bread is prepared by many methods and comparisons made.

Short Courses in Home Economics.

HOUSEKEEPERS' COURSE.

There are large numbers of young women who from lack of time are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of its managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, a 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. Taking students without scientific training, the instruction must be more largely a giving of facts, without an elaboration of the underlying principles. The work

is intensely practical, and the hundreds of girls who take this course each year go back to their homes with a broader view of life, and a knowledge and training which will enable them to meet their responsibilities.

ENTRANCE REQUIREMENTS.

Girls who are at least eighteen years of age will be admitted to the housekeepers' course upon presentation of a common-school, grammar-school, or high-school diploma.

FALL TERM.		WINTER TERM.	
Cookery I	5 (0-10)	Cookery II	7½ (0-15)
Sewing	7½ (0-15)	Home Nursing	2 (2- 0)
Color and Design	3 (0- 6)	Dressmaking	4 (0- 8)
		Floriculture	2½ (2- 1)

1. **Cookery I.** Fall term, ten hours.

A laboratory course. The study of stoves, stove construction, management and fuels are the first topics considered, followed by experiments illustrating the effect of heat upon starch and protein. The principles are then applied to the cookery of cereals, vegetables, beverages, breads, meats, soups, and simple cake mixtures and puddings.

2. **Sewing.** Fall term, fourteen hours.

A laboratory course. The student makes a model-book covering the full course in hand sewing, and consisting of basting, gathering, darning, patching, etc. Machine practice, drafting, cutting and making underskirt and drawers; drafting, fitting and making dress without lining. Materials for the model work will be furnished by the College. Each pupil will furnish her own material for the garments.

3. **Color and Design.** Fall term, six hours.

Simple designing and a study of color relations with special reference to problems in the home.

4. **Cookery II.** Winter term, fifteen hours.

A laboratory course. The work of the term is divided into three parts. Four weeks are given to the planning and serving of meals; four weeks to the study of diet in relation to disease, with the preparation of suitable food; and four weeks to canning, preserving, and making of salads, cakes, pastries and desserts.

5. **Home Nursing.** Winter term, two hours.

This course includes the study of the sick room, its care and furnishings; the giving of baths, and the means of adding to the comfort of the sick. Lectures are given on personal hygiene. Weeks-Shaw Textbook of Nursing.

6. **Dressmaking.** Winter term, eight hours.

A laboratory course. The student is taught the use of a dress-cutting system, cutting, fitting and making woolen dress. She must furnish her own material, and cut and make a dress for herself.

7. **Floriculture.** Winter term. Class work, two hours; laboratory, one hour.

Lectures in the classroom are supplemented by practical exercises in the greenhouses treating of the propagation and culture of flowers. Soil requirements, planting of seeds, transplanting, cultivation, making cuttings, selection of varieties adapted for the purposes of window gardening, lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and the operations necessary for their successful culture is afforded in the laboratory practice.

SUMMER COURSE FOR TEACHERS.

This course in home economics was instituted to meet the needs of teachers in the public schools. The instruction follows the same general line as in the regular course, with the exception that more stress is laid upon the methods of presentation to young students. There are lectures and recitations daily on food values, accompanied by laboratory experiments in cooking. The sewing is the same as that taught in the regular course under sewing I, II and III and dressmaking.

Instruction is given in the methods of introducing vocational subjects in graded and high schools. The work in domestic science for teachers will run parallel with that of agriculture and manual training.

A special circular announcing in detail this course as well as the courses in agriculture and manual training for teachers will be ready for distribution in the spring of 1911, and may be had upon application to the president of the College.

Division of General Science.

IN the class of colleges to which this institution belongs the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. The provision of a sound basis for technical training is held to include a thorough foundation in mathematics, physical science and biological science. It is also believed that education should include some preparation for the discharge of one's duties to the state and the community in which he lives. It should afford him the discipline and culture which alone can give him a grasp of the relations among things, breadth of view, tolerance of attitude, and hence influence with his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basal scientific, cultural and disciplinary training. Their work is not only foundational but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and gives it 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, though presenting but one that is distinctive of their own work. This one, however, by means of electives, is susceptible of manifold modification and application.

THE COURSE IN GENERAL SCIENCE.

The course in general science is the lineal descendant of the single one formerly offered here. It includes the fundamental training in English, mathematics, science, history, economics and physical culture required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some, instead of taking the vocational subjects characterizing other courses. This opportunity meets the need of several classes of young people, among these being: (1) Those who have not yet fully decided as to vocation, but who wish an education that is strong and well balanced in respect to modern science and culture subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the state. The electives offered allow one to give special attention to mathematics, physical science, biological science, elementary agriculture, elementary domestic science and art, history, economics, English and professional educational subjects. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering and other industries.

The elective groups offered in this course are to a considerable extent made up from 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 for 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 picking the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other courses. The studies of the freshman and sophomore years are basal and are required of all, without exception. These insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups combined logically in courses approved by the Faculty or the dean of science. Students changing from other courses to this are allowed credit for work done in other courses in so far as it fits into the general plan of this one. The guiding thought is to insure to the student thorough fundamental training, while at the same time affording an opportunity for specific preparation in a definite line of study and in minor subjects supporting it.

The course in general science in the junior and senior years requires of all students civics, American history I, economics, psychology and philosophy. This leaves an opportunity for the election of nineteen or more additional full studies. Not less than seventy-six credit units are to be chosen in groups in such a manner as to give logical coherence to the course as a whole. The elective portion of the course as thus made up will usually consist for the most part of five or six groups of three full studies or their equivalent. It is possible to include one group of three studies and a single additional study that may be advantageously taken without others. For a few courses special combinations have been planned to meet the needs of prospective teachers of manual training in sewing, cooking and shop work.

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 these 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. Others may be arranged.

Course in General Science.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. All young men in this course below the junior year take military drill. All young women in this course below the junior year, unless excused by the dean of women, take physical training, except that in the sophomore year music may be taken instead, provided that the student has had at least one year of physical training here or has been given credit for it on account of similar work elsewhere.

FRESHMAN.

FALL TERM.	WINTER TERM.	SPRING TERM.
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Algebra IV 4 (4-0)	Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Projection Drawing 1 (0-2)	Object Drawing II 2 (0-4)	Object Drawing III 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE.

College Rhetoric 4 (4-0)	English Literature I, *or* English Literature* 4 (4-0)	English Literature II, Analytical Geometry* 4 (4-0)
Public Speaking 4 (4-0)	Physics VI 4 (3-2)	Physics VII 4 (3-2)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	English History 4 (4-0)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 4 (2-4)

JUNIOR.

Psychology 4 (4-0)	Civics 4 (4-0)	Economics 4 (4-0)
Electives† 12 or more credit units	Electives 12 or more credit units	Electives 12 or more credit units

SENIOR.

American History I 4 (4-0)	Philosophy 4 (4-0)	Electives 16 or more credit units
Electives 12 or more credit units	Electives 12 or more credit units	

* If the student is planning to elect the biological groups for the junior and senior years, English Literature and Analytical Geometry must be chosen at this point instead of English Literature I and II.

† Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of science.

Course in General Science,

FOR STUDENTS GRADUATING IN 1914.

The Arabic numeral immediately following the name of a subject indicates the credit units, and those in parentheses the hours per week of recitation and laboratory, respectively. See note on preceding page concerning military and physical training.

FRESHMAN, 1910-'11.

FALL TERM.	WINTER TERM.	SPRING TERM.
Classics 4 (4-0)	Advanced Composition 4 (4-0)	Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Geometry I 4 (4-0)	Geometry II 4 (4-0)	Trigonometry 4 (4-0)
Free-hand Drawing 2 (0-4)	Object Drawing I 2 (0-4)	Agriculture 4 (4-0), *or*
Geometrical Drawing 1 (0-2)	Projection Drawing 2 (0-4)	Cooking 4 (2-4)
Woodwork I 2 (0-4), *or*	Woodwork II 2 (0-4), *or*	Blacksmithing I 2 (0-4), *or*
Sewing I 2 (0-4)	Sewing II 2 (0-4)	Sewing III 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE, 1911-'12.

Zoölogy I 4 (2-4)	Zoölogy II 4 (2-4)	Zoölogy III 4 (2-4)
Public Speaking 4 (4-0)	Physics VI 4 (3-2)	Physics VII 4 (3-2)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	English History 4 (4-0)
Plant Anatomy 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 4 (2-4)
Object Drawing II 1 (0-2)	Perspective Drawing 2 (0-4)	Object Drawing III 2 (0-4)

JUNIOR, 1912-'13.

College Rhetoric 4 (4-0)	English Literature I, *or* English Literature* 4 (4-0)	English Literature II, *or* Pl. Anal. Geom.* 4 (4-0)
Psychology 4 (4-0)	Civics 4 (4-0)	Economics 4 (4-0)
Electives† 8 or more credit units	Electives 8 or more credit units	Electives 8 or more credit units

SENIOR, 1913-'14.

American History I 4 (4-0)	Philosophy 4 (4-0)	Electives 16 or more credit units
Electives 12 or more credit units	Electives 12 or more credit units	

* If the student is planning to elect the biological groups for the junior and senior years, English Literature and Analytical Geometry must be chosen at this point instead of English Literature I and II.

† Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of science.

Elective Groups—Course in General Science.

FALL TERM.	WINTER TERM.	SPRING TERM.
	1	
German I 4 (4-0)	German II 4 (4-0)	German III 4 (4-0)
	2	
German IV 4 (4-0)	German V 4 (4-0)	German VI 4 (4-0)
	3	
Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
	4	
Physics XII 4 (3-2)	Physics XIII 4 (2-4)	Physics XIV 4 (2-4)
	5	
Inorganic Chemistry I 5 (3-4)	Inorganic Chemistry II 5 (3-4)	Inorganic Chemistry III 5 (3-4)
	6	
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
	7	
Physiological Chemistry I 4 (-)	Physiological Chemistry II 4 (-)	Human Physiology 4 (4-0), Geology I 4 (4-0), *or both*
	8	
General Bacteriology 4 (2-4)	Zoölogy VI (Adv. Verteb.) 4 (2-4)	Zoölogy VII (Adv. Verteb.) 4 (2-4)
	9	
Plant Pathology I 4 (2-4)	Plant Pathology II 4 (2-4)	Taxonomic Botany 4 (1-6)
	10	
Economic Botany 4 (3-2)	Evolution of Plants 4 (4-0)	Exper. Plant Breeding 4 (2-4) Mathematics of Biology 4 (4-0)
	11	
Entomology I (General) 4 (3-2)	Entomology II (Taxonomic) 4 (0-8)	Entomology III (Economic) 4 (3-2)
	12	
Plant Pathology I 4 (2-4)	Zoölogy IX (Embryology) 4 (3-2)	Zoölogy VIII (Taxonomic Vertebrate) 4 (0-8) Mathematics of Biology 4 (4-0)
	13	
Plant Pathology I 4 (2-4)	Dairy Bacteriology 4 (2-4)	Hygienic Bacteriology 4 (2-4)
	14	
Soil Bacteriology 4 (2-4)	Vaccines, Antitoxines and Serum Therapy 4 (3-2)	Water Purification and Sewage Disposal 4 (1-6) Mathematics of Biology 4 (4-0)

Elective Groups—Course in General Science—*Continued.*

FALL TERM.	WINTER TERM.	SPRING TERM.
	15	
General Bacteriology 4 (2-4)	Household Bacteriology 4 (2-4)	Human Physiology 4 (4-0)
	16	
Human Nutrition 4 (4-0)	Domestic Science IV 6 (3-6)	Domestic Science V 8 (3-10)
	17	
Drafting and Designing 3 (0-6) Color and Design I 2 (0-4) Working Drawings 1 (0-2)	Dressmaking 3 (1-4)	Adv. Dressmaking 2 (0-4)
	18	
History of Education 4 (4-0)	Methods of Teaching 4 (4-0)	School Management 4 (4-0) Philosophy of Education 4 (4-0)
	19	
Farm Crops I 2 (1-2) Live Stock I 3 (1-4)	Farm Crops II 4 (2-4) Poultry I 2 (0-4)	Landscape Gardening II 3 (2-2) Live Stock II 3 (1-4)
	20	
Live Stock III 2 (0-4) Dairying 4 (2-4) Farm Crops III 4 (2-4)	Farm Mechanics I 2 (1-2) Forestry I 4 (3-2) Soils I 4 (2½-3)	Plant Propagation 5 (3-4) Live Stock IV 3 (1-4) Elective in Agriculture 2-4 (-)
	21	
Woodwork III G 6 (2-8)	Woodwork IV G 3 (1-4) Wood Turning 3 (1-4)	Foundry and Pattern Mkg. 6 (0-12)
	22	
Physics VIII 5 (3-4) Blacksmithing II 2 (0-4) Machine Shop I 2 (0-4) Manual Training Drawing I 1 (0-2) Kinematics I 4 (4-0)	Physics IX 5 (3-4) Blacksmithing III G 3 (1-4) Machine Shop II 2 (0-4) Manual Training Drawing II 4 (0-8)	Physics X 5 (3-4) Blacksmithing IV G 2 (1-2) Machine Shop III G 3 (1-4) Manual Train. Drawing III 2 (0-4) Clay Modeling 2 (0-4)
	23	
Rhetoric of Oratory 2 (2-0) Argumentation and Debate 2 (2-0)	The Drama 4 (4-0)	American Literature, *or* 19th Century Literature 4 (4-0)
	24	
Sociology 4 (4-0)	Business Organization 2 (2-0) Wage Problems 2 (2-0)	Banks and Mechanism of Exchange 2 (2-0) Public Finance 2 (2-0)

Elective Groups—Course in General Science—*Concluded.*

FALL TERM.	WINTER TERM.	SPRING TERM.
	25	
Theory of Music History of Music Harmony	One hour of each per week each term through the year with instrumental or vocal music daily. 12 credit units.	
	26	
Harmony, continued through the year with instrumental or vocal lessons and daily practice. 12 credit units.		
	27	
French History 4 (4-0)	Modern Europe 4 (4-0), *or* Business Law 2 (2-0), *and* International Law 2 (2-0)	American History II 4 (4-0)
	28	
Sociology 4 (4-0)	Business Law 2 (2-0) International Law 2 (2-0)	American Literature 4 (4-0)
	29	
Entomology I (General) 4 (2-4)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0) Geology I (General) 4 (4-0)

The following subjects and others may be elected independently of other members of groups if prerequisites have been taken:

Entomology I 4 (2-4)	Technique of Speech 2 (2-0)	Human Physiology 4 (4-0)
General Bacteriology 4 (2-4)	General Bacteriology 4 (2-4)	Geology I 4 (4-0)
Sociology 4 (4-0)	Ethics 4 (4-0)	American Literature 4 (4-0)
Modern Europe 4 (4-0)	School Law 2 (2-0)	Forms of Public Address 4 (4-0) American History II 4 (4-0)

The following illustrative combinations have been arranged:

Physics and Mathematics—1, 3, 4, 5, 28 and 29.
Chemistry, Physics and Mathematics—1, 2, 3, 4, 5, 6 and Geology.
Chemistry and Mathematics—1, 2, 3, 5, 6 and 7, including both Physiology and Geology.
Chemistry and Domestic Science—1, 2, 5, 6, 15 and 16.
Biological Science, major work in Botany—1, 2, 7, 8, 9 and 10.
Biological Science, major work in Zoölogy—1, 2, 7, 8, 11 and 12.
Biological Science, major work in Bacteriology—1, 2, 7, 8, 13 and 14.
Education and Domestic Science and Art—1, 2, 15, 16, 17 and 18.
Education and Agriculture—1, 2, 18, 19 and 20.
Education and Manual Training—3, 18, 21 and 22.
Education and Humanities—18, 23, 24 and 27 and two groups Mathematics or Science.
History and English—1, 2, 23 and 27 and two groups Mathematics or Science.
History and Economics—1, 2, 24 and 27 and two groups Mathematics or Science.
Economics and English—1, 2, 23, 24 and two groups Mathematics or Science.
English and Music—1, 23, 25, 26 and two groups Mathematics or Science.

Department of Bacteriology.

Professor KING.
Instructor BUSHNELL.
Assistant WILSON.

The department of bacteriology occupies a part of the second floor of the new veterinary medicine building. The space is divided into three offices and private laboratories, an experiment station and research laboratory, a large general laboratory, 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 methods of instruction consist of lectures, recitations, demonstrations and laboratory practice. Printed synopses of the lectures and printed laboratory directions are furnished the students in each of the courses. Textbooks are not required. The departmental library contains all of the textbooks of bacteriology and allied subjects, also the current files of the important technical periodicals related to bacteriology. These are at the constant disposal of the students for reference. To those who desire to do graduate work the department offers excellent facilities.

The science of bacteriology is presented to the student as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. At the present time it is possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and a better understanding of cells in the aggregate. The second point of view from which this subject is approached is in respect to its practical application in agriculture, medicine, domestic science and sanitary engineering.

1. **General Bacteriology.** Sophomore year, winter term, and junior year, fall term. Two lectures and four laboratory hours per week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, veterinary medicine, printing and home economics; elective in the course in general science.

A general introductory course, consisting of lectures, recitations and demonstrations, covering the morphological and biological characters, classification and distribution of bacteria. Factors necessary for the development of bacteria. Culture media, cultural features, staining values and fundamental principles of applied bacteriology. Printed copies of synopsis of the lectures are furnished. No textbook is required.

Laboratory.—The student prepares culture media, becomes familiar with the principles of sterilization, incubation and general laboratory technique. During the last half of the term organisms representing the different families and genera of Migula's classification are studied microscopically and culturally. Printed laboratory directions are furnished.

2. **Sanitary Biology I and II.** Junior year, fall and winter terms. One lecture and four laboratory hours per week. Three credits. Required in the course in civil engineering.

Consideration of the morphology, classification, distribution and life processes of bacteria. Attention is also given to general characters of algæ, fungi and protozoa in their relation to potable water. The interpretation of quantitative and qualitative bacteriological examinations of water. Significance of the presence of various bacterial species in drink-

ing water. Water-borne diseases and micro-organisms involved. Typhoid fever epidemics. The bacteriology of sewage and sewage effluents. Methods of water purification and sewage disposal.

Laboratory.—During the first term of this course the student acquires a working knowledge of bacteriological technique. The time during the second term is utilized in conducting quantitative and qualitative examinations of water and sewage from different sources according to the standard methods. The course includes a comparative study of presumptive tests for the detection of the presence of *B. coli communis* in water. Printed laboratory directions are furnished.

3. **Soil Bacteriology.** Junior or senior year, fall term. Two lecture and four laboratory hours per week. Four credits. Elective in the course in general science.

An introductory course covering the principles of soil bacteriology as defined at the present time, and fitting the student for independent research on soil bacteriological problems. Historical sketch of bacteriology. The influence on bacterial flora of depth and character of soil, temperature, moisture, chemical reaction, aeration and other factors. Activities of soil bacteria, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Printed copies of synopsis of lectures are furnished. Lipman's Bacteria in Relation to Country Life is recommended as a reference book. Prerequisite, general bacteriology.

Laboratory.—The preparation of various special culture media and reagents necessary to conduct bacteriological soil analysis. Gravimetric and volumetric methods of quantitative analyses. Qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Pot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria. Printed laboratory directions are furnished. Prerequisite, general bacteriology.

4. **Household Bacteriology.** Junior year, winter term. Class work, two hours; four hours laboratory per week. Four credits. Elective in course in general science. The laboratory work only is required in the course in home economics. Two credits.

Laboratory.—A study of bacteria and their activities, both beneficial and harmful, in their relation to household economy. Bacteriological study of water, milk and foods. The determination of potable water. Milk contamination, effect of cooling upon the bacterial content of milk and pasteurization of milk. Microscopical study of yeasts and molds. The spoilage of canned vegetables and fruits. Methods of food preservation. The manufacture of vinegar. Study of fermentations, thermal death point of various species of bacteria and the germicidal action of various disinfectants. Printed laboratory directions are furnished. Prerequisite, general bacteriology.

5. **Dairy Bacteriology.** Junior year, winter term. Two lecture and four laboratory hours per week. Four credits. Required in the course in dairy husbandry and elective in course in general science.

Consideration of bacterial flora of milk, butter and cheese, infectious diseases conveyed through dairy products, bacterial contamination of milk by air, water, utensils, etc. Normal and abnormal fermentations in milk, their significance and control. Printed copies of synopsis of the lectures are furnished. Conn's Dairy Bacteriology is recommended as a reference book. Prerequisite, general bacteriology.

Laboratory.—The preparation of special culture media necessary for dairy bacteriological work. The study of milk contamination and quantitative and qualitative bacteriological analyses of milk. The microscopical and cultural characters of the types of micro-organisms representing the flora of milk, butter and cheese. Types of milk-fermenting organisms. The examination of cream, wash water and separator slime. The effect of temperature on the growth of milk bacteria. Pasteurization of milk. Examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci. Printed laboratory directions furnished. Russell and Hasting's Experimental Dairy Bacteriology recommended as a reference book.

6. **Pathological Bacteriology.** Junior year, spring term. Two lectures and four laboratory hours per week. Four credits. Required in the course in veterinary medicine.

A study of the morphology, resistant powers, pathogenesis, distribution, channels of infection and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals. Variations in the form of infectious diseases. Antitoxins, vaccines and specific treatments. Epizoötic and epidemic diseases of unknown etiology. Printed copies of synopsis of the lectures are furnished. Jordan's Textbook of Bacteriology is recommended as a reference book. Prerequisite, general bacteriology.

Laboratory.—A study of the microscopical and cultural characters of pathogenic bacteria. Laboratory animal inoculation, autopsy and diagnosis. The preparation of tuberculin, mallein and other biological products used in the diagnosis, prevention and treatment of specific infectious diseases. Printed laboratory directions are furnished.

7. **Hygienic Bacteriology.** Junior or senior year, spring term. Two lecture and four laboratory hours per term. Four credits. Elective in the courses in home economics and general science.

A study of pathogenic bacteria, especially those related to diseases of man. Channels of infection and means of dissemination of pathogenic bacteria. Epidemics, their cause and control. Isolation, disinfection and quarantine. Prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases. Printed copies of synopsis of lectures furnished. Jordan's Textbook of Bacteriology recommended as a reference book. Prerequisite, general bacteriology.

Laboratory.—The microscopical and cultural characters of pathogenic bacteria. Technique involved in demonstrating flagella, diagnosing *Bacterium tuberculosis* in sputum and growing pathogenic anærobic bacteria. The isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates. Printed laboratory directions furnished.

8. **Water Purification and Sewage Disposal.** Junior or senior year, spring term. One lecture and six laboratory hours per week. Four credits. Elective in the course in general science.

A study of the bacterial content of natural waters and the factors which may influence the bacterial flora of the water. Bacterial indicators of pollution. The collection and transmission of water samples. Interpretation of results of bacteriological analyses. Methods of water purification and sewage disposal. The application of water sanitation to rural homes and municipalities. Elements of Water Bacteriology, by Prescott and Winslow, and Water Supplies, by Savage, are recommended as reference books. Prerequisite, general bacteriology.

Laboratory.—Quantitative and qualitative examinations, according to standard methods, of water and sewage samples. Methods involved in the

enumeration and identification of intestinal bacteria in water. Laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions furnished. Prerequisite, general bacteriology.

9. **Vaccines, Antitoxins and Serum Therapy.** Senior year, winter term. Three lectures and two laboratory hours per week. Four credits. Elective in the course in general science.

A detailed study of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins and other biological products related to the diagnosis, prevention and treatment of specific infectious diseases. Susceptibility, immunity and infection. Theories of immunity. Anaphylaxis, opsonins, preciptins, bacterins and agglutins. Prerequisites, general bacteriology and either pathological bacteriology or hygienic bacteriology.

Laboratory.—The preparation in the laboratory of diphtheria and tetanus antitoxins. Determination of the antitoxin unit and standardization by the use of experimental animals. The attenuation of micro-organisms by heat, drying and chemicals. The increase in virulence of micro-organisms by passage through animals. The opsonic technique. The preparation of suspensions for the agglutination tests. Bacteriological tests of various biological products obtained on the market. Printed laboratory directions furnished.

Department of Botany.

Professor ROBERTS.
Assistant Professor DAVIS.
Assistant MONROE.
Assistant SMITH.
Assistant ROSE.
Assistant GRAFF.

The instruction given in the department of botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the student with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, excellent opportunities are offered to secure a broad and thorough training in the advances courses offered 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, and such as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the department of botany lies in the investigation of those economic problems in plant life which affect agriculture. Three distinct lines of work are being conducted in the Experiment Station, viz., experimental plant breeding, the investigation, prevention and control of plant diseases, and seed control—*i. e.*, the determination of the purity and vitality of agricultural seeds for farmers, seedsmen and others.

The equipment for elementary instruction comprises thirty compound microscopes and a series of Jung, Peter, Kny and Frank botanical charts, a Bausch & Lomb projection apparatus, and a very full collection of pre-

served material for general morphology and pathology. For advanced work, Zeiss microscopes with apochromatic lenses, a filar micrometer, Bausch & Lomb camera lucida, Zeiss drawing table, a Zeiss binocular microscope, and Bausch & Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff and graduate students. A Minot precision microtome, embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological study.

In physiology, a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available. A large, well-equipped dark room, provided with Folmer & Schwing enlarging, reducing and lantern-slide camera, a field camera of the best type, and a Bausch & Lomb photomicrographic apparatus, affords opportunity for the preparation of botanical photographs, lantern slides, illustrations for bulletins, etc.

In the Experiment Station laboratory are kept various instruments of precision employed in quantitative work in plant-breeding investigations, including special forms of apparatus used for taking measurements of organs, a specially designed gravimeter, an improved calorimeter, an Egli calculating machine, a Comptograph adding machine, a Corelli polar planimeter, specific gravity apparatus, numerous balances, the usual glassware, etc. For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas, and a very full collection of economic fungi. A very good botanical library is available, containing the usual standard texts and reference works and files of the principal English and foreign journals.

COURSES IN BOTANY.

1. **Elementary Botany I.** Subfreshman, first year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

An introduction to the life of plants, and a study of their elementary processes and responses to stimuli.

Laboratory.—Individual studies of germination, growth, responses to temperature, light, mosture, etc.; the absorption and transportation of raw materials and their elaboration into food; the respiration of plants, and the transpiration of water. The student performs a number of simple experiments, and makes an elementary examination of the microscopic structure of the organs and tissues concerned. Laboratory outlines furnished by the department.

2. **Elementary Botany II.** Subfreshman, first year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

A continuation of elementary botany I, with a gradual extension of the student's knowledge of the groups of plants and their relationships. Prerequisite, elementary botany I.

Laboratory.—Similar to the above in general outline, but more advanced in character. First studies of the characters of the chief plant groups. Laboratory outlines furnished by the department.

3. **Elementary Botany III.** Subfreshman, first year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

Continuation of elementary botany II. Further study of the chief

groups of plants, with especial reference to a comparative study of their life histories. In this term the student is introduced to the geographical distribution of plants, the formation of plant societies under different environments, and becomes acquainted with the history and relationships of the chief economic and useful plants. Prerequisite, elementary botany II.

Laboratory.—Chiefly the study of the life histories of plants, and the changes in plant tissues and organs induced by different environments. Some microscopic study of economic plant products is included. Laboratory outlines furnished by the department. Prerequisite, laboratory work in elementary botany II.

4. **Plant Anatomy.** Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, printing and general science.

A detailed study of the anatomy of the higher plants from the developmental standpoint. The principal organs and tissue systems are followed in detail from the earliest generalized embryonic tissues, through the successive stages of their growth and differentiation to their final form in the mature plant. The student thus learns to understand the origin and relations of complex tissues, difficult to comprehend when studied in the adult stages only. Textbook, Plant Anatomy, by W. C. Stevens. Prerequisite, elementary botany III.

Laboratory.—Microscopic study of successive stages in tissue differentiation, by means of prepared slides furnished by the department and fresh sections prepared by instructor and students. Laboratory outlines furnished by the department. Prerequisite, laboratory work in elementary botany III.

5. **Plant Physiology I.** Sophomore year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, printing and general science.

A course of lectures combined with special study of a required text and reference reading. The principal life functions of plants, such as photosynthesis, respiration, transpiration, growth, and the responses of plants to environmental conditions and physical stimuli, are studied in detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Textbook, Vegetable Physiology, by J. Reynolds Green. Prerequisite, plant anatomy.

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 aparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines furnished by the department. Prerequisite, laboratory work in plant anatomy.

6. **Plant Physiology II.** Sophomore year, spring term. Class work, two hours; laboratory, four hours; or laboratory only, four hours. Four or two credits. The full work is required in the course in general science; the laboratory work is required in the courses in agronomy, animal husbandry, dairy husbandry and horticulture.

Work of a more advanced character, dealing with the chief life functions in considerable detail, and from the quantitative rather than the descriptive standpoint. In this course the student is conducted into exact and special studies of a few of the most important functions. Lectures and required readings. Prerequisite, plant physiology I.

Laboratory.—Apparatus of precision of the most accurate type is used by groups of students, who follow the exact details of functional behavior in the more important life processes, keeping quantitative data, and becoming gradually trained in methods of research. Laboratory outlines are furnished by the department. Prerequisite, laboratory work in plant physiology I.

7. **Medical Botany.** Sophomore year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course involves a brief survey of the principal plants of the pharmacopœia. Especial attention is given to poisonous plants and their identification. Lectures. Prerequisite, elementary botany III.

Laboratory.—Microscopic study of plant products used as drugs, and a laboratory study of toxic plants. Laboratory outlines provided by the department. Prerequisite, laboratory work in elementary botany III.

8. **Plant Pathology I.** Junior or senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture; elective in the course in general science.

The diseases affecting the chief economic crops of field, orchard and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are discussed, and the student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm and in nursery and market-garden work. Physiological and bacterial diseases are considered to some extent, but the time is chiefly devoted to the more important diseases caused by the higher fungi, the life histories of which are studied in detail. Preventive measures are considered in each case, with special reference to the scientific principles underlying their application. An extensive collection of preserved pathological material, and a large herbarium of exsiccatæ of economic fungi is available. Textbook, Fungous Diseases of Plants, Duggar. Prerequisite, plant physiology II.

Laboratory.—Detailed microscopic studies of diseased tissues and identification of the fungus parasites which cause them. In the case of physiological diseases, the structural changes induced in the tissues are worked out with the microscope. Laboratory outlines are furnished by the department. Prerequisite, laboratory work in plant physiology II.

9. **Economic Botany.** Senior year, fall term. Class work, four hours; laboratory, two hours. Four credits. Elective in the course in general science.

This course is especially designed 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 methods of cultivation, harvesting, and the derivation of economic products. The plants of tropical and subtropical agriculture and horticulture are given considerable attention. Forestry products are not considered. Textbook, The Origin of Cultivated Plants, De Candolle. Lectures and reference reading. Prerequisite, plant anatomy.

Laboratory.—A microscopic study of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines furnished by the department. Prerequisite, laboratory work in plant anatomy.

10. **Plant Pathology II.** Senior year, winter term. Class work, two

hours; laboratory, four hours. Four credits. Elective in the course in general science.

A continuation of plant pathology I, involving the study of laboratory and field methods in the investigation of plant diseases, the growing of pure cultures of parasitic fungi, the making of inoculations, etc. This course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations. Lectures and reference reading. Prerequisite, plant pathology I.

Laboratory.—As described above. Laboratory outlines furnished by the department. Prerequisite, laboratory work in plant pathology I.

11. **Evolution of Plants.** Senior year, winter term. Class work, four hours. Four credits. Elective in the course in general science.

Involves a careful consideration of the lines along which evolution has proceeded in the plant kingdom, the relationships of the phyla and the probable derivation of the chief groups. Textbook, Evolution of Plants, Campbell. Lectures and reference reading. Prerequisite, economic botany, class and laboratory work.

12. **Experimental Plant Breeding.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture and elective in the course in general science.

Involves a study of the present knowledge of variation and heredity as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Lectures and reference reading. Prerequisite, evolution of plants. Corequisite, mathematics of biology.

Laboratory.—Practice work in the measurement of organisms; plotting of data in curves to express individual variation; plotting of frequency polygons and fitting them to theoretical curves; study of correlation and regression of characters, and determination of the chief constants. Prerequisite, evolution of plants. Laboratory guide: Statistical Methods with Special Reference to Biological Variation, Davenport.

13. **Taxonomic Botany.** Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in general science.

This course is designed to give biological students a broad training in the systematic relationships chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families and genera of the angiosperms. The course is designed to be strictly a 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 the commoner algæ and fungi. Lectures and reference reading. Prerequisite, plant anatomy.

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. It is endeavored to train the student's mind to a broad, comprehensive conception of species characters, using manuals merely as convenient guides to

this end. Laboratory guides: Britton's Manual of the Flora of the Northern States and Canada, second edition, and Gray's New Manual of Botany, seventh edition, revised. Prerequisite, laboratory work in plant anatomy.

14. **Seed Testing.** Senior year, spring term. Laboratory work, four hours. Two credits. Required in course in agronomy.

The student becomes familiar with the details of structure of the seeds of all of the principal races of agricultural plants grown in this region, and learns to distinguish such seeds as are used as adulterants or as fraudulent substitutes. Considerable time is also devoted to the identification of weed seeds and of weed plants, in both the seedling and the adult stages. Practice work is given in making purity and germination tests of seeds, according to the official rules and methods for seed testing. Prerequisite, class and laboratory work in elementary botany III.

Department of Chemistry.

Professor WILLARD.
Assistant Professor KING.
Assistant Professor WHELAN.
Assistant Professor SWANSON.
Assistant NEWMAN.
Assistant GRIFFIN.
Assistant THOMPSON.

All the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the special sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or human history. 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 the practical nature of the study. The ultimate object of the instruction 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 equipped amply for suitable experiments and demonstrations and the laboratories are designed to accommodate 276 students per term in freshman work and qualitative analysis. The laboratory for more advanced work provides space for 48 students, and is well supplied with general and special facilities. The state work in foods, feeding stuffs and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry.

COURSES IN CHEMISTRY.

1. **Chemistry I, II and III.** Freshman year, fall, winter and spring terms. Classes in chemistry I are also started at the beginning of the winter term, the work being followed up the two succeeding terms. The division of time between the lecture room and the laboratories is as follows: First term, lecture room three hours, laboratory two hours;

second term, lecture room two hours, laboratory four hours; third term, lecture room three hours, laboratory two hours. Four credits each term. Required in all courses.

This work is designed to give the student a knowledge of the fundamental principles of elementary chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions and of the rules for naming compounds, the significance of formulas, chemical equations, etc., much attention is given to these as well as to the practical uses of the substances and processes in metallurgy, engineering, agriculture and other arts. The textbook, Smith's General Chemistry for Colleges, is supplemented by lectures when necessary, and the subject 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 inorganic 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 latter part of this course includes blowpipe analysis of the more important species of minerals, especially those of common occurrence and economic importance in agriculture and engineering and also qualitative work on known substances. The student is not only required to give the designated amount of time, but at least a minimum amount of work must be satisfactorily performed in order to obtain credit. Laboratory manual, Newell's Descriptive Chemistry, Part II. The third term, tables for the identification of minerals, and Qualitative Analysis, by W. A. Noyes, are also required.

2. **Qualitative Analysis.** Sophomore year, fall term. Lecture room, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, veterinary medicine, home economics, and general science.

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 lessons, 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 simple to the more difficult, and at the same time to facilitate the comparative study of the several cations and anions. The theories of chemistry receive constant application, and the effect of the course is to broaden, strengthen and unify the student's ideas of general chemistry, greatly to enlarge his knowledge of chemical facts, and at the same time to fix many of them by their association with the reactions made use of in analytical processes. Must be preceded by chemistry III.

Laboratory.—The regular methods of qualitative analysis serve as a basis for a laboratory study of the chemical properties of substances. Laboratory manual, Qualitative Analysis, by W. A. Noyes.

3. **Elementary Organic Chemistry.** Sophomore year, winter term. Four hours per week, lecture room only. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, home economics and general science.

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 with greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soap, sugars, starch, proteids, and other less known substances. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While the useful organic compounds have special attention given them, the study of others is not excluded when they contribute to an understanding of the systematic relations existing among the several classes. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Textbook, Remsen's Organic Chemistry, in part, accompanied by lectures amplifying certain parts of the subject. Chemistry III is a prerequisite.

4. **Agricultural Chemistry.** Sophomore year, spring term. Class work, two hours; laboratory, four hours per week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry and horticulture.

This term's work is devoted chiefly to the study of the chemistry of soils. Among the subjects treated are: The soil-making rocks and minerals, and the agencies by which soils are formed from them and other materials; minerals used as fertilizers; injurious minerals; methods and limitations of soil analysis; soils of different regions compared; alkali soils and their reclamation; recognition of the chemical character of soils from their native vegetation. Textbook, Soils, by E. W. Hilgard. Prerequisite, qualitative analysis.

Laboratory.—This consists of simple quantitative exercises leading up to work upon substances of direct agricultural interest. These are so planned as to give as great a variety in training as is possible in the limited time available. Laboratory guide, Elementary Quantitative Chemical Analysis, by Lincoln and Walton. Prerequisite, qualitative analysis.

5. **Household Chemistry.** Junior year, fall term. One classroom exercise and six hours of laboratory work. Four credits. Required in the course in home economics.

This course is designed to give the women in the home economics course qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuels, fabrics, disinfectants, metals and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects. Prerequisite, qualitative analysis.

6. **Human Nutrition.** Junior year, fall term. Four hours per week. Four credits. Required in the course in home economics and elective in the course in general science.

This is a course in the chemistry of foods and nutrition, and includes the following topics, with others: Composition of the animal body; 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. The Nutrition of Man, by R. H. Chittenden, is used as a textbook, but is largely supplemented by a course of lectures. Elementary organic chemistry and physiology must precede this course.

7. **Chemistry D-I and D-II.** Junior year, fall and winter terms. Four hours of laboratory work each term. Two credits each term. Required in the course in dairy husbandry.

Feeding stuffs and dairy products furnish the materials which are drawn upon for exercises in quantitative analysis. Laboratory guide, Lincoln and Walton's Elementary Quantitative Analysis, supplemented by special directions. Prerequisite, agricultural chemistry laboratory work, or an equivalent course in quantitative analysis.

8. **Chemistry C-I and C-II.** Junior year, winter and spring terms. During the first term one hour per week is given to a lecture-room exercise and four hours to laboratory work. The second term is laboratory only, six hours per week. Three credits each term. Required in the course in civil engineering.

These courses are designed to give students of civil engineering as much training as the time permits in qualitative and quantitative analysis, the special direction given to the work being such as to lead to the largest amount of practical benefit. Textbooks: Qualitative Analysis, by W. A. Noyes, and Quantitative Analysis, by Lincoln and Walton, supplemented by pamphlets and mimeographed matter. Prerequisite, chemistry III.

9. **Chemistry E.** Junior year, spring term. A laboratory course of six hours per week. Three credits. Required in the course in electrical engineering.

Instruction is given in the testing of water, fuel and flue gases from the standpoint of the operator of a power plant. Prerequisite, chemistry III.

10. **Geology II.** Junior year, spring term. Four hours class and four hours laboratory work. Six credits. Required in the course in civil engineering.

The first half-term is given in the department of geology. The class work of the second half-term, given in the department of chemistry, consists in a study of rocks in respect to their mineral composition, structural properties, changes on weathering, etc. Textbook, Rocks, Rock Weathering and Soils, by G. P. Merrill.

Laboratory.—This consists in a laboratory study of the principal rocks and their mineral constituents.

11. **Principles of Animal Nutrition.** Graduate or elective, spring term. Four hours class work per week. Four credits.

This course gives a thorough study of the relations of animals to matter and energy. The methods of research and the results obtained are treated in an extended and scientific manner. Textbook, Principles of Nutrition, by H. P. Armsby. Prerequisite, elementary organic chemistry.

12. **Quantitative Analysis.** For each two hours work per week for a term, one credit.

This is given as part of the laboratory work accompanying certain courses, and may be elected independently at any time after completing qualitative analysis. In all cases certain preliminary training and exer-

cises are given, after which the student's attention may be more especially directed toward any one of the several branches of analysis, such as feeding stuffs, dairy products, soils and fertilizers, ores and rocks, water, gases, fuels, foods and beverages. The chemical study of special problems is encouraged. Prerequisite, qualitative analysis.

13. **Inorganic Chemistry I, II and III.** Graduate or elective; junior or senior year; fall, winter and spring terms. The subject extends through a year and is given in three classroom exercises and four hours of laboratory work per week. Five credits each term.

This course consists of a thorough study of the facts of chemistry and their theoretical interpretation according to the views of the present day.

14. **Organic Chemistry I, II and III.** Graduate or elective; junior or senior year; fall, winter and spring terms. Three lecture hours and four hours of laboratory work through the year are required for this course. Five credits each term.

The course includes a careful, systematic study of the aliphatic and aromatic compounds to such an extent as the time permits. Textbook, Organic Chemistry, by Holleman.

15. **Physiological Chemistry I and II.** Graduate or elective; junior or senior year; fall and winter terms. Four hours per week. Four credits each term.

A systematic and thorough study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances, and their general and specific functions; the changes that take place in digestion, assimilation and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism and the interrelations of organs are among the important topics studied. Textbook, Abderhalden's Textbook of Physiological Chemistry. Prerequisite, elementary organic chemistry.

Department of Economics.

Professor KAMMEYER.

Vocational training alone does not fully prepare a student for his life's work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the social and economic conditions under which he works, in order that he may advantage society as well as himself. The state needs men and women trained for citizenship, and it is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books bearing on economics, sociology and statistics is at the disposal of students, and is used for collateral readings, book reviews and reports.

COURSES IN ECONOMICS.

1. **Economics.** Junior year, fall and spring terms, and senior year, spring term. Four hours per week. Four credits. Required in the courses in architecture, engineering, printing, home economics and general science.

A general survey of economic principles underlying the phenomena of wealth production, consumption, distribution and exchange, including a study of the state in its relation to industry, transportation, public

utilities, insurance, socialism, etc. A brief study also of public revenues and expenditures, and of the history of economic thought. Instruction by recitations and lectures. Text, Ely's Outlines of Economics.

2. **Business Organization.** Junior or senior year, winter term. Two hours per week. Two credits. Required in the courses in engineering, architecture and printing, and elective in the course in general science.

A study of entrepreneurial, partnership and corporate business organization and management; the advantages and disadvantages of each, and restrictive legislation. The centralization and integration of industries, trusts, pools and combinations are studied with reference to their origin and effects, social and economic. Considerable time is given to a detailed study of stocks and bonds in all their variety of form, and to such phenomena as speculation, overcapitalization, etc. Instruction by recitations, lectures, and reports. Text, Sparling's Business Organization. Prerequisites, economics or agricultural economics.

3. **Agricultural Economics.** Junior year, spring term, or senior year, winter term. Four hours per week. Four credits. Required in the courses in agriculture and veterinary medicine.

This course is intended especially for students pursuing one of the agricultural courses, and in the main is like economics, with the distinction that more time and emphasis are given to such subjects as rent, size of farms, ownership and tenancy, transportation to markets, agricultural credit associations, farm labor and agricultural problems of an educational and social character. Instruction by recitation, lectures and reports. Text, Taylor's Agricultural Economics.

4. **Sociology.** Senior year, fall term. Four hours per week. Four credits. Required in the course in printing, and elective in the course in general science.

A study of the social and political units of organization, and questions of population, such as immigration, urban and rural population, and problems of city life; marriage, divorce, education and employment in their relation to family life; wealth accumulation and institutional means for the promotion of social well-being; remedial measures, legislative and voluntary, for the solution of social and economic problems. Instruction by recitations, lectures, and assigned readings. Text, Ward's Sociology. Prerequisite, economics or agricultural economics.

5. **Wage Problems.** Senior year, winter term. Two hours per week. Two credits. Required in course in printing, and elective in the course in general science.

A comparative study of the various theories of wages. Special emphasis is given to the history, organization, functions, results and legal status of labor unions both in the United States and in England. Such phenomena as strikes in their moral and economic aspects, boycotts, arbitration, etc., are made subjects for study and investigation. The course also includes a study of the various plans which have been proposed and tried for the more equitable distribution of wealth, such as profit sharing, consumers' leagues, etc. Instruction by lectures, assigned readings and reports. Prerequisite, economics or agricultural economics.

6. **Banks and the Mechanism of Exchange.** Senior year, spring term. Two hours per week. Two credits. Required in the course in printing, and elective in the course in general science.

A study in detail of money, its history and characteristics as a medium of exchange and standard of value. Bank currency: its nature, forms, and limitations. The principal banking systems of the world, machinery and methods, branch banks, clearing houses, foreign and domestic exchanges,

etc. Instruction by lectures, assigned readings and reports. Prerequisite, economics or agricultural economics.

7. **Public Finance.** Senior year, spring term. Two hours per week. Two credits. Required in the course in printing, and elective in the course in general science.

This course is designed to meet the needs of those who desire to make a more specific study of public revenues and expenditures than is given under the head of taxation in a general treatise on economics. It will include also a study of money and credit funds, their origin and character, and the agencies employed in funding operations, such as savings banks, building and loan associations, trust and insurance companies, etc. Instruction by lectures, assigned readings and reports. Prerequisite, economics or agricultural economics.

Department of English Language and Literature.

Professor BRINK.
Associate Professor SEARSON.
Assistant Professor BEALL.
Instructor RICE.
Instructor LEONARD.
Instructor KNIGHT.
Assistant FURLEY.
Assistant BOOT.
Assistant EDSON.

The work of this department is twofold: First, it deals with the derivation, nature and effective use of the mother tongue; second, it studies the literature of the English-speaking world, as exemplified by the master writers at different periods of our literary development. Thus the attention of the department is devoted to the theoretical and practical study of composition and rhetoric on the one hand, and to the study, both extensive and intensive, of literature, on the other.

The chief aim of the instruction in rhetoric is to give as thorough and systematic training in the principles and practice of writing good English as the time devoted to the subject will admit. The most common errors to which inexperienced writers are subject are pointed out and criticized; the elements of style are studied from a textbook and from the best writers as exemplified in their productions, and are applied practically in the writing of paragraphs, themes, and more formal essays. Attention is also given to methods of finding, selecting and arranging material, and to the application of these methods in the various types of discourse.

In literature, also, an ultimate purpose of the instruction is largely to train students in the art of effective writing. 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 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.

Candidates for admission to the College who present acceptable evidence of having completed the studies now generally prescribed for admission to the American colleges and universities, or the equivalents of those studies, including a practical knowledge of grammar, spelling, punctuation, the use of capital letters, composition and elementary rhetoric, may receive such credits in subfreshman and freshman English as the breadth and thoroughness of their preparation would warrant. Graduates of high schools that require four years of English language and literature and those who satisfactorily pass the examinations in the prescribed studies may receive credit for the English studies through the first year of the College course. Any of these credits may be revoked whenever a student shows himself deficient in any study involved.

The masterpieces prescribed for admission are divided into two groups: one for intelligent reading and the other for careful study. The lists for the academic year 1910-'11 are as follows:

I. FOR READING: (1) Shakspere—As You Like It, Henry V, Julius Cæsar, Merchant of Venice, Twelfth Night. (2) Bacon—Essays; Bunyan—Pilgrim's Progress; Addison—Sir Roger de Coverly Papers; Franklin—Autobiography. (3) Chaucer—Prologue; Spenser—Færie Queen; Pope—Rape of the Lock; Goldsmith—The Deserted Village. (4) Goldsmith—The Vicar of Wakefield; Scott—Ivanhoe; Hawthorne—The House of Seven Gables; Thackeray—Henry Esmond; Mrs. Gaskell—Cranford; Dickens—A Tale of Two Cities; Eliot—Silas Marner; Blackmore—Lorna Doone. (5) Irving—Sketch Book; Lamb—Essays of Elia; De Quincey—Joan of Arc and The English Mail Coach; Carlyle—Heroes and Hero Worship; Emerson—Selected Essays; Ruskin—Sesame and Lilies. (6) Coleridge—The Ancient Mariner; Scott—The Lady of the Lake; Byron—Mazeppa and The Prisoner of Chillon; Palgrave—Book IV of The Golden Treasury; Macaulay—Lays of Ancient Rome; Poe—poems; Lowell—The Vision of Sir Launfal; Arnold—Sohrab and Rustum; Longfellow—The Courtship of Miles Standish; Tennyson—Idylls of the King.

II. FOR CAREFUL STUDY: Shakspere—Macbeth; Milton—Minor Poems; Burke—Speech on Conciliation with America, or Washington—Farewell Address, and Webster—First Bunker Hill Oration; Macaulay—Life of Johnson, or Carlyle—Essay on Burns.

The examination for credit in English readings will usually consist of a paragraph or two on each of several topics drawn from group I or from the list given below under the heading "English Readings." Ten of the works mentioned in list I above will be chosen for this part of the examination—one or two works from each of the six groups in the list. The treatment of the topics should show a general knowledge of the books read, and especially should reveal the candidate's power of clear and accurate expression.

For credit in English classics the examination will be upon the subject matter, form, and structure, and presupposes a thorough study of the books in group II or in course 4 below. Attention is called to the fact that candidates are thus left free to offer for credit either the books mentioned in the lists named above or to substitute others of equal literary value.

Each applicant for admission is expected to present from his instructor a detailed statement of the books read, the time covered in any course, the grades attained, and any exercise book he may have contain-

ing compositions or other written work done in connection with his studies in English.

All candidates for admission will be required to give satisfactory evidence that they know how to spell, punctuate and capitalize properly, that they understand the essentials of grammar, and that they have a practical knowledge of the elements of composition. Whatever credits in preparatory or freshman English shall be given will be determined partly by such evidence and partly by the examinations described above. The aim will be to assign each student to that study which he is prepared to pursue with most profit.

All applications for credit in English should be presented at the beginning of the first term of attendance.

Classes are organized in all subfreshman and freshman courses in English each term, though formally set for a definite term.

COURSES IN ENGLISH LANGUAGE.

1. **Advanced Grammar.** Subfreshman, first year, fall term. Four hours per week. Four credits. Required of all subfreshman students.

A review of the principles of grammar as preliminary to the College entrance requirements in English. Practice in the grammatical analysis of difficult sentences and of somewhat extended passages of literature. Practice in parsing. Text, Buehler's Modern English Grammar.

2. **English Readings.** Subfreshman, first year, winter term. Four hours per week. Four credits. Required of all subfreshman students.

In this course a careful study is made of a number of standard productions of first-class interest and not too difficult style. Sketches of authors, both oral and written, character sketches, abstracts, outlines and analyses of every production are required. As these productions are mostly read and discussed in class, opportunity is afforded for considerable valuable training in pronunciation and effective reading. Prerequisite, course I.

List of Readings.—Julius Cæsar, Swan ed., pub. by Longmans; Tale of Two Cities, Houghton, Mifflin & Co.; A cient Mariner, Longmans; Snow Bound, Houghton, Mifflin & Co.; Books of Daniel, Ruth and Esther, edited by Moulton; selections from Tennyson, Scott, Foresman & Co.

3. **Elementary Composition.** Subfreshman, first year, spring term. Four hours per week. Four credits. Required of all subfreshman students.

The object of the work of this term is to give the student a knowledge of the elementary principles of English composition, to improve his vocabulary, and to help him overcome the fear of expressing himself in writing. To this end he is encouraged to choose subjects that spring from his own experience or observation, as well as to write on assigned subjects. He is required to present one theme each week, which, after being read and commented upon in class, is rewritten and then corrected by the instructor in charge. Text, Smith and Thomas, A Modern Composition and Rhetoric. From three to six weeks of this term are spent on the study of words. Text, Swinton's Word Analysis. Prerequisite, course 2.

4. **English Classics.** Subfreshman, second year, fall term. Four hours per week. Four credits. Required of all subfreshman students.

A careful study of a number of masterpieces of a grade suited to students of the degree of maturity ordinarily found in the third year

of first-class high schools. As far as possible the selections are read carefully in class. Character sketches, paraphrases, abstracts, outlines and analyses, as well as biographical sketches of authors, are required. This work is both oral and written, with the purpose of training the student in both accuracy and facility of speech. Thus the course aims to afford practice in composition as well as to impart a knowledge of the selections read. Prerequisite, course 3.

Class Readings.—Merchant of Venice, D. C. Heath & Co.; Lady of the Lake, Scott, Foresman & Co.; Macbeth, Henry Holt & Co.; Pilgrim's Progress, Ginn & Co.; Milton's Briefer Poems—Comus, Lycidas, L'Allegro, Il Penseroso—Ginn & Co.; First Bunker Hill Oration, Ginn & Co.

5. **Paragraph Writing.** Subfreshman, second year, winter term. Four hours per week. Four credits. Required of all subfreshman students.

A study of the nature and forms of the paragraph as the unit of discourse—its unity, coherence, the paragraph subject. Constant practice in the writing of paragraphs on a wide range of topics. The time devoted to letter writing is given to a consideration of the principles of correspondence, including business letters, letters of friendship, of social obligations, of condolence, congratulation and the like. Text, Huntington's Elements of English Composition as far as the "Forms of Discourse," also the chapter on "Letter Writing." Prerequisite, course 4.

6. **Elementary Rhetoric.** Subfreshman, second year, spring term. Four hours per week. Four credits. Required of all subfreshman students.

A rapid survey of the forms of discourse. Practice in simple plan making and theme writing. Illustrative material is examined from a wide range of subjects and a large number of authors. Text, Huntington's Elements of English Composition (completed) and Specimens of Prose Composition, by Nutter, Hersey and Greenough. Prerequisite, course 5.

7. **Narrative Writing.** Freshman year, fall and winter terms. Four hours per week. Four credits. Required in all courses.

Study of the principles of narration. Analysis of at least one novel. Writing of narrative paragraphs and of short stories. Texts, Buck and Morris, Narrative Writing; Mathews, The Short Story. Prerequisite, course 6.

8. **Theme Writing.** Freshman year, winter and spring terms. Four hours per week. Four credits. Required in all courses.

Continuation of the study of the principles of narration and the short story. Principles of description. Study of specimens of discourse. Simple plan making and theme writing and preliminary work in exposition. Texts, Fletcher and Carpenter; Andrews, Specimens of Discourse. Prerequisite, course 7.

9. **College Rhetoric.** Sophomore year, every term; junior year, fall and spring terms. Four hours per week. Four credits. Required in all courses.

Study of style and invention. Theoretical analysis of masterpieces illustrative of the various types of discourse, especially of exposition, argumentation and persuasion. Constant practice in making and criticising plans. Essays prepared under the direct supervision of the instructor in charge, care being taken both as to logic and style. Students that have completed courses 1 to 8, inclusive, and 12, or that are gradu-

ates of "accredited high schools," with four years in English, may be admitted to this course.

10. **The Rhetoric of Oratory.** Junior or senior year, fall term. Two hours per week. Two credits. Elective in courses in general science and home economics.

A study of that type of oral discourse whose ultimate purpose is to move the determination of hearers. The distinctions between spoken and written discourse. The examination of as many great speeches, especially of modern orators, as the time will permit. Study of oratorical style. The logic of oratory. Practice in the writing of speeches with a view to effective and persuasive utterance. Prerequisite, course 9.

11. **Argumentation and Debate.** Junior or senior year, fall term. Two hours per week. Two credits. Elective in the courses in general science and home economics.

A study of that type of discourse whose main end is to establish a proposition. A review of the principles of induction and deduction as applied to practical reasoning. The preparation of briefs for arguments, and the writing of papers in amplification of such briefs. The preparation of debates. Prerequisite, course 9.

COURSES IN ENGLISH LITERATURE.

12. **History of English Literature.** Freshman year, spring term, and sophomore year, fall term. Four hours per week. Four credits. Required in all courses.

Study of a text. Constant reading of representative specimens, both in and out of class. Frequent papers, including biographical essays, critical reviews of periods, criticisms of authors, and book reviews. Text, Halleck's History of English Literature. Prerequisite, course 8.

13. **English Literature.** Sophomore year, winter and spring terms. Four hours per week. Four credits. Required in courses in agriculture and home economics.

A brief review of the rise and development of English literature, with library study of periods and typical authors. Lectures: The nature of literature; the nature of poetry; linguistic and race contributions to the literature; the great literary periods. Class study, reports, the study of masterpieces. Prerequisite, course 9.

14. **English Literature I.** Sophomore year, winter term. Four hours per week. Four credits. Required in courses in general science and printing.

An outline of the history of the language and literature. Dissertations, both oral and written, on periods and types of literature, on representative writers, and significant movements. Lectures: What is literature? What is poetry? The nature of the drama; the plays of Shakspere; the elements of literary 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. Extensive study of such writers as Shakspere and Thackeray out of class, and intensive study of somewhat difficult poetical selections in class, with reports and informal discussions. Prerequisite, course 9.

15. **English Literature II.** Sophomore year, spring term. Four hours per week. Four credits. Required in the courses in general science and printing. Continuation of course 14.

Some plays of Shakspere by the seminary method; reports and discussions; principles of Shaksperian criticism; linguistic elements and tendencies of the lowland Scotch, with illustrations from the poetry of Burns. Critical study of typical productions of such writers as Shelley, Burns, Thackeray, Tennyson, Browning. Principles of Browning criticism. Must be preceded by course 14.

16. **The English Drama.** Junior or senior year, winter term. Four hours per week. Four credits. Elective in course in general science and home economics.

A study of the nature of the Romantic drama as distinguished from the classical school of this great type of literature. Devoted mainly to Shakspere, with reports and informal lectures on the drama before his time, and the reading of one or two plays of the subsequent period. The seminary method is mainly employed. The technique of the drama, including character analysis, thought interpretation and plot development. Prerequisite, College rhetoric.

17. **Nineteenth Century Literature.** To be given in 1911-'12 and alternate years thereafter. Junior or senior year, spring term. Four hours per week. Four credits. Elective in courses in general science and home economics.

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 will be devoted to a first-hand study of Carlyle, Tennyson, Wordsworth, Browning, Shelly, and other writers of the period, who either expressed the life of their time or were leaders in shaping the life of their own or of subsequent years. Prerequisite, College rhetoric.

18. **American Literature.** Junior or senior year, winter term. Four hours per week. Four credits. Elective in courses in general science and home economics. Given in 1910-'11 and alternate years thereafter.

A rapid survey of the rise and development of American authorship from colonial times to our own day. Study of the lives and criticism of the works of representative men of letters, and reading intensively of their works so far as the time will permit. The transcendental movement and the Brook Farm experiment. Seminary study of some of the great novels, longer poems and speeches. Emerson's essays and poems. Prerequisite, College rhetoric.

Department of Entomology.

Professor HEADLEE.
Assistant Professor DEAN.

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 are given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously. 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 and injurious species, and of the general principles for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of

them colored), and a series of microscope slides are available for illustration. (The lantern is used also for zoölogy and geology.) Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ENTOMOLOGY.

1. **Entomology I: General Entomology.** Senior year, fall term. Three class and two laboratory hours per week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry and horticulture, and elective in the course in general science.

This course consists of the study of elementary anatomy and physiology of insects, of the life economy of the most injurious species, and of the general principles upon which the control of these economic forms is based. The class work consists of lectures and of text and special reference study. Prerequisites, zoölogy I and II, or zoölogy IV.

Laboratory.—The laboratory work consists of a study of the external features of the insect body and of the classification of representative types to the family.

2. **Entomology II: Taxonomy of Insects.** Senior year, winter term. Eight hours of laboratory work per week. Four credits. Elective in the course in general science.

Here is included a study of the general principles of insect classification of representative 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 independent taxonomic studies. Prerequisite, entomology I.

3. **Entomology III: Economic.** Senior year, spring term. Three hours of class and two hours of laboratory per week. Four credits. Elective in the course in general science.

A study of the life economy of the more important insect pests, of the literature of economic entomology, and of methods to be used in dealing with forms whose life economy and measures of control are not understood. 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 study.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects and of insect breeding. Prerequisites, entomology I and II.

4. **Entomology IV: Economic.** Senior year, winter term. Two hours class work per week. Two credits. Required in the course in horticulture.

This course includes a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references. Prerequisite, entomology I.

5. **Entomology V: Economic.** Senior year, winter term. Two hours of class work per week. Two credits. Required in the course in home economics.

This course consists of a series of illustrated lectures on habits, life history and general methods of controlling the principal insect pests of house and garden, and the study of references. Prerequisite, zoölogy IV.

Department of Geology.

Professor HEADLEE.
Instructor SCHEFFER.

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. In 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 illustration.

COURSES IN GEOLOGY.

1. **Geology I: General Geology.** Junior or senior year, winter and spring terms. Four hours class work per week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry and horticulture, and elective in the course in general science.

This course consists of a brief study of the underlying principles of structural, dynamic and historical geology. The class work consists of lectures and of the study of text and references.

2. **Geology II.** Junior year, spring term. Four hours of class and four hours laboratory work per week. Six credits. Required in the course in civil engineering.

The first half of this course consists of a study of the general principles of structural and dynamic geology. The class work consists of lectures and of the study of text and references. The second half of the term is given to petrological work in the chemistry department.

Laboratory.—The laboratory work consists of observation and description of such structural and dynamic features as this locality affords.

Department of German.

Professor CORTELYOU.
Assistant MEINZER.

In whatever line the modern student turns his energies a practical knowledge of German is 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 that language. It is planned to have the work of this department as practical as possible, without, however, failing to encourage a fondness for German literature. The tendency toward introducing German classics into second-year or even first-year courses is becoming too frequent; students who have "mastered" Faust are too often unable to make the most commonplace remarks in German or to read current German literature with facility. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has excellent points but glaring defects also.

The courses should be taken in the order presented here; in exceptional

cases, with the consent of the head of the department, students may be assigned to courses 5 and 6 before taking 4. In addition to the time for each scheduled below, courses 1, 2, 3, 4 and 5 are taught the following term and 3 is given the winter term.

COURSES IN GERMAN.

1. **German I.** Junior year, fall term. Four hours class work. Four credits. Required in course in home economics, elective in course in general science, and optional in course in veterinary medicine.

After two recitations given to learning the sounds of the German letters, the pupil at once begins reading. Vocabularies are learned from the start. Grammar is learned gradually with the reading lessons in such a way as not to discourage the pupil. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term is included the study of articles, prepositions, declensions of nouns and pronouns, the numerals, and declension and comparison of adjectives. Frequent reviews are taken to enable the student to digest the facts presented. The abundant conversational and written work taken up serves the same end. Text, Spanhoofd's Lehrbuch der Deutschen Sprache (first fifteen lessons).

2. **German II.** Junior year, winter term. Four hours class work. Four credits. Required in course in home economics, elective in course in general science, and optional in course in veterinary medicine.

The remainder of the more important points of grammar are studied. Pupils are repeatedly drilled on grammatical points already gone over in German I. The general plan of the work is the same as in the preceding term. Essential facts of grammar are insisted on, but German is taught as a living language. Conversational exercises in German and written translations from English to German are frequent. Text, Spanhoofd's Lehrbuch der Deutschen Sprache (completed).

3. **German III.** Junior year, spring term. Four hours class work. Four credits. Required in course in home economics, elective in course in general science, and optional in course in veterinary medicine.

Readings of selections in dialogue form and dealing in detail with German life, customs, institutions, history and mythology. A few of the best and most popular song poems are studied also. Continued drills on grammar, with now and then sight readings and translations into German. Conversations based on the readings. Text, Bacon's In Vaterland.

4. **German IV.** Senior year, fall term. Four hours class work. Four credits. Elective in the courses in general science and home economics.

Reading of recent comedies of considerable literary merit, up-to-date one-act plays, which are lively, real, and full of a clean sort of fun. The following are read: Julius Rosen's Ein Knopf, Gustav von Moser's Ein amerikanisches Duell, Muller's Im Wartesalon erster Klasse and Emil Pohl's Die Schulreiterin. Exercises in conversation and composition based on these plays are introduced occasionally. Text, Manley and Allen's Four German Comedies.

5. **German V.** Senior year, winter term. Four hours class work. Four credits. Elective in the courses in general science and home economics.

This is a practical course 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 and how to make purchases; cafes, restaurants and drinking customs; meals

and expressions used at table; society events; dwellings, boarding houses and hotels; the family, weddings, marriages, etc.; dress; the human body; diseases; the school system; religion and church life; divisions of society, occupations; applied mathematics; money, measures and weights. Text, Kron's German Daily Life (first 155 pages).

6. **German VI.** Senior year, spring term. Four hours class work. Four credits. Elective in the courses in general science and home economics.

The general plan of the work is that of the preceding course. The ground covered is as follows: time; the seasons and the weather; festivities, recreations, the theater, games; traveling, the railroads and ships; street cars, hacks, motor cars, airships, etc.; the postal system, telegraph and telephone; the city in general; Berlin and cities of the provinces; inquiring one's way; in the country; the German empire; the military system; conversational phrases; the best German; everyday German. Occasionally some supplementary work is done, Wesselhoeft's German Composition being the text used. There are sight translations of easy selections. Text, Kron's German Daily Life (completed).

Department of History and Civics.

Professor PRICE.
Instructor TAYLOR.
Assistant REYNOLDS.
Assistant MACK.
Assistant GORDON.
Assistant L. A. CHASE.
Assistant HERR.

The department of history and civics offers fifteen different courses, as described below. Five of these are offered in the subfreshman years, and are to be taken in the order in which they are numbered, though each is taught each term. A student must have credit for preparatory United States history before entering on the work here outlined. Courses 1 to 5 follow primarily the textbook method. Courses 8, 9, 13, 14 and 15 combine the textbook and lecture methods. Courses 6, 7, 10, 11 and 12 combine the library and lecture methods of instruction. The department is well equipped with maps and charts and has an unusually strong library for a school of this character.

Training for citizenship, for 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.

COURSES IN HISTORY.

1. **Ancient History.** Subfreshman, first year, fall term. Three hours class work. Three credits. Required of all subfreshmen.

This course is introduced by a brief study of Egypt, the Hebrews, and other ancient oriental nations. The history of Greece is then studied from its prehistoric origin to its conquest by Rome, 146 B. C. The Persian and Peloponnesian wars must be studied, but the emphasis is laid rather on the life and government of the people in their city-states, on the age of Pericles, and on art, literature, government and philosophy of the Greeks. Alexander the Great is studied, not so much for his military achievements, but rather as the disseminator of Greek civilization. The second half of this course is a study of Roman history and

institutions. The growth of the nation is followed from the founding of the city till the great republic surrounded the Mediterranean and embraced practically all of the then known world. The Romanizing of Europe; the reasons for the change from republic to empire, and the method of its accomplishment; Rome's contributions to civilization, such as her roads and her laws; the origin of the Christian church; the Augustan age; and the lasting impression that 500 years of world empire made on mankind, are among the points emphasized. An attempt is made in the very brief time allotted to this subject to acquire some familiarity with the great personages, such as Pericles and Cæsar, who played their part in the ancient world. Text, Myers's Ancient History.

2. **Medieval History.** Subfreshman, first year, winter term. Three hours class work. Three credits. Required of all subfreshmen.

This course begins with a review of the fall of Rome and the migrations of the Teutonic tribes, thus discovering the very beginnings of the modern European nationalities and languages, and traces the story of European history and institutions to the Renaissance. The institution of feudalism; the Christian church and monasticism; Mohammedanism; the achievements of the Northmen; the Hundred Years' war; the Crusades; the Italian cities, and the Renaissance, are among the subjects studied. Special attention is given to England and the rise and power of the medieval church. Text, Robinson's History of Western Europe, through chapter XXII.

3. **Modern History I.** Subfreshman, first year, spring term. Three hours class work. Three credits. Required of all subfreshmen.

This course starts with a view of the European states at the opening of the sixteenth century. It includes a study of the Protestant Reformation and the later developments in the history of the church; the rise and fall of Spain; England under the Tudors; the heroic struggle of the Netherlands; the Reformation and the civil wars in France; the Thirty Years' war, especially its causes and results; the Stuarts and the Puritan revolution in England; and the ascendancy of France under Louis XIV. Text, Schwill's Political History of Modern Europe (to page 289).

4. **Modern History II.** Subfreshman, second year, fall term. Three hours class work. Three credits. Required of all subfreshmen.

This is a continuation of course 3. It includes a study of the second great series of wars between England and France, including the French and Indian wars, the American Revolution, and the Napoleonic wars to 1815; the French Revolution; the growth of France and recent changes in her government; the creation of the German empire and of the Italian kingdom; the growth of Russia; the situation in Austria and the Turkish situation. Contemporary events in American history are noted throughout this and the preceding course. Text, Schwill's Political History of Modern Europe (beginning at page 289).

5. **The American Nation.** Subfreshman, second year, winter term. Three hours class work. Three credits. Required of all subfreshmen.

In conformity with the plan worked out by the American Historical Association, and in keeping with the practical nature and spirit of our College, the subfreshman work in history reaches its culmination in a term's study of our American nation—its history and its government. The roots of our American history and institutions are found in the history and institutions of European nations, especially in that of England. In order really to understand American history you must know Euro-

pean history. This is one of the chief reasons—though not by any means the only reason—for our study of ancient and modern history. Thus in our study of European history American history and institutions are constantly kept in mind. This course traces the story of the growth of the great republic from its discovery by the modern European world at the moment that this European world was waking into the really modern period of its activities down to the present date, when America has become a world power, playing her part in world politics. With this story of national growth in size, in power and in importance is coupled a study of its institutions—of the chief features of its government. The textbooks for this course are McLaughlin's History of the American Nation, and James and Sanford's Government in State and Nation. No student is eligible to take this course unless he has credit for the preparatory United States history. Moreover, this course should always be preceded by courses 1 to 4, inclusive.

6. **Constitutional History.** Sophomore year, fall term. Four hours class work. Four credits. Required in the courses in engineering, architecture and veterinary medicine.

This is practically the same as course 11, except that special attention is given in this course to the principles of constitutional law as they arise—since the engineering students are not required to take the course in civics—13, below.

7. **Industrial History.** Sophomore year, spring term. Two hours class work. Two credits. Required in courses in architecture and engineering.

This course covers—

First.—A study of the physical geography, geology, climate, etc., of the American continents and how these have affected our history and institutions.

Second.—A study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people; and the attitude of the mother country toward colonization and the colonists—especially the colonial policy as regards the occupations and industries of the people—and the reasons for this policy. A careful study is made of the later history of immigration as to numbers, causes, character, location and effects on our industries, politics and institutions.

Third.—The influence of the frontier on our American history and institutions. The growth of our great West and the effects of our free lands, together with the spirit and institutions there engendered, including our public educational system, etc. How the life on the frontier developed the typical American citizen. Present-day irrigation—its needs, methods and advantages.

Fourth.—A study of the South—first, before the war (with slavery), and next, a study of the new South as it is developing since the war. A comparison of the South with New England and the West.

Fifth.—Throughout the whole course runs a study of the life and the industries or occupations of the people—how they were making their living and how they lived. This includes a study of the growth of the manufacturing industries and the development of transportation facilities; our maritime shipping interests; inventions—such as the steam engine, the telegraph, the sewing machine and the reaper. It includes a study of the growth of our cities as a combined result of manufactures, transportation, the exhaustion of our free lands, etc. An attempt is

made to appreciate the influence of all these things on political parties and party issues; for example, tariffs, internal improvements, expansion and slavery, and the attitude of sections and individual leaders on these issues.

This is a library course, guided by a notebook and supplemented by lectures. It includes reviews of books, magazine articles, etc. Prerequisite, constitutional history.

8. **English History.** Sophomore or senior year, spring term. Four hours class work. Four credits. Required in the courses in printing and general science and elective in the course in home economics.

This course traces the story of England's growth from the Britain of the earliest time up to the British empire of to-day. The political history is clearly traced, but emphasis is laid on the constitutional development, and the practical working of the present government is carefully studied. Due emphasis is laid on the industrial and social development of the people, especially on 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 emerges, and the conditions under which the United States of America becomes independent of England. This is primarily a textbook course, with Coman and Kendall, Cheyney or Andrews as the text; but supplementary reading is required, especially from Green's Short History of the English People and Cheyney's Industrial and Social History of England. Lectures are given on contemporary continental institutions, movements and conditions as far as the limited time will permit.

9. **French History.** Junior or senior year, fall term. Four hours. Four credits. Elective in the courses in home economics and general science.

The story of the growth of the French nation is traced from the days when Gaul was a Roman province, through the fall of Rome and the German conquest, the development of the Christian church and the institution of feudalism. The Crusades are studied, the formation of the French nation and the beginning of the absolute monarchy, till France becomes a great European power. Then follow the Hundred Years' war, the Protestant Revolution, the religious civil wars, and finally the grand monarchy under Louis XIV. The ancient *régime* in France, the French Revolution, Napoleon and the new nation bring this course to the point where the course in modern Europe takes up the subject. Text, Adams's The Growth of the French Nation.

10. **Modern Europe.** Junior or senior year, winter term. Four hours class work. Four credits. Required in the printing course and elective in the general science and home economics courses.

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 they are actually being conducted. An investigation is made of existing international relations and of the leading questions that are now agitating the modern world, such as the Turkish question, China, and the partition of Africa. Textbook, Judson's Europe in the Nineteenth Century, together with lectures and library work.

11. **American History I.** Junior year, winter term, and senior year, fall term. Four hours class work. Four credits. Required in the courses in general science, home economics and printing.

This is an advanced course in the history of America, especially from 1754 to 1854. The course is introduced by a study of the results or effects of the French and Indian war and of those causes and conditions that led to the war of American independence. The treaty of 1783, the governmental and political conditions during the confederation period, the convention of 1787 and the struggle for the adoption of the new constitution are next carefully examined; but the major part of this course is devoted to the period under the constitution. The brevity of the course requires judicious selection of the points to be emphasized, and the following lines of our national history are especially studied: The establishment of the nation and the organization and functions of the various departments of its government; the important presidential elections; Hamilton's financial measures, taxation, banks, internal improvements; history of political parties—their issues and their leaders; foreign relations and their connecting links between Europe and America, as in the Monroe doctrine; the slavery question—compromises, the laws and the constitution; nullification and secession throughout our history; annexation and government of territories; national boundaries; the growth and development of the West, with a study of its influence on our national character and history; to the Kansas-Nebraska bill of 1854. Since this course so largely involves a study of the practical application of our constitution in operation, it must be preceded by the course in civics. Channing's Students' History of the United States and Elson's History of the United States are used as textbooks; but this is primarily a library course, and each student uses an American history notebook of topics and references, prepared by the department, as an aid to larger and more thorough work in the term devoted to this subject. Prerequisite, civics.

12. **American History II.** Junior year, spring term, and senior year, winter and spring terms. Four hours class work. Four credits. Required in the courses in home economics and printing, and elective in the course in general science.

One-half of this term's work continues the course in American history I down to the present time. It begins with a study of 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 North and 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. Textbooks as in American history I. The other half of the term's work is essentially the same as the industrial history course. Prerequisite, American history I.

13. **American History.** Senior year, fall and spring terms. Four hours class work. Four credits. Required in the agricultural courses.

The first half of this course includes American history I, given chiefly by lectures. The second half includes the industrial history course—7, above. Prerequisite, civics.

COURSES IN CIVICS.

14. **Civics.** Junior year, fall, winter or spring term. Four hours class work. Four credits. Required in the agricultural, home economics, general science and printing courses.

This course is introduced by a very brief study of government in gen-

eral and of our colonial governments, followed by a more careful study of the articles of confederation and the adoption of the constitution, in so far as these seem essential to a clear understanding of the form and spirit of our present government. The work of the term is chiefly devoted to a careful study of the actual government of our nation under our constitution. Constant comparison is made with our own state government. Current events and incidents from history are used to illustrate the various principles until the everyday affairs of our government are made clear, practical and familiar. Comparison with other governments, especially with that of England, is made whenever this seems helpful to a better understanding of our own. The fundamental principles of our constitutional law are developed, and selected cases from the United States supreme court reports are studied. Textbook, Hinsdale's American Government, or Hart's Actual Government. References: Cooley's Principles of Constitutional Law, Bryce's American Commonwealth, Boyd's Cases on Constitutional Law, the national and state statutes, etc.

15. **Business Law.** Junior year, winter term. Two hours class work. Two credits. Required in the engineering, architecture and printing courses, elective in the course in general science, and optional in the course in veterinary medicine.

First and 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; next, the elements of the law of real property, including 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, White's Business Law, supplemented by lectures and supplemented and illustrated by Parsons's Laws of Business and the national and state statutes.

16. **International Law.** Junior or senior year, winter term. Two hours class work. Two credits. Required in course in printing and elective in course in general science.

The fundamental principles of international law and international relations, rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text, Wilson and Tucker's International Law (fifth edition, 1910).

Department of Library Economy.

Librarian BARNES.
Assistant Librarian TINKEY.
Assistant Librarian WARNER.
Assistant Librarian GULICK.
Assistant Librarian MUDGE.

An apprentice course in library economy is offered general science students as an elective in the junior and senior years. This course consists of four hours a week practice work in the library under supervision of the librarian and assistants and includes a consideration of the following subjects:

COURSES IN LIBRARY ECONOMY.

1. **Library Economy I.** Elective. Junior year, fall term. Four hours. Two credits.

Library handwriting, typewriting, mechanical preparation of books for the shelves.

2. **Library Economy II.** Elective. Junior year, winter term. Four hours. Two credits.

Classification, shelf arrangement, charging system and loan desk.

3. **Library Economy III.** Elective. Junior year, spring term. Four hours. Two credits.

Ordering, accessioning, and care of periodicals.

4. **Library Economy IV.** Elective. Senior year, fall term. Four hours. Two credits.

General reference books, book selection, elementary reference work.

5. **Library Economy V.** Elective. Senior year, winter term. Four hours. Two credits.

Advanced reference work, bibliography, history of books and printing.

6. **Library Economy VI.** Elective. Senior year, spring term. Four hours. Two credits.

Cataloguing, indexing, and alphabeting.

Department of Mathematics.

Professor REMICK.
Assistant Professor ANDREWS.
Assistant Professor BARNETT.
Instructor ZEININGER.
Assistant WHITE.
Assistant MCGARRAH.
Assistant PORTER.
Assistant PETTY.
Assistant KAY.
Assistant JACKSON.
Assistant HOLROYD.
Assistant BISBEY.

The courses in mathematics are offered primarily with the following ends in view: (1) The attainment of mental power and accuracy in the interest of general culture; (2) the acquirement of facts and processes that will furnish the student a valuable tool in further scientific and technical study.

Subfreshman and freshman courses are offered each term, sophomore courses at least twice during the year.

COURSES IN MATHEMATICS.

1. **Algebra I.** Subfreshman, first year, fall term. Four hours. Four credits. Required of all subfreshman students.

Four fundamental operations, integral linear equations, fractions, highest common factor and lowest common multiple by factoring. Text, Wells's Textbook in Algebra.

2. **Algebra II.** Subfreshman, first year, winter term. Four hours. Four credits. Required of all subfreshman students.

Fractions, fractional and literal linear equations, simultaneous linear equations, graphical representation. Text, Wells's Textbook in Algebra. Prerequisite, algebra I.

3. **Algebra III.** Subfreshman, first year, spring term. Four hours. Four credits. Required of all subfreshman students.

Involution, evolution, theory of exponents, radicals, quadratic equations, with applications to practical problems. Text, Wells's Textbook in Algebra. Prerequisite, algebra II.

4. **Plane Geometry I.** Subfreshman, second year, fall term. Four hours. Four credits. Required of all subfreshman students.

Groups 1 to 12, including most of the exercises, in Bush and Clarke, The Elements of Geometry. Prerequisite, algebra III.

5. **Plane Geometry II.** Subfreshman, second year, winter term. Four hours. Four credits. Required of all subfreshman students.

Groups 12 to 21, including most of the exercises, in Bush and Clarke, The Elements of Geometry. Prerequisite, plane geometry I.

6. **Solid Geometry.** Subfreshman, second year, spring term. Four hours. Four credits. Required of all subfreshman students.

Groups 21 to 26, inclusive, with all exercises, in Bush and Clarke, The Elements of Geometry. Prerequisite, plane geometry II.

7. **Bookkeeping.** Subfreshman, second year, spring term. Three hours. Three credits. Required of all subfreshman young men.

This is an elementary course taking up the fundamental principles of debit and credit, the formal methods of keeping the more common books, and some work in the practical application of these principles to the keeping of farm, household and shop accounts. Textbook, Bogle's Comprehensive Bookkeeping.

8. **Algebra IV.** Freshman year, fall term. Four hours. Four credits. Required in the courses in agriculture, architecture, engineering, general science, home economics, and printing.

Rapid review of complex fractions, theory of exponents, radicals, with special attention to rationalization and radical equations, quadratic forms, theory of quadratics, simultaneous quadratic equations with graphical work, ratio and proportion, binomial theorems with any exponent, logarithms without theory proofs. Text, Wells's Textbook in Algebra.

9. **Plane Trigonometry.** Freshman year, winter term. Four hours. Four credits. Required in the courses in engineering, architecture and general science.

Functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text, Wentworth's Plane and Spherical Trigonometry.

10. **College Algebra.** Freshman year, spring term. Four hours. Four credits. Required in the courses in engineering, architecture and general science.

Variation, progressions, undetermined coefficients, logarithms (theory and practice), methods of factoring, graphs of imaginaries, permutations and combinations, determinants and theory of equations. Text, Wells's Textbook in Algebra.

11. **Analytical Geometry.** Sophomore year, fall term. Four hours. Four credits. Required in the courses in architecture and engineering and elective in the course in general science.

Recitations. Loci, straight line, circle, general discussion of conics, tangents and normals, parabola, ellipse, and hyperbola. Text, Bailey and Woods. Prerequisites, plane trigonometry and college algebra.

12. **Differential Calculus.** Sophomore year, winter term. Four hours. Four credits. Required in the courses in architecture and engineering and elective in the course in general science.

Recitations. Fundamental principles, derivatives, Maclaurin's and Taylor's theorems, indeterminates, maxima and minima, partial differentiation, applications to geometry and mechanics. Text, Osborne's Differential and Integral Calculus. Prerequisite, analytical geometry.

13. **Integral Calculus.** Sophomore year, spring term. Four hours. Four credits. Required in the courses in architecture and engineering and elective in the course in general science.

Recitations. Fundamental formulas, integration of standard algebraic and transcendental expressions, definite integrals, applications to plane areas, lengths, surfaces, volumes. Text, Osborne's Differential and Integral Calculus. Prerequisite, differential calculus.

14. **Mathematics of Biology.** Senior year, spring term. Four hours. Four credits. Elective in the course in general science.

Lectures. Elements of differential and integral calculus, curve tracing, determination of equations of curves. This course is designed to meet the needs of students in biology. Prerequisite, analytical geometry.

Department of Military Training.

First Lieutenant BOICE, (U. S. A.), Professor of Military Science.
Commissary Sergeant CLAEREN (U. S. A., retired), Assistant.

This institution being one of the beneficiaries of the act of Congress of 1862, instruction in military tactics is made compulsory. The course of instruction is made to conform strictly to the provisions of General Orders No. 231, War Department, 1909.

In compliance with the requirements of that order, the course is both practical and theoretical, and applied as follows:

a.—Practical.

1.—Infantry drill regulations, through the evolution of the regiment, in close and extended order.
2.—Advance and rear guards and outposts.
3.—Marches.
4.—The ceremonies of regimental review, inspection, parades, and guard mounting.
5.—Infantry target practice.
6.—Instruction on first aid to the injured.

—Theoretical.

1.—The infantry drill regulations, covered by the practical instruction.
2.—The manual of guard duty.
3.—Small-arms firing regulations.
4.—Field-service regulations.
5.—The Articles of War, with specific reference to articles 4, 8, 15, 20, 21, 22, 23, 24, 32, 38, 39, 40, 42, 44, 46, 47, 50, 55, 57, 61 and 65.
6.—Lectures.

The national government has supplied the College with 475 rifles and an equal number of sets of infantry accouterments; also two three-inch field-guns and carriages. Swords, target supplies and annual issues of ball and blank cartridges are also received from the general government.

Organization. Cadets are organized into two battalions of infantry and a band, the drill and administration of which conforms to that of the United States army. Officers and noncommissioned officers are selected by the professor of military science and tactics, with the approval of the President, according to the principles governing such selection at the United States Military Academy, and receive commissions and warrants from the president of the College.

Discipline. Each cadet is furnished with a copy of the cadet regulations governing the military department, approved by the Board of Regents, and is required to familiarize himself with them and to conform strictly to their requirements.

Band. Assignments to the band are made by the band leader, who is charged with the technical instruction. Practice in the band is accredited, through the military department, in lieu of drill and theoretical instruction, subject to the provisions of the cadet regulations, with which strict conformity is required.

The purpose of the cadet band is to foster and encourage among the cadets a love for patriotic national airs and martial music.

Requirements. All young men in College courses below the junior year, unless excused for physical disability, are required to take military drill, and to complete each term's work in a satisfactory manner. Additional work is optional with juniors and seniors, who are given preference for appointment as officers. A junior or senior having enrolled optionally and accepted a commission is required to continue the work throughout the College year, subject to the same regulations as other cadets.

Uniform. The uniform conforms to the West Point cadet pattern. Blouse must be of good quality cadet-gray cloth, trimmed with best quality mohair braid one inch wide, collar not less than one and one-half inches high, with half-inch gilt metal letters K. S. A. C.; insignia of rank to conform to that of the United States infantry; trousers, good quality cadet-gray doeskin, with black cloth stripe of army regulation width to denote rank; cap, West Point cadet pattern, with College emblem.

Trimmings of band uniforms are modified as authorized for bands in the United States army.

The commandant of cadets furnishes specifications to all authorized dealers in uniforms, and uniforms must conform to such specifications.

All military students are required to provide themselves with uniforms within two weeks after assignment. The uniform can be purchased at a reasonable price, after enrollment, and makes a good, serviceable suit for regular College wear.

Textbooks. Each military student will be required to provide himself with the following textbooks: United States Drill Regulations (latest edition), The Manual of Guard Duty (latest edition), Small-arms Firing Regulations (latest edition), Field-service Regulations.

The instruction in keeping records will be from blank books provided by the War Department.

War Department Record. 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.

Department of Music.

Professor VALLEY.
Assistant Professor BROWN.
Assistant CANNON.
Assistant BAUM.
Assistant PING.
Band Leader WESTPHALINGER.

Recognizing the importance of music in our daily life, its power, culture, inspiration, comfort, and the necessity of musical knowledge for those who aim at the profession of teaching, this College offers to the earnest student a good opportunity for the study of music.

No regular or required course is given. The student may take music for one term only, or for an extended period of four years. Instruction is furnished free to all regular students assigned to music in the follow-

ing branches: Voice, piano, violin, wind and brass instruments; notation, theory, harmony and musical history.

CLASS INSTRUCTION. Class organization is wholly under the control of the professor of music, and classes are organized at such periods as best accommodate the students interested.

COURSES IN MUSIC.

VOCAL.

Development and cultivation of the voice.

First Year.—Breathing. Tone placing. Vocal physiology. Simple forms of vocal technique. Text, Teacher's Exercises. Concone's Vocalises, op. 9-17. Simple Songs and Ballads.

Second Year.—Extension of vocal technique. Concone's Exercises, continued. Sacred songs and ballads.

Third and Fourth Years.—Vocalises by Bordese, Lamperti, Marchesi, Nava, Panseron, Rubini. Songs by Schubert, Brahms, Schumann, and other masters. Oratorio and operatic arias.

PIANO.

First Year.—Studies in the rudiments of music, melody, rhythm and the underlying principles of touch and technic. Etudes by Gurlitt, Streabbog, Burgmuller, Kohler, Biehl, and simple selections from modern composers.

Second Year.—Loeschhorn, Czerny, Heller, Lecouppey, Bertini, Duvernoy, Smith. Preparatory octave studies, scales and special technical work.

Third Year.—Advanced work in technic and scales; studies by Cramer, Czerny, Field, Bach's little preludes and fugues, two-part inventions, Kullak octave studies, sonatas by Haydn and Mozart, selections from Chaminade, Rubenstein, Grieg, Scharwenka, Godard, Jensen and Poldini.

Fourth Year.—Advanced work in technic, phrasing and interpretation; Bach's three-part inventions and well tempered clavichord, Clementi's Gradus ad Parnassum, Foote, MacDowell and Henselt etudes, Beethoven sonatas, and more difficult selections from classic and modern composers.

VIOLIN.

First Year.—Particular attention is given to attaining correct position, intonation and bowing. Methods by Hohmann, Wichtl, etudes by Wohlfahrt; scale studies; easy pieces.

Second Year.—Methods by Wichtl, Dancla. Etudes by Wohlfahrt, Kayser Technical Studies. Duets by Pleyel, Mazas, etc. Selections from Dancla, Singelee, DeBeriot, and modern composers.

Third Year.—Methods by DeBeriot, David. Technical studies by Schradieck, special studies, Mazas scale studies. Etudes by Kreutzer, selections from DeBeriot, Alard, and others. Orchestral playing.

Fourth Year.—Etudes by Kreutzer, Mazas brilliant studies. Scale studies. Selections from Mozart, Tartini, Vieuxtemps, Wieniawski, and others. Orchestral playing. Ensemble classes.

ELECTIVE IN MUSIC.

In connection with vocal and instrumental music the following subjects are required:

JUNIOR YEAR.

Fall Term.—Theory: Notation of music, pitch, rhythm, measure, symbols, metronome marks, acoustics, chromatic signs, keys, major and minor scales, signatures. Harmony: Intervals, triads of the major and minor scales. History of music: Ancient and oriental music. Progress of musical development to close of the sixteenth century.

Winter Term.—Theory: Intervals, chords, ear training, thinking tones, nonchordal tones, embellishments, abbreviations used in music. Harmony: Inversions of triads, dominant sept-chords and inversions. History of music: Music in the seventeenth century. Opera, oratorio, and instrumental music to the present day.

Spring Term.—Theory: Musical forms, vocal, instrumental, instrumentation and uses of various instruments, modern orchestra, prosody, musical terms in general use. Harmony: Collateral sept-chords of the major and minor scales. Inversions, cadences. History of music: Biographies of great musicians—Bach, Haydn, Handel, Beethoven, Chopin, Schumann, Liszt, Wagner, Grieg and others. Texts: Theory, Musical Essentials by Maryatt; Harmony by Brockhoven; History by Fillmore.

SENIOR YEAR.

Fall Term.—Two lessons per week in vocal or specialized instrument. Harmony: Chords of ninth, eleventh, etc. Altered chords.

Winter Term.—Two lessons per week in vocal or specialized instrument. Harmony: Suspensions. Analysis. Modulation.

Spring Term.—Two lessons per week in vocal or specialized instrument. Harmony: Modulation. Harmonization of melodies.

Musical Organizations. Each instrument has a distinct function in the science of tonal expression, and only in their combination are the finest effects in the coloring of the melody, harmony and rhythm procured. This combination is made possible in the musical department by the number of students and the variety of instruments. Students who are sufficiently advanced to join the College choral union, College glee club, College orchestra or the military band may become members by assignment.

The Orchestra. This organization endeavors to maintain a correct and well-balanced instrumentation; and gives the members opportunity for practical work in orchestral playing. The work is highly educational, including as it does the study and performance of standard overtures, symphonies and concert pieces in classic and modern form. The orchestra furnishes music for chapel exercises each morning and assists in several concerts and entertainments during the year.

Choral Union. Chorus singing is of great importance to the vocal students, and this society was organized for their benefit. The students receive here much needed experience in sight reading, become familiar with choral masterpieces and enjoy its broadening influence. One rehearsal a week. Regular attendance required.

Chapel Chorus. The most advanced pupils are requested to sing in this chorus, which has for its aim to sing once a week in chapel. Only the best class of church music is used. Rehearsals are held Friday afternoons.

Glee Club. The College glee club is made up of the best male voices, from fourteen to eighteen strong.

Military Band. The band is part of the cadet corps, and practice in the band is accredited, through the military department, in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to cadet regulations. Assignments to the band are made by the band leader and are made for the entire year. Members of the band are required to attend regularly until after commencement exercises. The band furnishes music for all ceremonies of a military character and for various other College occasions.

Annual Concert. An annual concert is given by the choral union, assisted by the orchestra, on Monday of commencement week. During the spring term a number of musical recitals are given, in which the students furnish the entire program. These are open to the public.

Department of Philosophy.

Professor McKEEVER.

The courses offered in the department of philosophy are intended to give the student practical assistance in the performance of his chosen work. With this end in view, the abstract speculations once characterizing many of the philosophic subjects are studiously avoided, while the concrete and the human aspects of things are emphasized. In every course given it is sought to have the student keep consciously in mind the human society in which he lives and to set up for himself the goal of efficient membership therein.

The department is reasonably well equipped for doing satisfactory work. The psychology laboratory contains enough apparatus to meet the practical needs of the course, and the department library is sufficiently well stocked to allow for a liberal amount of reference work.

Courses 5 to 9, inclusive, are electives for those who wish to prepare to teach the subjects upon which the College places special emphasis, as agriculture, domestic science and art, manual training and the physical and biological sciences. Together with the foregoing, the young men should have psychology and philosophy, and the young women psychology and ethics. Young women finishing the course in home economics may take for their electives a double group, including history of education, philosophy of education, methods of teaching, sociology, ethics, school law and school management, and thus meet the minimum requirements of the State Board of Education for a state certificate to teach in the schools of Kansas.

COURSES IN PHILOSOPHY.

1. **Methods of Study.** Freshman year, fall and winter terms. One hour per week. One credit. Required of all freshman students.

This brief lecture course is based on elementary psychology. Its chief purpose is to assist the student in acquiring a better method of expending his time and energies in the pursuit of college work. Each member of the class is required to work out carefully a plan or program of the College exercises in which he is at the time most directly interested and to submit this schedule for criticism. A balanced schedule of study, work and recreation is made the subject of special consideration. McKeever's Psychology and Higher Life is used as a guide.

2. **Philosophy.** Sophomore or senior year, winter term. Four hours per week. Four credits. Required in courses in general science, printing and veterinary medicine.

This is a lecture and recitation course in which the student is introduced to some of the more important and practical aspects of philosophy, such as (1) the particular point of view of philosophy; (2) the philosophic implications of modern science; (3) man's destiny in the light of evolution; (4) the philosophy of work and of the vocational life. Brief consideration is given to defining the positions of some of the world's greatest philosophers. The student is required to do a liberal amount of reference reading and to offer a number of specially prepared discussions. The term's work is based on portions of Paulson's Introduction to Philosophy.

3. **Psychology.** Junior year, fall and winter terms. Four hours per week. Four credits. Required in the courses in home economics, general science and printing.

A general course combining lecture, recitation and laboratory features. An effort is made to master the general principles of the subject and to show their application to everyday life. The student is required to spend about one-half of the preparation time in reference reading, and to offer before the class during the term two or more independent discussions. It is also required that each student, by the use of laboratory instruments furnished by the department, make out a personal table of biometric measurements, a duplicate copy of which is kept on file. A brief amount of time is devoted to the study of some of the important problems in social psychology. James's Psychology is used as a text, with Angell and Judd as reference texts.

4. **Ethics.** Junior or senior year, winter term. Four hours per week. Four credits. Elective in the course in general science.

A lecture course giving brief consideration to systematic ethics and fuller treatment of practical ethics. Theories of conscience and of the highest good are subjects of special consideration, as is also the psychological aspect of the development of the ethical judgment. Each member of the class is required to present a number of discussions of reference readings and to consider the application of ethics to his chosen vocation. Text, Thilly's Ethics.

COURSES IN PEDAGOGY.

5. **History of Education.** Junior or senior year, fall term. Four hours per week. Four credits. Elective in the courses in general science and home economics.

The course includes a brief survey of ancient, medieval and modern education with special attention to epoch-making movements and the great educators connected with them. The student is asked to work out individually during the term an outline of the course, showing the movement of educational history toward modern systems.

6. **School Law.** Junior or senior year, winter term. Two hours per week. Two credits. Elective in the courses in general science and home economics.

The purpose of this course is to review briefly the laws referring directly to the public schools of the state of Kansas and to note any radical differences that may be found in the school laws of other states.

7. **Methods of Teaching.** Junior or senior year, winter term. A

lecture and recitation course, four hours per week. Four credits. Elective in the courses in general science and home economics.

This course embodies the application of the principles of psychology to teaching and begins with a cursory review of such principles, but the greater portion of the time is given to consideration of methods of teaching the special branches, the emphasis being placed upon the particular line of work which the student is preparing to teach. Each member of the class is required to do a liberal amount of reference reading and to offer for criticism several written dissertations.

8. **School Management.** Junior or senior year, spring term. Four hours per week. Four credits. Elective in the courses in home economics and general science.

An elementary course giving consideration to questions of management and discipline in graded and ungraded schools and treating briefly some of the minor problems of higher school administration. An effort is made to prepare the teacher to exercise proper judgment and authority in the position which he is preparing to hold.

9. **Philosophy of Education.** Junior or senior year, spring term. Four hours per week. Four credits. Elective in the courses in general science and home economics.

A careful analysis of the formal processes of the school, and of the educational influences of the institutions outside of the school, with a view to determining how these experiences all tend to unify life. The student is asked to formulate an ideal which the teacher might consciously set up as a goal of his efforts. Throughout the course a distinctive point of view of the philosophy of education is given prominent consideration. Somewhat extensive readings in general philosophy and psychology are required. Horne's Philosophy of Education is the guide book of the course.

Department of Physical Training for Women.

Director BARBOUR.

To maintain robust health and a good constitution should be one of the chief aims of every girl.

The great object of gymnastics is to promote harmony between mind and body. It is impossible to cultivate the body without benefit to the mind; likewise to cultivate the mind properly we should care for the body.

All young women of the College are entitled to the privileges of the gymnasium, which is well equipped with apparatus, lockers, shower baths, etc., and all entering below the junior year are required to take at least one year of physical training, unless excused by the dean of women or given credit therefor on account of similar work elsewhere. In the sophomore year students who have credit for one year of physical training may, at their option, take music or physical training.

A physical examination is made of each girl by the director before she is permitted to enter the class. This includes an elaborate system of body measurements and an examination of the condition of the heart and lungs. Physical defects, abnormalities and weaknesses are noted and judicious healthful exercise is prescribed to fit the student's individual needs. A suit has been adopted which consists of black blouse and bloomers, and must be made in uniform style. The pattern for the suit and samples of material may be obtained by sending the bust measure and fifteen cents to secretary of the College.

COURSES IN PHYSICAL TRAINING.

1. **Physical Training I.** Freshman year, each term. Four hours.

Correction of improper standing and walking, marching, free exercises, fancy steps, elementary series in wands, dumb-bells, Indian clubs, balance ladder and gymnastic games.

2. **Physical Training II.** Freshman year, each term. Four hours.

Military marching, continuation of work with light apparatus, stall bars, flying rings, giant stride, chest weights, games and basket ball. Prerequisite, physical training I.

3. **Physical Training III.** Freshman and sophomore years, each term. Four hours.

Fancy marching, advanced free exercises, coördination work with Indian clubs, wands, and dumb-bells, jumping horse and parallel bars. Folk dances and song plays, tennis and indoor baseball. Prerequisite, physical training II.

Department of Physics.

Professor HAMILTON.
Instructor LOGAN.
Assistant JENNESS.

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 aim 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 the student abundant opportunity to test the principal laws, 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 requirements for accurate work in all courses. The manual in use in most of the courses is one which has been prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS.

1. **Physics I.** Subfreshman, second year, fall term. Class work, three hours. Three credits. Required of all subfreshmen.

This course is intended to give a general view of the subject of mechanics and sound. Special emphasis is placed upon those principles which will be met again in later work in the same or other sciences. Textbook, Carhart and Chute's Physics. Prerequisite, algebra III.

2. **Physics II.** Subfreshman, second year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshmen.

Includes a study of heat and light, and is a continuation of physics I. Discussion of the most important laws involved in each, together with the explanation of many everyday phenomena, is followed by problems. Textbook, Carhart and Chute's Physics.

Laboratory.—The importance of accurate measurements, observations and conclusions is emphasized in the use of such instruments as the calipers, balances, micrometer, spherometer, barometer and thermometer, and in measurements in reflection and refraction. The measurements taken will be made the basis of problems to illustrate the various laws discussed in the classroom.

3. **Physics III.** Subfreshman, second year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshmen.

This course is a continuation of 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 made subjects for class discussion. Textbook, Carhart and Chute's Physics.

Laboratory.—Construction and use of cells, simple forms of wiring, use of instruments for measuring currents.

4. **Physics IV.** Freshman year, winter term. Class work, four hours. Four credits. Required in the course in home economics.

A course of lectures and demonstrations in which the laws relating to principles involved in appliances of the household are explained and illustrated, such as the action of pumps, siphons, gas meters, water meters, etc. A study of the laws of sound and sounding bodies and the physical principles involved in music. A study of light with its color phenomena and actinic effects, also optical instruments which may be used in other lines of work.

5. **Physics V.** Freshman year, spring term. Class work, four hours. Four credits. Required in the course in home economics.

This course is a continuation of physics IV. The work in heat is based upon a study of radiation, absorption, thermometry, calorimetry, and methods of insulation, refrigeration and ventilation. A study is made of electricity and electrical appliances as used in the home, and the value of the different kinds of lights and devices for heating. The lecture work is accompanied by demonstrations and tests to ascertain the cost, and to emphasize care in the use of electricity.

6. **Physics VI.** Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in general science and printing.

This course, as the one following, is provided for those intending to specialize in scientific lines. It covers in as thorough a manner as possible the general principles involved in mechanics and heat. Textbook, Hastings and Beach, General Physics. Prerequisite, trigonometry.

Laboratory.—The work is based upon the laws and principles discussed in the classroom and is so arranged that the student may have practical illustrations of the truth of the facts learned.

7. **Physics VII.** Sophomore year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in general science and printing.

Theory of electricity, sound and light. The class work follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy, photometry, wave length and spectrum analysis. Prerequisite, physics VI.

Laboratory.—The work follows the subjects presented in the class and

with a grade of apparatus that should give a training in the use of the better class of instruments for scientific investigations.

8. **Physics VIII.** Sophomore year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering and the course in architecture, and elective in the course in general science.

Mechanics. This course is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power and energy; also the laws of simple machines, gases and liquids as they occur in the transformation of force and energy. Textbook, Watson, A Textbook of Physics. Prerequisite, trigonometry.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity and rigidity, and other laws and principles involved in mechanics. Accurate measurements and carefully recorded data are required.

9. **Physics IX.** Sophomore year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering and the course in architecture, and elective in the course in general science.

Electricity and light. The work in electricity is of such a nature as to give the student a working knowledge of the units employed and the fundamental laws, and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Prerequisite, physics VIII.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, the transformation of mechanical into electrical energy. The work on light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by the spectroscope, the use of the interferometer, and photometry.

10. **Physics X.** Sophomore year, spring term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering, and in the course in architecture, and elective in the course in general science.

Heat is treated both theoretically and practically, and in such a manner that its relation to mechanical energy is emphasized. The methods of measuring heat energy and the methods of heat transformations and transference are discussed and illustrated. The facts in sound that involve points of special use and training are discussed. Prerequisite, physics III and IX.

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.

11. **Physics XI.** Junior year, spring term. Class work, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry and horticulture.

A series of lectures and class demonstrations based upon heat, light and electricity as involved in and 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 may be used on the farm.

12. **Physics XII.** Junior or senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science.

Radiant energy—lectures and demonstrations. This and the two following courses are arranged with the special view of giving a line of training which will be of value to those who may intend to teach physics, chemistry or mathematics, or to those expecting to do advanced scientific work. The various forms of radiant energy are discussed: Spectra and spectrum analysis, polarized light, radio-activity, electric and magnetic waves, absorption and dispersion and their phenomena.

Laboratory.—The work is based upon theory as developed in class work and includes the use of the spectrometer, polariscope, interferometer, optical bench, photometry, etc.

13. **Physics XIII.** Junior or senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science.

Physical measurements. 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 taken up with the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in variety of instruments used and principles illustrated.

14. **Physics XIV.** Junior or senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science.

Physical manipulations. Class periods are used to outline and discuss 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. Opportunity is given in this course to those intending to teach to become thoroughly acquainted with modern laboratories and laboratory methods.

15. **Photography.** Some knowledge of photography is often of great advantage to scientists, engineers and others in the practice of their vocations. To meet the need for instruction in this art a course is offered in the fall term to students who are properly prepared. The work given is both theoretical and practical.

Department of Public Speaking.

Professor KAMMEYER.
Assistant JOHNSTON.

It is the constant effort of this department to correlate the training in public speaking with the work in all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial in character. With this end in view, students in agriculture are trained in the presentation and discussion of agricultural facts before supposed audiences of farmers. Students in engineering, home economics, architecture, etc., are trained in speaking on subject matter relating to their respective courses of study, and to their prob-

able needs and activities in later life. Conviction, not entertainment, is the dominant purpose in every case.

COURSES IN PUBLIC SPEAKING.

1. **Public Speaking.** Sophomore year, fall, winter and spring terms. Four hours per week. Four credits. Required in the courses in agriculture, veterinary medicine, printing, home economics and general science.

This course begins with a study of the fundamental principles and accepted rules of public address. These are applied in the interpretation of selected masterpieces of general literature and oratory, and then in the delivery of original subject matter by each student, the class serving as his audience and critics. Some time is devoted to exercises in correct breathing, articulation and tone production, and to fit these to the individual needs of students. Instruction by recitation, lectures and platform work. Text, Clark's Vocal Expression.

2. **Extempore Speech.** Sophomore year, spring term. Two hours per week. Two credits. Required in the courses in engineering and architecture.

This course is an abbreviation of course I and is limited to engineering students. It is not an equivalent of course I and may not be substituted for it. Instruction by lectures and platform work.

3. **Technique of Speech.** Junior or senior year, winter term. Two hours per week. Two credits. Elective in the course in general science.

The specific purpose of this course is to offer more extended drill and practice in vocal and physical expression than can be given in the others as outlined. Practically all the time is devoted to exercises for the correction of faulty articulation, grouping, bearing, attitude, gesture, etc. Reading and impromptu speaking before the class afford opportunity for testing the ability acquired. The dominant purpose of the course is to help students to fix correct habits of speech by frequent repetitions and conscious effort. Instruction by drill and platform work. Prerequisite, public speaking or extempore speech.

4. **Forms of Public Address.** Junior or senior year, spring term. Four hours per week. Four credits. Elective in the course in general science.

A special study of types of utterance and forms of public address is made. Great orations of ancient and modern times are studied in their historical settings, analyzed and interpreted. Original platform work continues throughout the term, and consists of after-dinner speeches, memorial addresses, debates, and other forms of public address for formal occasions. Instruction by assigned readings, lectures and platform work. Prerequisite, public speaking or extempore speech.

Department of Zoology.

Professor HEADLEE.
Instructor SCHEFFER.

Classroom teaching and laboratory instruction are closely correlated and the student is expected to be able to give in either work information gathered in both lines and 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. The student is never allowed to forget that he is dealing with living creatures, in many cases fellow members of his own environment, some of which are decidedly beneficial or decidedly injurious to his welfare. The courses offered by this department are intended to awaken in the student an appreciation of the general principles of animal life and of its relation to the welfare of man.

A large number of standard anatomical charts, a representative collection of vertebrates and invertebrates, a series of lantern slides and a series of microscope mounts are available for illustrative purposes. Compound dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ZOOLOGY.

1. **Zoology I, II and III: General.** Freshman year, fall, winter and spring terms, respectively. Each of these courses consists of two hours class and four hours laboratory work per week for one term. Four credits each term. Required in the courses in general science, agronomy, animal husbandry, dairy husbandry and horticulture.

These courses represent a connected elementary study of the structure and function of animal types selected to illustrate the development of the animal kingdom. The purpose of these courses is to give the student an understanding of the general principles underlying animal life. The class work consists of lectures and of text and special reference study.

Laboratory.—The laboratory work consists of observation of form and action of the living animal and of dissection and sketching of each of the important systems of each animal selected as a type.

2. **Zoology IV and V: General.** Freshman and Sophomore years. fall and winter terms, respectively. Each of these courses consists of two hours class and four hours laboratory work per week for one term. Four credits each term. Required in courses in veterinary medicine and home economics.

These courses cover much the same ground as zoölogy I, II and III, and are intended for students pursuing lines where only two terms of zoölogy are required. Fewer types are studied and emphasis is placed on the vertebrate side. The class work consists of lectures and of text and special reference study.

Laboratory.—The laboratory work is an abbreviation of that offered in zoölogy I, II and III.

3. **Zoology VI and VII: Advanced Vertebrate Zoology.** Junior year, winter and spring terms, respectively. Each of these courses occupies two hours of class and four hours of laboratory work per week for one term. Four credits each term. Elective in the course in general science.

These courses consist of a fundamental study of the structure and physiology of vertebrate animals. The class work includes lectures and special reference text and reference study. Textbook, Textbook of Zoölogy, by Parker and Haswell. Prerequisites, zoölogy I, II and III.

Laboratory.—The laboratory work consists of dissection and sketching of each of the systems of selected types and such experiments in fundamental physiology as the time and apparatus permit.

4. **Zoology VIII: Taxonomy of Vertebrates.** Senior year, spring term. Eight hours of laboratory work per week for one term. Four credits. Elective in the course in general science.

This course includes consideration of the general principles underlying classification and of the literature necessary thereto, and the classification of representative vertebrate forms. The purpose of the course is so to acquaint the student with the literature, methods and ideals of classification of vertebrate animals that he will be able expeditiously to identify forms unknown to him and to pursue independent taxonomic studies. Prerequisites, zoölogy II and III or IV and V.

5. **Zoology IX: Embryology of Vertebrates.** Sophomore or senior year, fall term for young men; winter term; spring term for young women. Three hours of class and two hours of laboratory work per week. Four credits. Required in the courses in animal husbandry, dairy husbandry, veterinary medicine and home economics. Elective in course in general science.

This course consists of a study of the development of the vertebrate embryo. The class work includes lectures and text and special reference study. Prerequisites, zoölogy II and III or IV and V.

Laboratory.—The laboratory work consists in the examination and sketching of selected stages in embryonic development, beginning with the ovum and sperm and ending with well-formed organs.

6. **Parasitology.** Senior year, fall term. Two hours of class and two hours of laboratory work per week. Three credits. Required in the course in veterinary medicine.

A study of the characteristic marks, life economy and methods of controlling the most serious external and internal parasites of domestic animals. Prerequisite, zoölogy IV and V.

7. **Evolution of Domestic Animals.** Senior year, winter term. One hour of class work per week. One credit. Required in course in animal husbandry.

This course is intended to bridge the gap between ordinary zoölogical study and the study of breeds of domestic animals. It consists of a series of ten lectures and of wide reference reading.

Summer Courses for Teachers.

THE public is demanding the introduction of vocational training into the graded and high schools. Progress in this line is being greatly retarded by the lack of a sufficient number of properly trained teachers. The Kansas State Agricultural College, realizing the importance of this work, offers summer courses in agriculture, manual training and domestic science for the benefit of those who are already prepared for teaching in general lines, but who desire to teach this work either as a specialty or in addition to their other subjects. It is realized that although many of these teachers have had good college courses, their education has been in different lines, and that they will appreciate this opportunity to acquire proficiency in this particular field. Moreover, there are many well-trained country school-teachers who desire to acquire a knowledge of agricultural science in order to teach the subject to elementary classes.

The opportunity is offered to choose among these courses, or to elect portions of two or more, as may best meet the special needs of the teacher.

THE COURSE IN AGRICULTURE.

The course in agriculture consists of lectures and laboratory exercises in plant propagation, grain and fruit judging, soils, crop production, landscape gardening, budding and grafting, judging horses, cattle, sheep and swine, managing and scoring of poultry, and the manufacture of butter and cheese.

THE COURSE IN MANUAL TRAINING.

This course consists of woodwork, molding and blacksmithing. The woodwork covers the ordinary shop practice in bench work and cabinet making, with lectures on the methods of introducing this subject into elementary schools. The molding consists of the making of molds and cores and of cupola practice, with especial attention to the use of alloys such as may be readily employed in the average high school for making casts, etc. The work in blacksmithing consists of practice in forming and welding wrought iron, with enough instruction in the use of high-carbon steels to give the student skill in making and tempering the tools required in this and other branches of manual training in graded and high schools. The instruction is intended to represent correctly the methods which should be employed in introducing these subjects into secondary and primary schools, considering the limited facilities available.

THE COURSE IN DOMESTIC SCIENCE.

The instruction follows the same general line as in the regular course, with the exception that especial emphasis is laid upon the methods of presentation to young students. The course covers recitations on food

values, with laboratory experiments in cooking and in sewing, drafting and dressmaking.

Instruction in these courses is intended to represent correctly that which may be introduced successfully into graded and high schools, the limited facilities available in these schools being kept constantly in mind.

A special circular fully describing these courses will be issued in ample time, and may be had by addressing the president of the College.

College Extension.

J. H. MILLER, Superintendent.
P. E. CRABTREE, Farm Management.
G. C. WHEELER, Farm Management.
C. H. HINMAN, Dairy Management.
C. V. HOLSINGER, Horticulture.
W. S. GEARHART, Highway Engineering.
FRANCES L. BROWN, Home Economics.
E. L. HOLTON, Rural Education.

UNTIL 1905 the work of College extension, in the form of farmers' institutes, was in charge of a farmers' institute committee of the College. Applications for College lecturers at the institutes were referred to this committee, and such members of the Faculty as happened to be available were detailed to attend the meetings. The state appropriation for extension work was small, no regular extension staff could be employed, and the institutes themselves were for the most part unorganized and of a temporary and sporadic character. The first step toward the betterment of the extension work was in the employment by the Board of Regents of a superintendent, who took charge of the organization of the institute work in October, 1905. In July, 1906, the department of farmers' institutes was formally organized by the Board of Regents. An energetic prosecution of the work of agricultural extension had resulted in an awakened interest throughout the state, and in a legislative appropriation of $4000 in 1905, to which amount the College added $800. In 1907 the results of the extension work were seen to be so valuable that the legislature appropriated $11,500, to which the College added $1000. In 1909 the legislature, with unprecedented liberality, made an appropriation for agricultural extension work of $52,500.

The principal value of the Agricultural College, as a teaching factor, must be in the training it is able to give to the young people who enter upon and continue through its courses of study, in residence. The Agricultural Experiment Station, as a natural adjunct to the College, has its great field in the discovery of new truths relating to agriculture. But so long as the institution limits its efforts to these lines it is evident that only a small proportion of the people of a state can derive direct and practical benefit from the work of the College. The progress of agricultural education would be slow, indeed, were not the Agricultural College to offer other forms of instruction to the people of the state. The same economic principle that justified the expenditure of public funds for educating young people who are able to attend the College classes justifies a similar expenditure for the purpose of taking the College to those who are not able to come to it. State education is not philanthropy, but self-protection—foresight. An educated citizenship is a prosperous citizenship. The Kansas Agricultural College, through its several lines of extension, is taking its work each year to practically a hundred thousand farmers and their families.

While this is directed by the division of agricultural extension, the scope would be very limited were it not for the coöperation of the other divisions and departments of the College in supplying speakers for institutes, assistants in various lines of demonstration work, teachers for movable schools and wise counsel in the various lines of public effort.

The policies and plans for this division are established by a committee consisting of the president of the College, the director of the Experiment Station and the superintendent of the division.

LINES OF EXTENSION WORK.

The department, as now organized, includes the following forms of agricultural extension.

- Farmers' institutes.
- Publications for institute members.
- Agricultural railway trains.
- Schoolhouse campaigns.
- Boys' corn-growing contests.
- Girls' cooking and sewing contests.
- Rural education.
- Demonstration farming.
- Highway construction.
- Movable schools.
- Special campaigns.
- Publications for teachers.
- Correspondence courses.
- Home economics clubs.

THE FARMERS' INSTITUTE.

The farmers' institutes of the state have regular officers, and constitution and by-laws, and they are required by law to meet at least annually. Many of these organizations also hold six or more monthly meetings. For the annual meeting the College aims to send one or more speakers to present certain well-defined lessons in some branch of agriculture. The speakers and their subjects are chosen because of a known need or interest in a particular community, with the view of starting or encouraging certain definite lines of agricultural work. Effort has been made to build up a fixed membership in these institutes, and the list of members reported to this department up to April 1, 1910, is about 11,000. This list becomes here the mailing list for this department for the regular pamphlets issued for members. In addition to these pamphlets, each member who fills out and returns a membership blank will receive such other literature as his interests demand, from the College, from the government or from some other state. Each year some one subject is made specially prominent in institute programs, either for the whole state or for certain districts, as live stock, plant breeding, gardening, orcharding, dairying, etc. Special meetings are held by probably two-thirds of the institutes for the discussion of special subjects on certain designated days for all institutes in the state, as "Alfalfa Day," "Poultry Day," "Good Roads Day," etc. The programs for all regular meetings are based on suggestive outlines sent out by the extension department, and when returned by the local committees the programs and posters are printed and sent out free. The department furnishes literature, on request, for members who are to take part in any program of the institute or grange or other organization. During the year just ending the College assisted in the holding of 97 two-day institutes and 164 one-day institutes, or a total of 261 institutes, with an aggregate attendance of more than 50,000 farmers with their families.

PUBLICATIONS FOR FARMERS' INSTITUTE MEMBERS.

Since definite subjects are selected for each year's institute work, with a view of bringing about a certain unanimity of action, it seems appropriate that some of these subjects be treated more at length and published in pamphlet form, and then mailed to all institute members. These pamphlets were first issued as special numbers of the *Industrialist*, but

later, under the name of *Agricultural Education*, said publication was entered in the post office as a regular periodical. There is a membership fee in all institutes, and all members receive free from four to six or more numbers of this periodical during each year. A large edition of each number is printed and back numbers are mailed to new members until the supply is exhausted.

Institute Pamphlets Issued.—1907-'08—Swine, Farm Dairying, Poultry, Sheep, Dry-land Farming, Hay Making, Demonstration Methods. 1908-'09—Plant Breeding, Insects Injurious to Farm Crops, Some Wheat Problems. 1909-'10—Orcharding, The Silo.

Pamphlets for Teachers.—1907-'08—The Soil, How Plants Feed and Grow, Hygienic Cookery, Tree Culture, Bird Life. 1908-'09—A Corn Primer, Some Insect Studies. 1909-'10—Some Weather Studies.

BOYS' AND GIRLS' CONTESTS.

In the hope of creating keener interest in rural life, these contests in growing corn, potatoes, etc., and in baking, fruit canning and sewing were inaugurated. They are usually considered to be a part of the work of the farmers' institutes and are for the most part conducted by these organizations. Prizes are arranged for, in some counties aggregating as much as $400. Prizes for boys and girls fifteen years old and over are free trips to the state institute held at the Agricultural College each winter. This is clearly educational work, and many county school superintendents state that these contests in corn, bread, etc., have stimulated the entire work of a country school. It is intended that the contests shall in time include many other subjects.

DEMONSTRATION FARMS.

A visible object lesson has great value in matters pertaining to farming as well as in anything else. Methods of farming have been recommended for years, but comparatively few men are willing to adopt a method read about. If they wish to do so, they may carelessly neglect one very important step, and if failure results they will lay it to the method, forgetting their one failure to follow the exact steps. Therefore, the Agricultural College is offering to conduct demonstration work on "county poor farms" or on private farms. The principal purpose of these demonstrations is to plant the best and purest seed and to grow in the best way the largest possible crop, thus demonstrating the yielding value of good seed and the profit in right methods, and also to have good seed to supply to the farmers of that particular county. On these farms several varieties of corn are grown to determine adaptability and comparative yield. Rotations of crops are planned with legumes, and portions of fields are manured heavily and small portions left as check plots. On each of these farms a "field day" program is given in September, when the farmers of the community are invited to inspect the demonstration fields and witness the results of the different systems of crop growing employed.

HORTICULTURAL DEMONSTRATIONS.

The fruit and garden interests of Kansas fully justify the College in employing a practical horticulturist who spends about five months of each year in attending farmers' institutes and special meetings, and the remainder of the year in visiting orchards, gardens and potato fields, conducting demonstrations in pruning and spraying; and when requested, he also visits orchards later to advise as to picking and packing the fruit and as to the methods and places of marketing. He is also available at

times for certain investigational work under the direction of the horticultural department of the Experiment Station.

DAIRY WORK.

No other agricultural question is exciting more attention in Kansas just now than dairying. Therefore, the College has in its extension department a special man to advise farmers and dairymen relative to dairy problems. For about five months of each year he attends farmers' institutes and special meetings, and for the remainder of the year he is at the call of those who feel the need of his services in giving instruction in building silos and dairy barns, in installing testing records and advising as to the care and management of dairy herds.

HIGHWAY ENGINEERING.

It is eminently proper that the Agricultural College should maintain a trained highway engineer who is primarily the state adviser for county and city officials on matters relating to roads and bridges. He advises as to location, makes plans and specifications for bridges and culverts, examines proposed highway improvements and, if it is desired, makes plans and specifications for such road work, whether the improvement contemplates the use of macadam, oil, sand-clay, or is simply to be an improved earth road. Later, if desired, he will inspect all bridge and road work on its completion and report on same to the proper county or city officials. All such work is done without charge to the local community, other than actual traveling expenses. When other work will permit he also advises bridge contractors and furnishes plans, specifications, etc., on the same terms as to officials, except that the contractor will be charged actual cost of draftsman's time in drawing plans.

HOME ECONOMICS.

While thousands of young women have had residence instruction in domestic science at the Agricultural College, there are still many other thousands who have been unable to take advantage of the excellent facilities which the College has in this line. Therefore the extension department employs a competent teacher and demonstrator in this subject to carry domestic science instruction to these absent ones. This teacher attends farmers' institutes for the regular institute period of five months, holds "movable schools" for three months, and then holds "women's meetings," attends teachers' institutes, chautauquas, grange meetings, women's club meetings, etc., the remainder of the year. At all times an extensive correspondence is carried on with the women and girls of the state. "Girls' Home Economics Clubs" are also organized in high schools and in rural neighborhoods, with regular cooking and sewing lessons sent out from the department. Correspondence is also invited with women's clubs relative to occasional lessons in cookery and printed lessons are sent on request. There is urgent need of another teacher for this department and the appropriation will permit the employment of another after January 1, 1911, dividing the state into districts.

RURAL EDUCATION.

Recognizing that the problem of education for the farmer must begin with the child, the College maintains in the extension department a professor of rural education. His duties will include the direction of the boys' contests in growing corn, potatoes, etc., Boys' Poultry Clubs, etc. He will visit high schools and, where desired, will advise as to methods of introducing and teaching agriculture, cooking and sewing and manual

training; he will lecture before teachers' institutes and associations, farmers' institutes, high schools, commercial clubs, and all other organizations interested in the introduction into our schools of the industrial or vocational branches. He will also give during the year in the College a course of lectures on rural education.

MOVABLE SCHOOLS.

In February, 1910, an announcement was made that the College was ready to offer "movable schools" in home economics, dairying, orcharding, and farm crops and live stock. Twenty calls were received for schools in cooking and sewing. These schools continue one week, from Monday, 1:15 P. M., to Saturday, 11:45 A. M. The sessions of the home economics schools are, from 9 to 11:45, cookery; 1:15 to 3:45, sewing; 4 to 5, "round table" for the public. The class must have at least fourteen members and not more than twenty-four, and each member must pay a fee of one dollar to the local committee for the purchase of supplies and for entertainment of the two College teachers who conduct the class. No visitors are permitted until after the close of a day's work, 3:45 P. M. The months set aside for these schools are April, May and September.

GIRLS' HOME ECONOMICS CLUBS.

The College is able to give personal instruction in home economics each year to only about 800 girls; through the "movable schools" it is not likely that more than 500 women and girls can be reached annually with the limited instruction that can be given in one week; through the farmers' institutes and women's institutes not more than 3000 women can receive the limited instruction that can be given in one or two more or less formal discussions; through the correspondence courses it is not probable that more than a few hundred can be instructed. Therefore the College has undertaken the work of organizing hundreds of "Girls' Home Economics Clubs" in town and village high schools and in rural communities. A club with six charter members can receive a certificate, although better results are likely to follow with a larger membership. Printed lessons in cooking and sewing are supplied to the secretary of the club, with blanks for reports after each lesson. Literature is sent to the members relating to the work being carried on. This is in a limited way a form of correspondence work, and girls can be somewhat prepared either for the regular correspondence courses, for regular domestic science work in high school or college, or for their usual home duties. The work also prepares the way for the regular teaching of domestic science and art in the high schools of the state. It is hoped that a College representative may be able to visit these clubs each year, although this may not be possible until after the meeting of the next legislature.

SCHOOLHOUSE CAMPAIGNS.

A state campaign for agricultural education would not be complete without touching the public schools. Elementary agriculture is now being taught in hundreds of rural schools, but the College attempted a rather unique campaign in October, 1909, that will be repeated in October, 1910. With the coöperation of county school superintendents and the institute officers, "schoolhouse campaigns" were conducted in six counties, the College representative speaking in four schoolhouses each day and in a village in the evening, giving in each case a short, practical and simple talk on an agricultural or household subject. The exact schedules were printed in the papers the preceding week and patrons were invited to the

several schoolhouses to hear the addresses. In the six counties of Doniphan, Leavenworth, Anderson, Marion, Linn and Ottawa the College representatives spoke to about 3500 children and to nearly 2500 adults. In two counties the subject was horticulture, one dairying, one cooking and home sanitation, and in another the plea was for live-stock farming. The College believes that this work can be made the means of a great agricultural awakening and it will be continued and developed.

AGRICULTURAL TRAINS.

The College has for several years enjoyed the coöperation of the leading railroads of Kansas in the matter of special educational trains, such as "corn," "alfalfa," "wheat" and "dairy" trains. In this way it has been possible to meet many thousand people in a few days, conveying to them in a forcible way the importance of better seed, better culture, better dairy stock, silos, etc.

SPECIAL CAMPAIGNS.

BEAUTIFYING CITIES.

Under this general classification the College undertakes certain seasonable lines of public teaching. In April, 1910, meetings were held in fourteen towns and cities of the state for the purpose of starting a movement for the beautifying of homes and towns. In most of these cities an organization was perfected, to be known as the "City Beautiful League." These organizations will be formed elsewhere as desired, leading in time to a great state organization with leagues in hundreds of towns and cities and enrolling thousands of adults and children, all pledged to help by planting flowers, trees, shrubs and grass and all to support public movements for properly beautifying the town or city. This work will be continued and developed.

BOYS' AND GIRLS' MEETINGS.

The College is inaugurating a system of special meetings for the boys and girls who are in the various contests. This work will usually be done as a sort of county campaign, holding four or six afternoon meetings in a county in one week, with the idea of reaching practically all the boys and girls engaged in one or more contests. When these young people are sufficiently interested the representatives of the College will form them into a club to be known as "Boys' Good Farming Club" or "Girls' Home Economics Club." Next year the College will organize in towns and villages of the state "Boys' Poultry Clubs" and "Boys' Garden Clubs." "Girls' Flower Clubs" will also be organized where there are no "City Beautiful Leagues." Special circuits will be made for these boys' and girls' meetings as for the regular farmers' institutes, and the officers of these clubs will report to a College official as do the officers of the institutes.

CORRESPONDENCE COURSES.

The correspondence courses here outlined ought to be of special interest to the following classes:

(1) Boys and girls who have completed the common-school course of study and who cannot just now attend 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 want to know more of the sciences of the farm and the home.

(4) Men who have been trying farming on general lines, who have an interest in some special line of work, as orcharding or dairying, and who want to turn their attention to that special line.

(5) Road supervisors who want to know more of the science of road making, building culverts, etc., and who cannot afford to stop and take a special course.

(6) Men and women who have passed middle life, about to retire from active farming, who want to keep young by studying and who want to enrich their own experience by adding a knowledge of what others have found out.

(7) The capitalist, the business man who is holding investments in lands and who should know how to make those investments grow in value.

(8) Teachers who want to teach agriculture or home economics in special classes or who want to know how to enrich their teaching of the usual classes in the sciences.

Only a small percentage of the farming population of Kansas can attend the classes in the Agricultural College, and only about 60,000 or 70,000 people attend the farmers' institutes, and only a few hundred attend movable schools. There are still practically a million adult people living in the country, few of whom have ever read carefully a single book on farm crops, dairying or horticulture, farm drainage, etc. The College is now preparing to offer, by September, 1910, correspondence courses in the following subjects:

Elementary agriculture.	Farm crops.
Soils.	Orcharding.*
Vegetable gardening.	Landscape gardening.
Farm dairying.	Dairy manufacturing.
Stock feeding.	Farm drainage.
Highway construction.*	Forestry.
Poultry management.	Care of farm animals.
Cookery.*	Farm buildings.
Sewing.	Farm economics.

Insects injurious to farm and garden crops.*

The fee for this instruction will be two dollars for each course—a nominal sum and scarcely enough to pay the actual cost of grading the exercises and examination papers. This fee does not include the textbook. For subjects marked (*) there will be no textbook required, the student being furnished certain free pamphlets and bulletins in place of a text. With all other courses many state government bulletins will be furnished free, as supplementary to the textbook used. The special announcement for correspondence courses will be *mailed free on application to the extension department.*

Student Organizations.

STUDENT COUNCIL.

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the Faculty of the College. Its objects are: "(1) To act as a representative body before the governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and elsewhere may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore and one from the freshman class. In addition, the subfreshman class elects a delegate, who has the privilege of speaking on subjects pertaining to his class, but has no vote. At each meeting of the council a committee of the College Faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reëlected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the Faculty. All acts of the council are submitted to the president of the College, and if they touch the rules, regulations or ordinances of the College are subject to approval by the proper governing body. The council is especially helpful in its maintenance of a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding of matters liable to cause friction between the student body and the Faculty it performs a most important function.

THE CHRISTIAN ASSOCIATIONS.

The Young Men's and the Young Women's Christian Associations are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian asociations are of practical and efficient service among the students in many directions, to be specifically related in discussing each organization. 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 on the corner of Eleventh and Fremont streets, near the College grounds, at a cost of $35,000.

This building contains reading rooms, eighteen students' living rooms, a dining hall, and a gymnasium 42 x 70 feet, provided with lockers, baths, etc. The building with its conveniences is open free to all students, although a small fee of five dollars a year is charged for the use of the gymnasium and baths. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and of the work of the Christian missions, which are held through the winter. The regular religious meetings of the association are held on Thursday evenings, from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Social meetings and receptions are arranged from time to time, which serve to broaden the acquaintanceship of the students and promote good-fellowship. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address, General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION.

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Y. W. C. A. home, at 905 Fremont street, is the permanent headquarters of the association, to which all young women of the College are at all times heartily welcome. An office for the secretary and a girls' rest room are also maintained during the College year, on the first floor, southwest corner, of the Domestic Science and Art Building. The rooms at the College are open to visitors at any hour of the day and are attractively furnished with conveniences for rest and study.

At the association home informal gatherings and entertainments lend variety and cheer to the life of the young women members and their friends.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. One of the most practical of these is the investigation of cases of illness among the College girls, and the rendering of assistance when necessary. At the beginning of the College terms the incoming trains are met by a committee of girls wearing purple bows, by 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. Once each year, in the winter term, the two associations entertain jointly.

The religious life of the Young Womens' Association is fostered by

weekly religious meetings, courses in the study of the Bible and in special Sunday services, for which outside speakers are often obtained. Courses for the study of mission work are also conducted.

LITERARY AND SCIENTIFIC SOCIETIES.

The literary societies of the College, seven in number, are wholly students' organizations, holding weekly meetings in the College buildings. The Alpha Beta and the Franklin societies are open to both sexes; the Ionian and Eurodelphian admit only young women to membership, while the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate and general experience in conducting meetings and in dealing with their fellows.

THE SCIENCE CLUB.

This is an organization of instructors and students for the promotion and advancement of science at the College. Membership is open to all persons interested in science. The meetings are held on the first Monday evening of each month in the lecture room of the department of chemistry in Physical Science Hall. All papers given at these meetings represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members.

THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

This national organization of electrical engineers has a College branch, which holds its meetings on the first Tuesday evening of each month in the rooms of the department of electrical engineering, on the first floor of Physical Science Hall. At these meetings papers and discussions of professional interest are presented. Membership is confined to instructors and students in electrical engineering.

THE AGRICULTURAL ASSOCIATION.

The Agricultural Association, composed of students especially interested in agricultural progress, holds meetings every two weeks, on Monday evening, in Fairchild Hall.

THE CADET CORPS.

Under the provisions of the Morrill act of 1862, under which the College was founded, instruction in military science and tactics is obligatory. Military science and drill are required of all men students in the freshman and sophomore years. This body of young men is formed into a cadet corps, organized into two battalions of infantry, under the command of a United States regular army officer in active service, temporarily detailed to this duty. The cadet corps is officered by upper classmen and constitutes a body under excellent discipline and training, and of attractive military bearing.

The uniforms are of the West Point pattern, and the insignia of rank are those of the United States infantry. The uniform is required to be worn while on military duty by all students subject to the drill regulations, and by reason of its neat appearance and serviceable character, it is also quite frequently used by the under classmen for daily wear. Military discipline and training for a short time in a student's life has undoubted value in creating habits of obedience, neatness and precision, and in the development of an *esprit de corps*.

THE COLLEGE BAND.

The College band is also a military organization, conducted by a chief musician of the United States army (retired), and is composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The band is limited in its membership, for whom attendance 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 provided with means for giving complete physical as well as mental training. This building, which will be equipped with all the usual accessories, will assist in developing and maintaining physical tone and health to the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall, football teams are organized, in the fall and winter basket ball, while in the spring baseball, tennis and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. At the same time 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 their own gymnasium, under a physical director, they receive training suitable to their needs. Basket ball and tennis teams are organized among the young women.

List of Students.

GRADUATES.

In Course Leading to Master's Degree.

Robert J. Barnett, B. S. '95.....*Horticulture, Forestry.*
Manhattan, Riley county.

Julia Susanna Bayles, B. S. '07.....*Domestic Science, Chemistry.*
Manhattan, Riley county.

James E. Brock, B. S. '08.....*Agronomy.*
Manhattan, Riley county.

Thomas Warner Buell, B. S. '04.....*Agronomy.*
Manhattan, Riley county.

Jules Cool Cunningham, B. S. '05.....*Horticulture.*
Manhattan, Riley county.

Oliver William Hunter, B. S. '09.....*Bacteriology.*
Blue Rapids, Marshall county.

Joe Grigsby Lill, B. S. '09.....*Agronomy.*
Hutchinson, Reno county.

Francis Burzley Milliken, B. S. '09.....*Entomology.*
Hill City, Graham county.

Roy Andrew Seaton, B. S. '04.....*Mechanical Engineering.*
Manhattan, Riley county.

John Eliphalet Smith (Oregon Agricultural College).....*Zoölogy.*
Manhattan, Riley county.

In Advanced Course Not Leading to a Degree.

Katherine Alexander, B. S. '06.....*English History, German.*
Manhattan, Riley county.

Elmer A. Bull, B. S. '08.....*Architecture.*
Manhattan, Riley county.

Edith Coffman, B. S. '06.....*Domestic Science, Bacteriology.*
Manhattan, Riley county.

Amy Cole, B. S. '07.....*Domestic Science.*
Manhattan, Riley county.

Marie Coons, B. S. '09.....*Library Elective, Drawing.*
Manhattan, Riley county.

Charles Doryland, B. S. '08.....*German.*
Manhattan, Riley county.

Odessa Dow, B. S. '06.....*Domestic Art, Mathematics.*
Manhattan, Riley county.

Amanda Kittell, B. S. '09.....*Domestic Science.*
Manhattan, Riley county.

Eleanor March, B. S. '09.....*Physiology, Drawing.*
Manhattan, Riley county.

Lucy Needham, B. S. '08.....*Domestic Art, Domestic Science.*
Rantoul, Franklin county.

Harrison E. Porter, B. S. '07.....*Civil Engineering.*
Manhattan, Riley county.

Kathleen Selby, B. S. '09.....*Domestic Science, History of Education.*
Downs, Osborne county.

Myrtle Simpson, B. S. '09.....*American History, Civics.*
Manhattan, Riley county.

Marcia Elizabeth Turner, B. S. '06.....*German, Music.*
Manhattan, Riley county.

Alonzo F. Vass, B. S. '09.....*Agronomy, German.*
Glasco, Cloud county.

Helen Westgate .....*Drawing.*
Manhattan, Riley county.

SENIORS.

Name.	Post office and county (or state).
Louis C. Aicher,	Denver, *Colo.*
Winifred Lois Alexander,	Manhattan, Rilev.
Jessie Mabel Alvord,	Zurich, Rooks.
Raiffe Alvord,	Manhattan, Riley.
Isabella C. Arnott,	Blue Rapids, Marshall.
Will David Austin,	Isabel, Barber.
Marguerite Axtell,	Newton, Harvey.
Harvey Wiltson Baker,	Marvin, Phillips.
Stella Louise Ballard,	Washington, Washington.
Cecil Pearl Barnett,	Manhattan, Riley.
Dorus Clark Bascom,	Howard, Elk.
James W. Benner,	Manhattan, Riley.
Grace Berry,	Topeka, Shawnee.
Hazel E. Bixby,	Manhattan, Riley.
Roscoe Eugene Blair,	Mulvane, Sumner,
Warren Lale Blizzard,	McPherson, McPherson.
Harley James Bower,	Eureka, Greenwood.
Roscoe Arthur Branson,	Belleville, Republic.
James C. Browning,	Manhattan, Riley.
Virgil C. Bryant,	Cimarron, Gray.
Glenn A. Bushey,	Abilene, Dickinson.
Etta Carlton,	Manhattan, Riley.
Charles Elmer Cassel,	Manhattan, Riley.
Thomas E. Clarke,	Manhattan, Riley.
Lillian Clemmons,	Osborne, Osborne.
Ethel R. Coffman,	Manhattan, Riley.
Minnie Faye Conner,	Lyons, Rice.
Louis G. Cooke,	Effingham, Atchison.
Reva Violet Cree,	Manhattan, Riley.
Ida Myrtle Crow,	Kinsley, Edwards.
Herman L. Cudney,	Belpre, Edwards.
Ivon la Vergne Dallas,	Parker, Linn.
Susan Davis,	Arkalon, Seward.
Mabel Ethel Davison,	Michigan Valley, Osage.
Wilbur Sumner Davison,	Michigan Valley, Osage.
Edgar Hamilton Dearborn,	Manhattan, Riley.
Harlan Deaver,	Sabetha, Nemaha.
William Droge,	Seneca, Nemaha.
Leila Dunton,	Lebanon, Smith.

Name.	Post office and county (or state).
Ruth E. Elliot,	Manhattan, Riley.
Maude Estes,	Manhattan, Riley.
Eugenia Fairman,	Manhattan, Riley.
Rena Amelia Faubion,	Oskaloosa, Jefferson.
Frank E. Ferris,	Osage City, Osage.
Gilbert G. Ghormley,	Partridge, Reno.
John Gingery,	Haddam, Washington.
Amos H. Gish,	Manhattan, Riley.
Harold William Gore,	Raymore, *Mo.*
Samuel S. Gross,	Abilene, Dickinson.
Paul D. Guy,	Winfield, Cowley.
Thomas Hall,	St. John, Stafford.
Ralph Robert Hand,	Wellington, Sumner.
Anton Hanson,	Jamestown, Cloud.
Floyd Harrison,	Conway, McPherson.
Yozizaemon Hashimoto,	Manhattan, Riley.
Ella Hathaway,	Mankato, Jewell.
Christine Heim,	Lincoln, Lincoln.
Helen Henderson,	Topeka, Shawnee.
Ida Viola Hepler,	Manhattan, Riley.
Harry Ellis Hershey,	White Water, Butler.
Rees William Hillis,	Reading, Lyon.
Louise Hofman,	Topeka, Shawnee.
George Benjamin Holmes,	Manhattan, Riley.
William Avery Hopper,	Manhattan, Riley.
Wyllys Lyman Hull,	Manhattan, Riley.
DeForest Hungerford,	Randolph, Riley.
Harley Main Hunter,	Kansas City, Wyandotte.
Emma Sophia Irving,	Baker, Brown.
Carl D. Irwin,	Salina, Saline.
Roy Mentzer Johnson,	Mankato, Jewell.
Edna Mary Jones,	Manhattan, Riley.
Ursa Joslin,	Randall, Jewell.
Ethel M. Justin,	Manhattan, Riley.
Jesse A. Keeble,	Coffeyville, Montgomery.
Ruth Mary Kellogg,	Fay, Russell.
Paul V. Kelly,	McCracken, Rush.
Roy Kilmer,	Gypsum, Saline.
Mattie Eunice Kirk,	Bazaar Chase.
Fred Krotzer,	Manhattan, Riley.
Willard W. Lawton,	Denison, Jackson.
Emma Lee,	Culver, Ottawa.
David Ernest Lewis,	Independence, Montgomery.
Frank Clark Lewis,	Paola, Miami.
Albert R. Losh,	Leon, Butler.
Lillian May Lowrance,	Thayer, Neosho.
Roland Loyd,	Bendena, Doniphan.
John Wallace Lumb,	Wakefield, Clay.
Charles Wilbur McCampbell,	Manhattan, Riley.
John R. McClung,	Jewell, Jewell.
Mabel Mortier McKenzie,	Solomon, Dickinson.
Sam A. McWilliams,	Morrowville, Washington.
Martha Mae MacLeod,	Valley Falls, Jefferson.
Karl C. Manny,	Winfield, Cowley.
Charles L. Manshardt,	Manhattan, Riley.
Roy Masheter,	Sabetha, Nemaha.
John M. May,	Minneapolis, Ottawa.
Vincent Mecke,	Anness, (Kingman).
Louis B. Mickel,	Soldier, Jackson.
Robert A. Mitchel,	Winchester, Jefferson.

Name.	Post office and county (or state).
Hurd T. Morris,	Manhattan, Riley.
Telie E. B. Nafziger,	Partridge, Reno.
Franklin W. Newacheck,	El Dorado, Butler.
Gladys Irene Nichols,	Liberal, Seward.
Wilma Orem,	Manhattan, Riley.
William Mails Orr,	Manhattan, Riley.
Walter Osborn,	Waverly, Coffey.
Myrtle Oskins,	Manhattan, Riley.
Arthur J. Ostlund,	Clyde, Washington.
Hope Olive Palmer,	Arkansas City, Cowley.
Frank Thomas Parks,	Manhattan, Riley.
Charles Beryl Pitman,	Manhattan, Riley.
Robert Platt,	Aetna, Barber.
Percy B. Potter,	Kiowa, Barber.
Hilie Rannells,	Manhattan, Riley.
George Thomas Ratliffe,	Wichita, Sedgwick.
Alvin Josiah Reed,	St. Clere, Pottawatomie.
Eva Rees,	Topeka, Shawnee.
Wray Robert Reeves,	Manhattan, Riley.
Harry W. Reppert,	Valley Falls, Jefferson.
Hugh E. Reppert,	Valley Falls, Jefferson.
Guy Chester Rexroad,	Partridge, Reno.
Hugh Robertson,	Highland, Doniphan.
Maybeth Robison,	Manhattan, Riley.
Harold Rowe,	Hill City, Graham.
Lynnie Sandborn,	Jewell, Jewell.
Albert Leslie Schell,	Wichita, Sedgwick.
Fred H. Schreiner,	Dorrance, Russell.
Richard Schuppert,	Arrington, Atchison.
Grace Ellen Shelley,	McPherson, McPherson.
Theodore Sherrard,	Winfield, Cowley.
William Preston Shuler,	Burrton, Harvey.
Reynold Shuyler,	Sterling, Rice.
Esther Metta Sieder,	Enterprise, Dickinson.
Claude W. Simpson,	Cawker City, Mitchell.
Edward Skillman,	Tribune, Greeley.
Stanley Van Smith,	Manhattan, Riley.
Robert A. Snider,	Abilene, Dickinson.
Estella Pearl Soupene,	Manhattan, Riley.
Alden G. Strong,	Goddard, Sedgwick.
Randall E. Talley,	Overbrook, Osage.
George Ira Thatcher,	Great Bend, Barton.
Nellie L. Thompson,	Manhattan, Riley.
Leslie O. Tippin,	Winchester, Jefferson.
Harry E. Totten,	Haddam, Washington.
Cora Trimmer,	Topeka, Shawnee.
Earl Jay Trosper,	Manhattan, Riley.
Edwin Earl Truskett,	Caney, Montgomery.
Grace Irene Tucker,	Manhattan, Riley.
William Fenwick Turner,	Tonganoxie, Leavenworth.
Blanche Vanderlip,	Manhattan, Riley.
Clyde Q. Ward,	Wetmore, Nemaha.
Francis Weber,	Monument, Logan.
Ray Thurman Wells,	Parsons, Labette.
Georgiana Welstead,	Jewell, Jewell.
Hannah Wetzig,	Manhattan, Riley.
Bessie May White,	Manhattan, Riley.
Roy Wilkins,	Burden, Cowley.
Jennie Williams,	Meriden, Jefferson.
Edna Leona Willis,	Manhattan, Riley.

Name.	Post office and county (or state).
Esther S. Wilson,	Manhattan, Riley.
Floyd E. Wilson,	Soldier, Jackson.
John Thomas Wilson,	Winfield, Cowley.
Albert Lemont Wiltse,	Covert, Osborne.
Raymond Withers,	Valley Falls, Jefferson.
Clara Woestemeyer,	Bethel, Wyandotte.
William B. Wood,	Anthony, Harper.
Ward Woody,	Cawker City, Mitchell.
Wilbur W. Zacharias,	Manhattan, Riley.
Charles L. Zoller,	Kirwin, Phillips.

JUNIORS.

Effie Adams,	Ozawkie, Jefferson.
Rowena Allcutt,	Lawrence, Douglas.
Harold H. Amos,	Manhattan, Riley.
Aaron E. Anderson,	Eskridge, Wabaunsee.
H. Ray Anderson,	Manhattan, Riley.
Benjamin B. Baird,	Riley, Riley.
Harry S. Baird,	Marquette, McPherson.
Ray O. Baird,	Manhattan, Riley.
Orville L. Baker,	Manhattan, Riley.
Amy Estelle Banker,	Overbrook, Osage.
Lebbins B. Barber,	Junction City, Geary.
William A. Barr,	Harper, Harper.
Ellen Margaret Batchelor,	Manhattan, Riley.
Harry Penock Bates,	Topeka, Shawnee.
Myrtle Ruth Bayles,	Manhattan, Riley.
Willis Ernest Berg,	Cleburne, Riley.
Clara Anna Bergh,	Newton, Harvey.
Glenn R. Blain,	Manhattan, Riley.
David George Blattner,	Jetmore, Hodgeman.
Alexander Thurston Bodle,	Meade, Meade.
Lewis Losee Bouton,	Wichita, Sedgwick.
Fred S. Bradford,	Concordia, Cloud.
Ruth Bright,	Manhattan, Riley.
Harrison Broberg,	Vesper, Lincoln.
Edwin H. Brooks,	Tescott, Ottawa.
William Brunker,	Manhattan, Riley.
Walter August Buchheim,	Winkler, Riley.
W. Van Buck,	Oskaloosa, Jefferson.
Maye Burt,	Eureka, Greenwood.
Carl Balfour Butler,	Manhattan, Riley.
Ralph Morris Caldwell,	Wichita, Sedgwick.
Frank Griswold Campbell,	Manhattan, Riley.
George Lewis Campbell,	Bushong, Lyon.
John R. Carnahan,	Manhattan, Riley.
Nannie Carnahan,	Manhattan, Riley.
Clifford H. Carr,	Solomon, Dickinson.
Henry W. Carr,	Topeka, Shawnee.
Julia Eleanore Cheney,	Great Bend, Barton.
Robert Vernon Christian,	Iola, Allen.
Clifton W. Clark,	Pratt, Pratt.
David Charles Clarke,	Manhattan, Riley.
Luther J. Coblentz,	Topeka, Shawnee.
Harry K. Coe,	Topeka, Shawnee.
Joseph H. Coffman,	Manhattan, Riley.
Lester Warren Coiner,	Kansas City, Wyandotte.
Roy David Coleman,	Denison, Jackson.
Ray F. Cooper,	Wichita, Sedgwick.
Winnie Cowan,	Kensington, Smith.
Walter S. Criswell,	Frankfort, Marshall.

Name.	Post office and county (or state).
Oscar C. Crouse,	Harlan, Smith.
George Samuel Croyle,	New Cambria, Saline.
Tom J. Darrah,	McPherson, McPherson.
Bertha Davis,	Brownell, Ness.
Percy Grover Davis,	Brownell, Ness.
Evard A. Dean,	Manhattan, Riley.
Vinton V. Detwiler,	Jewell, Jewell.
Urfa A. Domsch,	Galva, McPherson.
Mary J. Dow,	Manhattan, Riley.
George Edward Dull,	Washington, Washington.
Martin Dupray,	Ash Valley, Pawnee.
Goldie Georgie Eagles,	Salina, Saline.
Margaret Camoren Eastland,	Russell, Russell.
Ralph Waldo Edwards,	Emporia, Lyon.
Frederick D. Elliott,	Manhattan, Riley.
George Elliott,	Holton, Jackson.
Robert W. Ellis,	Stamford, *Conn.*
Katherine Lucy Emslie,	Manhattan, Riley.
Asbury Endacott,	Kansas City, Wyandotte.
Abner Ethan Engle,	Abilene, Dickinson.
Lilla Cecil Farmer,	Aetna, (Comanche).
Florine Elizabeth Fate,	La Cygne, Linn.
Harry Albert Fearey,	Anness, Sedgwick.
Oliver Archie Findley,	Kiowa, *Okla.*
Victor Florell,	Jamestown, Republic.
Lucile Mabel Forest,	Thayer, Neosho.
Edwin LeValle Foster,	Independence, Montgomery.
Frank William Fowler,	Independence, Montgomery.
Clarence Griffing Fry,	Manhattan, Riley.
Frank Edwin Fuller,	Clay Center, Clay.
Mary Gabrielson,	Hutchinson, Reno.
Carrie M. Gates,	Asherville, Mitchell.
Harry A. Geauque,	Manhattan, Riley.
Richard William Getty,	Downs, Osborne.
William Holman Goldsmith,	Acme, Dickinson.
Edna Jane Grandfield,	Wichita, Sedgwick.
Edwin Harison Grandfield,	Wichita, Sedgwick.
Fred Foster Greeley,	Manhattan, Riley.
Earl Livingston Hageman,	Clifton, Washington.
Leo Roscoe Hain,	Ellsworth, Ellsworth.
Lewis A. Hammers,	Clearwater, Sedgwick.
Mabel Rea Hammond,	Manhattan, Riley.
Henry H. Harbecke,	Whiting, Jackson.
Carrie Olive Harris,	Manhattan, Riley.
Arthur Raymond Hawkes,	Banner, Trego.
F. Myrtle Hayne,	Kansas City, *Mo.*
Charles Appleton Hazzard,	Maplehill, Wabaunsee.
Charles Hennon,	Morrowville, Washington.
Thomas Elliott Henry,	Meade, Meade.
Nellie Marguerite Hickok,	Ulysses, Grant.
Charles T. Hocker,	Purcell, *Okla.*
Walter Hole,	Manhattan, Riley.
Ward Hollis,	Whiting, Jackson.
Clara Grace Holloway,	Yates Center, Woodson.
William B. Honska,	Lost Springs, Marion.
Fred Hopper,	Manhattan, Riley.
Joseph Hopper,	Manhattan, Riley.
Edgar Houk,	Americus, Lyon.
Irwin V. Howenstine,	Manhattan, Riley.
Clarence A. Hulse,	Meriden, Jefferson.
Clara Hungerford,	Randolph, Riley.

Name.	Post office and county (or state).
George E. Hungerford,	Manhattan, Riley.
Mildred Huse,	Manhattan, Riley.
Blanche Ingersoll,	Kirwin, Phillips.
Nellie Florence (Nixon) Ingraham,	Manhattan, Riley.
Mildred Lee Inskeep,	Manhattan, (Pottawatomie).
Edward Isaac,	Haddam, Washington.
Jessie Jenkins,	Manhattan, Riley.
John Ethbert Jenkins,	Manhattan, Riley.
Fern Jessup,	Merriam, Johnson.
Benjamin Olaf Johnson,	Wichita, Sedgwick.
Donald Jones,	Wichita, Sedgwick.
Arthur L. Kahl,	Manhattan, Riley.
Mabel Keats,	Horton, Brown.
Alice Mary Keith,	Ottawa, Franklin.
Edward Kellogg,	Manhattan, Riley.
Willis Norton Kelly,	Hutchinson, Reno.
Ray Kiene,	Valencia, Shawnee.
Elmer Frederic Kittell,	Topeka, Shawnee.
Clara Marie Kliewer,	Newton, Harvey.
Ira T. Koogle,	Chapman, Dickinson.
Edward Larson,	Vesper, Lincoln.
Hilmer H. Laude,	Rose, Woodson.
Martin L. Laude,	Rose, Woodson.
Claire Lewallen,	Manhattan, Riley.
Fairy Lightfoot,	Manhattan, Riley.
M. Eva Linn,	Otis, Rush.
Clay Lint,	Kansas City, Wyandotte.
Mary Huntington Love,	Hiawatha, Brown.
Mabel E. Lungren,	Haviland, Kiowa.
DeNell Gilbert Lyon,	Manhattan, Riley.
Frank Donald McClure,	Blue Mound, Linn.
Walker M. McColloch,	Anthony, Harper.
Minnie Vergie McCray,	Manhattan, Riley.
John E. McDowell,	Hymer, Chase.
Bert J. McFadden,	Stafford, Stafford.
Clyde McKee,	Manhattan, Riley.
Arthur Earl McNeil,	Centralia, Nemaha.
Albert John Mack,	Axtell, Marshall.
Geo. A. Markle.	Lyons, Rice.
John Z. Martin,	Kansas City, Wyandotte.
George May,	New Cambria, Saline.
Fred Christian Maybach,	Great Bend, Barton.
Eugene Ralph Meier,	Atchison, Atchison.
Winona Gertrude Miller,	Kansas City, Wyandotte.
Jesse C. Mitchel,	Manhattan, Riley.
Celia Caroline Moore,	Manhattan, Riley.
William David Moore,	Idana, Clay.
Bessie Moorman,	Burr Oak, Jewell.
Clara King Morris,	Wichita, Sedgwick.
Margaret Morris,	Manhattan, Riley.
Maria Morris,	Manhattan, Riley.
Flora Harriette Morton,	Wichita, Sedgwick.
Robert Clay Moseley,	Alma, Wabaunsee.
Roy M. Myers,	Manhattan, Riley.
Velma Pearl Myers,	Manhattan, Riley.
Charles Myszka,	Garnett, Anderson.
Orville Nauman,	Frankfort, Marshall.
Marion Neiman,	White Water, Butler.
Ellen E. Nelson,	Randolph, Riley.
Inez Mildred Ethel Nelson,	Stark, Neosho.
James H. Nelson,	Ellsworth, Ellsworth.

Name.	Post office and county (or state).
Jessie E. Newland,	Bridgeport, Saline.
James M. Nicholson,	Scranton, Osage.
Minnie H. Nider,	Manhattan, Riley.
Laura B. Nixon,	Riley, Riley.
Ida Rose Nonamaker,	Osborne, Osborne.
Edythe O'Brien,	Manhattan, Riley.
Harold Dale O'Brien,	Luray, Russell.
John Francis O'Connor,	Hartford, Lyon.
Carl Olson,	Lindsborg, McPherson.
David Bethol Osburn	Colwich, Sedgwick.
Laurence Osmond,	Great Bend, Barton.
Dora Marie Otto,	Riley, Riley.
Harry Elmer Overholt,	Jewell, Jewell.
Thomas Parker,	Minneapolis, Ottawa.
Helen Tracy Parsons,	Arkansas City, Cowley.
Mary Russell Parsons,	Arkansas City, Cowley.
Floyd Pattison,	Herington, Dickinson.
Milton Leroy Pearson,	Cawker City, Mitchell.
Cyrus Arthur Perry,	Greenleaf, Washington.
Clara E. M. Peters,	Manhattan, Riley.
Bertha Ellen Phillips,	Manhattan, Riley.
Kenneth W. Phillips,	Manhattan, (Pottawatomie).
Bertha L. Plumb,	Fairview, Brown.
M. Alma Plumb,	Fairview, Brown.
John Allison Porter,	Manhattan, Riley.
Leo Price,	Manhattan, Riley.
Lyle Phillips Price,	Republic, Republic.
Edna Pugh,	Junction City, Geary.
William Arthur Pulver,	Mankato, Jewell.
Daniel Milton Purdy,	Arkansas City, Cowley.
Oral DeEnnon Oyles,	Anthony, Harper.
Olga Raemer,	Herkimer, Marshall.
Harvey Rait,	Junction City, Geary.
Raymond Ramage,	Arkansas City, Cowley.
Georgia Randel,	Lewis, Edwards.
Silas Milo Ransopher,	Clyde, Cloud.
Edgar Reed,	Culver, Ottawa.
Ross Herbert Reynolds,	Gypsum, Saline.
Newell Robb,	Neal, Greenwood.
Josephine Robinson,	Morrill, Brown.
Walter S. Robinson,	Nashville, Kingman.
Marie E. Roehrig,	Newton, Harvey.
Elsie Alma Rogler,	Cottonwood Falls, Chase.
Harvey Roots,	Manhattan, Riley.
Worth D. Ross,	Manhattan, Riley.
Dave G. Roth,	White Water, Butler.
John Schlaeffli,	Cawker City, Mitchell.
Ed. H. Schroer,	Parallel, Riley.
Bertha Schwab,	Morganville, Clay.
Cyrus McDonald Scott,	Arkansas City, Cowley.
Minnie M. Scott,	Waterville, Marshall.
Gladys Sadie Seaton,	Jewell, Jewell.
Ernest O. Sechrist,	Meriden, Jefferson.
August W. Seng,	Salina, Saline.
Claude L. Shaw,	Eskridge, Wabaunsee.
Leslie Leon Shaw,	Leavenworth, Leavenworth.
Clara Lois Shofe,	Manhattan, Riley.
(Mrs.) Mary Edna Simmons,	Burlington, Coffey.
Harry E. Skinner,	Beverly, Lincoln.
Homer Sloan,	Independence, Montgomery.
Edward P. G. Small,	Wichita, Sedgwick.

Name.	Post office and county (or state).
Richard J. Small,	Anness, Sedgwick.
Harlan D. Smith,	Manhattan, Riley.
Luberta Smith,	Manhattan, Riley.
Pearl Smith,	Colby, Thomas.
Florence Snell,	Douglass, Butler.
Mabel Sommer,	Kiowa, Barber.
Edna Grace Soupene,	Manhattan, (Pottawatomie).
Whitcomb G. Speer,	Cottonwood Falls, Chase.
Judd P. Stack,	Topeka, Shawnee.
Charles Stants,	Kensington, Smith.
Clyde Raymond Stevens,	Humboldt, Allen.
H. Curtis Stinson,	Belleville, Republic.
Ross Stockwell,	Havensville, Pottawatomie.
John Russell Stoker,	Manhattan, Riley.
Clifton J. Stratton,	Kansas City, Wyandotte.
Matthew Castle Stromire,	Manhattan, Riley.
Paul Stuewe,	Alma, Wabaunsee.
Bertha Swartz,	Newton, Harvey.
Leonhardt Swingle,	Manhattan, Riley.
Ellen Maude Terhune,	Manhattan, Riley.
Grace Terhune,	Manhattan, Riley.
G. Eldon Thompson,	Manhattan, Riley.
Harry W. Tobey,	Hope, Dickinson.
Walter Edwin Tomson,	Topeka, Shawnee.
Tom K. Toothaker,	Blaine, Pottawatomie.
Robert Thaddious Towler,	Ulysses, Grant.
Zepherine Ellen Towne,	Manhattan, Riley.
Alice Marie True,	Topeka, Shawnee.
Chester Francis Turner,	Manhattan, Riley.
Mary Lee Turner,	Manhattan, Riley.
Arthur Unruh,	Pawnee Rock, Barton.
Philip Cornelius Vilander,	Manhattan, Riley.
Roy I. Walthour,	Newton, Harvey.
Clarence Shont Watson,	Pittsburg, Crawford.
John Earl Watt,	Anthony, Harper.
Oley W. Weaver,	Effingham, Atchison.
Gladys K. Wenkheimer,	Belpre, (Pawnee).
Louis Wermelskirchen,	Manhattan, Riley.
Edgar Westover,	Brownell, Ness.
Andrew Jefferson Wheeler,	Tyro, Montgomery.
Clarence Wheeler,	Jefferson, Montgomery.
Helen Wheeler,	Logan, Phillips.
Glenn Edwin Whipple,	Manhattan, Riley.
Cecil Ray Wilhoit,	Centralia, Nemaha.
Harrison Walter Wilkison,	Dwight, Morris.
Clyde Douglas Williams,	Williamsburg, Franklin.
Owen E. H. P. Williams,	Manhattan, Riley.
Ray M. Wolfe,	La Cygne, Linn.
Harold Pope Wood,	Elmdale, Chase.
Olive Bell Wright,	Ottawa, Franklin.
Kirby K. Wyatt,	Highland, Doniphan.
Florence Wyland,	Smith Center, Smith.
Gerald Wyland,	Smith Center, Smith.
Oscar York,	Dunlap, Morris.

SOPHOMORES.

Hattie Julia Abbott,	Manhattan, Riley.
Elizabeth Aberle,	Manhattan, Riley.
Nellie Aberle,	Manhattan, Riley.
Mark Abildgaard,	Winfield, Cowley.
Arthur Adams,	Maplehill, Wabaunsee.

Name.	Post office and county (or state).
George W. Alexander,	Everest, Brown.
Roy E. Alexander,	Bucklin, Ford.
Fayette H. Allis,	Manhattan, Riley.
James Alsop,	Wakefield, Clay.
Leon Newton Ambler,	Fall River, Greenwood.
Earl Aurora Ames,	Olathe, Johnson.
Algot B. Anderson,	McPherson, McPherson.
John H. Anderson,	Lebanon, Smith.
Ethel Fines Andrews,	Norcatur, Decatur.
Justina Andrews,	Norcatur, Decatur.
Dudley Atkins,	Kansas City, Wyandotte.
Mary E. Austin,	Isabel, Barber.
Nellie M. Baker,	Marvin, Phillips.
Ethel L. Bales,	Manhattan, Riley.
George A. Barnard,	Madison, Greenwood.
Louis Burton Barofsky,	Ellsworth, Ellsworth.
Margaret Lewis Barrows,	Atchison, Atchison.
Thomas Bartlett,	Iola, Allen.
Amy Gertrude Batchelor,	Manhattan, Riley.
William Clyde Baxter,	Thayer, Neosho.
Olive Beal,	Valencia, Shawnee.
Borden Beck,	Republic, Republic.
Evalyne Annette Bentley,	Valhalla, Gove.
Eunice Benton,	Kansas City, Wyandotte.
Albert T. Berry,	Jewell, Jewell.
George Edward Bircher,	Cairo, Pratt.
Frank Scott Blair,	Blue Rapids, Marshall.
Grace Ida Blake,	Ulysses, Grant.
George William Blythe,	White City, Morris.
Ernest Boettcher,	Winkler, Riley.
R. Clyde, Bohrer,	Cawker City, Mitchell.
John W. Bolinger,	Bogue, Graham.
David C. Brandt,	Harper, Harper.
Carl Shipman Breese,	Manhattan, Riley.
Lawrence E. Brennan,	Maplehill, Wabaunsee.
Mabel M. Broberg,	Vesper, Lincoln.
John William Brown,	Fort Scott, Bourbon.
Fred Brunker,	Manhattan, Riley.
Elsie Luella Buchheim,	Winkler, Riley.
Meta Evalina Buck,	Manhattan, Riley.
Glenn Buckman,	Conway, McPherson.
Monica Burbank,	Manhattan, Riley.
Grace Drollinger Burtner,	Manhattan, Riley.
Frank Buzard,	St. Joseph, *Mo.*
Speer W. Callen,	Junction City, Geary.
Edyth Campbell,	Manhattan, Riley.
Robert Proffitt Campbell,	Attica, Harper.
Georgia Canfield,	Belleville, Republic.
Hazel Cannon,	———.
Ida Alfreda Carlson,	Manhattan, Riley.
Frances Case,	Kansas City, Wyandotte.
Lula L. Case,	Kansas City, Wyandotte.
(Mrs.) Pansy Case,	Manhattan, Riley.
S. Irene Case,	Kansas City, Wyandotte.
Thomas Arthur Case,	Manhattan, Riley.
Berta Lorena Chandler,	Manhattan, Riley.
Harry J. Cheesebro,	Clyde, Cloud.
Lewis Caie Christie,	Manhattan, Riley.
Stanley Clark,	Manhattan, Riley.
Lee Will Cogdall,	Winfield, Cowley.
Edwin Lloyd Cole,	Manhattan, Riley.

Name.	Post office and county (or state).
Harry L. Cole,	Manhattan, Riley.
Merle Dolin Collins,	Manhattan, Riley.
Myron Collins,	Manhattan, Riley.
Edgar R. Cooke,	Beloit, Mitchell.
John R. Cooper,	Atwood, Rawlins.
William W. Cooper,	Americus, Lyon.
M. Irene Cotton,	Burrton, Harvey.
Nell Agnes Cotton,	Wamego, Pottawatomie.
Ralph Vere Cotton,	Waverly, Coffey.
Vida Mae Cowgill,	Long Island, Phillips.
May Louise Cowles,	Lawrence, Douglas.
Anna Cox,	Kirwin, Phillips.
Merton Cozine,	Linn, Washington.
Kirksey Lewis Curd,	Kansas City, Wyandotte.
Alfhild Marie Dahl,	Montrose, Jewell.
Olga Dahl,	Montrose, Jewell.
Roy Ira Davis,	Plevna, Reno.
Gladys Deaver,	Cassoday, Butler.
Harold Delap,	Manhattan, Riley.
Mary Delfs,	Inman, McPherson.
Earl W. Denman,	Cawker City, Mitchell.
Frank H. Dillenback,	Walnut, (Neosho).
Charles C. Dingee,	Minneapolis, Ottawa.
Leslie J. Dixon,	Bison, Rush.
Russell Reuben Dodderidge,	White City, Morris.
Clarence Drake,	Jewell, Jewell.
Cora M. Brown,	Manhattan, Riley.
William Dunn,	Manhattan, Riley.
Frederick C. Duttlinger,	Monument, Logan.
Mollie Elizabeth Eagles,	Salina, Saline.
Emily G. Ebner,	Atchison, Atchison.
Ruth Edgerton,	Manhattan, Riley.
Earl Lewis Edwards,	Phillipsburg, Phillips.
G. DeWitt Elder,	Augusta, Butler.
Martha Elliott,	Manhattan, Riley.
Frank C. Ellis,	Fort Scott, (Linn).
Homer Emmons,	Bucklin, Ford.
Lawrence Endacott,	Clay Center, Clay.
Harry C. Errett,	Cottonwood Falls, Chase.
William D. Essmiller,	Great Bend, Barton.
Elsie May Ester,	Peck, Sedgwick.
Mabel Etzold,	Liberal, Seward.
Marian Evans,	Kansas City, Wyandotte.
Lottie Alice Farnsworth,	North Topeka, Shawnee.
Clemens Inks Felps,	Manhattan, Riley.
Raymond M. Ferris,	Osage City, Osage.
Glenn R. Fickel,	Holton, Jackson.
Raymond D. Fink,	Formoso, Jewell.
Jennie Irene Flinn,	Admire, Lyon.
Lulu Mae (Snodgrass) Folsom,	Manhattan, Riley.
Hilder Forsberg,	Manhattan, Riley.
I. Loren Fowler,	Manhattan, Riley.
John T. Freed,	Scott, Scott.
Ivy Ann Fuller,	Manhattan, (Pottawatomie).
Russel Fuller,	Clay Center, Clay.
Orville E. Giger,	Elmdale, Chase.
John Hamilton Gill,	Manhattan, Riley.
J. Scott Gilleece,	Mayetta, Jackson.
Nathan A. Gish,	Manhattan, Riley.
Lois Ruth Gist,	Manhattan, Riley.

Name.	Post office and county (or state).
Hester Clark Glover,	Manhattan, Riley.
Walter Earl Glover,	Topeka, Shawnee.
John H. Goheen,	Manhattan, Riley.
Andrew Goldsmith,	Abilene, Dickinson.
Mabel Maye Gonterman,	Manhattan, Riley.
Lee H. Gould,	Dodge City, Ford.
Everett C. Gravatt,	Beloit, Mitchell.
Ray L. Graves,	Lincoln, Lincoln.
David D. Gray,	Topeka, Shawnee.
Ella Ruth Graybill,	Sedgwick, Harvey.
William Ernest Gregg,	Oakley, Logan.
Marvin C. Griffin,	Brighton, *Colo.*
William Henry Grinter,	Perry, Jefferson.
Lawrence G. Gross,	Junction City, Geary
Lottie Gugenhan,	May Day, Riley.
Simpson Floyd Hacker,	Atwood, Rawlins.
Otto C. Hagans,	Utica, (Lane).
Arthur Hall,	Hope, Dickinson.
Emma Ellen Hall,	Hoyt, Jackson.
Frank Ermel Halm,	Topeka, Shawnee.
Nettie Regina Hanson,	Concordia, Cloud.
Edith Harris,	Manhattan, Riley.
Richard Harris,	Manhattan, Riley.
May Hartwell,	Goodland, Sherman.
Charles Hartwig,	Goodland, Sherman.
Margaret Hartwig.	Goodland, Sherman.
Ralph S. Hawkins,	Marysville, Marshall.
William Lauren Heard,	Dodge City, Ford.
Guy Hendrickson,	Manhattan, Riley.
Viola Josephine Hepworth,	Burlingame, Osage.
Thomas Matthew Heslip,	Garnett, Anderson.
Charles William Hickok,	Ulysses, Grant.
Mary Elizabeth Hickok,	Ulysses, Grant.
Besse Maie Hildreth,	Altamont, Labette.
George Hill,	Hope, Dickinson.
Leva L. Hills,	Esbon, Jewell.
Martin Anthon Hinrichs,	Randolph, Riley.
Hazel Juanita Hoke,	Manhattan, Riley.
Leonard Joseph Hole,	Manhattan, Riley.
Rodney Grant Holmberg,	North Topeka, Shawnee.
Adelaide Julia Holmes,	Manhattan, Riley.
Jacob Claude Holmes,	Piedmont, Greenwood.
Ada Statira Holroyd,	Manhattan, Riley.
Oscar Stephen Holroyd,	Hewins, Chautauqua.
George Arthur Hopp,	Manhattan, Riley.
William Adric Hosick,	Yates Center, Woodson.
Arthur Justus Hotte,	Manhattan, Riley.
Glen William Hout,	Formoso, Jewell.
Lester Lawrence Howenstine,	Manhattan, Riley.
D. Ray Hull,	Manhattan, Riley.
Arthur B. Hungerford,	Manhattan, Riley.
Edwin Hungerford,	Manhattan, Riley.
Noble M. Hutchinson,	Kiefer, *Okla.*
Louis Edgar Hutto,	Manhattan, Riley.
Mary Inghram,	Newton, Harvey.
Raymond Jackson,	Elmont, Shawnee.
Mary Cassandra Jeffries,	Manhattan, Riley.
Eula Jenkins,	Kansas City, Wyandotte.
Gladys May Johnson,	Manhattan, Riley.
Waldo Harold Johnson,	White City, Morris.

Name.	Post office and county (or state).
Clifford Grant Jones,	Wichita, Sedgwick.
Joseph Clarence Jones,	Manhattan, Riley.
Catherine L. Justin,	Manhattan, Riley.
Emma Dorothy Kammeyer,	Manhattan, Riley.
Edgar T. Keith,	Manhattan, Riley.
Ernest B. Keith,	Manhattan, Riley.
Pauline Kennett,	Concordia, Cloud.
George Kernohan,	Manhattan, Riley.
Minnie Luella King,	Lexington, Clark.
J. I. Kirkpatrick,	Wichita, Sedgwick.
Roy William Kiser,	Geneseo, Rice.
Pearl Alice Kolterman,	Onaga, Pottawatomie.
Frank Kramer,	Zeandale, Riley.
Ray Delbert Laflin,	Goff, Nemaha.
Leslie E. K. Lair,	Clay Center, Clay.
J. Ralph LaMont,	Longton, Elk.
Katie LaMont,	Longton, Elk.
Robert Gould Larzelere,	Wathena, Doniphan.
Frank Baxter Lawton,	Newton, Harvey.
Charles Leadley,	Rozel, Pawnee.
Thomas A. Leadley,	Rozel, Pawnee.
Arthur J. Lee,	El Dorado, Butler.
Grover Lee,	Pratt, Pratt.
Charles A. Leech,	Fort Scott, Bourbon.
Alma Levengood,	Athol, Smith.
Lena Lindeman,	Formoso, Jewell.
Elva M. Lindsay,	Grantville, Jefferson.
Nellie Lindsay,	Manhattan, Riley.
Frank B. Livingston,	Axtell, Marshall.
Annie Elizabeth Logan,	Maplehill, Wabaunsee.
Mattie Caroline Logan,	Tecumseh, *Neb.*
J. Lee Lorimer,	Olathe, Johnson.
Clyde Ludington,	Manhattan, Riley.
John Barlow Lund,	Manhattan, Riley.
Gertrude Lyman,	Manhattan, Riley.
Charles E. Lyness,	Walnut, Crawford.
Hubert M. Lyon	Waverly, Coffey.
John M. Lyons,	Dendena, Doniphan.
Viva Margaret McCray,	Manhattan, Riley.
Irene Sophia McCreary,	Manhattan, Riley.
Edwin McDonald,	Abilene, Dickinson.
Eula Delpha McDonald,	Manhattan, Riley.
Ross L. McDonald,	Manhattan, Riley.
Scott Roger McDonald,	Manhattan, Riley.
Zara Harmon McDonnall,	Manhattan, Riley.
Henry W. McFadden,	Halls Summit, Coffey.
Jessie Estelle McKinnie,	Beloit, Mitchell.
Charles Curtis McKirahan,	Topeka, Shawnee.
Edmund C. Magill,	Wichita, Sedgwick.
Kenneth R. March,	Manhattan, Riley.
George Eugene Maroney,	Attica, Harper.
Earl Harrison Martin,	Belle Plaine, Sumner.
Francis R. Mennis,	Douglass, Butler.
Alsey W. Michael,	Havana, Montgomery.
Dwight Logan Miller,	Manhattan, Riley.
Edwin Darrah Carlisle Miller,	Concordia, Cloud.
Ralph Leroy Miller,	Eureka, Greenwood.
Virgil Emmit Miller,	Manhattan, Riley.
Dale Johnson Missimer,	Manhattan, Riley.
Leon Newton Moody,	Riley, Riley.
Leora Evangeline Moody,	Riley, Riley.

Name.	Post office and county (or state).
Ralph Allen Moore,	White City, Morris.
Dorr D. Morey,	Manhattan, Riley.
Stell Morton,	Green, Clay.
William A. Moss,	Lincoln, Lincoln.
Delbert E. Mossman,	Maplehill, Wabaunsee.
Dennis F. Mossman,	Maplehill, Wabaunsee.
Emie Mulford,	Hoyt, Jackson.
Myra May Munger,	Manhattan, Riley.
Boise Russell Murphy,	Liberal, Seward.
Karl Bryant Musser,	Acme, Dickinson.
Hazel Helen Myers,	Hutchinson, Reno.
Glenn E. Nelson,	Smith Center, Smith.
Eulalia Griffith Nevins,	Ford, Ford.
Clare Sparks Newkirk,	Geneseo, Rice.
Grace Lee Newman,	Kansas City, Wyandotte.
Arthur F. Nichols,	Buffalo, (Woodson).
Floyd Bruce Nichols,	Buffalo, (Woodson).
Jessie Nichols,	Liberal, Seward.
Josie E. Nicolay,	Scranton, Osage.
Harry M. Noel,	Valencia, Shawnee.
Maude Eveline Nonamaker,	Osborne, Osborne.
Oscar Marion Norby,	Cullison, Pratt.
Minnie J. O'Brien,	Kansas City, Wyandotte.
Valerie Almina Ogilvie,	Burr Oak, Jewell.
Nell Emily Osborn,	Coffeyville, Montgomery.
Glenn Decatur Paddleford,	Manhattan, (Pottawatomie)
Mabel Parker,	Osborne, Osborne.
William Theodore Parry,	Linwood, Leavenworth.
Edith B. Payne,	Wichita, Sedgwick.
Dudley B. Pellette,	Hutchinson, Reno.
Ina Pence,	Elmont, Shawnee.
Kate Maria Penn,	Manhattan, Riley.
Isrear Perkins,	Kansas City, Wyandotte.
Dale Perrill,	Chapman, Dickinson.
Lawrence Todd Perrill,	Chapman, Dickinson.
Claude Edward Pfeiffer,	Kansas City, Wyandotte.
Arthur Dow Phelps,	Great Bend, Barton.
Edwin W. Pierce,	Bison, Rush.
Amelia Gertrude Pierson,	Manhattan, Riley.
Guy G. Pingree,	Pomona, Franklin.
Lucy W. Platt,	Ætna, Barber.
Henry James Plumb,	Pleasanton, Linn.
Ray Hamlin Pollom,	North Topeka, Shawnee.
Maggie Price,	Manhattan, Riley.
Mary Puett,	Manhattan, Riley.
Iola Grace Rader,	Manhattan, Riley.
William Judson Railsback,	Langdon, Reno.
Helen Rannells,	Manhattan, Riley.
Chester Arthur Reavis,	Havana, Montgomery.
Enid Alzine Redden,	Gypsum, Saline.
Eva Mary Reeves,	Manhattan, Riley.
Christine Rentschler,	———.
Alice Dunbar Roberts,	Horton, Brown.
Margaret Rodgers,	Manhattan, Riley.
Irving Campdoras Root,	Kansas City, Wyandotte.
Franco T. Rosado,	Isabela Occ, *Negros, P. I.*
David S. Rose,	Douglass, Butler.
Ruth Lillian Rowland,	Kansas City, Wyandotte.
Leslie W. Rowles,	Topeka, Shawnee.
Neil L. Rucker,	Burdett, Pawnee.
Warren A. Rude,	Hoisington, Barton.
Fred Ruffner,	Beloit, Mitchell.

Name.	Post office and county (or state).
Edwin E. Rugg,	Liberal, Seward.
Mary H. Sanneman,	Blue Rapids, Marshall.
Walter G. Savage,	Winfield, Cowley.
Axel Scheleen,	Manhattan, Riley.
Elsie Helen Schmidler,	Marysville, Marshall.
Henry W. Schmidler.	Marysville, Marshall.
Essie B. Schneider,	Manhattan, Rilev.
Charles H. Scholer,	Milo, Lincoln.
Elmer Schultz,	Manhattan, Riley.
Maida Schultz,	Junction City, Geary.
Ludwig Schwab,	Partridge, Reno.
Elmer Scneder,	Prescott, Linn.
Abel Segel,	McPherson, McPherson.
Harry Seyffer,	Le Roy, Coffey.
Lula Shelby,	Kansas City, Wyandotte.
Etta Sherwood,	Manhattan, Riley.
Virgie Sherwood,	Manhattan, Riley.
Harry Nelson Shuler,	Manhattan, Riley.
Carrie Marietta Shumway,	Manhattan, Riley.
Frank Sidorfsky,	Le Roy, Coffey.
Warren Earl Simonsen,	Manhattan, Riley.
Merl Hudson Sims,	Wellsville, Franklin.
Edythe Skinner,	Manhattan, Riley.
John Slabach, jr.,	Conway, McPherson.
Fred D. Slaght,	White City, Morris.
Charles Smith,	Spring Hill, Johnson.
Claude H. Smith,	Manhattan, Riley.
Harry C. Smith,	Manhattan, Riley.
Isaac Newton Smith,	Manhattan, Riley.
Ned Smith,	Manhattan, Riley.
Ralph B. Smith,	Manhattan, Riley.
Stanley Albert Smith,	Salina, Saline.
Floyd Snow,	Topeka, Shawnee.
Earl Springer,	Highland, Doniphan.
Odith K. Spurrier,	Guthrie, *Okla.*
Lulu E. Stallman,	Hutchinson, Reno.
William Edward Stanley,	Burrton, Harvey.
John T. Steele,	Manhattan, Riley.
Walter Steffey,	Valley Falls, Jefferson.
Lottie Geneva Stephenson,	Clements, Chase.
Ralph Ralston Sterrett,	Morganville, Clay.
Ferne Ella Stevenson,	Parkville, *Mo.*
George Yates Stewart,	Hazelton, Barber.
Carl James Stoddard,	Muscotah, Atchison.
Delia Stoddard,	Manhattan, Riley.
Marcia Story,	Manhattan, Riley.
Charley D. Strain,	Phillipsburg, Phillips.
Mabel Greta Stump,	Manhattan, Riley.
Wayne Elmer Sullivan,	Junction City, Geary.
Eva May Surber,	Kansas City, Wyandotte.
Neil Edmond Swanson,	Vliets, Marshall.
Ross H. Sweet,	Manhattan, Riley.
Eugene H. Swegman,	Manhattan, Riley.
Cassie Lydia Tanner,	Manhattan, Riley.
Fred Martin Taylor,	Formoso, Jewell.
Oscar M. Taylor,	Lawrence, Douglas.
Olive Tennis,	Chanute, Neosho.
Arthur Herbert Thompson,	Manhattan, Riley.
John Tinkham,	Manhattan, Riley.
Leander Alpheas Tombaugh,	Athol, Smith.
Katherine Ann Tucker,	Manhattan, Riley.

Name.	Post office and county (or state).
Otho C. Tucker,	Salina, Saline.
Koshiro Ushiku,	Lawrence, Douglas.
Emma V. Valentine,	Manhattan, Riley.
Harry Vanderlip,	Manhattan, Riley.
Robert Daniel VanNordstrand,	Le Roy, Coffey.
Edgar Allen Vaughn,	Toronto, Woodson.
George D. Villee,	Topeka, Shawnee.
Frank Vincent,	Kansas City, Wyandotte.
Terence Vincent,	Girard, Crawford.
John A. Vohringer,	Hutchinson, Reno.
Elsmere Joe Walters,	Manhattan, Riley.
Walter Gilling Ward,	Bird City, Cheyenne.
Vera Ware,	Topeka, Shawnee.
Burt O. Warren,	Maplehill, Wabaunsee.
James J. Weakley, jr.,	Kansas City, Wyandotte.
Gertrude Weber,	Manhattan, Riley.
John Webster,	Carneiro, Ellsworth.
Anita Berenice Weible,	Topeka, Shawnee.
James West,	Rydal, Republic.
Florence Whipple,	Longford, Clay.
Lucy Ethel Whipple,	Manhattan, Riley.
A. Homer Whitney,	Narka, Republic.
Ethel A. Wilburn,	Lawrence, Douglas.
Jo Wilcox,	Coffeyville, Montgomery.
Horace T. Wilkie,	Topeka, Shawnee.
Louis Coleman Williams,	Manhattan, Riley.
Mary Catherine Williams,	Manhattan, Riley.
Shelton Williams,	Kenneth, Johnson.
Stephen C. Williams,	Manhattan, Riley.
Scott Williamson,	Holton, Jackson.
Luther Earle Willoughby,	Alton, Osborne.
Matilda Jane Wilson,	Manhattan, Riley.
Roy M. Wilson,	Concordia, Cloud.
Susan Elizabeth Wingfield,	Dwight, (Geary).
Dean Wise,	Clearwater, Sedgwick.
John Barton Wise,	Clearwater, Sedgwick.
Reuben E. Wiseman,	Manhattan, Riley.
Joseph Roy Witmer,	Baileyville, Nemaha.
Jesse W. Wittmeyer,	Harper, Harper.
Charles C. Wolcott,	Garfield, Pawnee.
LeRoy Bushnell Wolcott,	Garfield, Pawnee.
Nellie Lunette Wreath,	Manhattan, (Pottawatomie).
Aleck Rowland Yarrow,	Wakefield, Clay.
Albert F. Yeager,	Bazaar, Chase.
Arthur M. Young,	Manhattan, Riley.
George A. Young,	Kansas City, Wyandotte.
Henry Zimmerman,	Stilwell, Johnson.

FRESHMEN.

Edwin R. Acker,	Leona, Doniphan.
Elsie Adams,	Ozawkie, Jefferson.
Harry Allen,	Goff, Nemaha.
Ruth Evangeline Allen,	Randolph, Riley.
Amel O. Anderson,	Minneapolis, Ottawa.
Clarence Anderson,	Hartford, Lyon.
Earl Anderson,	Topeka, Shawnee.
Frances May Anderson,	Hartford, (Coffey).
Pearl Anderson,	Beattie, Marshall.
Alfred Carroll Apitz,	Manhattan, Riley.
Edna Marie Apitz,	Manhattan, Riley.
Roy Austin Appleton,	Maplehill, Wabaunsee.

Name.	Post office and county (or state).
Claude H. Arbuthnot,	Haworth, Republic.
Elsie Kathryn Arbuthnot,	Haworth, Republic.
Charles M. Archibald,	Rose, Woodson.
Mamie E. Arnold,	Cottonwood Falls, Chase.
Charles Edwin Ashlock,	Argentine, Wyandotte.
Fred G. Astrom,	Osage City, Osage.
John Homer Austin,	El Dorado, Butler.
Edith Florence Avery,	Wakefield, Clay.
Harry Grant Avery,	Wakefield, Clay.
Roger Andrew Axline,	Medicine Lodge, Barber.
George H. Baird,	Valencia, Shawnee.
Madeline Baird,	Manhattan, Riley.
O. R. Baird,	Manhattan, Riley.
Earl Franklin Baker,	Arkansas City, Cowley.
Emza Catherine Baker,	Malta Bend, *Mo.*
Florence E. Baker,	Malta Bend, *Mo.*
Leslie M. Baker,	Washington, Washington.
Orlena Marguerite Baker,	Manhattan, Riley.
Georgia Baldwin,	Manhattan, Riley.
Raymond Albert Baldwin,	Atchison, Atchison.
John Otto Barnes,	Waterville, Marshall.
Robert L. Barnum,	Simpson, Cloud.
Harold Bates,	Manhattan, Riley.
Ruth Haller Bates,	Manhattan, Riley.
John Bayles,	Manhattan, Riley.
A. Pearl Beaman,	Hopewell, Pratt.
Fred Beck,	Nickerson, Reno.
Harry Beggs,	Minneapolis, Ottawa.
Ralph A. Belden,	Lebanon, Smith.
Albert Smith Bell,	Manhattan, Riley.
Albert William Bellomy,	Manhattan, Riley.
Ross Spencer Bentley,	Valhalla, Gove.
Frank Bergier,	Glasco, Cloud.
Arthur J. Berry,	Jewell, Jewell.
Ina Fern Bigger,	Topeka, Shawnee.
Joe Billings,	Grantville, Jefferson.
Russell Bills,	Manhattan, Riley.
George N. Blain,	Manhattan, Riley.
Charles H. Blake,	Ulysses, Grant.
Lynn D. Blanchard,	Manhattan, Riley.
Margaret Blanchard,	Bennington, Ottawa.
Eugene F. Bloom,	Pawnee Rock, Barton.
Lawrence John Blythe,	White City, Morris.
Ray Boiselle,	Hoisington, Barton.
William High Bond,	Manhattan, Riley.
Cecil Francis Boucher,	East Las Vegas, *N. M.*
Myrtle Augusta Bower,	Eureka, Greenwood.
Lola Edna Brethour,	Green, (Riley).
Mary Weir Bright,	Manhattan, Riley.
Harry Broud,	Topeka, Shawnee.
E. Bess Brown,	Manhattan, Riley.
Glenn Brown,	Mont Ida, Anderson.
Henry B. Brown,	Mont Ida, Anderson.
Elma Brubaker,	Edwardsville, Wyandotte.
Albert M. Bucholtz,	Argentine, Wyandotte.
Walter Albert Buck,	Manhattan, Riley.
Foster Cloyes Burbank,	Manhattan, Riley.
Paul Burnett,	Hymer, Chase.
Alpha Vivia Byarlay,	Bala, Riley.
Russell Charles Calhoun,	Formoso, Jewell.
Quinton Campbell,	Conway Springs, Sumner.

Name.	Post office and county (or state).
Mary Alice Canfield,	Belleville, Republic.
Howard R. Carpenter,	Council Grove, Morris.
Emil Edgar Cartwright,	Burlington, Coffey.
Bessie H. Chambers,	Milford, Geary.
Goldie M. Chambers,	Milford, Geary.
Ralph Brower Chapman,	Muscotah, Atchison.
Eugene Cheeseman,	Lenora, Norton.
George W. Christie,	Manhattan, Riley.
Alfred L. Clapp,	Yates Center, Woodson.
Hazel Clark,	Pratt, Pratt.
Fred Coburn,	Marion, Marion.
Archie Raymond Cogswell,	Kirwin, Phillips.
James Denison Colt,	Manhattan, Riley.
Neva Helen Colville,	Wichita, Sedgwick.
Stanley Arno Combs,	Manhattan, Riley.
Beulah J. Conaway,	Manhattan, Riley.
Aubrey Deakins Conrow,	Manhattan, Riley.
Lena Adelle Conrow,	Manhattan, Riley.
Rose Conway,	Norcatur, Decatur.
Elizabeth Anna Cox,	Goodrich, Linn.
Florence Bell Cragg,	Manhattan, Riley.
Floyd C. Cragg,	Manhattan, Riley.
Bessie Cree,	Manhattan, Riley.
Maud R. Criger,	Howard, Elk.
Nathan P. Cross,	Pleasanton, Linn.
Bessie Crotts,	Woodsdale, Stevens.
Eunice Curtiss,	Abilene, Dickinson.
Carrie Ethel Cutter,	Ogden, Riley.
Elmer Jeremiah Dart,	Neodesha, Wilson.
John Davidson,	Wichita, Sedgwick.
Alex Earl Davis,	Belleville, Republic.
Arthur Davis,	Fairview, Brown.
Charley Ambrose Davis,	Clay Center, Clay.
Floyd Everell Davis,	Clay Center, Clay.
Ray Robert Davis,	Cherryvale, Montgomery.
Robert Thomas Dearing,	Brookville, Saline.
Lawrence V. Deming,	Larkin, Jackson.
Loren S. Deming,	Anthony, Harper.
Marie Dewey,	Manhattan, Riley.
William M. Docking,	Manhattan, Riley.
Marguerite Dodd,	Manhattan, Riley.
Cid. I. Doolittle,	Dodge City, Ford.
Frances Florence Doty,	Manhattan, Riley.
Clyde Drake,	Manhattan, Riley.
Henry O. Dresser,	Manhattan, Riley.
Victor Vincil Dryden,	Larned, Pawnee.
Edward Dueker,	Woodbine, Dickinson.
Joe H. Dunlevy,	Parsons, Labette.
Harriet Ellen Dunn,	Manhattan, Riley.
Ethel Durham,	Paradise, Russell.
Charles Wesley Durrett,	Manhattan, Riley.
Pearl Bernard Durrett,	Manhattan, Riley.
Hugh M. Dyatt,	Almena, Norton.
William Lester Dyatt,	Almena, Norton.
Myron F. Eddy,	Ingalls, Gray.
Edward J. Edwards,	Lyons, Rice.
Marguerite M. Elliot,	Manhattan, Riley.
Ray B. Ellis,	Pleasanton, Linn.
Mina Erickson,	Manhattan, Riley.
Hattie Ericson,	Lindsborg, McPherson.
Noll Rufus Estes,	Stafford, Stafford.

Name.	Post office and county (or state).
Ada Elizabeth Evans,	Manhattan, Riley.
Howard H. Evans,	Manhattan, Riley.
Scott Farmer,	Ætna, Barber.
Verne Farnsworth,	North Topeka, Shawnee.
Frederic H. Fate,	Manhattan, Riley.
Laura Margaret Fate,	Manhattan, Riley.
Ruth Marie Ferguson,	Manhattan, Riley.
George C. Ferrier,	Osborne, Osborne.
Viva M. Fish,	Manhattan, Riley.
Lloyd Flanders,	Salina, Saline.
Eula Ford,	Leonardville, Riley.
Willis Pearl Ford,	Highland, Doniphan.
Edward John Francoeur,	Concordia, Cloud.
Oliver Morris Franklin,	Odee, Meade.
Herbert Linwood Freese,	Wakefield, Clay.
Velora A. Fry,	Manhattan, Riley.
Harold Gaden,	Riley, Riley.
Ward Stanley Gates,	Asherville, Mitchell.
Marguerite Gentry,	Minneapolis, Ottawa.
Cecil Gibbs,	Kinsley, Edwards.
Clarence H. Gilleece,	Manhattan, Riley.
George Smith Gillespie,	Elk City, Montgomery.
Carleton Gilmore,	Oakley, Logan.
J. Lura Gilmore,	Manhattan, Riley.
Anna Lillie Gish,	Manhattan, Riley.
David E. Gish,	Acme, Dickinson.
Hiram S. Gish,	Manhattan, Riley.
Edith L. Givens,	Manhattan, Riley.
Mary Ellen Glenn,	Waverly, Coffey.
Ethel Goheen,	Manhattan, Riley.
Frank H. Graham,	Holton, Jackson.
Glenn James Graham,	Manhattan, Riley.
Edw. R. Green,	Mankato, Jewell.
Herbert W. Gribble,	Manhattan, Riley.
Edythe Groome,	Manhattan, Riley.
S. Lelia Groome,	Manhattan, Riley.
Myrtle Grover,	Manhattan, Riley.
Lester Earl Grube,	Vermillion, Marshall.
Percy Hacker,	Manhattan, Riley.
Roy F. Hagans,	Utica, Ness.
Helen Haines,	Manhattan, Riley.
Clyde W. Hall,	Pleasanton, Linn.
Merlyn J. Hammett,	Marysville, Marshall.
Aaron L. Hammond,	North Topeka, Shawnee.
Vida Agnes Harris,	Manhattan, Riley.
Mabel Joy Harrison,	Riley, Riley.
Grace Elsie Haynes,	Baldwin, Douglas.
Clarence Haywood,	Wilburn, Ford.
John Chester Heard,	Dodge City, Ford.
John Hedberg,	Marquette, McPherson.
Gladys Hendrickson,	Manhattan, Riley.
Walter Andrew Hepler,	Manhattan, Riley.
Lynn Hildwein,	Hiawatha, Brown.
Garnet W. Hislop,	Lebanon, Smith.
Norris Shuel Hogue,	Spring Hill, Johnson.
Grace Hole,	Manhattan, Riley.
Blanche Hoover,	Canton, McPherson.
Mabel Hoover,	Canton, McPherson.
Paul C. Hoover,	Columbus, Cherokee.
Walter Hoover,	Canton, McPherson.
Charles Hopper,	Manhattan, Riley.
Edna G. Horton,	Yates Center, Woodson.

Name.	Post office and county (or state).
Ethel M. Hotte,	Manhattan, Riley.
Grace E. Houser,	Anthony, Harper.
James M. Howell,	Kansas City, Wyandotte.
Leland A. Howell,	North Topeka, Shawnee.
Leslie Howell,	Kansas City, Wyandotte.
Archie C. Hower,	Sylvan Grove, Lincoln.
Arlo Hubbard,	Topeka, Shawnee.
Louie C. Hubbell,	McPherson, McPherson.
Cecil Harley Hungerford,	Manhattan, Riley.
Daniel Hampton Hunt,	Bigelow, Marshall.
Harry Frank Hunt,	Fredonia, Wilson.
Ralph Harper Hunter,	Manhattan, Riley.
Harold Raymond Hurd,	Topeka, Shawnee.
Genevieve Ingersoll,	Overbrook, Osage.
Irving Ingraham,	Manhattan, Riley.
Mary Inslee,	Isabel, (Pratt).
Carl Lourencious Ipsen,	Cleburne, Pottawatomie.
Dan. N. Jackson,	Coldwater, Comanche.
Herold Jaeger,	Vesper, Lincoln.
William Gordon James,	Arkansas City, Cowley.
(Mrs.) Florence Jeffries,	Manhattan, Riley.
Vera Louise Jenison,	Farnsworth, Lane.
Carl Olaus Johnson,	Frankfort, Marshall.
Harry C. Johnson,	Lawrence, Douglas.
Roy Johnson,	Russell, Russell.
Harry Ralph Johnston,	Manhattan, Riley.
James Coffman Johnston,	Manhattan, Riley.
Glen C. Jones,	Hamlin, Brown.
Raymond Jones,	Springfield, Seward.
Oscar Martin Jorgenson,	Manhattan, Riley.
Wilma A. Kammeyer,	Manhattan, Riley.
Larry Leroy Keel,	Manhattan, Riley.
Clarence Edward Kellogg,	Manhattan, Riley.
M. Louise Kenyon,	Jetmore, Hodgeman.
Mary Kernohan,	Nashville, Kingman.
Ray Kerr,	Salina, Saline.
Ethel D. Kershaw,	Garrison, Pottawatomie.
Nellie L. King,	Lexington, Clark.
John Calvin Kinzer,	Manhattan, Riley.
Geo. B. Kirkpatrick,	Eureka, Greenwood.
Archer F. Kiser,	Geneseo, Rice.
Vera B. Kiser,	Manhattan, Riley.
Charles J. Klaumann,	Belleville, Republic.
Sam A. Krehbiel,	Moundridge, McPherson.
Harley Ladd,	Prescott, Linn.
David F. Laubmann,	Russell, Russell.
Walter Melvin Lawry,	Manhattan, Riley.
Florence Leeper,	———
C. Oscar Levine,	Marysville, Marshall.
Hazel Viola Limbocker,	Manhattan, (Pottawatomie).
Marc Atchison Lindsay,	Madison, Greenwood.
Benjamin N. Linton,	Mayetta, Jackson.
Walter W. Loeffler,	Linn, Washington.
Sewell Lofinck,	Manhattan, Riley.
J. Paul Loomis,	Manhattan, Riley.
Ray Luther,	Kansas City, Wyandotte.
Thomas Daniel Lyons,	Manhattan, Riley.
Anna Eliza McCoy,	Manhattan, Riley.
Hannah Elsie McCoy,	Manhattan, Riley.
William Ross McCoy,	Manhattan, Riley.
Malcolm Lloyd McCune,	Leavenworth, Leavenworth.
Joe E. McGuire,	Neodesha, Wilson.

Name.	Post office and county (or state).
Clayton Alexander McIntosh,	Washington, Washington.
Jennet McKee,	Richland, Shawnee.
Iona McKeeman,	Manhattan, Riley.
Mary Iva McKellips,	Beloit, Mitchell.
Owen Floyd McKittrick,	McCracken, Rush.
Homer McNamara,	Soldier, Jackson.
Homer H. McNamee,	Plevna, Reno.
Mable Jean McNee,	Cottonwood Falls, Chase.
Sophia Elizabeth Maelzer,	Centralia, Nemaha.
Hugh H. Malcolm,	Almena, Norton.
Anna Malm,	Manhattan, Riley.
Hilda Malm,	Manhattan, Riley.
Lowell Manchester,	Chiles, Miami.
Florence F. Marshall,	Jennings, Decatur.
Earl W. Martin,	Scandia, Republic.
Edward H. Marxen,	Piper, Wyandotte.
John T. Mason,	Fulton, Bourbon.
Golda Estella Masters,	Manhattan, Riley.
Epha Estella Mather,	Grinnell, Gove.
Ella C. Meyer,	Clifton, Washington.
Chester Howard Middleton,	Manhattan, Riley.
Gertrude Helen Miller,	Langdon, Reno.
Perry D. Miller,	Garfield, Pawnee.
Margret Ellenor Moore,	Idana, Clay.
Murray Kent Morse,	Kinsley, Edwards.
Frank Edward Moss,	Eureka, Greenwood.
Mabel Moyer,	Manhattan, Riley.
Junior Mudge,	Manhattan, Riley.
Curt D. Muller,	Nekoma, Rush.
Katherina Munger,	Manhattan, Riley.
Charles Murphy,	Halstead, Harvey.
Elmer B. Myers,	Hutchinson, Reno.
Vergie Beatrice Myers,	Manhattan, Riley.
Nathan B. Needham, jr.,	Clifton, Washington.
Albert H. Nelson,	Falun, Saline.
Anthony Wayne Nelson,	Wakarusa, Shawnee.
Florence Mae Bernese Nelson,	Manhattan, Riley.
Nancy Nelson,	Manhattan, Riley.
Winifred Louise Neusbaum,	Manhattan, Riley.
Gerald Knowlton Nider,	Manhattan, Riley.
Clament Neilson,	Leonardville, Riley.
Katherine I. Neilson,	Marysville, Marshall
Mary Nixon,	Manhattan, Riley.
Albert V. Norlin,	Windom, McPherson.
Harold Ellsworth Norton,	Limon, *Colo.*
Mamie Norton,	Barnard, Lincoln.
Irvin C. Noyce,	Stockton, Rooks.
Lawrence Archibald O'Brien,	Luray, Russell.
William O'Connell,	Kiowa, Barber.
George B. Okeson,	Fairview, Brown.
Raymond F. Olinger,	Lafontaine, Wilson.
Henry Herman Olsen,	Baker, Brown.
Lester N. Olson,	Topeka, Shawnee.
Omer Oshel,	Gardner, Johnson.
Ephriam A. Ostlund,	Clyde, Washington.
George Miles Overlander,	Manhattan, Riley.
Otto Parker,	Lyons, Rice.
Donald Louis Parkinson,	Manhattan, Riley.
Ellen Parsons,	Clements, Chase.
Charles Arthur Patterson,	Ford, Ford.
Mabel Pearson,	Clifton, Washington.

Name.	Post office and county (or state).
Melva Gay Perry,	Manhattan, Riley.
George H. Peterson,	Eskridge, Wabaunsee.
Roy M. Phillips,	Manhattan, Riley.
Herbert Pierce,	Seely, Cowley.
Ruth Plumb,	Pleasanton, Linn.
Bruce M. Polley,	Republic, Republic.
Zola Polley,	Republic, Republic.
Lester B. Pollom,	Topeka, Shawnee.
Lena Porter,	Manhattan, Riley.
Evart Rea Potts,	Manhattan, Riley.
Walter Edmund Prather,	Oakley, Gove.
Ethelyn P. Pray,	Manhattan, Riley.
George W. Pray,	Hope, Dickinson.
Earl F. Price,	Baldwin, Douglas.
Ina T. Priest,	Manhattan, Riley.
Aaron Purdy,	Arkansas City, Cowley.
Marion Earl Rader,	Manhattan, Riley.
Fredrick William Raemer,	Herkimer, Marshall.
George Hemrod Railsback,	Norcatur, Decatur.
Karl O. Manny,	Osawatomie, Miami.
Nellie Reed,	Havensville, Pottawatomie.
Fred Thomas Rees,	Grantville, Jefferson.
Paul Renard,	Concordia, Cloud.
John H. Ressel,	Colony, Anderson.
William Revel,	Chase, Rice.
Leo W. Rexroad,	Darlow, Reno.
Harriet H. Reynolds,	Topeka, Shawnee.
Irving Reynolds,	Topeka, Shawnee.
Archie Monroe Richards,	Manhattan, Riley.
Bertha E. Richards,	Manhattan, Riley.
Esther Katherine Richards,	Manhattan, Riley.
Leird R. Richards,	Manhattan, Riley.
Wilma Richards,	Manhattan, Riley.
Marcella Catherine Risdon,	Manhattan, Riley.
William Ray Rittenhouse,	Cherryvale, Montgomery.
Fannie Roark,	Manhattan, Riley.
Ray R. Row,	Larned, Pawnee.
Paul Royce,	Kirwin, Phillips.
Anna Sanders,	Manhattan, Riley.
Elbridge Sanders,	Manhattan, Riley.
William Albert Sanford,	Kensington, Smith.
Margaret Washburn Schultz,	Manhattan, Riley.
William A. Schuster,	Leavenworth, Leavenworth.
Winnie Winfield Scott,	Colony, Anderson.
Ernest Edgburt Seal,	Macksville, Pawnee.
Robert E. Sellers,	Emporia, Lyon.
Hartley W. Setchell,	Morland, Graham.
Laura Lee Setliff,	Sedalia, *Mo.*
John W. Sexton,	Manhattan, Riley.
Lorine Shaefer,	Manhattan, Riley.
Roy Oscar Sharpe,	Chase, Rice.
James Shaw,	Grainfield, Gove.
Martin Ivin Shields,	Lost Springs, Marion.
Francis Lewelling Shull,	Manhattan, Riley.
Augustus Simms,	Manhattan, Riley.
Grace Evelyn Simpson,	Manhattan, Riley.
Barney Gayle Sims,	Wellsville, Franklin.
Vera Skeels,	Burr Oak, Jewell.
Myrtle Mae Skinner,	Beverly, Lincoln.
Ernest H. Smies,	Clifton, (Clay).
Hazel Mary Smith,	Manhattan, Riley.

Name.	Post office and county (or state).
Lyman H. Sommer,	Kiowa, Barber.
Frank Sommers,	Manhattan, Riley.
Cora Sponsler,	Hutchinson, Reno.
Lewis B. Sponsler,	Hutchinson, Reno.
Thomas G. Spring,	Ellinwood, Barton.
Charles H. Stacy,	Manhattan, Riley.
Elmer G. Stahl,	Topeka, Shawnee.
H. Fesler Stalder,	Meade, Meade.
Bessie Stephenson,	Manhattan, Riley.
Maude Jewell Stephenson,	Manhattan, Riley.
Clarence Sterrett,	Morganville, Clay.
Chesley Earl Stigers,	Manchester, Harper.
Lola Stoddard,	Manhattan, Riley.
Lyda Stoddard,	Horton, Brown.
Mary Stoddard,	Manhattan, Riley.
Simon Reiuier Cornelius Stomps,	Manhattan, Riley.
Howard W. Strickland,	Junction City, Geary.
Arthur R. Strohm,	Jewell, Jewell.
Frank Hall Strong,	Gove City, Gove.
Elsie Malvina Swanson,	Manhattan, Riley.
Ernest Swanson,	Manhattan, Riley.
Mae Audeline Swanson,	Vliets, Marshall.
Murrel Sweet,	Manhattan, Riley.
Blanche Lovina Tanner,	Manhattan, Riley.
Gail Tatman,	Manhattan, Riley.
Ivie Ann Taylor,	Lawrence, Douglas.
Ira Earl Taylor,	Manhattan, Riley.
Leon Warden Taylor,	Chapman, Dickinson.
Arthur Lewis Theiss,	Hutchinson, Reno.
Benjamin Thomas,	Homestead, Chase.
Carl Harris Torrence,	Reading, Lyon.
George F. Townsend,	Manhattan, Riley.
H. D. Townsley,	Holton, Jackson.
George O. Turner,	Manhattan, Riley.
John Westley Turner,	Liberal, Seward.
Nellie Marie Turner,	Manhattan, Riley.
Robert Edward Turner,	Manhattan, Riley.
Hazel Joy Tweedy,	Manhattan, Riley.
Leo J. Unruh,	Pawnee Rock, Barton.
Verna May Vanderlip,	Manhattan, Riley.
Ethel Nellie Vanderwilt,	Solomon, Dickinson.
Ralph VanZile,	Manhattan, Riley.
Marie Vernon,	Emporia, Lyon.
Don Wade,	Formoso, Jewell.
Lulu Rhuanna Wakefield,	Wilsey, Morris.
Claude Walden,	Manhattan, Riley.
Morgan B. Wallace,	Concordia, Cloud.
Anderson Wathen,	Hiawatha, Brown.
Charles Oscar Watkins,	Anthony, Harper.
Fern Vera Weaver,	Wakefield, Clay.
Fred Webster,	Manhattan, Riley.
Frank J. Wenkheimer,	Belpre, (Pawnee).
Elizabeth Mae Whipple,	Manhattan, Riley.
Frank Elbert Whipple,	Longford, Clay.
Helen Gould Whipple,	Manhattan, Riley.
John Leroy Whipple,	Longford, Clay.
Hattie White,	Manhattan, Riley.
Lloyd Whitney,	———.
Raymond Whitney,	Manhattan, Riley.
Clifford Wight,	Trinidad. *Colo.*

Name.	Post office and county (or state).
Gladys Wilcox,	Manhattan, Riley.
Ray Fontell Williams,	Manhattan, Riley.
Russell Williamson,	Princeton, Franklin,
Earl J. Willis,	Manhattan, Riley.
Katherine Elizabeth Williston,	Manhattan, Riley.
Clarence Willyard,	Manhattan, Riley.
Elmer W. Wilson,	Turner, Wyandotte.
Roy Montgomery Winfrey,	Buckner, *Mo.*
Clyde George Winter,	Dover, Shawnee.
Lee Beauford Wood,	Liberal, Seward.
Willis Bruce Wood,	Manhattan, Riley.
Ada Worley,	Natoma, Osborne.
Oma Alvaretta Worrel,	Manhattan, Riley.
Wilbur William Wright,	Ottawa, Franklin.
Bessie Margaret Young,	Manhattan, Riley.
Bertha Zeller,	Keats, Riley.

SUBFRESHMEN.

Clara Adam,	Wakefield, Clay.
Herbert H. Adams,	Langdon, Reno.
Olaf M. Abrahams,	Wayne, Republic.
Katherine Adams,	Manhattan, Riley.
Orville Anderson,	Council Grove, Morris.
John M. Allenson,	Riley, Riley.
C. Lee Archer,	Glasco, Cloud.
Walter Rudolph Arndt,	Alta Vista, Wabaunsee.
Dulce Atkins,	Manhattan, Riley.
Ben Bailey,	Wichita, Sedgwick.
Gail Bailey,	Manhattan, Riley.
George C. Bailey,	Bucklin, Ford.
Gladys Bailey,	Manhattan, Riley.
Benjamin P. Baker,	Topeka, Shawnee.
Freda Dorothea Bardwell,	Manhattan, Riley.
Edwin Barnard,	Madison, Greenwood.
Milven Benjamin Bateman,	Fowler, Meade.
Arthur J. Bayles,	Manhattan, Riley.
Marcia Beaman,	Macksville, Pratt.
James Attison Bell,	Ackerland, Leavenworth.
Gordon Bennett,	Axtell, Marshall.
Mabel Berry,	Lancaster, Atchison.
Harry Beutelschies,	Manhattan, Riley.
Trafford Bigger,	Topeka, Shawnee.
Elmer Bird,	Great Bend, Barton.
Harry Bird,	Great Bend, Barton.
George H. Blanchard,	Marysville, Marshall.
Jacob Bleam,	Bloomington, Osborne.
Otis Blosser,	Blosser, *Mo.*
James Blunt,	Greeley, Anderson.
Esther Boell,	Riley, Riley.
Austin Boggs,	Concordia, Cloud.
Elsie Bollinger,	Plevna, Reno.
John L. Boyer,	Wilsey, Morris.
William Boyer,	Wilsey, Morris.
Beatrice Breneman,	McPherson, McPherson.
Grace Brennan,	Maplehill, Wabaunsee.
Robert Lawson Brent,	Leon, Butler.
Raymond U. Brethour,	Green, Riley.
William D. Brigham,	Burlington, Coffey.
Hans William Broberg,	Vesper, Lincoln.
Dwight Ryland Brown,	Olathe, Johnson.
Kendall Brooks Burbank,	Manhattan, Riley.

Name.	Post office and county (or state).
Charles Walter Burk,	Clifton, Washington.
Arthur Burkholder,	Marion, Marion.
Leo J. Bush,	Girard, Crawford.
David Loring Cahill,	Lucas, Osborne.
Bert Camp,	Topeka, Shawnee.
Grace Pearl Campbell,	Ogden, Riley.
Germ R. Cantine,	Lawrence, Douglas.
H. F. Christiansen,	Salina, Saline.
Anton Christophersen,	Garrison, Pottawatomie.
Mae Clark,	Paxico, Wabaunsee.
Alice Clarkson,	Paradise, Russell.
Lynn Cleland,	Alma, Wabaunsee.
Cecil H. Coburn,	Marion, Marion.
Franklin A. Coffman,	Manhattan, Riley.
Kyle George Coffman,	Topeka, Shawnee.
William B. Coffman,	Manhattan, Riley.
Philip Henry Colahan,	Bushton, Rice.
Walter F. Colburn,	Riley, Riley.
Myrtle Blanch Coleman,	Elmont, Shawnee.
George Nelson Collister, jr.,	Manhattan, Riley.
Loyd Combs,	Manhattan, Riley.
Edward Horace Cormack,	Solomon, Dickinson.
Clay Coughenour,	McCracken, Rush.
Lloyd Coughenour,	McCracken, Rush.
Halla Marie Cowgill,	Long Island, Phillips.
Byrl Cox,	Chanute, Neosho.
Ronald L. Craven,	Topeka, Shawnee.
Pitney Will Crippen,	Nickerson, Reno.
Frank Clay Cross,	Fountain, *Colo.*
Samuel Crotinger,	Bison, Rush.
Nettie Crouse,	Harlan, Smith.
Bruce Henry Cummings,	Richland, (Douglas).
James M. Cummings,	Richland, (Douglas).
Genevieve Cunningham,	Manhattan, Riley.
James Cunningham,	Meriden, Jackson.
John Cunningham,	Meriden, Jackson.
Virgil Cunningham,	Manhattan, Riley.
Roy C. Curtis,	Lawrence, Douglas.
William Cusic,	Tecumseh, Shawnee.
Mary Dahl,	Montrose, Jewell.
Nora Dahl,	Montrose, Jewell.
Edwin Danielson,	Clyde, Cloud.
Donald Clarence Darroch,	Fredericksburg, *Tex.*
G. Malcolm Darroch,	Fredericksburg, *Tex.*
A. Park Davidson,	Manhattan, Riley.
Alex Mortimer Davis,	Dunavant, Jefferson.
Charlie Sherman Davis,	Dunavant, Jefferson.
Clarence Clyde Davis,	Manhattan, Riley.
David Everett Davis,	Cave, Gray.
Earl Edward Davis,	Dunavant, Jefferson.
Flossie Davis,	Plevna, Reno.
Nelson H. Davis,	Delavan, Morris.
William Glenne Davis,	Clay Center, Clay.
William W. Davis,	Sawyer, Pratt.
Wilma Louise Davis,	Manhattan, Riley.
Frank Edwin Day,	Allen, Lyon.
Harry Dean,	Lebanon, Smith.
Frank A. Detweiler,	Summerfield, Marshall.
V. Ray Detweiler,	Summerfield, Marshall.
Harry Vincent Dilsaver,	Athol, Smith.
Bertha Rumina Disser,	Arkansas City, Cowley.
Arthur Doryland,	Junction City, Geary.

Name.	Post office and county (or state).
Ernest Doryland,	Junction City, Geary.
Charles E. Draper,	Coolidge, Hamilton.
Stella Rose Drayer,	Manhattan, Riley.
Andrew James Drummond,	Elmdale, Chase.
Fred R. Dunlap,	Eureka, Greenwood.
Mina Louise Dyer,	Riley, Riley.
Reba Anna Ellison,	Jefferson, Montgomery.
Nellie Ferrin Ely,	Coldwater, Comanche.
Charles Engelman,	Junction City, Geary.
Earl Erickson,	Manhattan, Riley.
Osborn A. Erickson,	Leona, Doniphan.
Alan Eustace,	Wakefield, Clay.
George W. Fairchild,	Ellsworth, Ellsworth.
Jay Faris,	Denison, Jackson.
John B. Fearey,	Anness, Sedgwick.
Sydney Carl Fellows,	Concord, *N. H.*
Elwin Stanlet Fitzwater,	Abilene, Dickinson.
Harry Leon Fenn,	Holliday, Johnson.
John Dwight Ferrell,	Ness City, Ness.
Lawrence Fickel,	Manhattan, Riley.
Frank L. Fleming,	Reading, Lyon.
Rea Flora,	Leavenworth, Leavenworth.
David Louis Ford,	Palco, Rooks.
John Clyde Ford,	Leonardville, Riley.
Evard Frank,	Manhattan, Riley.
Jesse J. Frey,	Ogden, Riley.
Roy William Fritts,	Topeka, Shawnee.
Olive Ruth Gage,	La Cygne, Linn.
Albert Hilery Ganshird,	Manhattan, Riley.
Jesse Arthur Gantz,	Plevna, Reno.
William N. Gardner,	Plainville, Rooks.
Roy Garner,	Portis, Osborne.
Frederick W. Garrison,	Ingalls, Gray.
Irene Garrison,	Salina, Saline.
Charles Spurgeon Getman,	Manhattan, Riley.
Roy Bert Gilger,	Kinsley, Edwards.
Robert Ray Gingrich,	Wakefield, Clay.
John C. Gist,	Bucklin, Ford.
William Joe Glenn,	Waverly, Coffey.
Harold Goble,	Riley, Riley.
Fred Goeken,	Linn, Washington.
Cameron S. Goldsmith,	Abilene, Dickinson.
Hal Eugene Goode,	Fort Scott, Bourbon.
Grace Mildred Goodell,	Tecumseh, Shawnee.
Joe M. Goodwin,	Asherville, Mitchell.
George Gray,	Peabody, Marion.
Grace Green,	Concordia, Cloud.
Robert Roy Green,	Uniontown, Bourbon.
Lawrence Gridley,	Oakley, Logan.
Lloyd Earnest Grossman,	Cullison, Pratt.
Paul B. Gwin,	Morrowville, Washington.
Roy E. Gwin,	Morrowville, Washington.
George F. Haas,	Baldwin, Douglas.
Harold P. Haffa,	Abilene, Dickinson.
Abbie B. Hall,	St. John, Stafford.
Daisy Arminta Hall,	Speed, Phillips.
Samuel H. Hansen,	Penalosa, Kingman.
Arthur Lynn Harris,	Harveyville, Wabaunsee.
Harry Noble Harris,	Strong City, Chase.
Melvin E. Hartzler,	Goodland, Sherman.
John William Haury,	Moundridge, McPherson.
Omar F. Hawkins,	Marysville, Marshall.

Name.	Post office and county (or state).
Frank Joseph Haynes,	Grantville, Jefferson.
Malcolm Percy Haynes,	Baldwin, Douglas.
Theodosia Hays,	Manhattan, Riley.
Carl Robinson Haywood,	Wilburn, Ford.
Chester Gilmore Hedges,	Chase, Rice.
Robert Henderson,	Topeka, Shawnee.
Charles Henry,	Eureka, Greenwood.
Alta Sarah Hepler,	Manhattan, Riley.
Bertha E. Hines,	Argentine, Wyandotte.
Leo N. Hinshaw,	Plevna, Reno.
Arthur Lawrence Hjort,	Manhattan, Riley.
Orme Leo Hoch,	Hartford, Lyon.
Bluford Holland,	Manhattan, Riley.
Raymond LeRoy Hollinger,	Chapman, Dickinson.
John T. Honn,	Merriam, Johnson.
Mary Hoover,	Manhattan, Riley.
John Howard Hopkins,	Grainfield, Gove.
Louie Horr,	Lawrence, Douglas.
Raymond R. Houser,	Grainfield, Gove.
Claude G. Howard,	Manhattan, Riley.
Meda Flora Howell,	North Topeka, Shawnee.
Sadie Hubbell,	Lebanon, Smith.
Ruth Hughes,	Topeka, Shawnee.
Hubert Hull,	Hiawatha, Brown.
Oscar Lee Humbert,	Silver Lake, Shawnee.
Harold Humiston,	Webber, Jewell.
Carl Hutto,	Russell Springs, Logan.
Frank Ira,	St. John, Stafford.
Perry Ray Irey,	Waverly, Coffey.
George Jameson,	Abilene, Dickinson.
Thomas Stephen James,	Riley, Riley.
Carl Oscar Jensen,	Coffeyville, Montgomery.
Fred P. Jensik,	Narka, Republic.
Eben W. Johnson,	Lindsborg, McPherson.
Elmer Johnson,	Lawrence, Douglas.
Iver Kempley Johnson,	Corning, Nemaha.
Myron E. Johnson,	Lenexa, Johnson.
Ernest Jones,	Bellaire, Smith.
Esther Jones,	Manhattan, Riley.
Lewis Harrison Jones,	Saxman, Rice.
George Donald Jopling,	Mineral, Cherokee.
Royal O. Jorstad,	Manhattan, Riley.
Robert Earl Karper,	Manhattan, Riley.
Edythe Louise Katz,	Manhattan, Riley.
Emeline Mildred Katz,	Manhattan, Riley.
Merritt L. Keithline,	Shannon, Atchison.
John Mulvane Kepley,	Valencia, Shawnee.
Ellis Wesley Kern,	Kirwin, Phillips.
Edward Kernohan,	Nashville, Kingman.
Paul E. Ketchersid,	Hope, Dickinson.
Arthur Clarence King,	Utica, Ness.
Raleigh Klein,	Topeka, Shawnee.
Albert Lewis Knapp,	Nortonville, Jefferson.
Olive Knapp,	Leavenworth, Leavenworth.
Sophia Knapp,	Leavenworth, Leavenworth.
Eric William Koesling,	Bloomington, Osborne.
Fred Korsmeier,	Kansas City, *Mo.*
Donald G. Krudop,	Manhattan, Riley.
Jefferson Kubin,	McPherson, McPherson.
Edward Parker Lamborn,	Leavenworth, Leavenworth.
Alvin Lloyd Law,	Hill City, Graham.
Carl Lebsack,	Otis, Rush.

Name.	Post office and county (or state).
Nathan Thaddeus Lemert,	Severance, Doniphan.
Seth G. Libby,	Smith Center, Smith.
Rose Aveta Lichtenhaln,	Junction City, Geary.
Gertrude Likes,	Pomona, Franklin.
Walter Lill,	Panhandle, *Tex.*
James Walton Linn,	Otto, Rush.
Russel Longwood,	Waverly, Coffey.
Thomas A. Lowe,	Liberal, Seward.
Carl A. Lundquist,	Clifton, Washington.
Joseph Sparks Lupton,	Cimarron, Gray.
Howard McClanahan,	Manhattan, Riley.
Mayme McCluskey,	Junction City, Geary.
Lowell Hobart McDonald,	Aurora, Cloud.
Ira McKeeman,	Soldier, Jackson.
Roy McMahan,	Alma, Wabaunsee.
Leda Elizabeth Mackender,	Riley, Riley.
Frank Bertrum Magwire,	Hutchinson, Reno.
Madeline Marshall,	Clifton, Washington.
Almeda Marty,	Manhattan, Riley.
Bertha Mae Marty,	Manhattan, Riley.
Norman Colman Mason,	New Ulysses, Stevens.
Gladys Irene Matthews,	Wellington, Sumner.
Lucile Maughlin,	Sylvia, Reno.
Amy Leota Maxwell,	Valley Falls, Jefferson.
Alfred G. May,	Williamstown, Jefferson.
Carl E. May,	Coldwater, Comanche.
Earl Meade,	Palco, Rooks.
V. L. Meairs,	Dodge City, Ford.
Edna Mekemson,	Redding, *Iowa.*
A. T. Melby,	Jamestown, Cloud.
Orville Leslie Mendenhall,	Turkville, Ellis.
Jesse Benedict Miller,	Langdon, Reno.
Edwin F. Milliken,	Crowley, *La.*
Frank A. Moore,	Tribune, Greeley.
George M. Moore,	Manhattan, Riley.
Harry A. Moore,	Manhattan, Riley.
Thomas E. Moore,	Manhattan, Riley.
Claude Franklin Morey,	Manhattan, Riley.
Simon C. Morgan,	Topeka, Shawnee.
Edna May Morris,	Manhattan, Riley.
Fred Morse,	Lebo, Coffey.
Helen Morse,	Lebo, Coffey.
Glen Arthur Morton,	Cawker City, Mitchell.
Walter C. Mosier,	Maple City, Cowley.
Opie O. Mowrey,	Luray, Osborne.
Aubert Jackson Mowry,	Lucerne, Sheridan.
Catherine Hardie Murdock,	Edgerton, Johnson.
Jerie Murphy,	Caldwell, Sumner.
Gustav Herman Mydland,	Everett, Brown.
Clarence Myers,	Wakefield, Clay.
Frank Lewis Myers,	Manhattan, Riley.
George M. Myers,	Langley, Ellsworth.
Emil Fridolf Nelson,	Clifton, Washington.
Karl Kibler Nelson,	Cassoday, Butler.
Oscar C. Nelson,	Girard, Crawford.
Otillie V. Nelson,	Keats, Riley.
Elsie Grace Newland,	Thayer, Neosho.
Harry Bryan Newland,	Thayer, Neosho.
Mary Ellen Nicoll,	Bloom, Ford.
Paul Nixon,	Riley, Riley.
Ola Edith Novis,	Manhattan, Riley.
LeClar W. Obee,	Peabody, Marion.

Name.	Post office and county (or state).
Edgar Allen O'Brien,	Luray, Russell.
James O'Connell,	Kiowa, Barber.
Inez M. Olson,	Clifton, (Clay).
Nellie Olson,	Harveyville, Wabaunsee.
A. Clarence Oman,	Leonardville, Riley.
John O'Rourke,	Clay Center, Clay.
Ethel Palmer,	Manhattan, Riley.
Eber Francis Parker,	Larned, Pawnee.
Frank E. Parker,	Langdon, Reno.
Horace Pateman,	White City, Morris.
Aaron Ernest Pearson,	Simpson, Mitchell.
David V. Pence,	Elmont, Shawnee.
Ross Perry,	Wabaunsee, Wabaunsee.
Aksel Peterson,	Manhattan, Riley.
Blaine B. Phillips,	Waverly, Coffey.
Don Glennwood Phillips,	Clyde, Cloud.
William Dale Pierce,	Rice, Cloud.
Emily B. Pitts,	Manhattan, Riley.
Roy I. Platt,	Ætna, Barber.
P. Clinton Plumb,	Fairview, Brown.
Robert Polley,	Manhattan, Riley.
Edward Pond,	Gorham, Russell.
Ernest Lawrence Potter,	Manhattan, Riley.
Sylvan Potts,	Manhattan, Riley.
Will C. Poyzer,	Neosho Rapids, Lyon.
Nellie Euretta Priddy,	Elmont, Shawnee.
Gourney A. Prier,	Marion, Marion.
Jeannette Putman,	Manhattan, Riley.
Charles W. Quinn,	Dwight, Geary.
Agnes Nancy Anna Ramsey,	Hymer, Chase.
Josephine Randle,	Riley, Riley.
Hazel Floye Reed,	Stockton, Rooks.
Etta Fay Reid,	Elmont, Shawnee.
Ira Ressel,	Colony, Anderson.
Francis Reynolds,	Basehor, Leavenworth.
Seaton S. Reynolds,	Grainfield, Gove.
William Leon Rhoades,	Pleasanton, Linn.
Benjamin Harrison Ridlon,	Coyville, Wilson.
David Thomas Ritchie,	Oskaloosa, Jefferson.
John M. Roach,	Lowemont, Leavenworth.
Will Roark,	Manhattan, Riley.
Earl Roberts,	Coffeyville, Montgomery.
James LeRoy Robinson,	Nashville, Kingman.
Frances Mary Robison,	Riley, Riley.
Ralph Rochat,	Council Grove, Morris.
Charles L. Rose,	Almena, Norton.
Von M. Rude,	Hoisington, Barton.
Edward Russell,	McPherson, McPherson.
Homer Wesley Russell,	Cheney, (Kingman).
Wallace Rynerson,	Tecumseh, Shawnee.
Nolan Raymond Sanford,	Manhattan, Riley.
Vern Sargent,	Manhattan, Riley.
A. Inez Savage,	Miltonvale, Cloud.
Benjamin Scalapino,	Everest, Brown.
Charles Schlax,	Horton, Brown.
Agatha M. Schmidler,	Marysville, Marshall.
Claud P. Schnellbacher,	Colby, Thomas.
Albert Schoonhoven,	Riley, Riley.
Harrison Earl Schwyhart,	Belle Plaine, Sumner.
Leatha Esther Scott,	Westphalia, Anderson.
Alta May Seal,	Macksville, Pawnee.

Name.	Post office and county (or state).
Harry E. Seal,	Macksville, Pawnee.
Welty R. Seanor,	Geuda Springs, Sumner.
Milner Webb Seargeant,	Manhattan, Riley.
Anna Winifred Searl,	Morland, Graham.
John Charles Searl,	Morland, Graham.
Richard J. Sedivy,	Blue Rapids, Marshall.
H. Guy Seely,	Wilroads, Ford.
Harvey James Sellers,	Minneapolis, Ottawa.
Clara Lola Vie Setchell,	Morland, Graham.
William H. Shank,	Salina, Saline.
DeLoss Shannon,	Lebanon, Smith.
Bladen Sharon,	Waverly, Coffey.
Eva Leona Sharpe,	Chase, Rice.
Ray M. Sharples,	Riley, Riley.
Warren Sitterley,	Manhattan, Riley.
Anna Maude Smith,	Lyons, Rice.
Cloyd Smith,	Huron, Atchison.
Dorr Kennett Smith,	Smith Center, Smith.
Earl June Smith,	Colby, Thomas.
Harry McMillen Smith,	Codell, Rooks.
Martha Smith,	Codell, Rooks.
Roy Smith,	Coffeyville, Montgomery.
Ulysses Jay Smith,	Portis, Smith.
Floyd A. Smutz,	Bird City, Cheyenne.
Clara Spaniol,	Plevna, Reno.
Worthy E. Sparks,	Horton, Brown.
Will J. Spencer,	Netawaka, Jackson.
George Sanford Sperry,	Beverly, Lincoln.
Burton Floyd Srader,	Manhattan, Riley.
Floyd Stambaugh,	Meriden, Jefferson.
Elmer David Stephens,	Manhattan, Riley.
George Edward Sterling,	Hardtner, Barber.
Howard Sterrett,	Morganville, Clay.
Hartwell Sullivan,	Bazaar, Chase.
Starley Sullivant,	Waverly, Coffey.
Allen Sumner,	Prescott, Linn.
Harry Swain,	Caldwell, Sumner.
Harry Lovel Swain,	Rock, Cowley.
Mae E. Takemire,	Silver Lake, Shawnee.
Clarence V. Tate,	Luray, Russell.
Byron J. Taylor,	Chapman, Dickinson.
Lorena Belle Taylor,	Zenith, Stafford.
Ralph Taylor,	Sedgwick, Harvey.
Charlie P. Teague,	Collyer, Trego.
Delos George Tepfer,	Wichita, Sedgwick.
Clarence H. Thompson,	Manhattan, Riley.
Maude Thompson,	Manhattan, Riley.
Ray Thorpe,	Ellsworth, Ellsworth.
Howard Burrel Timmins,	Bellaire, Smith.
Julia Kathryn Tobin,	Rossville, (Jackson).
Mary M. Tombaugh,	Athol, Smith.
Raleigh Glenn Toothaker,	Blaine, Pottawatomie.
Matthias G. T. Torrence,	Reading, Lyon.
Estell Towler,	Ulysses, Grant.
Don Lewallen Towne,	Junction City, Geary.
Charles Towns,	Palco, Rooks.
Clarence L. Trible,	Palco, Rooks.
Charles W. Tucker,	Pleasanton, Linn.
Zelma Mabel Turner,	Seneca, Nemaha.
Lewis Marten Umberger,	Hymer, Chase.
Della Unruh,	Pawnee Rock, Barton.
Starr Vale,	Webber, Jewell.

Name.	Post office and county (or state).
Charles Harvey Van Meter,	Johnson, Stanton.
George Crider Van Neste,	Lawrence, Douglas.
Guy Struple Van Wey,	Pendennis, Lane.
Leland Ray Varcoe,	Wilsey, Morris.
Nathan B. Vaughn,	Caldwell, Sumner.
Leonard F. Vawter,	Carbondale, Osage.
Margaret Esther Walbridge,	Russell, Russell.
Chester J. Walden,	Manhattan, Riley.
Bessie Walsh,	Clay Center, Clay.
Lillian May Warrington,	Marysville, Marshall.
Johnnie Donley Waugh,	Olivet, Osage.
L. P. Wehrle,	Scranton, Osage.
Edgar Lawrence Wells,	Anthony, Harper.
George Edwin Werner,	Linn, Washington.
Everett Wheatcroft,	Pendennis, Lane.
Bert Whipple,	Manhattan, Riley.
Harry G. White,	Scandia, Republic.
Pearl Bissell Wikoff,	Manhattan, Riley.
Marshall Wilder,	Wichita, Sedgwick.
Earl Williams,	Baldwin, Douglas.
Ray Warden Williams,	Olivet, Osage.
Guy Williamson,	Ashton, Sumner.
Nellie Mae Williamson,	Ashton, Sumner.
Robert Milton Willis,	Eureka, Greenwood.
Harry Homer Wilson,	Silver Lake, Shawnee.
William Henry Wilson,	Washington, Washington.
Laura Wingfield,	Dwight, Geary.
M. Beulah Wingfield,	Dwight, Geary.
Alice J. Wood,	Anthony, Harper,
Earl Wood,	Council Grove, Morris.
Lucy E. Woods,	Belleville, Republic.
Katie Worrel,	Manhattan, Riley.
Carlos Kirkwood Worrell,	Larned, Pawnee.
Benjamin Harrison Wright,	Ottawa, Franklin.
Minnie H. Wright,	Topeka, Shawnee.
Clarence Wynne,	Topeka, Shawnee.
Adelaide H. Young,	Topeka, Shawnee.
Harry Zech,	Roxbury, McPherson.

PREPARATORY.

Caroline Abbott,	Quanah, *Okla.*
Edwin Adam,	Cedar Vale, Chautauqua.
George Alwin,	Morrowville, Washington.
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H. B. Bayer,	Toronto, Woodson.
Melvin Jasper Boatwright,	Youngsville, Greeley.
Samuel Long Boyer,	Quinter, Gove.
Ernest Otto Brown,	Manhattan, Riley.
Jennie Brown,	McPherson, McPherson.
Karl W. Brown,	Manhattan, Riley.
Flora Budden,	Wakefield, Clay.
Fred H. Bundy,	Belleville, Republic.
Charles C. Canfield,	Belleville, Republic.
Ruth E. Canfield,	Belleville, Republic.
Fanny Cox,	Kirwin, Phillips.
Ford F. Donnelly,	Topeka, Shawnee.
Mary Doverspike,	Alta Vista, Wabaunsee.
Lester Henry Drayer,	Manhattan, Riley.
Charles Eberle,	Manhattan, Riley.
John Frederick Eggerman,	Manchester, *Okla.*
Clarence A. Fickel,	Manhattan, Riley.

Name.	Post office and county (or state).
Andrew Flint,	Leavenworth, Leavenworth.
Esther Freeman,	Scandia, Republic.
William Riley Goodwin,	Belleville, Republic.
Roy Haynes,	Fowler, Meade.
John A. Heck,	Manhattan, Riley.
Engle N. Hershey,	Abilene, Dickinson.
Roy Highley,	Hoisington, Barton.
Edna Leatha Hoke,	Manhattan, Riley.
William Reed Hollinger,	Chapman, Dickinson.
Martin Holmgren,	Onaga, Pottawatomie.
Chester Ray Howe,	Cimarron, Gray.
Clifford Carlton Howe,	Cimarron, Gray.
Cloid O. Howe,	Palmer, Washington.
Ralph L. Hull,	Hoisington, Barton.
George James Hutchinson,	Wamego, Pottawatomie.
Alva Inslee,	Isabel, Pratt.
Elmer Jackson,	Phillipsburg, Phillips.
Carl V. Johnson,	Osage City, Osage.
Ralph B. Jordan,	Claflin, Barton.
Charles W. Kessler,	Leoti, Wichita.
Hattie Kimball,	Manhattan, Riley.
Ed Krauss,	Sedgwick, Harvey.
Jacob G. Krauss,	Sedgwick, Harvey.
Joseph Lane,	Delia, Jackson.
Thomas Robert Logan,	Manhattan, Riley.
Grace McNamee,	Plevna, Reno.
Josephine Lynn Mann,	Quinter, Gove.
Edmund Marcellous Mattingly,	Vining, Clay.
Ralph R. Maughlin,	Sylvia, Reno.
Alta Maxwell,	Gypsum, Saline.
Albert Miller,	Fowler, Meade.
Charlie S. Miller,	Garfield, Pawnee.
John Andrew Moore,	Manhattan, Riley.
Clara Moss,	Beloit, Mitchell.
Ninetta Neusbaum,	Manhattan, Riley.
Walter Edward Newland,	Thayer, Neosho.
Edward Aulfin Nixon,	Spearville, (Stafford).
Melvin Barnard Norby,	Cullison, Pratt.
(Mrs.) Belle Norton,	Barnard, Lincoln.
Clement W. Norton,	Barnard, Lincoln.
Karl Frederick Nystrom,	Topeka, Shawnee.
Albert Oesterhaus,	Junction City, Geary.
Alice E. Olson,	Clifton, Clay.
Florence B. Palmer,	Manhattan, Riley.
Margaret Paton,	Jewell, Jewell.
Eyleen Pringle,	Wabaunsee, Eskridge.
Grover W. Putman,	Delavan, Morris.
Ruth Quinn,	Geuda Springs, Sumner.
Vernon Reeves,	Manhattan, Riley.
Ethyl Retzer,	Manhattan, Riley.
Herbert E. Reynolds,	Topeka, Shawnee.
Avis Robert Ricketts,	Topeka, Shawnee.
Herbert T. Ross,	Alta Vista, Geary.
Lile R. Ross,	La Cygne, Linn.
James Runneals,	Winona, Logan.
William J. Saunders,	Pleasanton, Linn.
Harley M. Schrock,	Selden, (Norton).
Cameron M. Smith,	Wakefield, Clay.
Jesse Smith,	Derby, Sedgwick.
Harry O. Snodgrass,	Eminence, Finney.
Caroline Sparman,	May Day, Riley.
Isaac A. Spire,	Peru, Chautauqua.

Name.	Post office and county (or state).
Frank William Stafford,	Glenwood, Osborne.
Ethel Stout,	Manhattan, Riley.
Clara Wengar,	Powhattan, Brown.
Ray H. Whitenack,	Herington, Dickinson.
Archie L. Woods,	Douglass, Butler.
Edward Yaussi,	Marysville, Marshall.

SPECIAL.

Henry William Adam,	Wakefield, Clay.
Roberta Marie Allin,	Manhattan, Riley.
Edgar McCall Amos,	Manhattan, Riley.
Seth Babcock,	Minneapolis, Ottawa.
Jay O. Baird,	Manhattan, Riley.
Theodore C. Barnes,	Emporia, Lyon.
(Mrs.) Gertrude N. Beall,	Manhattan, Riley.
James Burns Bond,	Bala, Riley.
Estella Boot,	Manhattan, Riley.
Lucile Bradford,	Manhattan, Riley.
Stella Brown,	Gallatin, *Tenn.*
William Alexander Calderhead,	Marysville, Marshall.
Carlos C. Carpenter,	Ottawa, Franklin.
Charles Raymond Carpenter,	Madison, Madison.
William Wallace Casteel,	Fort Riley, Geary.
Lloyd Conwell,	North Topeka, Shawnee.
Cora Winifred Cox,	Hays, Ellis.
Thomas LeRoy Dill,	Manhattan, Riley.
Francis Silas Dobel,	Kansas City, *Mo.*
Hogan Eastland,	Russell, Russell.
Ray A. Eastman,	Matfield Green, Chase.
(Mrs.) Maude E. Edwards,	Manhattan, Riley.
Minnie Erickson,	Lincolnville, Marion.
Lucius Grant Folsom,	Little River, Rice.
Stanley H. Freelove,	Clyde, Cloud.
Virginia Mae Gerren,	Kansas City, Wyandotte.
Edna M. Glover,	Manhattan, Riley.
Alva LeRoy Hamilton,	Salina, Saline.
Ella May Hancock,	Emporia, Lyon.
Ada Maude Hand,	Wellington, Sumner.
O. C. Harris,	Eureka, Greenwood.
James D. Harrod,	Stockholm, Wallace.
John Carroll Higgins,	Manhattan, Riley.
Karl William Hofer,	Manhattan, Riley.
J. Everett Holcomb,	Chetopa, Labette.
Perry Robb Hulet,	Russell, Russell.
Esta Jane Hungerford,	Soldier, Jackson.
Ralph E. Hunt,	Marysville, Marshall.
Marie Huth,	Clay Center, Clay.
Chester Arthur Jackson,	Manhattan, Riley.
Benjamin David Jeffs,	Manhattan, Riley.
Madge Kay,	Manhattan, Riley.
Emma Kersley,	Ottawa, Franklin.
Victor Thomas Kirk,	Bazaar, Chase.
Michael Knapp,	Leavenworth, Leavenworth.
John E. LaMont,	Manhattan, Riley.
Mildred Lemert,	Garden City, Finney.
Otto M. Low,	Manhattan, Riley.
Frank McKnight,	Junction City, Geary.
Robert J. Mackey,	Topeka, Shawnee.
Ralph Manly,	Manhattan, Riley.
Joseph Francis Marron,	Ogden, Riley.
Walter W. Meyer,	Leavenworth, Leavenworth.

Name.	Post office and county (or state).
Ella Frances Miles,	Manhattan, Riley.
Josie C. Miller,	Kansas City, Wyandotte.
Silva Miller,	Conway, McPherson.
Robert Murray McCheynne Murdock,	Edgerton, Johnson.
Noboru Nosay,	Manhattan, Riley.
Anna Nyberg,	Clay Center, Clay.
Andrew N. Peterson,	Marysville, Marshall.
Ina Myrtle Pinnick,	Fowler, Meade.
Maude Ella Pinnick,	Fowler, Meade.
Ruth Prewett,	Manhattan, Riley.
Elizabeth Putnam,	Manhattan, Riley.
J. P. Reeves,	Haddam, Washington.
Nellie Richardson,	Kansas City, Wyandotte.
Norah Roark,	Manhattan, Riley.
Floyd Joe Robbins,	Russell, Russell.
Temple Robinson,	Manhattan, Riley.
Clarence Roby,	Eureka, Greenwood.
Elwin Clayton Roby,	Eureka, Greenwood.
Amelia Seng,	Salina, Saline.
Harry Lewis Smith,	Hutchinson, Reno.
Susie Smith,	Hutchinson, Reno.
Elmer Spurrier,	Minneapolis, Ottawa.
Gertrude Srader,	Manhattan, Riley.
Alpha Sumners,	Leonardville, Riley.
Ray E. Trant,	Troy, Doniphan.
John E. Traver,	Hugoton, Stevens.
Thomas S. Waller,	———
Andrew D. Wear,	Barnard, Lincoln.
Lanius Emmett Weckman,	Horton, (Atchison).
Eva May Wheeler,	Tyro, Montgomery.
Mamie White,	Manhattan, Riley.
Charles Peterson Willig,	Wamego, Pottawatomie.
Eleanor Cornelia Winne,	Manhattan, Riley.
Agnes Woestemeyer,	Bethel, Wyandotte.

FARMERS' SHORT COURSE—SECOND TERM.

Howard Aley,	Cedar Vale, (Cowley).
Bert R. Anderson,	McPherson, McPherson.
Edwin Barnard,	Madison, Greenwood.
Theodore C. Barnes,	Emporia, Lyon.
Albert Billing,	Courtland, Republic.
Jacob Bleam,	Bloomington, Osborne.
Francis M. Boyer,	Linn, Washington.
Harry A. Bragg,	Dodge City, Ford.
Joseph B. Brown,	Jennings, Decatur.
Willis Lee Chapin,	Medicine Lodge, Barber.
Richard Christenson,	Sabetha, Brown.
Ira E. Cline,	Lyons, Rice.
Earl Milo Cook,	Russell, Russell.
Clyde James Egee,	Penokee, Graham.
Paul J. Englund,	Falun, Saline.
Harold Arthur Eslinger,	Kinsley, Edwards.
Guy M. Folks,	Lawrence, Douglas.
Joseph Henry Fowler,	Ozawkie, Jefferson.
Royale Cecil Fox,	Zenda, Kingman.
Arthur L. Francis,	St. John, Stafford.
Glen W. Gage,	Ottawa, Franklin.
Fred Garrett,	McLouth, Jefferson.
Boyd Q. Gentzler,	Leona, Doniphan.
John T. Guthrie,	Walton, Harvey.
George F. Hanson,	Olsburg, Pottawatomie.

Name.	Post office and county (or state).
Otto W. Hinderliter,	Ottawa, Franklin.
Arthur R. Ihde,	Hope, Dickinson.
David E. Johnson,	Macksville, Stafford.
Warren Irven Lowrey,	Stafford, Stafford.
Leland Nellis McAfee,	Topeka, Shawnee.
Robert Murray McCheynne Murdock,	Edgerton, Johnson.
Oscar C. Nelson,	Girard, Crawford.
Noboru Nosay,	Manhattan, Riley.
James Andrew Pringle,	Eskridge, Wabaunsee.
Alva F. Railsback,	Norcatur, (Norton).
James Donald Reardon,	Liberty, Montgomery.
Halley H. Rector,	Glen Elder, Mitchell.
Clarence Roby,	Eureka, Greenwood.
Earl Shaffer,	Denison, Jackson.
Henry M. Stutzman,	McPherson, McPherson.
Wilfred Thompson,	Gypsum, McPherson.
Andrew D. Wear,	Barnard, Lincoln.
George Barnette Wise,	Centralia, Nemaha.

FARMERS' SHORT COURSE—FIRST TERM.

Gifford Abbott,	Blaine, Pottawatomie.
Henry William Adam,	Wakefield, Clay.
George W. Anderson,	Americus, Lyon.
Ward Wesley Bacon,	Emporia, Lyon.
Martin Alvin Bade,	Concordia, Cloud.
Ray Carlton Bondy,	Bogue, Graham.
Floyd Cleland,	Hiattsville, Bourbon.
John H. Cleland,	Hiattsville, Bourbon.
John S. Coleman,	Kingman, Kingman.
Arthur F. Cornell,	Larned, Pawnee.
Ezra Dance,	Isabel, Barber.
Victor Pearl Dixon,	Manhattan, Riley.
Leo Dorrell,	Duquoin, Harper.
William Harrison Drescher,	Topeka, Shawnee.
Edward J. Edwards,	Lyons, Rice.
Edward Benjamin Ester,	Peck, Sedgwick.
Ned Bluford Estes,	Stafford, Stafford.
Elmer L. Ewing,	Arlington, Reno.
Ralph J. Ferris,	Conway, McPherson.
Fred Finch,	White Water, Butler.
Bert Fowler,	Broughton, Clay.
Lyle David Fraser,	Morrowville, Washington.
Elmo C. Frazier,	Ingalls, Gray.
Jesse Arthur Gantz,	Plevna, Reno.
William N. Gardner,	Plainville, Rooks.
Harvey Earl Gates,	Anthony, Harper.
Frank George,	Lebo, Coffey.
Edward J. Gwinn,	Great Bend, Barton.
Albert Clarence Hansen,	Greenleaf, Washington.
Samuel H. Hansen,	Penalosa, Kingman.
James D. Harrod,	Stockholm, Wallace.
Monser Herrell,	———, *Mo.*
Edgar Hirschler,	Halstead, Harvey.
Garnet W. Hislop,	Lebanon, Smith.
Everett Holcomb,	Chetopa, Labette.
John Howard Hopkins,	Grainfield, Gove.
John Horne, jr.,	Williamsburg, Franklin.
Harold Humiston,	Webber, Jewell.
George Jameson,	Abilene, Dickinson.
Walter Janzen,	Halstead, Harvey.
James Arthur Jennings,	Lincoln, Lincoln.

Name.	Post office and county (or state).
Charles Lewis Johnson,	Russell, Russell.
Herbert Johnson,	Macksville, Stafford.
Lewis Harrison Jones,	Saxman, Rice.
Ralph Eli Kerr,	Americus, Lyon.
Melvin King,	———
Paul King,	Potwin, Butler.
Albert Lehman,	Slater, *Iowa.*
John Loesch,	Raymond, Rice.
John McAllister,	Holton, Jackson.
Glenn A. McNown,	Moline, Chautauqua.
South Wesley McNown,	Moline, Chautauqua.
Fred Miller,	Densmore, Graham.
Edwin F. Milliken,	Crowley, *La.*
Ernest Nelson,	Williamsburg, Franklin.
Frank Edwin New,	Russell, Russell.
August V. Olson,	Russell, Russell.
Will E. Palmer,	Hays, Ellis.
Jacob Lotspeich Parkhurst,	Kinsley, Edwards.
James Patterson,	Clay Center, Clay.
Edward Pond,	Gorham, Russell.
Austin Porterfield,	Holton, Jackson.
Thomas Pyle,	Americus, Lyon.
William Judson Railsback,	Langdon, Reno.
Earl W. Ray,	Delavan, Morris.
Ira Ressel,	Colony, Anderson.
William Robinson,	Great Bend, (Stafford).
Abe Rose,	Luray, Osborne.
Frank Rusch,	Chapman, Dickinson.
Glenn S. Salisbury,	Hays, Ellis.
Walter G. Savage,	Winfield, Cowley.
Willie P. Schowalter,	Halstead, Harvey.
Ralph Scott,	Kinsley, (Kiowa).
Henry Soeken,	Claflin, Barton.
Earl Stearns,	Spivey, Kingman.
William Henry Sutton,	Longton, Elk.
Harry K. Traul,	Manhattan, Riley.
Elmer Weber,	Salina, Saline.
Frank Williams,	Hull, Marshall.
Harlan Loyde Wright,	Holton, Jackson.
Horrace Yarrow,	Wakefield, Clay.

DAIRY FARMERS' SHORT COURSE—SECOND TERM.

James F. Adee,	Weaubleau, *Mo.*
Earl Finney,	El Dorado, Butler.
Charles Grainger,	Clay Center, Clay.
Roy M. Gray,	Emporia, Lyon.
Micheal Knapp,	Leavenworth, Leavenworth.

DAIRY FARMERS' SHORT COURSE—FIRST TERM.

Edwin R. Acker,	Leona, Doniphan.
Lewis Hopkins Aines,	Merriam, Johnson.
John M. Allenson,	Riley, Riley.
Carl Anderson,	Clay Center, Clay.
James Anderson,	Rosalia, Butler.
Ward Wesley Bacon,	Emporia, Lyon.
Harry S. Baird,	Marquette, McPherson.
James Herbert Balding,	Osage City, Osage.
Alexander L. Ballard,	Almena, Norton.
Elmer Bahnmaier,	Lecompton, Douglas.
Charlie Bizek,	Timken, Rush.
James Bolen,	Le Roy, Coffey.

Name.	Post office and county (or state).
Glenn R. Blain,	Manhattan, Riley.
Walter William Boughton,	Clay Center, Clay.
Sydney Carl Brenner,	Oakhill, Clay.
Robert Lawson Brent,	Leon, Butler.
F. C. Brockerman,	Holton, Jackson.
Ernest Charles Brown,	Bogue, Graham.
Alfred Campbell,	Wilsey, Morris.
George Nelson Collister, jr.,	Manhattan, Riley.
Frederick Howard Cook,	Kirwin, Rooks.
Charles Andrew Crumbaker,	Onaga, Pottawatomie.
Vern C. Crumpacker,	McPherson, McPherson.
James M. Cummings,	Richland, (Douglas).
Roy George Currie,	Manhattan, Riley.
Arthur Darling,	Lyons, Rice.
Harry E. Dodge,	Salina, Saline.
Albert Droge,	Seneca, Nemaha.
Herbert August Droge,	Seneca, Nemaha.
Jesse H. Dunbar,	Wilmot, Cowley.
Edward H. H. Emery,	Wetmore, Nemaha.
Osborn A. Erickson,	Leona, Doniphan.
Andrew Flint,	Leavenworth, Leavenworth.
Fred Goeken,	Linn, Washington.
Omer Gwinn,	Burrton, Harvey.
Percy Hacker,	Manhattan, Riley.
Sam Coffman Hale,	Allen, Lyon.
Robert H. Hanson,	Jamestown, Cloud.
A. H. Harris,	Muscotah, Atchison.
Harry Hennigh,	Sabetha, Nemaha.
Laurance Herren,	Lincoln, Lincoln.
Linzzie L. Hill,	Burlington, Coffey.
Hobart E. Hobbie,	Tipton, Mitchell.
Harry A. Holvorson,	St. Marys, Wabaunsee.
Kenneth Howenstine,	Manhattan, Riley.
Aldie P. Immenschuh,	Manhattan, Riley.
Herold Jaeger,	Vesper, Lincoln.
Lloyd Johnson,	Lyons, Rice.
Clifford Grant Jones,	Wichita, Sedgwick.
Amos Lea Keltner,	Peabody, Marion.
Warren Frank Kemmerer,	Mankato, Jewell.
John Koci,	Auburn, Shawnee.
Ed. Krauss,	Sedgwick, Harvey.
Edward Lehman,	Slater, *Iowa.*
Joseph Sparks Lupton,	Cimarron, Gray.
J. Myron McCray,	Manhattan, Riley.
Frank Bertrum Magwire,	Hutchinson, Reno.
Carl L. Maveus,	Manhattan, Riley.
Walter H. Melchert,	Lorraine, Ellsworth.
Walter W. Meyer,	Leavenworth, Leavenworth.
Harry Milligan,	Garnett, Anderson.
Ralph E. Mills,	Cedar Vale, Cowley.
Walter C. Mosier,	Maple City, Cowley.
William E. Niles,	Colony, Anderson.
Alfred Palm,	Fall River, Greenwood.
Donald Louis Parkinson,	Manhattan, Riley.
Alvin Peimann,	Vassar, Osage.
Henry Georgie Pfaff,	Winkler, Riley.
Arthur Dow Phelps,	Great Bend, Barton.
Lonnie J. Plummer,	Wilsey, Morris.
John Allison Porter,	Manhattan, Riley.
Loran Quackenbush,	Madison, (Lyon).
Niles Reed,	Wilsey, Morris.
Ivon Jones Rees,	Emporia, Lyon.

Name.	Post office and county (or state).
Vernon Reeves,	Manhattan, Riley.
John E. Regier,	White Water, Butler.
Elmer Riley,	Dodge City, Ford.
Wendell Phillip Riley,	Mentor, Saline.
Herman L. Rolfs,	Lorraine, Ellsworth.
Edwin S. Root,	Brookville, Saline.
Henry Harrison Root,	Brookville, Saline.
Ray R. Row,	Larned, Pawnee.
J. S. Sanders,	Broughton, Clay.
William H. Shank,	Salina, Saline.
Harry Shearer,	Logan, Phillips.
Barney Gayle Sims,	Wellsville, Franklin.
Will J. Spencer,	Netawaka, Jackson.
Ralph Ralston Sterrett,	Morganville, Clay.
Howard W. Strickland,	Junction City, Geary.
Ollie R. Swanson,	Manhattan, Riley.
Lloyd Clinton Swihart,	Webber, Jewell.
Lawrence Blain Takemire,	Silver Lake, Shawnee.
Clarence H. Thompson,	Manhattan, Riley.
Charles Wenford Thompson,	Fredonia, Wilson.
Charlie Richard Topping,	Lawrence, Douglas.
Alden Lewis True,	Topeka, Shawnee.
Lawrence Vanier,	Abilene, Dickinson.
Clyde Wesley Wallace,	White City, Morris.
Charles Oscar Watkins,	Anthony, Harper.
Elwood Weaver,	Lincoln, Lincoln.
Neil Williams,	Meriden, Jefferson.
Charles C. Wilson,	Silver Lake, Shawnee.
Walter Wilson,	Carlton, Dickinson.
Martin Alfred Youngstrom,	Fredonia, Wilson.
Harry Zech,	Roxbury, McPherson.
Herman Zinn,	Topeka, Shawnee.

DAIRY MANUFACTURES COURSE.

Austin Boggs,	Concordia, Cloud.
Oscar C. Ellison,	Jefferson, Montgomery.
Boyd S. Kauffman,	Hope, Dickinson.
Isaac Newton Smith,	Manhattan, Riley.

DOMESTIC SCIENCE SHORT COURSE.

Ellen Adams,	Oxford, Sumner.
Nellie Albertson,	Hill City, Graham.
Millie Elizabeth Bade,	Concordia, Cloud.
Susan Merle Balland,	Peabody, Marion.
Nelle Batchellor,	Salina, Saline.
Ruth Haller Bates,	Manhattan, Riley.
Esther M. Berry,	Jewell, Jewell.
Clyde Bonebrake,	Topeka, Shawnee.
Hazel E. Broadie,	Ashland, Clark.
Edith Ruth Brown,	Manhattan, Riley.
Jennie Brown,	McPherson, McPherson.
Ida J. Buchheim,	Lecompton, Douglas.
Alice Evyln Carlgren,	Concordia, Cloud.
Agnes Chapman,	Downs, Osborne.
Verna Combs,	Manhattan, Riley.
Marjorie Ellen Cooper,	Stockton, Rooks.
Mabel E. Cornell,	Larned, Pawnee.
Lena Corsant,	Salina, Saline.
Margaret I. Cummings,	Manhattan, Riley.
Ethel Daugherty,	Beloit, Mitchell.

Name.	Post office and county (or state).
Anna Laura Davis,	Emporia, Lyon.
Ruth Esther Dawes,	Asherville, Mitchell.
Marguerite Dewey,	Manhattan, Riley.
(Mrs.) Roy Dill,	Manhattan, Riley.
Bertha Rumina Disser,	Arkansas City, Cowley.
Fay Douglas,	Manhattan, Riley.
Lucy Steves Dowie,	Stockton, Rooks.
Josie Eastman,	Matfield Green, Chase.
Laura Eslinger,	Wilson, Ellsworth.
Mabel Etzold,	Liberal, Seward.
Anna S. Fredrickson,	Clyde, Washington.
Mamie Venetta Gann,	Jewell, Jewell.
Eva Garrett,	Topeka, Shawnee.
Mildred Gates,	Anthony, Harper.
Bessie Gayhart,	Topeka, Shawnee.
Virginia Mae Gerren,	Kansas City, Wyandotte.
Ella Eliza Gfeller,	Junction City, Geary.
Primrose I. Gilchrist,	Topeka, Shawnee.
Grace Lorena Hammond,	Manhattan, Riley.
Sue D. Haynes,	Perry, Jefferson.
Ellen Augusta Hedberg,	Marquette, McPherson.
Trella Hillman,	Glen Elder, Mitchell.
Sylvia V. Hovatter,	Topeka, Shawnee.
Daisy Lee Howerton,	Rossville, Shawnee.
Ora Maude Hoy,	Long Island, Phillips.
Martha Henrietta Ihde,	Hope, Dickinson.
Emma S. Johnson,	Clyde, Washington.
Anna Jorgensen,	Council Grove, Wabaunsee.
Hulda Clara Keller,	Junction City, Geary.
Grace Kennedy,	Richland, Shawnee.
Ettie Kreipe,	Tecumseh, Shawnee.
Mabel Kretz,	Clifton, (Clay).
Sara Leadley,	Rozel, Pawnee.
Verna Lehmann,	Slater, *Iowa.*
Mildred Lemert,	Garden City, Finney.
Josie Litch,	Princeton, Franklin.
Mary Lovejoy,	Almena, Norton.
Helen Mary Lyon,	Waverly, Coffey.
Marian McAfee,	Topeka, Shawnee.
Jennie McCarter,	Topeka, Shawnee.
Mayme McClusky,	Junction City, Geary.
Janet Russell McFarland,	Parkville, *Mo.*
Bertha McKeage,	Hoyt, Jackson.
Inah Jane McMath,	Manhattan, Riley.
Mary E. McNamara,	Manhattan, Riley.
Helen Marshall,	Simpson, Mitchell.
Laura A. Marshall,	Jennings, Decatur.
Agnes Martin,	Williamsburg, Franklin.
Dorothy Miller,	Lorraine, Ellsworth.
Ella R. Miller,	Belvue, Wabaunsee.
Eunice Eula Miner,	Princeton, Franklin.
Anita Mummey,	Conway Springs, Sumner.
Manette Alice Myers,	Atchison, Atchison.
Emma Frances Nelson,	Minneapolis, Ottawa.
Laura L. Norris,	Winkler, Riley.
Millie Oltmanns,	Halstead, Harvey.
Ermine L. Osborn,	Medicine Lodge, Barber.
Hedwig Pieper,	Hanover, Washington.
Helen Platt,	———
Orpha Reeves,	Atwood, Rawlins,
Bess B. Renwick,	Topeka, Shawnee.
Amy Pearl Reynolds,	Council Grove, Wabaunsee.

Name.	Post office and county (or state).
Nellie Richardson,	Kansas City, Wyandotte.
Anna G. Ridings,	Salina, Saline.
Mary Margaret Ritchie,	Topeka, Shawnee.
Louise Rivenburg,	Peabody, Marion.
Norah Roark,	Manhattan, Riley.
Ellen Rosenquist,	Osage City, Osage.
Ethel Clara Seaman,	Osborne, Osborne.
Amelia Seng,	Salina, Saline.
Mary Sittner,	Ottawa, Franklin.
Racy Sittner,	Ottawa, Franklin.
Eva M. Stafford,	Hoyt, Jackson.
Elizabeth Stallman,	Hutchinson, Reno.
Harriet Anna St. John,	Wamego, Pottawatomie.
Edith Stone,	Garden City, Finney.
Margaret B. Stone,	Manhattan, Riley.
Olive Tennis,	Chanute, Neosho.
Alice Thompson,	Manhattan, Riley.
Laura Trosper,	Manhattan, Riley.
Christine Florence Van Vliet,	Wheaton, Pottawatomie.
Elizabeth H. Van Vliet,	Frankfort, Marshall.
Neva M. Wallis,	Beloit, Mitchell.
Nellie Blaine Warren,	Weber, Jewell.
Cora Irene Weaver,	Admire, Lyon.
Marjorie A. Whitney,	Topeka, Shawnee.
Etta M. Wilke,	Troy, Doniphan.
Dixie Williams,	Kenneth, Johnson.
Elizabeth Wolfe,	———
Laura Wolfe,	Lyndon, Osage.
(Mrs.) C. A. Wood,	Manhattan, Riley.

DOMESTIC SCIENCE SHORT COURSE—SUMMER TERM.

Ruby Anne Adams,	Wichita, Sedgwick.
Sophia Antene,	Ada, Ottawa.
(Mrs.) Minnie Babcock,	Minneapolis, Ottawa.
Ethel Bales,	Manhattan, Riley.
Ethel Barber,	Manhattan, Riley.
E. Estella Barnes,	Wichita, Sedgwick.
Mae Riederer Besore,	Rozel, Pawnee.
(Mrs.) Pearl Thompson Brintnall,	Manhattan, Riley.
Helen Brooks,	Manhattan, Riley.
Amy Burd,	Wichita, Sedgwick.
Alice F. Dickson,	Atchison, Atchison.
Fanny M. Dilsaver,	Athol, Smith.
Bertha L. Donaldson,	Manhattan, Riley.
Kathryn Duttlinger,	Monument, Logan.
Mabel Eddy,	Manhattan, Riley.
Lulu Ferrell,	Peru, Chautauqua.
Josephine Finley,	Manhattan, Riley.
Ellan Pearl Frank,	Manhattan, Riley.
Ida E. Grippin,	Council Grove, Morris.
Nellie Isabelle Hale,	Lebanon, Smith.
Dollie Anna Ham,	Grantville, Jefferson.
Elsie Ham,	Grantville, Jefferson.
Edith A. Harder,	Minneapolis, Ottawa.
Geneva Jones,	Minneapolis, Ottawa.
Mary S. Lane,	Eskridge, Wabaunsee.
(Mrs.) Hattie S. Loomis,	Manhattan, Riley.
Nellie McClure,	Baldwin, Douglas.
Stella McClure,	Baldwin, Douglas.
Stella E. McClure,	Athol, Smith.
Irma Leah Moore,	Holton, Jackson.

Name.	Post office and county (or state).
Tillie M. Moore,	Junction City, Geary.
Florence Mulvey,	Wichita, Sedgwick.
Beulah A. Pennell,	Junction City, Geary.
(Mrs.) Emma Pontius,	Fairview, Brown.
Edith Mildred Records,	Manhattan, Riley.
Bertha May Ruble,	Caney, Montgomery.
Alberta Smutz,	Linn, Washington.
Gertrude May Srader,	Manhattan, Riley.
Ida M. Taylor,	Formoso, Jewell.
Olga Frances Unruh,	Larned, Pawnee.
Irene Walker,	Athol, Smith.

SHORT COURSE IN CREAM TESTING.

C. M. Abbott,	Goff, Nemaha.
E. E. Almond,	Kingman, Kingman.
E. E. Alspaugh,	Winfield, Cowley.
J. M. Atnip,	Abilene, Dickinson.
M. D. Bell,	Lincoln, Lincoln.
C. E. Bellinger,	White City, Morris.
G. Brock,	Buhler, Reno.
W. P. Bosworth,	Paola, Miami.
A. E. Brown,	Michigan Valley, Osage.
F. A. Brown,	Tonganoxie, Leavenworth.
H. H. Brown,	Harris, Anderson.
H. W. C. Budden,	Wakefield, Clay.
Chas. L. Burcher,	Agricola, Coffey.
J. R. Cates,	Winfield, Cowley.
C. A. Childs,	Reno, Leavenworth.
J. C. Christianson,	Tonganoxie, Leavenworth.
Art Chubb,	Ottawa, Franklin.
F. F. Clifford,	Shady Bend, Lincoln.
D. N. Clines,	Homewood, Franklin.
D. U. Clines,	Richmond, Franklin.
B. F. Commons,	Devon, Bourbon.
W. A. Craig,	Burlingame, Osage.
Joseph Cyr,	Idana, Clay.
W. T. Daetweiler,	Herington, Dickinson.
J. F. Danielson,	Smolan, Saline.
Jas. DeCoursey,	Kansas City, *Mo.*
A. H. Dennis,	Eureka, Greenwood.
L. G. Denny,	Burlington, Osage.
R. F. Denny,	Colony, Anderson.
J. A. Dorrill,	Columbia, *Mo.*
Geo. B. Dorn,	Tonganoxie, Leavenworth.
W. A. Droge,	Burlington, Osage.
W. F. Dyas,	Garnett, Anderson.
P. F. Edquist,	Salina, Saline.
S. D. Ely,	Turon, Reno.
W. G. Engle,	Abilene, Dickinson.
L. E. Eythe,	Enterprise, Dickinson.
Jas. Fitzgerald,	Kingman, Kingman.
D. A. Force,	Sabetha, Nemaha.
F. F. Force,	Abilene, Dickinson.
J. B. Ford,	Garden, Johnson.
H. F. Fulton,	Emporia, Lyon.
A. L. Gifford,	Bradford, Wabaunsee.
John Graff,	Waldo, Russell.
R. H. Graham,	Salina, Saline.
Robert Greer,	Ramona, Marion.
P. W. Happy,	Waverly, Coffey.
E. W. Harmon,	Elmo, Dickinson.

Name.	Post office and county (or state).
A. D. Harper,	Rantoul, Franklin.
A. R. Harrar,	Tonganoxie, Leavenworth.
M. L. Harrar,	Tonganoxie, Leavenworth.
John Harris,	Havensville, Pottawatomie.
T. M. Heaton,	Norton, Norton.
Mrs. T. M. Heaton,	Norton, Norton.
H. Hitchcock,	Mont Ida, Anderson.
V. J. Hall,	Lexington, *Neb.*
P. G. Hoffman,	Abilene, Dickinson.
W. H. Howard,	Cawker City, Mitchell.
J. R. Jenkins,	Atlanta, Cowley.
H. E. Jewell,	Arrington, Atchison.
C. Johnson,	Lindsborg, McPherson.
E. W. Johnson,	Iola, Allen.
S. B. Johnson,	Council Grove, Morris.
W. C. Johnson,	Eureka, Greenwood.
Ellis Johnston,	McLouth, Jefferson.
A. C. Jones,	Olpe, Lyon.
J. S. Kauffman,	Hope, Dickinson.
Roy P. Kauffman,	Elmo, Dickinson.
T. G. Kauffman,	Abilene, Dickinson.
N. E. Kennedy,	Canton, McPherson.
Asa L. Kennidott,	Bunkerhill, Russell.
Geo. Kinninmouth,	Winfield, Cowley.
J. P. Lantz,	Abilene, Dickinson.
A. S. McClure,	Hoxie, Jackson.
E. McGuire,	Tonganoxie, Leavenworth.
Ed. McKay,	Richmond, Franklin.
Frank McMahon,	Belleville, Republic.
C. A. McRoberts,	Sabetha, Nemaha.
Thos. Macklin,	Greeley, Anderson.
Wm. Martick,	Atlanta, Cowley.
E. K. Maxey,	Pomona, Franklin.
Ned Meek,	Solomon, Dickinson.
John Menli, jr.,	Hope, Dickinson.
Chas. A. Mertz,	Kingman, Kingman.
J. D. Mitchell,	Quincy, Greenwood.
Robt. Moore,	Harris, Anderson.
G. S. Meyer,	Washington, Washington.
Roy Neff,	Bern, Nemaha.
J. T. Nelson,	Hope, Dickinson.
H. E. Newhouse,	Lane, Franklin.
O. U. Newhouse,	Lane, Franklin.
J. C. Newton,	Richmond, Franklin.
A. B. Olson,	Savonburg, Allen.
A. E. Patterson,	Wellsville, Franklin.
Peter Paulson,	Lyndon, Osage.
J. W. Peddycord,	Wilsey, Morris.
B. T. Perkins,	Pittsburg, Crawford.
John F. Perkins,	Walnut, Crawford.
W. A. Pfoutz,	Lancaster, Atchison.
F. M. Pontius,	Rantoul, Franklin.
Jas. Reed,	Belleville, Republic.
Niles Reed,	Wilsey, Morris.
Paul Renard,	Concordia, Cloud.
S. B. Rich,	Salina, Saline.
L. D. Richardson,	Havensville, Pottawatomie.
T. J. Richardson,	Havensville, Pottawatomie.
H. E. Richter,	Summerfield, Marshall.
L. D. Riggs,	Leon, Butler.
A. A. Robe,	Amiot, Anderson.

Name.	Post office and county (or state).
J. A. Rowe,	Howard, Elk.
A. V. Scott,	Colony, Anderson.
H. D. Sebring,	Farmington, Atchison.
John C. Seitz,	Leavenworth, Leavenworth.
T. E. Shannon,	Howard, Elk.
Geo. Sheeks,	Iola, Allen.
W. G. Slade,	Smith Center, Smith.
O. L. Smith,	Cambridge, Cowley.
Victor L. Smith,	Princeton, Franklin.
Ben C. Sperry,	Beverly, Lincoln.
Theo. Stallbones,	Hanover, Washington.
E. J. Stone,	Osage City, Osage.
G. A. Thomas,	Concordia, Cloud.
W. B. Thurston,	Seneca, Nemaha.
J. R. Turner,	Colony, Anderson.
Alf. Umbehr,	Alma, Wabaunsee.
E. V. Walton,	Harveyville, Wabaunsee.
Michiel Weber,	Abilene, Dickinson.
Jacob Weisner,	Meriden, Jefferson.
Otto H. Welk,	Eskridge, Wabaunsee.
Harry Werts,	Eudora, Douglas.
A. R. Weybright,	Lone Star, Douglas.
Percy William,	Havensville, Pottawatomie.
T. M. Wilson,	Williamsburg, Franklin.
I. E. Whitehead,	Westphalia, Anderson.
W. H. Wiseman,	Agra, Phillips.
E. J. Ziegler,	Berryton, Shawnee.

SUMMARY.

CLASSES.	Men.	Women.	Total.
Graduate	13	13	26
Senior	111	59	170
Junior	194	92	286
Sophomore	271	146	417
Freshmen	298	158	456
Subfreshmen	348	105	453
Preparatory	65	24	89
Special	53	34	87
Dairy Manufactures	4	.....	4
Farmers' and Dairy Short Courses	235	.....	235
Domestic Science Short Courses	.....	152	152
Counted twice	57	13	70
Totals	1,535	770	2,305

From Kansas	2,267	From New Hampshire	1
Colorado	5	New Mexico	1
Connecticut	1	Oklahoma	5
Iowa	4	Tennessee	1
Louisiana	2	Texas	3
Missouri	13	Philippine Islands	1
Nebraska	1		

Record of Attendance, 1879-1910.

COLLEGE YEAR.	Domestic science short course	Dairy manufactures	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshmen	Freshmen	Sophomore	Junior	Senior	Graduate	Counted twice	Total	Graduated
1878-79						1			89	89	16	12			207	9
1879-80						1			166	61	35	11	2		276	7
1880-81						6			178	48	24	9	2		267	8
1881-82						5			227	50	19	11			312	9
1882-83						4			241	60	30	12			347	12
1883-84						2			255	92	26	18	2		395	17
1884-85						2			271	71	36	16	5		401	14
1885-86						1			273	91	35	24	4		428	21
1886-87									303	100	44	24	10		481	21
1887-88									305	92	46	27	2		472	22
1888-89									266	103	41	28	7		445	25
1889-90						1			307	105	63	28	10		514	27
1890-91									342	135	50	53	12		598	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
1899-1900	24		57	47	50	32	162		376	163	109	69	27	22	1094	58
1900-01	47		72	109	79	23	318		348	183	80	74	40	52	1321	60
1901-02	41		66	125	87	19	298		396	206	120	65	32	59	1396	52
1902-03	63		38	123	78	36	342		471	229	141	86	24	57	1574	55
1903-04	51		16	122	72	33	443		403	206	161	114	20	36	1605	102
1904-05	88		24	99	12	30	500		289	198	122	117	26	43	1462	107
1905-06	92		28	118		46	598		373	214	145	110	30	64	1690	96
1906-07	134		23	179		48	144	511	411	269	149	133	24	88	1937	118
1907-08	188		26	173		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	135
1909-10	152	4	111	124		87	89	453	456	417	286	170	26	70	2305	

INDEX.

NOTE.—*Italicized* words designate subjects of instruction.