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FIFTY-SEVENTH SESSION, 1919-'20



With Announcements for 1920-'21

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The State Board of Administration

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WILBUR N. MASON HARVEY J. PENNEY E. L. BARRIER
MALCOLM M. GRAY, *Secretary*

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C. W. MYERS, *Assistant Business Manager*
E. B. CRONEMEYER, *Assistant Business Manager*

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President of the College..... WILLIAM M. JARDINE
Vice President, and Dean of the Division of
General Science J. T. WILLARD
Dean of the Division of Agriculture and Di-
rector of the Agricultural Experiment
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Dean of the Division of Engineering and Di-
rector of the Engineering Experiment
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Dean of the Summer School..... E. L. HOLTON
Dean of Women..... MARY P. VAN ZILE
Principal of the School of Agriculture..... H. L. KENT
Registrar JESSIE MCD. MACHIR
Librarian ARTHUR B. SMITH
Custodian of Buildings and Grounds..... G. R. PAULING

CALENDAR

1920														1921																	
JANUARY							JULY							JANUARY							JULY										
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S				
..	1	2	3	1	2	3	1	1	2	1	2	3
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11	12	13	14	15	16	17	11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16				
18	19	20	21	22	23	24	18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23				
25	26	27	28	29	30	31	25	26	27	28	29	30	31	23	24	25	26	27	28	29	24	25	26	27	28	29	30				
..	30	31	31				
FEBRUARY							AUGUST							FEBRUARY							AUGUST										
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8	9	10	11	12	13	14	8	9	10	11	12	13	14	6	7	8	9	10	11	12	7	8	9	10	11	12	13				
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29	29	30	31	27	28	28	29	30	31				
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MARCH							SEPTEMBER							MARCH							SEPTEMBER										
..	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	1	2	3	4				
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12	4	5	6	7	8	9	10				
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28	29	30	31	26	27	28	29	30	27	28	29	30	31	25	26	27	28	29	30	..				
..				
APRIL							OCTOBER							APRIL							OCTOBER										
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4	5	6	7	8	9	10	3	4	5	6	7	8	9	3	4	5	6	7	8	9	2	3	4	5	6	7	8				
11	12	13	14	15	16	17	10	11	12	13	14	15	16	10	11	12	13	14	15	16	9	10	11	12	13	14	15				
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..	31	30	31				
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MAY							NOVEMBER							MAY							NOVEMBER										
..	1	1	2	3	4	5	6	1	2	3	4	5	6	7	..	1	2	3	4	5	6				
2	3	4	5	6	7	8	7	8	9	10	11	12	13	8	9	10	11	12	13	14	6	7	8	9	10	11	12				
9	10	11	12	13	14	15	14	15	16	17	18	19	20	15	16	17	18	19	20	21	13	14	15	16	17	18	19				
16	17	18	19	20	21	22	21	22	23	24	25	26	27	22	23	24	25	26	27	28	20	21	22	23	24	25	26				
23	24	25	26	27	28	29	28	29	30	29	30	31	27	28	29	30				
30	31				
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JUNE							DECEMBER							JUNE							DECEMBER										
..	..	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2	3	4	5						
6	7	8	9	10	11	12	5	6	7	8	9	10	11	5	6	7	8	9	10	11	4	5	6	7	8	9	10				
13	14	15	16	17	18	19	12	13	14	15	16	17	18	12	13	14	15	16	17	18	11	12	13	14	15	16	17				
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27	28	29	30	26	27	28	29	30	31	..	26	27	28	29	30	25	26	27	28	29	30	31				
..				

The College Calendar

SUMMER SCHOOL, 1920

May 28, Friday.—Registration of students for Summer School begins at 8 a. m.
May 29, Saturday.—*All classes meet according to schedule.
May 29 to July 30, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1920-1921

Sept. 6, Monday.—†Special courses for auto-mechanics, tractor operators, machinists, blacksmiths, foundrymen, and carpenters begin.
Sept. 10, Friday.—All members of the instructional force on duty.
Sept. 11, Saturday.—Meeting of assigners with committee on schedule at 2 p. m.
Sept. 11, Saturday.—Meeting of assigners with deans at 3 p. m.
Sept. 13, Monday.—Admission and registration of students begin at 8 p. m.
Sept. 14, Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Sept. 15, Wednesday.—Registration of students closes at 11 a. m.
Sept. 15, Wednesday.—Opening convocation, 11 a. m. to 12 m.
Sept. 15, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Oct. 9, Saturday.—Examinations to remove conditions.
Oct. 16, Saturday.—Scholarship deficiency reports due.
Nov. 13, Saturday.—Midsemester scholarship deficiency reports due.
Nov. 24, Wednesday.—Thanksgiving vacation begins at 12 m.
Nov. 27, Saturday.—Thanksgiving vacation closes at 6 p. m.
Dec. 21, Tuesday.—Housekeepers' Course closes at 12 m.
Dec. 21, Tuesday.—Winter vacation begins at 6 p. m.
Jan. 3, 1921, Monday.—†Special courses for auto-mechanics, electricians, tractor operators, machinists, blacksmiths, foundrymen, carpenters, and radio operators begin.
Jan. 4, Tuesday.—Winter vacation closes at 6 p. m.
Jan. 10, Monday.—Short Course in Agriculture and Creamery Short Course begin.
Jan. 22 to 29, Saturday to Saturday.—Examinations at close of semester.
Jan. 29, Saturday.—First semester closes at 11 a. m.

SECOND SEMESTER, 1920-1921

Feb. 1, Tuesday.—Admission and registration of students begin at 8 a. m.
Feb. 1, Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Feb. 2, Wednesday.—Registration of students closes at 11 a. m.
Feb. 2, Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Feb. 7 to 12, Monday to Saturday.—Farm and Home Week.
Feb. 22, Tuesday.—Holiday, Washington's Birthday.
Feb. 26, Saturday.—Examinations to remove conditions.
Mar. 5, Saturday.—Scholarship deficiency reports due.
Mar. 5, Saturday.—Short Course in Agriculture and Creamery Short Course close at 12 m.
April 9, Saturday.—Midsemester scholarship deficiency reports due.
April 21, Thursday.—Announcement of elections of seniors to Phi Kappa Phi.
May 10, Tuesday.—Housekeepers' Course closes at 12 m.
May 20 to 26, Friday to Thursday.—Examinations for seniors.
May 26 to June 1, Thursday to Wednesday.—Examinations at close of semester.
May 30, Monday.—Holiday, Decoration Day.
June 2, Thursday.—Commencement Day.

SUMMER SCHOOL, 1921

June 3, Friday.—Registration of students for Summer School begins at 8 a. m.
June 4 to Aug. 5, Saturday to Friday.—Summer School in session, nine weeks.

FIRST SEMESTER, 1921-1922

Sept. 12, Monday.—Admission and registration of students begins at 8 a. m.
Sept. 14, Wednesday.—Registration of students closes at 11 a. m.

* Students must be present at the first meeting of each class or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes. A fee of one dollar is charged those who enroll after the time set for close of registration unless a reasonable excuse is offered.

† Similar courses begin the first Monday of every month from September to May, also, at the beginning of the Summer School.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Ina Holroyd, Bessie W. Birdsall, J. O. Hamilton, W. H. Andrews, G. A. Dean, W. B. Wendt, H. L. Ibsen.

ADVANCED CREDIT: *College*.—R. R. Price, L. E. Call, H. H. King, J. R. Macarthur, Elizabeth Rothermel, J. T. Willard.

School of Agriculture.—A. P. Davidson, E. V. James, W. T. Stratton, Wilma Orem.

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

ATHLETICS: President Jardine, M. F. Ahearn, Z. G. Clevenger, G. A. Dean, H. H. King, E. L. Holton, R. A. Seaton.

CATALOGUE: J. V. Cortelyou, J. T. Willard, H. W. Davis.

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

DEBATE: J. R. Macarthur, O. H. Burns, J. G. Emerson.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad, J. W. Searson, Mary P. Van Zile.

GRADUATE STUDY: W. A. Lippincott, L. E. Conrad, L. E. Call, Helen B. Thompson, H. H. King, R. K. Nabours, J. H. Burt.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Westbrook, J. W. Searson, E. L. Holton, W. H. Andrews, W. A. Lippincott.

SCHEDULE OF CLASSES: A. E. White, J. T. Willard, W. T. Stratton, R. I. Throckmorton, L. E. Conrad, Hildegard Kneeland.

STUDENT AFFAIRS: J. R. Macarthur, Mary P. Van Zile, H. H. King, A. E. Westbrook, C. F. Baker, H. L. Kent, Elizabeth Rothermel, J. G. Emerson.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, Z. G. Clevenger, Mary P. Van Zile.

Officers of Instruction and Administration

PRESIDENT

WILLIAM MARION JARDINE, B. S. A., LL. D.,
President of the College (1910, 1918).*
B. S. A., Utah Agricultural College, 1904; LL. D., Campbell College, 1916.
† A 30; 1020 Houston.

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D.,
Professor of Architecture, Emeritus (1876, 1917).
†M. S., 1883; A. D., 1908. E 56; 809 N. Eleventh.

JULIUS TERRASS WILLARD, M. S., Sc. D.,
Vice President of the College (March 1, 1918); Dean of the Division
of General Science (1909); Professor of Chemistry (1883, 1901);
Consulting Chemist (1888, 1918), Agricultural Experiment Station.
B. S., 1883; M. S., 1886; Sc. D., 1907. A 47; 1725 Poyntz.

BENJAMIN LUCE REMICK, Ph. M.,
Professor of Mathematics (1900).
Ph. B., Cornell College, 1889; Ph. M., *ibid.*, 1892. A 71; 613 Houston.

ALBERT DICKENS, M. S.,
Professor of Horticulture (1899, 1902); Horticulturist (1899, 1902),
Agricultural Experiment Station.
B. S., 1893; M. S., 1901. H 30; 509 N. Manhattan.

RALPH RAY PRICE, A. M.,
Professor of History and Civics (1903).
A. B., Baker University, 1896; A. M., University of Kansas, 1898.
F 57; 826 Houston.

JULIUS ERNEST KAMMEYER, A. M., LL. D.,
Professor of Economics (1903, 1904).
A. B., Central Wesleyan College, 1886; A. M., *ibid.*, 1889; LL. D., Kansas City Uni-
versity, 1912. A 52; 340 N. Sixteenth.

JOHN VANZANDT CORTELYOU, Ph. D.,
Professor of Modern Languages (1904, 1916).
A. B., University of Nebraska, 1897; A. M., *ibid.*, 1901; Ph. D., University of Heidel-
berg, 1904. N 59; 325 N. Fourteenth.

* One date standing immediately after the title shows when the office was assumed. In the case of two dates separated by a comma or a semicolon, the first date indicates when services with the College began, the second when present office was assumed. Dates separated by a dash indicate times of assumption and termination, respectively, of the duties indicated in the title.

† The College buildings are designated by letters, as follows:

A—Anderson Hall (Administration).	I—Illustrations Hall.
Ag—Waters Hall (Agriculture).	K—Kedzie Hall (Cafeteria).
C—Denison Hall (Chemistry, Physics).	L—Home Economics Hall.
CA—Chemistry Annex.	M—Auditorium.
D—Dairy Hall.	N—Nichols Gymnasium.
E—Engineering Hall.	R—Farm Machinery Hall.
F—Fairchild Hall (Library).	S—Engineering Shops.
G—School of Agriculture Hall.	V—Veterinary Hall.
H—Horticultural Hall.	X—Dairy Commission Hall.

‡ In a statement of degrees without mention of the institution conferring them, the Kansas State Agricultural College is to be understood.

- JOHN ORR HAMILTON, B. S.,
Professor of Physics (1901, 1908).
B. S., University of Chicago, 1900. C 57; 331 N. Fourteenth.
- MARY PIERCE VAN ZILE,
Dean of Women (1908, 1918).
Diploma, Iowa State College, 1904. A 40; 1318 Fremont.
- LOWELL EDWIN CONRAD, M. S.,
Professor of Civil Engineering (1908, 1909).
B. S., Cornell College, 1904; C. E., *ibid.*, 1906; M. S., Lehigh University, 1908.
E 32; 317 N. Seventeenth.
- LESLIE ARTHUR FITZ, B. S.,
Professor of Milling Industry (1910, 1912).
B. S., 1902. Ag 40; 1014 Houston.
- EDWIN LEE HOLTON, A. B.,
Professor of Education (1910, 1913); Dean of the Summer School
(1910, 1918).
A. B., Indiana University, 1904. A 32; 217 N. Fourteenth.
- ANDREY ABRAHAM POTTER, S. B.,
Dean of the Division of Engineering (1905, 1914); Director of the
Engineering Experiment Station (1913, 1914); Professor of Steam
and Gas Engineering (1905, 1910).
S. B., Massachusetts Institute of Technology, 1903. E 30; 1328 Fremont.
- ROY ANDREW SEATON, M. S.,
Professor of Applied Mechanics and Machine Design (1904, 1914).
B. S., 1904; M. S., 1910; S. B., Massachusetts Institute of Technology, 1911.
S 61; 722 Humboldt.
- JAMES WILLIAM SEARSON, A. M.,
Professor of English (1910, 1911).
A. B., University of Nebraska, 1896; A. M., *ibid.*, 1899. K 27; 1314 Fremont.
- ARTHUR BOURNE SMITH, Ph. B., B. L. S.,
College Librarian (1911).
Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902.
F 32; 810 S. Juliette.
- WILLIAM ADAMS LIPPINCOTT, M. S.,
Professor of Poultry Husbandry (1912); Poultry Husbandman (1912),
Agricultural Experiment Station.
A. B., Illinois College, 1903; B. S., Iowa State College, 1911; M. S., University of
Wisconsin, 1917. Ag 38; 321 N. Eighteenth.
- LELAND DAVID BUSHNELL, M. S.,
Professor of Bacteriology (1909, 1912); Bacteriologist (1909, 1912),
Agricultural Experiment Station.
B. S., Michigan Agricultural College, 1905; M. S., University of Kansas, 1915.
V 54; 1414 Humboldt.
- BESSIE WEBB BIRDSALL,
Professor of Clothing and Textiles (1912).
Graduate, Drexel Institute, 1903. L 56; 1320 Fremont.
- LELAND EVERETT CALL, M. S.,
Professor of Agronomy (1907, 1913); Agronomist (1907, 1913), Ag-
ricultural Experiment Station.
B. S. in Agr., Ohio State University, 1906; M. S., *ibid.*, 1912.
Ag 58; 223 N. Fourteenth.

- GEORGE ADAM DEAN, M. S.,
Professor of Entomology (1902, 1913); Entomologist (1902, 1913),
Agricultural Experiment Station.
B. S., 1895; M. S., 1905. F 52; 327 N. Seventeenth.
- ROBERT KIRKLAND NABOURS,³ Ph. D.,
Professor of Zoölogy (1910, 1913); Zoölogist (1910, 1913), Agricultural
Experiment Station; Curator of the Natural History Museum
(1910).
Ed. B., University of Chicago, 1905; Ph. D., *ibid.*, 1911. F 54; 210 S. Tenth.
- RALPH RALPH DYKSTRA, D. V. M.,
Dean of the Division of Veterinary Medicine (1911; July 1, 1919);
Professor of Surgery (1911, 1913).
D. V. M., Iowa State College, 1905. V 31; 607 Houston.
- CLARENCE ERLE REID, B. S.,
Professor of Electrical Engineering (1914).
B. S. in E. E., Purdue University, 1902. C 33; 421 N. Sixteenth.
- FRANCES LANGDON BROWN,² A. B., B. S.,
State Leader of Emergency Home Demonstration Agents (1909, 1917),
Division of College Extension.
B. S., 1909; A. B., Kansas State Normal School, 1910. A 35; 510 N. Ninth.
- MICHAEL FRANCIS AHEARN, M. S.,
Professor of Landscape Gardening (1904, 1915).
B. S., Massachusetts Agricultural College, 1904; M. S., 1913.
H 27; 110 N. Juliette.
- NELSON ANTRIM CRAWFORD, A. M.,
Professor of Industrial Journalism and Superintendent of Printing
(1910, 1915).
A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914.
K 52; 221 N. Juliette.
- ARTHUR EDGAR WESTBROOK, A. B., B. Mus.,
Director of Music and Professor of Voice (1915).
A. B., Albion College, 1910; B. Mus., *ibid.*, 1911. M 30; 309 N. Sixteenth.
- JOHN ROBERTSON MACARTHUR, Ph. D.,
Professor of English (1914, 1916).
A. B., University of Manitoba, 1892; Ph. D., University of Chicago, 1903.
A 59A; 1126 Bluemont.
- ZORA GOODWIN CLEVINGER,
Professor of Physical Education and Director of Athletics (1916).
Student, Indiana University, 1900-1904; Graduate, Summer School of Physical Educa-
tion and Athletics, Chautauqua, N. Y., 1905; Graduate, Summer School for Coaches and
Directors, University of Illinois, 1915. N 35; _____.
- CHARLES MOSES SIEVER, Ph. G., M. D.,
College Physician (1916).
Ph. G., Trinity University, 1903; M. D., *ibid.*, 1903; M. D., University of Kansas,
1907. A 65; 1627 Anderson.
- ANDREW CLEVELAND HARTENBOWER,¹ B. S.,
Superintendent of Institutes and Extension Schools, Division of Col-
lege Extension (July 1, 1917 - November 15, 1919).
B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

3. Absent on leave, Nov. 1, 1919, to Aug. 31, 1920.

- WALTER WILLIAM CARLSON, B. S., M. E.,
 Professor of Shop Practice (1910, 1917); Superintendent of Shops
 (1910, 1912).
 B. S., 1908; M. E., 1916. S 62; 1130 Bluemont.
- SAMUEL CECIL SALMON, B. S.,
 Professor of Farm Crops (1913, 1917).
 B. S., South Dakota Agricultural and Mechanical College, 1907.
 Ag 82; 1648 Leavenworth.
- JAMES GORDON EMERSON, J. D.,
 Professor of Public Speaking (1915, 1917).
 B. S., Iowa State College, 1912; J. D., Leland Stanford, Junior, University School of
 Law, 1915. G 56; 1623 Anderson.
- CECIL FRANKLIN BAKER, M. S.,
 Professor of Architecture (1917).
 A. B., University of Illinois, 1907; B. S., Massachusetts Institute of Technology, 1907;
 M. S., *ibid.*, 1909. E 57; 321 N. Eighteenth.
- WALTER HORACE BURR,²
 Director of Rural Service (1914, 1915), Division of College Extension.
 A 3; 612 N. Fourteenth.
- HARRY JOHN CHARLES UMBERGER,² B. S.,
 Dean, Division of College Extension (1911; July 1, 1919); County
 Agent Leader, Division of College Extension (1911; 1917 - Dec. 31,
 1919).
 B. S., 1905. A 33; 1739 Fairchild.
- OTIS EARLE HALL,¹ A. B.,
 Director of Junior Extension Service (1914-April 15, 1920), Division
 of College Extension.
 A. B. Wabash College, 1907.
- MARY WHITING McFARLANE, M. S.,
 State Leader of Home Economics Specialists (1918), Division of Col-
 lege Extension.
 B. S., University of Wyoming, 1894; M. S., Oregon Agricultural College, 1916.
 A 36; 1335 Anderson.
- HERBERT HIRAM KING, Ph. D.,
 Professor of Chemistry (1906, 1918); Chemist, Agricultural Experi-
 ment Station (1918); Chemist, Engineering Experiment Station
 (1909, 1918).
 B. S., Ewing College, 1904; A. M., *ibid.*, 1906; M. S., 1915; Ph. D., University of
 Chicago, 1918. C 30; 916 Humboldt.
- CHARLES WILBUR McCAMPBELL, D. V. M.,
 Professor of Animal Husbandry (1910, 1918); Animal Husbandman
 (1910, 1918), Agricultural Experiment Station.
 B. S., 1906; D. V. M., 1910; B. S. in Agr., 1918. Ag. 8; 343 N. Fourteenth.
- RAY IAMS THROCKMORTON, B. S.,
 Professor of Soils (1911, 1918).
 B. S., Pennsylvania State College, 1911. Ag 60; 825 Houston.

2. In cooperation with the U. S. Department of Agriculture.

- JAMES EDWARD ACKERT, Ph. D.,**
 Professor of Zoölogy (1913, 1918), in Charge (Nov. 1, 1919 - Aug. 31, 1920); Parasitologist (1913), Agricultural Experiment Station.
 A. B., University of Illinois, 1909; A. M., *ibid.*, 1911; Ph. D., *ibid.*, 1913.
 F 58; 1605 Humboldt.
- ALFRED EVERETT WHITE, M. S.,**
 Professor of Mathematics (1909, 1918).
 B. S., Purdue University, 1904; M. S., *ibid.*, 1909. A 72; 1743 Fairchild.
- JAMES BURGESS FITCH, B. S.,**
 Professor of Dairy Husbandry (1910, 1918); Dairy Husbandman (1910, 1918), Agricultural Experiment Station.
 B. S., Purdue University, 1910. D 30; 321 N. Sixteenth.
- HALLAM WALKER DAVIS, A. M.,**
 Professor of English (1913, 1918).
 A. B., Indiana University, 1909; A. M., Columbia University, 1913.
 A 61; 532 N. Fourteenth.
- ARAMINTA HOLMAN,**
 Professor of Applied Art (1913, 1918).
 Graduate, New York School of Fine and Applied Art, 1912.
 A 67; 1636 Fairchild.
- FRANCIS DAVID FARRELL, B. S.,**
 Dean, Division of Agriculture (1918); Director (1918), Agricultural Experiment Station.
 B. S., Utah Agricultural College, 1907. Ag 34; 1007 Houston.
- HELEN BISHOP THOMPSON, Ph. D.,**
 Dean, Division of Home Economics (1918); Professor of Nutrition and Dietetics (1918).
 B. S., 1903; M. S., 1907; A. M., Columbia University, 1913; Ph. D., Yale University, 1917.
 L 30; 1412 Leavenworth.
- VIVAN LEWIS STRICKLAND, A. M.,**
 Professor of Education (Jan., 1920); Director of Home-study Service (1917, 1918), Division of College Extension.
 A. B., University of Nebraska, 1906; A. M., *ibid.*, 1915. A 4; 1512 Leavenworth.
- JAMES PARK CALDERWOOD, M. E., M. S.,**
 Professor of Mechanical Engineering (1918, 1919).
 M. E., Ohio State University, 1908; M. S., Pennsylvania State College, 1916.
 S 55; 321 N. Fourteenth.
- HARRY LLEWELLYN KENT, B. S.,**
 Professor of Vocational Education (1911; July 1, 1919); Principal of School of Agriculture (1911, 1913).
 A. B., Kansas State Normal School, 1912; B. S., 1913. G 29, 32; 321 Delaware.
- JAMES HENRY BURT, D. V. M.,**
 Professor of Anatomy and Physiology (1909; July 1, 1919).
 V. S., Ontario Veterinary College, 1895; D. V. M., Ohio State University, 1905.
 V 32; 800 Poyntz.
- LEO EDWARD MELCHERS, M. S.,**
 Professor of Botany and Plant Pathology (1914; July 1, 1919); Plant Pathologist (1914), Agricultural Experiment Station.
 B. S., Ohio State University, 1912; M. S., *ibid.*, 1913. H 58; 1801 Leavenworth.

- EDWIN CYRUS MILLER, Ph. D.,
 Professor of Plant Physiology (1910; July 1, 1919).
 A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., *ibid.*, 1910.
 H 56; 501 Laramie.
- LOTTA JEAN BOGERT, Ph. D.,
 Professor of Food Economics and Nutrition (Sept. 1, 1919).
 A. B., Cornell University, 1910; Ph. D., Yale University, 1916.
 L 42; 903 Houston.
- HILDEGARDE KNEELAND, A. B.,
 Professor of Household Economics (Sept. 1, 1919).
 A. B., Vassar College, 1911. L 42; 1638 Osage.
- FREDERICK BRAHAN TERRELL, Capt. Inf., U. S. A.,
 Professor of Military Science and Tactics, and Commandant of Cadets
 (Sept. 1, 1919). N 26; 353 N. Fifteenth.
- THOMAS JESSE TALBERT, A. M.,
 Superintendent of Institutes and Extension Schools (Dec. 1, 1919),
 Division of College Extension.
 B. S. in Agr., University of Missouri, 1913; A. M., *ibid.*, 1917.
 A 34; 1123 Houston.

ASSOCIATE PROFESSORS

- ODIS HERSCHEL BURNS, A. B.,
 Associate Professor of English, and Debate Coach (1918; Sept. 1,
 1919).
 A. B., University of Kansas, 1916. G 66; 1623 Anderson.
- LEWIS CLARKE DAVIDSON, Capt. Inf., U. S. A.,
 Associate Professor of Military Science and Tactics (Feb. 19, 1919;
 Sept. 1, 1919).
 Graduate, United States Military Academy, 1915. N 27; 317 S. Delaware.
- WILLIAM HIDDLESON ANDREWS, A. B., M. S.,
 Associate Professor of Education (1906, 1913).
 A. B., University of Chicago, 1900; M. S., 1919. A 64; 630 Moro.
- CHARLES OSCAR SWANSON, M. Agr.,
 Associate Professor of Agricultural Chemistry (1906, 1914); Associate
 Chemist (1906, 1914), Agricultural Experiment Station.
 A. B., Carleton College, 1899; M. Agr., University of Minnesota, 1905.
 C 6; 931 Bluemont.
- HARRY BRUCE WALKER, B. S. in C. E.,
 Associate Professor of Irrigation and Drainage Engineering (1914);
 Drainage and Irrigation Engineer (1910), Division of College Ex-
 tension.
 B. S. in C. E., Iowa State College, 1910. E 32; 110 S. Seventeenth.
- IVOR VICTOR ILES, A. M.,
 Associate Professor of History and Civics (1911, 1915).
 A. B., University of Kansas, 1905; A. M., *ibid.*, 1905. F 4; 1725 Fairchild.
- OLIVER WILLIAM HUNTER, M. S.,
 Associate Professor of Bacteriology (1911, 1917).
 B. S., 1909; M. S., University of Wisconsin, 1911. V 28; 417 Houston.

- JONTA BOEN MARCELLUS,¹ B. S. in C. E.,
Associate Professor of Irrigation and Drainage Engineering (1917 -
Sept. 30, 1919); Drainage and Irrigation Engineer (1917 - Sept. 30,
1919), Division of College Extension.
B. S. in C. E., University of Kansas, 1904.
- PORTER JOSEPH NEWMAN, M. S.,
Associate Professor of Chemistry (1909, 1918).
B. S., Franklin College, 1908; M. S., *ibid.*, 1910. W 27; 914 Leavenworth.
- EDWARD GUERRANT KELLY, M. S.,
Associate Professor of Entomology (1918; Jan. 1, 1920), Division of
College Extension.
B. S., University of Kentucky, 1908; M. S., *ibid.*, 1904. F 64; 431 Leavenworth.
- JOSIAH SIMSON HUGHES, Ph. D.,
Associate Professor of Chemistry (1910, 1918).
B. S., Ohio Wesleyan University, 1908; M. S., *ibid.*, 1910; A. M., Ohio State Uni-
versity, 1910; Ph. D., *ibid.*, 1917. C 41; 344 N. Fifteenth.
- GRACE EMILY DERBY, A. B.,
Associate Librarian (1911, 1918).
A. B., Western College for Women, 1905. F 32; 1825 Leavenworth.
- JAMES WALKER McCOLLOCH, B. S.,
Associate Entomologist (1910, 1918), Agricultural Experiment Sta-
tion.
B. S., 1912. F 64; 1626 Leavenworth.
- HOWARD W. BRUBAKER, Ph. D.,
Associate Professor of Chemistry (1913, 1918).
B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904.
C 64; 1116 Fremont.
- INA FOOTE COWLES, B. S.,
Associate Professor of Clothing and Textiles (1902, 1918).
B. S., 1901. L 55; 1021 Houston.
- MARY THERESA HARMAN, Ph. D.,
Associate Professor of Zoölogy (1912, 1918).
A. B., Indiana University, 1907; A. M., *ibid.*, 1909; Ph. D., *ibid.*, 1912.
F 62; 1430 Poyntz.
- GEORGE ELLSWORTH RABURN, M. S.,
Associate Professor of Physics (1910, 1918).
A. B., University of Michigan, 1907; M. S., *ibid.*, 1913. C 61; 1014 Bluemont.
- ROBERT WARREN CONOVER, A. M.,
Associate Professor of English (1915, 1918).
A. B., Wesleyan University, 1911; A. M., *ibid.*, 1914. A 58; 319 N. Sixteenth.
- MAURICE COLE TANQUARY,¹ Ph. D.,
Associate Professor of Entomology (1912; 1918 - Feb. 1, 1920); Asso-
ciate Entomologist (1912; 1918 - Feb. 1, 1920), Agricultural Ex-
periment Station.
A. B., University of Illinois, 1907; A. M., *ibid.*, 1908; Ph. D., *ibid.*, 1912.

1. Resigned.

- WYLIE BRODBECK WENDT, B. C. E.,
Associate Professor of Applied Mechanics (1916, 1918).
B. C. E., University of Kentucky, 1906. E 8A; 1623 Anderson.
- FRED D. MERRITT, Ph. D.,
Associate Professor of Sociology and Economics (1917, 1918).
B. S., Upper Iowa University, 1891; A. M., University of Iowa, 1898; Ph. D., *ibid.*, 1900. A 59; 1634 Osage.
- FLOYD WAYNE BELL, B. S. A.,
Associate Professor of Animal Husbandry (1918).
B. S. A., Cornell University, 1911. Ag 5; 916 Osage.
- EUSTACE VIVIAN FLOYD,⁴ B. S.,
Associate Professor of Physics (1911, 1918).
B. S., Earlham College, 1908.
- EVAN F. FERRIN, B. S.,
Associate Professor of Animal Husbandry (1918).
B. S. in A. H., Iowa State College, 1911. Ag 13; 1511 Leavenworth.
- WALDO ERNEST GRIMES, B. S.,
Associate Professor of Agricultural Economics (1913; July 1, 1919);
in Charge (Feb. 1, 1920).
B. S., 1913. Ag 51A; 1821 Leavenworth.
- CLAUDE CARROLL CUNNINGHAM,¹ B. S.,
Associate Professor of Agronomy (1907; July 1, 1919 - Apr. 1, 1920).
B. S., 1903. Ag. 60; 1026 Fremont.
- ANDREW MINIE PATERSON, B. S.,
Associate Professor of Animal Husbandry (1913; July 1, 1919).
B. S., 1913. Ag 13; 1320 Fremont.
- JOHN HUNTINGTON PARKER, M. S.,
Associate Professor of Farm Crops (1917; July 1, 1919).
B. S. in Agr., University of Minnesota, 1913; M. S. in Agr., Cornell University, 1916.
Ag 76; 1809 Leavenworth.
- HAROLD MORTON JONES, B. S.,
State Dairy Commissioner (1913; July 1, 1919).
B. S., Purdue University, 1908. X; 904 Blument.
- CHARLES ELKINS ROGERS, A. B.,
Associate Professor of Industrial Journalism (July 1, 1919).
A. B., University of Oklahoma, 1914. K 55; 905 Laramie.
- RUDOLPH LOUIS HENSEL, B. S. F.,
Associate Professor of Pasture Management (July 15, 1919).
B. S. F., Iowa State College, 1913. Ag 82; 1416 Humboldt.
- PERCY LEIGH GAINEY, A. M., M. S.,
Associate Professor of Bacteriology (1914; July 1, 1919); Soil Bac-
teriologist (1914), Agricultural Experiment Station.
B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; M. S., *ibid.*, 1910; A. M., Washington University, 1911. V 26; 1019 Houston.

1. Resigned.

4. Absent on leave, 1919-'20.

- WILLIAM TIMOTHY STRATTON, A. M.,
Associate Professor of Mathematics (1910; Sept. 1, 1919).
A. B., Indiana University, 1906; A. M., *ibid.*, 1913. A 70; R. F. D. 1.
- ELDEN VALORIUS JAMES, A. M.,
Associate Professor of History and Civics (1912; Sept. 1, 1919).
A. B., Marietta College, 1901; A. B., University of Michigan, 1905; A. M., Marietta College, 1908. F 1; 621 Humboldt.
- JOHN CHRISTIAN PETERSON, Ph. D.,
Associate Professor of Education (1917; Sept. 1, 1919).
A. B., University of Utah, 1913; Ph. D., University of Chicago, 1917. A 66; 1622 Osage.
- ELIZABETH ROTHERMEL, A. M.,
Associate Professor of Food Economics and Nutrition (1918; Sept. 1, 1919).
A. B., University of California, 1899; A. M., Columbia University, 1913. L 35; 1014 Houston.
- WILLIAM EDWARD MULDOON, D. V. M., A. M.,
Associate Professor of Surgery and Medicine (Sept. 1, 1919).
D. V. M., New York State Veterinary College, Cornell University, 1913; A. M., Cornell University, 1916. V 33; 1709 Laramie.
- ELLEN ANN REYNOLDS,¹ M. S., A. M.,
Associate Professor of Household Economics (Sept. 1, 1919 - Feb. 13, 1920).
B. S., University of Kentucky, 1895; M. S., *ibid.*, 1896; A. M., University of Chicago, 1919.
- FREDERICK ERVING COLBURN,
Head of Department of Illustrations (Oct. 7, 1919).
I; 322 N. Seventeenth.

ASSISTANT PROFESSORS

- WILMER ESLA DAVIS, A. B.,
Assistant Professor of Botany (1909).
Graduate, Ohio Normal University, 1894; A. B., University of Illinois, 1903. H 76; 1014 Vattier.
- EDGAR LEMUEL TAGUE, A. M.,
Assistant Professor of Chemistry (1914); Assistant in Protein Chemistry (1914), Agricultural Experiment Station.
A. B., University of Kansas, 1908; A. M., *ibid.*, 1909. C 3; 617 N. Manhattan.
- ADA RICE, M. S.,
Assistant Professor of English (1899, 1915).
B. S., 1895; M. S., 1912. G 28; 917 Osage.
- JOSEPH HENRY MERRILL, Ph. D.,
Assistant Professor of Entomology (1912, 1915); Assistant Entomologist (1912), Agricultural Experiment Station.
B. S., Dartmouth College, 1905; Ph. D., Massachusetts Agricultural College, 1914. F 52; 626 Moro.
- FORREST FAYE FRAZIER, C. E.,
Assistant Professor of Civil Engineering (1911, 1915).
C. E., Ohio State University, 1910. E 55; 1815 Leavenworth.

1. Resigned.

- MALCOLM CAMERON SEWELL, M. S.,
Assistant Professor of Soils (1914, 1915).
B. S., 1912; M. S., Ohio State University, 1914. Ag 56; 530 N. Fourteenth.
- ALBERT GARLAND HOGAN,¹ Ph. D.,
Assistant Professor of Chemistry (1914; 1916 - Oct. 15, 1919), Agricultural Experiment Station.
A. B., University of Missouri, 1907; B. S., *ibid.*, 1909; A. M., *ibid.*, 1912; Ph. D., Yale University, 1914.
- ROYCE GERALD KLOEFFLER, B. S.,
Assistant Professor of Electrical Engineering (1916).
B. S. in E. E., University of Michigan, 1913. C 33; 831 Vattier.
- ADOLPH GEORGE SCHULZ,¹
Assistant Professor of Athletics and Assistant Coach (1916-May 31, 1920).
Student, University of Michigan, 1904-'08.
- CLINTON ELLICOTT PEARCE, S. B.,
Assistant Professor of Machine Design (1917).
S. B., Massachusetts Institute of Technology, 1919. S 63; 615 N. Eleventh.
- GEORGE MERRITT POTTER,¹ D. V. M.,
Specialist in Veterinary Medicine (1917 - Dec. 31, 1919), Division of College Extension.
D. V. M., Ohio State University, 1906.
- ROSS MADISON SHERWOOD,¹ B. S.,
Specialist in Poultry Husbandry (1914 - Sept. 30, 1919), Division of College Extension.
B. S. in A. H., Iowa State College, 1910.
- LEILA DUNTON, M. S.,
Assistant Professor of English (1916; 1917 - Oct. 16, 1919).
B. S., 1910; M. S., 1912. Ag 40; 325 N. Seventeenth.
- ELIZABETH MACLEAN,⁶ Ph. D., M. Di.,
Assistant Professor of English (1916; 1917 - Oct. 16, 1919).
B. Di., Iowa State Teachers' College, 1894; M. Di., *ibid.*, 1900; Ph. B., University of Chicago, 1909.
- HENRY HUXLEY FENTON, B. S.,
Assistant Professor of Electrical Engineering (1917; Sept. 1, 1919).
B. S. in E. E., 1913. C 33; 1449 Laramie.
- HARLEY JAMES BOWER,² M. S.,
Assistant Professor of Soils (1913; Jan. 1, 1920), Division of College Extension.
B. S., 1910; M. S., Ohio State University, 1912. Ag 60; 419 Leavenworth.
- EARL ARTHUR STEWART, B. S.,
Assistant Professor of Physics (1918).
B. S., University of Chicago, 1915; B. Pd., Michigan State Normal College, 1910.
C 36; College Hill.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

6. Deceased.

- WALTER LEROY LATSHAW, B. S.,
Assistant Professor of Chemistry (1914, 1918).
B. S., Pennsylvania State College, 1912. C 3; 917 Fremont.
- NORMAN EVERETT OLSON, B. S.,
Assistant Professor of Dairy Husbandry (1918).
B. S., Iowa State College, 1915. D 30; 1601 Humboldt.
- WILLIAM HENRY SANDERS, M. E.,
Assistant Professor of Farm Engineering (1914, 1918), in Charge
(July 1, 1919).
B. S., 1890; M. E., 1916. R; N. Manhattan.
- JAMES WALTER ZAHNLEY, B. S.,
Assistant Professor of Farm Crops (1915; Nov. 15, 1919); Assistant
Professor of Education (1915; 1918 - Nov. 15, 1919).
B. S., 1909; B. S. in Agr., 1918. Ag 82; 1131 Laramie.
- HARRY WINFIELD CAVE, M. S.,
Assistant Professor of Dairy Husbandry (1918).
B. S. A., Iowa State College, 1914; M. S., 1916. D 30; 1638 Osage.
- ALICE LLOYD-JONES,¹ M. S.,
Assistant Professor of Education (1918, 1919).
B. S., University of Wisconsin, 1911; M. S., *ibid.*, 1918.
L 64; 331 N. Seventeenth.
- CLYDE WILLIAM MULLEN,¹ M. S.,
Assistant Professor of Farm Crops (1918 - Nov. 1, 1919).
B. S., Oklahoma College of Agriculture and Mechanic Arts, 1915; M. S., 1917.
- CARL G. ELLING,² B. S.,
Assistant Professor of Animal Husbandry (1918; Jan. 1, 1920), Division
of College Extension.
B. S., 1904. A 33; R. R. 1.
- PAUL PORTER BRAINARD, A. M.,
Assistant Professor of Education (1919; Jan., 1920), Home Study
Service, Division of College Extension.
B. L., Whitman College, 1909; A. M., Columbia University, 1913.
A 5; 1114 Vattier.
- HARRY BURDETT WINCHESTER, M. S.,
Assistant Professor of Animal Husbandry (1919).
B. S., Iowa State College, 1916; M. S., *ibid.*, 1917. Ag 13; 1221 Laramie.
- PRESTON ESSEX McNALL,¹ M. S.,
Specialist in Farm Management Studies (1913; 1919 - Sept. 30, 1919),
Division of College Extension.
B. S. in E. E., 1909; B. S. in Agr., 1913; M. S., 1914.
- ALONZO FRANKLIN TURNER,² B. S.,
Assistant State Leader of County Agents (1917; Jan. 1, 1920), Division
of College Extension.
B. S., 1905. A 2; 810 Moro.

1. Resigned.

2. In cooperation with the U. S. Department of Agriculture.

- KARL KNAUS,² B. S.,
Assistant County Agent Leader in Charge (1916; Jan. 1, 1920), Division of College Extension.
B. S., 1914. A 2; 519 N. Manhattan.
- CHARLES HENRY SCHOLER, B. S.,
Testing Engineer (1919), Department of Applied Mechanics and Machine Design, Engineering Experiment Station.
B. S., 1914. E 8A; 1616 Fairview.
- EDGAR TALBERT KEITH, B. S.,
Assistant Professor of Printing (1912; July 1, 1919).
B. S., 1912. K1; 1421 Poyntz.
- HERBERT FREDERICK LIENHARDT, D. V. M.,
Assistant Professor of Pathology (1917; July 1, 1919).
D. V. M., University of Pennsylvania, 1916. V 58; 1015 Fremont.
- FRANK ELMER FOX, B. S.,
Assistant Professor of Poultry Husbandry (1916; July 1, 1919).
B. S., Iowa State College, 1915. Ag 38; 1604 Humboldt.
- FREDERICK LEE HISAW, A. M.,
Assistant Professor of Zoölogy (July 1, 1919); Mammalogist (July 1, 1919), Agricultural Experiment Station.
A. B., University of Missouri, 1914; B. S., *ibid.*, 1915; A. M., *ibid.*, 1916. F 54A; 1622 Osage.
- HEMAN LAURITZ IBSEN, Ph. D.,
Assistant Professor of Genetics (July 1, 1919).
B. S., University of Wisconsin, 1912; M. S., *ibid.*, 1913; Ph. D., *ibid.*, 1916. Ag 15A; 1623 Anderson.
- FREDERICK LUNDY THOMSEN, M. S.,
Assistant Professor of Agricultural Economics (July 1, 1919).
B. S., Maryland State College of Agriculture, 1917; M. S., University of Wisconsin, 1919. Ag 51A; 1725 Anderson.
- ARTHUR FREDERICK PEINE, A. M.,
Assistant Professor of History and Civics (1913; Sept. 1, 1919).
A. B., Illinois Wesleyan University, 1911; A. M., University of Illinois, 1913. F 4; 826 Houston.
- ARTHUR ROY FEHN, Ph. B.,
Assistant Professor of Mathematics (1910; Sept. 1, 1919).
Ph. B., Baldwin Wallace College, 1903. A 70; 1506 Poyntz.
- LOUIS HENRY LIMPER, A. M.,
Assistant Professor of Modern Languages (1914; Sept. 1, 1919).
A. B., Baldwin Wallace College, 1907; A. M., University of Wisconsin, 1914.
- STANLEY ALBERT SMITH, B. S.,
Assistant Professor of Architecture (1913; Sept. 1, 1919).
B. S., 1913. E 58B; 812 Laramie.
- FLORENCE MABELLE HEIZER, A. B.,
Assistant Professor of English (1918; Sept. 1, 1919).
A. B., Bethany College, 1907; A. B., University of Kansas, 1910. A 53; 703 Poyntz.

2. In coöperation with the U. S. Department of Agriculture.

- MARTHA S. PITTMAN, A. M.,
Assistant Professor of Food Economics and Nutrition (Sept. 1, 1919).
B. S., 1906; B. S., Columbia University, 1916; M. S., *ibid.*, 1918.
L 47; 112 S. Twelfth.
- WILLIAM RAYMOND BRACKETT, A. B.,
Assistant Professor of Physics (Sept. 1, 1919).
A. B., University of Colorado, 1905. C 38; 530 Moro.
- CHARLES WILLIAM COLVER, Ph. D.,
Assistant Professor of Organic Chemistry (Sept. 1, 1919).
B. S., University of Idaho, 1909; M. S., *ibid.*, 1911; Ph. D., University of Illinois,
1919. C 64; 1610 Laramie.
- EDWARD CHAPMAN CONVERSE, A. M.,
Assistant Professor of Physics (Sept. 1, 1919).
A. B., University of Illinois, 1904; A. M., *ibid.*, 1909. C 38; College Hill.
- FRANK CALEB GATES, Ph. D.,
Assistant Professor of Botany (Sept. 1, 1919).
A. B., University of Illinois, 1910; Ph. D., University of Michigan, 1912.
H 57; 1218 Bluemont.
- HERBERT ALLEN LORENZ,
Assistant Professor of Physical Education (Sept. 1, 1919).
Graduate, Y. M. C. A. College, Springfield, Mass., 1914. N 35; 523 Houston.
- ELMER LAMONT RHOADES, B. S.,
Assistant Professor of Farm Management (Oct. 1, 1919), Division of
College Extension.
B. S., University of Missouri, 1916. A 2; 523 Pierre.
- ALLAN PARK DAVIDSON, B. S.,
Assistant Professor of Education (Nov. 15, 1919); Associate Principal
of School of Agriculture (Nov. 15, 1919).
B. S., 1914. G 29; 1200 Bertrand.
- WILLIAM EARL PETERSON,² M. S.,
Assistant Professor of Dairy Husbandry (1917; Jan. 1, 1920), Division
of College Extension.
B. S. in Agr., University of Minnesota, 1916; M. S., *ibid.*, 1917.
D 31; 515 Bluemont.
- JULIA MARGARET BAKER ALDER, B. S.,
Assistant Professor of English (1917; Jan. 1, 1920), Home Study
Service, Division of College Extension.
B. S., 1914; Graduate, Kansas State Normal School, 1912.
A 5; 327 N. Fifteenth.
- ROY WILLIAM KISER,² B. S.,
Assistant Professor of Animal Husbandry (1918; Jan. 1, 1920), Di-
vision of College Extension.
B. S., 1914. A 34; 1635 Fairchild.
- GEORGE GEMMELL, B. S.,
Assistant Professor of Agronomy (1918; Jan. 1, 1920), Home Study
Service, Division of College Extension.
B. S., Kansas Manual Training Normal School, 1917. A 5; 411 N. Sixteenth.

2. In coöperation with the U. S. Department of Agriculture.

- RALPH KENNEY, B. S. A.,
Assistant Professor of Crops (1914; Jan. 1, 1920), Division of College Extension.
B. S. A., Ohio State University, 1912. Ag 59; 714 Houston.
- THOMAS ARTHUR CASE, D. V. M.,
Assistant Professor of Veterinary Medicine (1918; Jan. 1, 1920), Division of College Extension.
D. V. M., 1912. V 27; 1324 Laramie.
- HARRY ELKINS DODGE,¹ B. S.,
Assistant Professor of Dairy Husbandry (1918; Jan. 1, 1920-Feb. 29, 1920), Division of College Extension.
B. S. in D. H., 1918.
- FLOYD PATTISON, B. S.,
Assistant Professor of Steam and Gas Engineering (Dec. 15, 1919; Jan. 1, 1920), Home Study Service, Division of College Extension.
B. S., 1912. A 5; 1014 Laramie.
- LOUIS COLEMAN WILLIAMS, B. S.,
Assistant Professor of Horticulture (1915; Feb. 1, 1920), Division of College Extension; Assistant Club Leader (1915; 1917-Feb. 1, 1920), Division of College Extension.
B. S., 1912. H 26; 1110 Vattier.
- ROGER CLETUS SMITH, Ph. D.,
Assistant Professor of Entomology (Feb. 1, 1920).
A. B., Miami University, 1911; A. M., Ohio State University, 1914; Ph. D., Cornell University, 1917. F 64; _____.
- FRANK ANDREW DAWLEY,⁹ B. S.,
Assistant County Agent Leader (1917; Jan. 1, 1920), Division of College Extension.
B. S., 1895. A 2; 303 N. Fourteenth.

ASSOCIATES

- FRANK SWARTZ CAMPBELL,¹ B. S.,
Associate in Food Analysis (Feb. 10, 1919-Dec. 1, 1919).
B. S., 1919.
- HOWARD ROBERT DEROSE, A. B.,
Associate in Food Analysis (Oct. 6, 1919; Dec. 1, 1919); Associate in Stock Remedy Analysis (Oct. 6, 1919-Dec. 1, 1919).
A. B., Colorado University, 1918. CA 30; 346 N. Sixteenth.
- CHARLES HENRY GREINER, A. B.,
Associate in Stock Remedy Analysis (Feb. 20, 1920).
A. B., University of Michigan, 1914. CA 30; 1222 Bluemont.
- GEORGE VANDERVEEN, B. S.,
Associate in Feed-stuffs Analysis (Feb. 21, 1920), Agricultural Experiment Station; Assistant Chemist (April 3, 1919-Jan. 1, 1920), Agricultural Experiment Station.
B. S., University of Chicago, 1919. CA 30; 1623 Anderson.

1. Resigned.

9. Temporary appointment.

INSTRUCTORS

- ANNETTE LEONARD, A. B.,
Instructor in English (1907, 1909).
A. B., University of Kansas, 1906. A 53; 337 N. Fourteenth.
- WILLIAM LEONARD HOUSE,
Instructor in Wood Work (1909); Foreman of Carpenter Shop (1888).
S 29; 608 Moro.
- EDWARD GRANT,
Instructor in Molding (1913); Foreman of Foundry (1913).
S 42; 1733 Laramie.
- INA EMMA HOLROYD, B. S.,
Instructor in Mathematics (1900, 1914).
B. S., 1897; B. S., Kansas State Normal School, 1916. G 28; 1001 Moro.
- EMMA FLORA FECHT,
Instructor in Clothing and Textiles (1913, 1914).
Graduate, Bradley Polytechnic Institute, 1912. L 55; 1623 Fairchild.
- DANIEL EMMETT LYNCH,
Instructor in Forging (1914); Foreman of Blacksmith Shop (1914).
S 38; 1729 Laramie.
- ALICE EDNA SKINNER,⁷ B. S.,
Instructor in Food Economics and Nutrition (1910; Sept. 1, 1919).
B. S., 1909.
- HELEN LOUISE GREEN,⁴ B. S.,
Instructor in Food Economics and Nutrition (1912; Sept. 1, 1919).
B. S., Simmons College, 1915.
- EDWARD C. JONES, B. M. E.,
Instructor in Shop Practice (1916); Foreman of Machine Shop (1916).
B. M. E., Iowa State College, 1905. S 31; 1011 Kearney.
- LOTTIE MILAM, B. S.,
Assistant Club Leader (1917), Boys' and Girls' Club Work, Division
of College Extension.
B. S., Oregon Agricultural College, 1914. A 35; 1419 Laramie.
- JOHN THOMPSON PARKER,
Instructor in Woodwork (1906, 1917).
S 26; College Heights.
- GRACE CUSHING AVERILL,⁸
Instructor in Applied Art (1913, 1917).
Graduate, Wisconsin State Normal School, 1906. A 68; 1412 Leavenworth.
- MINNIE SEQUIST, A. B.,
Specialist in Home Economics, Division of College Extension (1916).
A. B., Kansas State Normal School; Graduate, Stout Institute, 1916.
A 36; 1020 Leavenworth.
- DORIS MARJORIE BUGBEY,¹ Mus. B.,
Instructor in Theory of Music (1917; Sept. 1, 1919-June 1, 1920).
Mus. B., Conservatory of Music, Oberlin College, 1918. M 4; 535 N. Manhattan.

1. Resigned.

4. Absent on leave, 1919-'20.

7. Absent on leave, first semester, 1919-'20.

8. Absent on leave, Sept. 1, 1919, to June 1, 1920.

- EULA BERNICE BÜTZERIN,¹ R. N.,
Specialist in Home Economics (1917-Dec. 1, 1919), Division of College Extension.
R. N., School for Nurses, Presbyterian Hospital, Chicago, 1914.
- MANFORD W. FURR, B. S.,
Instructor in Highway Engineering (1917).
B. S. in C. E., Purdue University, 1913. E 55; 816 Pierre.
- JOHN B. GINGERY,¹ D. V. M.,
Instructor in Surgery and Medicine (1917; July 1, 1919-Dec. 1, 1919).
D. V. M., 1910.
- PAUL REVERE IMEL,¹ B. S.,
Specialist in Pig and Baby Beef Club Work (1917-Dec. 31, 1919),
Division of College Extension.
B. S., Purdue University, 1917.
- WILMA OREM, A. M.,
Instructor in History and Civics (1917).
B. S., 1910; A. M., University of Michigan, 1916. G 28; R. R. 3.
- MARGARET RUSSEL, A. M.,
Instructor in English (1917).
A. B., Washburn College, 1913; A. M., Columbia University, 1915.
A 54; 1412 Leavenworth.
- ELSIE HARRIET SMITH,
Instructor in Piano (1917).
Graduate, Certificate Course, Chicago Musical College, 1909.
M 58; 1512 Leavenworth.
- ALBERT JOHN MACK, B. S.,
Instructor in Steam and Gas Engineering (1917).
B. S., 1912. E 26; 1512 Poyntz.
- SUSANNA SCHNEMAYER, B. S.,
Specialist in Home Economics (1917), Extension Schools, Division of
College Extension.
B. S., 1909. A 36; 510 N. Ninth.
- KATHERINE KIMMEL,
Instructor in Voice (1917).
Graduate, Battle Creek (Mich.) Conservatory of Music, 1913. M 52; 1201 Moro.
- HERBERT HENLEY HAYMAKER, M. S.,
Instructor in Botany (1917).
B. S., 1915; M. S., University of Wisconsin, 1916. H 54; 315 N. Sixteenth.
- LASSIE LANE,¹
Specialist in Extension Schools (1918 - Oct. 1, 1919), Division of College Extension.
- GERTRUDE LYNN,
Specialist in Institutes in Home Economics (1918), Division of College Extension.
Graduate, Kansas State Manual Training Normal School, 1907.
A 36; 1020 Leavenworth.

1. Resigned.

- RENA AURELIA FAUBION,² B. S.,
Specialist in Dairying (1918; July 1, 1919), Division of College Extension.
B. S., 1910. A 36; 1419 Laramie.
- HAROLD SIMONDS,¹ B. S.,
Specialist in Horticulture (1918 - Jan. 31, 1920), Division of College Extension.
B. S., Washington State College, 1916.
- JOSEPHINE CARRIER PERRY, B. S.,
Instructor in Food Economics and Nutrition (1916; Sept. 1, 1919).
B. S., Simmons College, 1914. L 34; 1201 Moro.
- EDWARD STAUNTON WEST, A. B.,
Instructor in Chemistry (1917; Sept. 1, 1918).
A. B., Randolph Macon College, 1917. C 64; 1623 Anderson.
- STELLA MAUDE HARRISS, M. S.,
Instructor in Chemistry (1917, 1918).
B. S., 1917; Graduate, (Peru) Nebraska State Normal School, 1908; M. S., 1919.
W 26; 804 Moro.
- LOIS EMILY WITHAM, M. S.,
Instructor in Bacteriology (1917, 1918).
B. S., 1916; M. S., 1918. V 53; 1324 Laramie.
- NORA ELIZABETH DALBEY, A. M.,
Instructor in Botany (1918).
A. B., University of Kansas, 1913; A. M., *ibid.*, 1914. H 54; 350 N. Sixteenth.
- ODESSA DELLA DOW, B. S.,
Instructor in Chemistry (1918).
B. S., 1906. C 64; R. R. 1.
- ERNEST BAKER KEITH, B. S.,
Instructor in Chemistry (1918).
B. S., 1913. W 26; 1031 Humboldt.
- ELIAS WARD MARKLE,¹ B. S.,
Instructor in Electrical Engineering (1918-Feb. 29, 1920).
B. S. in E. E., Pennsylvania State College, 1913.
- IZIL ISABEL POLSON, B. S.,
Instructor in Industrial Journalism (1918).
B. S., 1916. K 59; 1111 Bluemont.
- BESS JANE MCKITTRICK, A. B.,
Instructor in Mathematics (1918).
A. B., University of Kansas, 1912. G 28A; 1636 Fairchild.
- ALICE LENORE BROWN, A. B.,
Instructor in Zoölogy (1918).
A. B., University of Kansas, 1916. F 61; 321 N. Fourteenth.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

- KATHERINE MAXWELL BOWER, B. S.,**
Instructor in English (1918; Nov. 1, 1919); Specialist in Home Economics (1918 - Nov. 1, 1919), Home Study Service, Division of College Extension.
B. S., 1915. A 54; 510 N. Ninth.
- LEON VINCENT WHITE, C. E.,**
Instructor in Civil Engineering (1918).
B. S., 1903; C. E., 1918. E 55; 1733 Anderson.
- IRA EARL TAYLOR,¹ C. E.,**
Assistant Drainage and Irrigation Engineer (1918 - Dec. 31, 1919), Division of College Extension.
B. S. in C. E., 1913; C. E., 1918.
- FRED HARRISON BUNDY,¹**
Instructor in Shop Practice (1916; 1919-Mar. 10, 1920).
- HERBERT C. STROM,**
Instructor in Automobiles (1918, 1919). S 62; 1209 Poyntz.
- LILLIE CILLEY, B. L. S.,**
Head Cataloguer in Library (1918, 1919).
A. B., Grinnell College, 1914; B. L. S., University of Illinois, 1917. F 27; 1725 Fairchild.
- MARY MATTIE McDONALD, Ph. B.,**
Instructor in Clothing and Textiles (1916, 1919).
Ph. B., University of Chicago, 1916; Graduate, Eastern Illinois State Normal School, 1910; Graduate, Bradley Polytechnic Institute, 1912. L 64; 1631 Fairchild.
- AUBREY DEAKENS CONROW, B. S.,**
Assistant Testing Engineer (1919), Department of Applied Mechanics and Machine Design, Engineering Experiment Station.
B. S., 1913. E 8; R. R. 1.
- CLIFF ERRETT AUBEL, M. S.,**
Instructor in Animal Husbandry (1919).
B. S., Pennsylvania State College, 1915; M. S., 1917. Ag 13; 1623 Anderson.
- W. PEARL MARTIN,**
Specialist in Home Nursing (June 15, 1919), Division of College Extension.
Graduate, Christ Hospital, Topeka.
- MARY WINONA WARD,**
Instructor in Household Economics and Director of the Cafeteria (1917; July 1, 1919). K 30; 1641 Fairchild.
- HARVEY HARLOWE NININGER,⁹ A. M.,**
Specialist in Entomology (June 5 - Sept. 5, 1919), Division of College Extension.
A. B., McPherson College, 1914; A. M., Pomona College, 1916.
- EFFIE ADAMS,⁹ B. S.,**
Instructor in Institutional Cookery (June 6 - Aug. 8, 1919).
B. S., 1911.

1. Resigned.

9. Temporary appointment.

- ALICE LOUISE HUGHES,⁹
Instructor in Public School Music Methods (June 6 - Aug. 8, 1919).
Graduate, Illinois Women's College, 1914.
- SAMUEL PATTERSON LYLE,⁹
Instructor in Farm Engineering (June 6 - Aug. 8, 1919).
- KATHRYN ANN TUCKER,⁹ B. S.,
Instructor in Lunch Room Management (June 6-28, 1919).
B. S., 1912.
- ARMIN MEREDITH DOERNER,¹ B. S.,
Instructor in Horticulture (1916; July 1, 1919 - Feb. 1, 1920).
B. S., Oregon Agricultural College, 1916.
- WILLIAM FRANCIS PICKETT, B. S.,
Instructor in Horticulture (1917; July 1, 1919).
B. S., 1917. 1209 Bluemont.
- FLOYD W. ATKESON, B. S.,
Instructor in Dairy Husbandry (1918; July 1, 1919).
B. S. in Agr., University of Missouri, 1918. D 30; 1623 Anderson.
- LYMAN RAY VAWTER, D. V. M.,
Instructor in Pathology (1918; July 1, 1919).
D. V. M., 1918. V 56; 331 N. Seventeenth.
- FLOYD ALONZO SMUTZ, B. S.,
Instructor in Drawing (1918; July 1, 1919).
B. S. in Arch., 1914. S 63; 912 Fremont.
- HARRY WORKMAN AIMAN,
Instructor in Carpentry (1918; July 1, 1919). S 26; 728 Poyntz.
- FRED ROBERT BEAUDETTE, D. V. M.,
Instructor in Bacteriology (July 1, 1919).
D. V. M., 1919. V 53; 1025 Bluemont.
- MARION HARRISON,
Instructor in Clothing and Textiles (1914; Sept. 1, 1919).
Graduate, Mechanics Institute, 1913. L 65; 1201 Moro.
- FLORENCE HUNT,
Instructor in Clothing and Textiles (1914; Sept. 1, 1919).
Graduate, Pratt Institute, 1910. L 64; 1412 Leavenworth.
- JOSEPH PRESTWICH SCOTT, D. V. M.,
Instructor (1916; Sept. 1, 1919), Department of Vaccine Laboratories.
B. S., Scientific Gymnasium, Lausanne, Switzerland, 1910; D. V. M., Ohio State University, 1914. V 2; 1605 Leavenworth.
- EDITH LORRAINE BOND, A. B.,
Instructor in Physical Training for Women (1917; Sept. 1, 1919).
A. B., University of Wisconsin, 1917. N 3; 421 N. Sixteenth.
- VERA ANNE McCOY, B. S.,
Instructor in Household Economics (1918; Sept. 1, 1919).
B. S., 1917. L 28; 1409 Anderson.

1. Resigned.

9. Temporary appointment.

- S. FRED PRINCE,
Biological Artist (1918; Sept. 1, 1919).
I —; 805 Kearney.
- NINA BESS CURRY,
Instructor in Voice (June 6, 1919; Sept. 1, 1919); Assistant in Music
(June 6 to Aug. 8, 1919).
M 52; 1441 Laramie.
- CHARLES DEGUIRE CHRISTOPH, A. B.,
Instructor in English (1916; Sept. 1, 1919).
A. B., University of Michigan, 1912. A 55; 1623 Anderson.
- GRACE WAUGH BOWMAN,¹⁰
Instructor in Public Speaking (Sept. 1, 1919).
Graduate, University of Kansas, 1910; Graduate, Leland Powers School of the Spoken
Word, Boston, 1912. G 55; 630 Bluemont.
- VINA MARY BRAZLETON, B. M.,
Instructor in Piano (Sept. 1, 1919).
B. M., Bush Conservatory, Chicago, 1918. Barracks; 900 Leavenworth.
- BERENICE FULLER, B. S.,
Instructor in English (Sept. 1, 1919).
B. S., Washburn College, 1904. A 55; 817 Osage.
- HELEN MABEL HANNEN,
Instructor in Violin (Sept. 1, 1919).
Graduate, Malek School of Music, Grand Rapids, Mich., 1917; Graduate, Department
of Public School and Community Music, Northwestern University, 1919. M 53; 1441 Laramie.
- MARIE ADALINE HEDRICK, B. L. S.,
Head of Circulation Department in Library (Sept. 1, 1919).
A. B., University of Kansas, 1915; B. L. S., University of Illinois, 1919.
F 31; 421 N. Sixteenth.
- LEONARD SINCLAIR HOBBS, B. S.,
Instructor in Steam and Gas Engineering (Sept. 1, 1919).
B. S., Texas College of Agriculture and Mechanic Arts, 1916. E 27A; 1709 Laramie.
- MABEL LOUISE LEFFLER, Mus. B.,
Instructor in Piano (Sept. 1, 1919).
Mus. B., Oberlin Conservatory of Music, 1910. M 55; 1638 Osage.
- EDITH MAUDE LING,
Instructor in Piano (Sept. 1, 1919).
Graduate in Music, Northwestern University, 1916. A —; 900 Leavenworth.
- ARNOLD LEONE LOVEJOY,
Instructor in Voice (Sept. 1, 1919).
M 51; 309 N. Sixteenth.
- T. MARK McDONALD, B. S.,
Instructor in Chemistry (Sept. 1, 1919).
B. S., University of Chicago, 1909. CA 26; 340 N. Sixteenth.
- DORA MARIE OTTO,¹⁰ B. S.,
Instructor in Food Economics and Nutrition (1916; Sept. 1, 1919).
B. S., 1911. L 34; 725 Houston.

10. Temporary appointment, year 1919-'20.

- JULES HENRY ROBERT, B. S.,
Instructor in Drawing (1916; Sept. 1, 1919).
B. S., 1914. E 53; 1623 Anderson.
- HERSCHEL SCOTT,¹ M. S.,
Instructor in Soils (Sept. 1, 1919 - Feb. 20, 1920).
B. S. Agr., University of Kentucky, 1915; M. S., 1917.
- GABE ALFRED SELLERS, B. S.,
Instructor in Shop Practice (Sept. 1, 1919).
B. S., 1917. S 62; 1729 Laramie.
- WILBUR NEILSON SKOURUP, B. S.,
Instructor in Chemistry (Sept. 1, 1919).
B. S., 1915; A. B., University of Kansas, 1916. CA 31; 805 Houston.
- MARY FIDELIA TAYLOR, B. S.,
Instructor in Physics (Sept. 1, 1919).
B. S., 1919. C 36; 914 Moro.
- HAROLD PARKER WHEELER,
Instructor in Orchestral and Band Instruments (Sept. 1, 1919); Band
Leader (Sept. 1, 1919). M 29; 1018 Leavenworth.
- ANDREW WINTER,
Instructor in Automobiles (Sept. 1, 1919). E 52A; 120Q Bertrand.
- BRENTON CREAMER ZIMMERMAN, M. S. Agr.,
Instructor in Animal Husbandry (Sept. 1, 1919).
B. S. in Agr., Ohio State University, 1917; M. S. Agr., University of Missouri, 1918.
Ag 13A; 1709 Laramie.
- MERRILL AUGUSTUS DURLAND, B. S.,
Instructor in Mechanical Drawing (Sept. 10, 1919).
B. S., 1918. S 63; 1116 Bluemont.
- JOHN DWIGHT PARSONS, B. S.,
Instructor in Farm Engineering (Sept. 15, 1919).
B. S. in M. E., 1915. R 54; 616 Poyntz.
- MIRIAM RUSSELL SPICER, A. B.,
Instructor in Chemistry (Sept. 22, 1919).
A. B., University of Kansas, 1917. CA 26; 335 N. Fifteenth.
- WILLIAM MAX McLEOD, D. V. M.,
Instructor in Anatomy and Physiology (Oct. 1, 1919).
D. V. M., Iowa State College, 1917. V 32; 413 Houston.
- OHMER ROGER MILLER,¹⁰ B. S.,
Instructor in Physics (Oct. 9, 1919).
B. S. in E. E., 1918. C 61; 1219 Bluemont.
- MYRTIE VAN DEUSEN ROUSE,⁹ A. M.,
Instructor in Food Economics and Nutrition (Oct. 27, 1919 - Jan. 24,
1920).
B. S., Columbia University, 1912; A. M., *ibid.*, 1916.

1. Resigned.

9. Temporary appointment.

10. Temporary appointment, 1919-'20.

- EARL ALBERT MARTIN,¹⁰ A. M.,
 Instructor in Zoölogy (Nov. 1, 1919).
 A. B., University of Missouri, 1914; A. M., *ibid.*, 1916.
- EDWIN JACOB FRICK, D. V. M.,
 Instructor in Surgery and Medicine (Dec. 1, 1919).
 D. V. M., Cornell University, 1918. V 33; 1623 Anderson.
- NORTON LEWIS HARRIS,
 Instructor in Poultry Husbandry (Feb. 1, 1920), Division of College
 Extension. Ag 38A; ———.
- ANNETTE WOODWARD PERRY,⁹ B. S.,
 Instructor in History and Civics (Feb. 10 - June 1, 1920).
 B. S., 1916.
- EUGENE SIDNEY LYONS, B. S.,
 Instructor in Soils (Feb. 23, 1920).
 B. S., 1920. Ag 55; 1000 Laramie.
- HELEN W. FORD, B. S.,
 Instructor in Household Economics (April 15, 1920), Home Study
 Service, Division of College Extension.
 B. S., Rhode Island State College, 1914. A 5A; ———.
- ASSISTANTS
- JESSIE GULICK,
 Assistant Cataloguer in Library (1907, 1911). F 27; 421 N. Sixteenth.
- ALANSON LOLA HALLSTEAD, B. S.,
 Assistant in Dry Farming (1910), Fort Hays Branch Agricultural Ex-
 periment Station. Hays, Kan.
 B. S., 1903.
- BRUCE STEINHOFF WILSON, B. S.,
 Assistant in Coöperative Experiments (1910, 1912).
 B. S., 1903. Ag 60; 514 N. Manhattan.
- ASHER EULESTA LANGWORTHY, Ph. C.,
 Feeding-stuffs Inspector (1912), Agricultural Experiment Station.
 Ph. C., University of Kansas, 1911. Ag 26; 1709 Laramie.
- ROBERT GETTY,² B. S. A.,
 Assistant in Forage Crops (1913), Fort Hays Branch Agricultural
 Experiment Station. Hays, Kan.
 B. S. A., University of Nebraska, 1913.
- WILLIAM PATRICK HAYES, M. S.,
 Assistant in Entomology (1913, 1914).
 B. S., 1913; M. S., 1918. F 54A; 319 Denison.

2. In coöperation with the U. S. Department of Agriculture.

9. Temporary appointment.

10. Temporary appointment, 1919-'20.

- OTIS EVERETT STRODTMAN,² D. V. S.,
Deputy Inspector and College Representative (1914), Marshall County
Cholera Eradication Project.
D. V. S., Kansas City Veterinary College, 1911. Marysville, Kan.
- HUGH DURHAM, A. M.,
Assistant to the Dean of the Division of Agriculture (1915); Assistant
to the Director of the Agricultural Experiment Station (1915, 1918).
Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909;
A. M., *ibid.*, 1915. Ag 30; 730 Osage.
- MABEL GERTRUDE BAXTER,
Class Reserves Assistant in Library (1916). F 31; 1624 Fairchild.
- LESTER HENRY DRAYER,
Assistant in Heat and Power (1916). E 3; 1201 Kearney.
- LENA LETITIA PRICE,
Assistant to the President (1912; July 1, 1919).
A 30; 1642 Fairchild.
- ELIZABETH PERRY HARLING,
Seed Analyst (1912, 1917). Ag 77; 628 Fremont.
- GRACE ROBERTA HESSE, A. B.,
Assistant in Modern Languages (1917).
A. B., University of Michigan, 1917. N 60; 1409 Anderson.
- HARRIET WRIGHT ALLARD,
Assistant in Home Economics (1917), Extension Schools, Division of
College Extension. A 36; 510 N. Ninth.
- HENRY JAMES ALLEN,
Assistant in Heat and Power (1914, 1917). E 27; 330 Vattier.
- GEORGE HERBERT PHINNEY,
Assistant in Agronomy (1917); Foreman of Agronomy Farm (1917).
Graduate, Topeka Business College, 1903. Agronomy Farm.
- CHESTER WILLIS OAKES,
Miller, Department of Milling Industry (1918).
Ag 26C; 1031 Vattier.
- HAROLD ARTHUR PRATT,¹ B. S.,
Assistant in Horticulture (1918-Feb. 1, 1920); Foreman of Green-
houses (1918-Feb. 1, 1920).
B. S., Massachusetts Agricultural College, 1917.
- CYRUS EARL BUCHANAN,
Assistant in Feed Control (1912, 1918). Ag 26A; 521 Vattier.
- MABLE CALDWELL, B. S.,
Assistant to Superintendent of Institutes and Extension Schools
(1918), Division of College Extension.
B. S., Oklahoma College of Agriculture and Mechanic Arts, 1918.
A 34; 1408 Fairchild.

1. Resigned.

2. In cooperation with the U. S. Department of Agriculture.

- CORA ALBERTA PITMAN, B. S.,
Assistant to the Registrar (1918).
B. S. in H. E., 1916. A 29; 730 Yuma.
- RUTH EVALYN HURD, B. S.,
Assistant in Zoölogy (1918).
B. S., Carthage College, 1918. F 55; 317 N. Seventeenth.
- BRUCE BUNYAN SMITH,
Assistant in Farm Engineering (1918). R 26; 830 Laramie.
- NATHAN DANIEL HARWOOD, D. V. M.,
Assistant in Vaccine Laboratories (1918; July 1, 1919).
D. V. M., 1918. V 32; 340 N. Sixteenth.
- GEORGE CALVIN GIBBONS,¹ B. S.,
Assistant to Superintendent (1918-Oct. 31, 1919), Fort Hays Branch
Agricultural Experiment Station.
B. S. in Agr., 1918.
- MARTHA LIVINGSTON DENNY, A. M.,
Assistant in Zoölogy (1918); Assistant in Genetics (1918), Agricul-
tural Experiment Station.
A. B., Indiana University, 1917; A. M., *ibid.*, 1919. Insectary; 1430 Poyntz.
- MARGARET ELEANOR MOORE, B. S.,
Assistant in Blackleg Vaccine Production (1918).
B. S., 1914. V 24; 1214 Bluemont.
- MORRILL THORNTON DOW, B. S.,
Assistant in Physics (1918).
B. S., Ottawa University, 1917. C 39; 1100 Moro.
- FRANK MARION AIMAN,
State Feeding-stuffs Inspector (1919). Ag 26B; 528 Laramie.
- EDDIE GRANELL,
Assistant in Shop Practice (1919). S 38; 809 Vattier.
- SAMUEL JAMES MOLBY,
Assistant in Farm Engineering (1919).
B. S., 1917; B. S. in Agr., 1918.
- CLARENCE ROY JACCARD, B. S.,
Nurseryman (1919), Fort Hays Branch Agricultural Experiment
Station. Hays, Kan.
B. S. in Agr., 1914.
- SELMA MARIE FOBERG,
Office Assistant to the Dean (Apr. 1, 1919), Division of College Ex-
tension. A 33; 1743 Fairchild.
- WILLIAM PRESTON TUTTLE,⁹ B. S. A.,
Assistant in Soil Survey (June 1-June 26, 1919).
B. S. A., University of Kentucky, 1915.

* 1. Resigned.
9. Temporary appointment.

- ESTHER FAYMAN,
Secretary to the President (June 1, 1919).
A 30; 1425 Laramie.
- GEORGE YOEMAN BLAIR,⁹ B. S.,
Assistant in Soil Survey (June 26, 1919-Dec. 31, 1919).
B. S., 1919.
- CLARA ELIZABETH HIGGINS, B. S.,
Research Assistant in Poultry Husbandry (July 1, 1919).
B. S., 1919. Poultry Farm; 1423 Fairchild.
- ALICE MAUDE MELTON, B. S.,
Secretary to the Dean of the Division of General Science (July 1,
1919).
B. S., 1898. A 49; 804 Moro.
- JOHN VICTOR ROLANDER,
Assistant in Heat and Power (July 1, 1919).
E 27; 517 Kearney.
- RAYMOND HAZELTON WHITENACK, B. S.,
Deputy State Dairy Commissioner (July 1, 1919).
B. S., 1916. X 26; 1216 Laramie.
- MADGE GLADYS AUSTIN,¹ B. S.,
Class Reserves Assistant in Library (Sept. 1 - Dec. 1, 1919).
B. S., 1919.
- GEORGIA KILBOURN BALDWIN, B. S.,
Assistant in Household Economics (Sept. 1, 1919).
B. S., 1913. K 30; 714 Poyntz.
- WINIFRED BARTHOLF, A. B.,
Assistant in Physical Education (Sept. 1, 1919).
A. B., University of Wisconsin, 1919. N 3; 1824 Humboldt.
- FREDERICK HERBERT BUDDEN,
Laboratory Assistant in Applied Mechanics and Machine Design
(1917; Sept. 1, 1919):
E 8; R. R. 2.
- EDWARD L. CLAEREN,
Secretary to the Commandant (1910; Sept. 1, 1919).
N 27; 900 Pierre.
- PERCY LEROY DEPUY, B. S.,
Assistant in Zoölogy (Sept. 1, 1919).
B. S., 1918. F 5; 1725 Leavenworth.
- LOUISE HELEN EVERHARDY,
Assistant in Applied Art (Sept. 1, 1919).
A 67B; 1417 Laramie.
- BLANCH SHIRLEY FRENCH,² B. S.,
Research Assistant in Agricultural Economics (Sept. 1, 1919).
B. S., 1919. Ag 51A; 1423 Fairchild.
- EARL MARTIN HIESTAND,² B. S.,
Research Assistant in Agricultural Economics (Sept. 1, 1919).
B. S., 1919. Holton, Kan.

1. Resigned.

2. In coöperation with the U. S. Department of Agriculture.

9. Temporary appointment.

- CARL FOUNTAIN HUFFMAN, B. S.,
Assistant in Dairy Husbandry (Sept. 1, 1919).
B. S., 1917. D 30; 1623 Anderson.
- CHARLES HOWARD KITSELMAN, D. V. M.,
Assistant in Pathology.
D. V. M., University of Pennsylvania, 1918. V 58; 1015 Fremont.
- RUTH EUGENIA SANKEE, A. B.,
Reference Assistant in Library (Sept. 1, 1919).
A. B., University of Kansas, 1914. F 35; 1419 Laramie.
- RUTH KATHRYN TRAIL, B. S.,
Assistant in Food Economics and Nutrition (Sept. 1, 1919).
B. S., Connecticut College for Women, 1919. L 53; 730 Osage.
- GRACE ELLEN UMBERGER, B. S., R. N.,
Assistant to the College Physician (Sept. 1, 1919).
[B. S., 1905; R. N., Illinois Training School for Nurses, 1909.
A 65; 1104 Vattier.
- MARION JULIA WILLIAMS, B. S.,
Assistant in Food Economics and Nutrition (Sept. 1, 1919).
B. S., Connecticut College for Women, 1919. L 53; 319 N. Fifth.
- EDITH WILLMANN, A. B.,
Assistant in Zoölogy (Sept. 1, 1919).
A. B., Barnard College, Columbia University, 1919. F 62; 800 Houston.
- MARY ABBIE WORCESTER, B. S.,
Assistant in Clothing and Textiles (Sept. 1, 1919).
B. S., New Hampshire College, 1917. L 65; 1725 Fairchild.
- FRANCIS GEORGE WELCH, B. S.,
Assistant in Animal Husbandry (Sept. 6, 1919), Home Study Service,
Division of College Extension.
B. S., Kansas State Normal School, 1918. A 5; 1224 Fremont.
- CHARLES CLAIRMONT VASEY, B. S.,
Deputy State Dairy Commissioner (Sept. 22, 1919).
B. S., University of Nebraska, 1917. X 26; 1416 Laramie.
- MARY AVIS BLAIN, B. S.,
Assistant in Physical Education for Women (Sept. 29, 1919).
B. S., 1919. N 3; 343 N. Fourteenth.
- DOROTHY JOSEPHINE CASHEN, B. S.,
Assistant in Botany (Sept. 29, 1919).
B. S., Carthage College, 1917. H 57B; 1015 Fremont.
- ALBERT HARRISON KERNS,
Assistant to the Superintendent (Nov. 1, 1919), Fort Hays Branch
Agricultural Experiment Station. Hays, Kan.
- MARY ISABEL SCHELL,⁹
Assistant in Applied Art (Nov. 5, 1919 - May 31, 1920).
Normal Graduate, Art Institute, Chicago, Ill., 1919.

9. Temporary appointment.

- LUELLA CORY, A. B.,
General Assistant in Library (Nov. 24, 1919).
A. B., University of Kansas, 1916. F 3; 1419 Laramie.
- HUBERT ALOYSIUS McNAMEE,⁹
Assistant in Farm Engineering (Dec. 1, 1919 - Mar. 1, 1920).
Graduate, Air Service Mechanics School, 1918.
- FLORENCE LILLIAN DIAL, B. S.,
General Assistant in Library (Dec. 1, 1919).
B. S., 1919. F 3; 1030 Moro.
- CHARLES RANGER ENLOW, B. S.,
Research Assistant in Agricultural Economics (Dec. 15, 1919).
B. S., 1920. McPherson, Kan.
- JOSEPH NATHANIEL LUDEN,⁹
Assistant in Farm Engineering (Jan. 1 - Mar. 1, 1920).
- MORRIS EVANS,⁹
Teaching Assistant in Agricultural Economics (Jan. 1-May 31, 1920).
Ag 51A; 1504 Humboldt.
- STANLEY PAUL HUNT,⁹ B. S.,
Assistant in Applied Mechanics (Jan. 26 - May 31, 1920).
B. S., 1919. S 63; 619 Thurston.
- LORPAID CARL TEETER,⁹ B. S.,
Assistant in Applied Mechanics (Jan. 26 - May 31, 1920).
B. S., 1917. S 63; 614 Bluemont.
- GLADYS GARNAND RUDE, B. S.,
Assistant in Zoölogy (Feb. 1, 1919).
B. S., 1919. F 64; 344 N. Fifteenth.
- ROBERT MCKINLEY GOODWIN,⁹
Assistant in Farm Engineering (Mar. 1 - May 31, 1920).
R 28; 724 Laramie.
- JOHN WORLEY TATTERSHALL,
Assistant in Heat and Power (Mar. 1, 1920).
E 26B; 831 Laramie.
- PERTTU HANNES VIRTANEN, B. S.,
Assistant in Horticulture (July 1, 1920).
B. S., 1920.

SUPERINTENDENTS

- JACOB LUND, M. S.,
Superintendent of Heat and Power (1893, 1901); Custodian of Buildings and Grounds (1893, 1917).
B. S., 1883; M. S., 1886. E 26B; 1414 Fairchild.

9. Temporary appointment.

CHARLES ROZELL WEEKS, B. S.,
Superintendent (1916), Fort Hays Branch Agricultural Experiment
Station (1916).

B. S., University of Nebraska, 1907; B. Ed., Nebraska State Normal School, Peru,
Neb., 1912. Hays, Kan.

JOHN JASPER BAYLES, B. S.,
Superintendent (1918), Colby Branch Agricultural Experiment Sta-
tion.

B. S., 1915. Colby, Kan.

CARL IVAR MATTSON,¹
Superintendent (1918 - Mar. 1, 1919), Tribune Branch Agricultural
Experiment Station.

Tribune, Kan.

HAROLD BAYLISS MUGGLESTONE,
Superintendent of Poultry Farm (1918).

Poultry Farm.

CHARLES WESLEY HOBBS, D. V. S.,
Superintendent of Vaccine Laboratories (1913; July 1, 1919).

D. V. S., Western Veterinary College, 1901. V 31; 303 N. Sixteenth.

GEORGE RICHARD PAULING,
Superintendent of Building and Repair (1916; July 1, 1919).

S 34; 1017 Fremont.

FAY ARTHUR WAGNER, B. S.,
Superintendent (July 1, 1919), Garden City Branch Agricultural Ex-
periment Station.

B. S. in Agr., New Mexico Agricultural College, 1916. Garden City, Kan.

G. E. LOWREY,
Superintendent (Mar. 1, 1920), Tribune Branch Agricultural Experi-
ment Station.

Tribune, Kan.

AGRICULTURAL AGENTS²

WILLIAM ARMFIELD BOYS, B. S.,
Sumner County Agricultural Agent (1912, 1918), Division of College
Extension.

B. S., 1904. Wellington, Kan.

EVEREST JOHN MACY, B. S.,
Sedgwick County Agricultural Agent (1913, 1918), Division of Col-
lege Extension.

B. S., Earlham College, 1904. Wichita, Kan.

OTTO C. HAGANS,¹ B. S.,
Atchison County Agricultural Agent (1914, 1918 - Dec. 31, 1919), Divi-
sion of College Extension.

B. S., 1914. Effingham, Kan.

VALENTINE MEACHAM EMMERT, B. S.,
McPherson County Agricultural Agent (1916), Division of College
Extension.

B. S., 1901. McPherson, Kan.

1. Resigned.
2. All agricultural agents are employed coöperatively by the College and the U. S.
Department of Agriculture, and in case of county agents in coöperation with the county
farm bureaus.

- RAYMOND OLIVER SMITH, B. S.,
Douglas County Agricultural Agent (1916; Jan. 10, 1920), Division
of College Extension; Wilson County Agricultural Agent (1916-
Jan. 9, 1920), Division of College Extension.
B. S. in Agr., University of Nebraska, 1915. Lawrence, Kan.
- RALPH POWELL SCHNACKE, B. S.,
Pawnee County Agricultural Agent (1916), Division of College Ex-
tension.
B. S., 1916. Larned, Kan.
- IRA NICHOLS CHAPMAN, B. S.,
Leavenworth County Agricultural Agent (1916), Division of College
Extension.
B. S., 1916. Leavenworth, Kan.
- PRESTON ORIN HALE,¹ B. S.,
Chase County Agricultural Agent (1917 - Jan. 31, 1920), Division of
College Extension.
B. S., 1916. Cottonwood Falls, Kan.
- RAYMOND WALTER SCHAFER, M. S.,
Washington County Agricultural Agent (1917), Division of College
Extension.
B. S., 1914; M. S., University of Wisconsin, 1917. Washington, Kan.
- FLOYD JOE ROBBINS, B. S.,
Franklin County Agricultural Agent (1917), Division of College Ex-
tension.
B. S., 1913. Ottawa, Kan.
- WILHELM ALEXANDER WUNSCH,¹ B. S.,
Harvey County Agricultural Agent (1917, 1918 - Feb. 29, 1920), Divi-
sion of College Extension.
B. S., 1917. Newton, Kan.
- WILBUR WILLIAM WRIGHT, B. S.,
Greenwood County Agricultural Agent (1917, 1918), Division of Col-
lege Extension.
B. S., 1917. Eureka, Kan.
- CHARLES D. THOMPSON, B. S. D.,
Neosho County Agricultural Agent (1918), Division of College Ex-
tension.
B. S. D., Warrensburg (Mo.) State Normal School, 1895. Erie, Kan.
- ALBERT CECIL HANCOCK,¹ B. S.,
Cherokee County Agricultural Agent (1918 - Sept. 30, 1919), Division
Division of College Extension.
B. S. in Agr., 1918. St. Francis, Kan.
- EDWIN ISAAC MARIS, B. S.,
Rawlins County Agricultural Agent (1918), Division of College Ex-
tension.
B. S., 1916. Atwood, Kan.
- EARL JOSEPH WILLIS,¹ B. S.,
Cherokee County Agricultural Agent (1918 - Sept. 30, 1919), Division
of College Extension.
B. S., 1914. Columbus, Kan.

1. Resigned.

- JOHN W. THORNBURGH,¹ C. E.,
Hodgeman County Agricultural Agent (1918 - Sept. 30, 1919), Division of College Extension.
C. E., Campbell College, 1888. Jetmore, Kan.
- AVERY CLEVELAND MALONEY, B. S.,
Bourbon County Agricultural Agent (1918), Division of College Extension.
B. S., 1918. Fort Scott, Kan.
- EDWARD H. LEKER, B. S. A.,
Jackson County Agricultural Agent (1918), Division of College Extension.
B. S. A., University of Missouri, 1917. Holton, Kan.
- HERBERT LYNNE HILDWEIN, B. S.,
Kingman County Agricultural Agent (1917, 1918), Division of College Extension.
B. S., 1914. Kingman, Kan.
- HAYS MARION COLE,
Montgomery County Agricultural Agent (1918), Division of College Extension.
Independence, Kan.
- FRANK SUMNER TURNER, B. S.,
Anderson County Agricultural Agent (1918), Division of College Extension.
B. S., 1917. Garnett, Kan.
- JOE MYRON GOODWIN,
Jefferson County Agricultural Agent (1919), Division of College Extension.
Valley Falls, Kan.
- LOUIS EDWARD HOWARD,¹ B. S.,
Pratt County Agricultural Agent (1919), Division of College Extension.
B. S., 1917. Pratt, Kan.
- JACOB MICHAEL MURRAY,¹ D. V. M.,
Nemaha County Agricultural Agent (Jan. 1 - Oct. 31, 1919), Division of College Extension.
D. V. M., 1908. Seneca, Kan.
- GEORGE W. SALISBURY, B. S.,
Labette County Agricultural Agent (1919), Division of College Extension.
B. S., University of Illinois, 1915. Altamont, Kan.
- FRANK OTTO BLECHA, B. S.,
Shawnee County Agricultural Agent (1919), Division of College Extension.
B. S., 1918. Topeka, Kan.
- GAYLORD HANCOCK,
Lyon County Agricultural Agent (1919), Division of College Extension.
Emporia, Kan.

1. Resigned.

- THOMAS E. CLARKE,¹ B. S.,
Barber County Agricultural Agent (Mar. 5 - Dec. 31, 1919), Division
of College Extension.
B. S., 1910. Medicine Lodge, Kan.
- JOSEPH VINCENT QUIGLEY,¹ B. S.,
Miami County Agricultural Agent (Mar. 15 - Nov. 30, 1919), Division
of College Extension.
B. S., 1916. Paola, Kan.
- THEODORE W. THORDARSON, B. S.,
Barton County Agricultural Agent (1919), Division of College Exten-
sion.
B. S., North Dakota Agricultural College, 1916. Great Bend, Kan.
- AMWEL EDWIN JONES,¹ B. S.,
Jewell County Agricultural Agent (1919 - Jan. 31, 1920), Division of
College Extension.
B. S., 1915. Mankato, Kan.
- FRANK HAROLD DILLENBACK, B. S.,
Doniphan County Agricultural Agent (1919), Division of College Ex-
tension.
B. S., 1916. Troy, Kan.
- ERNEST HENRY PTACEK,¹ B. S.,
Douglas County Agricultural Agent (Apr. 1 - Oct. 31, 1919), Division
of College Extension.
B. S., 1918. Lawrence, Kan.
- JOHN LAWRENCE GARLOUGH,¹ B. S.,
Marion County Agricultural Agent (May 5 - Sept. 14, 1919), Division
of College Extension.
B. S., 1916.
- EMMETT L. GARRETT, B. S. A.,
Comanche County Agricultural Agent (May 22, 1919), Division of
College Extension.
B. S. A., Oklahoma A. and M. College, 1915. Coldwater, Kan.
- HENRY JOSEPH ADAMS, B. S.,
Gray County Agricultural Agent (1917; June 27, 1918), Division of
College Extension.
B. S., 1917. Cimarron, Kan.
- CHARLES ELMER CASSEL, B. S.,
Finney County Agricultural Agent (1912; Aug. 16, 1917), Division of
College Extension.
B. S., 1910. Garden City, Kan.
- LUTHER EARL WILLOUGHBY, B. S.,
District Agricultural Agent (1917; Jan. 25, 1919), West Central Kan-
sas, Division of College Extension.
B. S., 1912; B. S. in Agr., 1916. Hays, Kan.
- JOHN VERN HEPLER,¹ B. S.,
Ford County Agricultural Agent (1917; July 1 - Nov. 30, 1919), Di-
vision of College Extension.
B. S., 1915.

1. Resigned.

- HARRY SCOTT WILSON,
Johnson County Agricultural Agent (1917; July 1, 1919), Division of
College Extension.
Olathe, Kan.
- GEORGE W. SIDWELL,¹
Greeley County Agricultural Agent (1918; July 1 - Nov. 30, 1919),
Division of College Extension.
- ALBERT BARNEY KIMBALL, B. S.,
Clark County Agricultural Agent (1918; July 1, 1919), Division of
College Extension.
B. S., 1889. Ashland, Kan.
- AMBROSE DICKSON FOLKER, B. S.,
Wyandotte County Agricultural Agent (July 1, 1919), Division of Col-
lege Extension.
B. S., Iowa State College, 1911. Kansas City, Kan.
- ROBERT ELLIOTT CURTIS, B. S.,
Clay County Agricultural Agent (July 1, 1919), Division of College
Extension.
B. S., 1916. Clay Center, Kan.
- JAMES HENDRIX McADAMS, B. S.,
Coffey County Agricultural Agent (July 14, 1919), Division of College
Extension.
B. S., 1916. Burlington, Kan.
- WILLIAM LOUIS TAYLOE, B. S. A.,
Morris County Agricultural Agent (July 15, 1919), Division of College
Extension.
B. S. A., University of Missouri, 1917. Council Grove, Kan.
- CARL VINCENT MALONEY, B. S.,
Meade County Agricultural Agent (Sept. 1, 1919), Division of College
Extension.
B. S., 1919. Meade, Kan.
- RAYMOND FRANKLIN OLINGER, B. S.,
Marion County Agricultural Agent (Sept. 15, 1919), Division of Col-
lege Extension.
B. S., 1913. Marion, Kan.
- ORVILLE THOMAS BONNETT, B. S.,
Marshall County Agricultural Agent (Nov. 10, 1919), Division of Col-
lege Extension.
B. S., 1918. Blue Rapids, Kan.
- FRED A. BILLHIMER,
Wichita - Greeley County Agricultural Agent (Dec. 22, 1919), Division
of College Extension.
Leoti, Kan.
- BENJAMIN FRANCIS BARNES, B. S.,
Cherokee County Agricultural Agent (Jan. 15, 1920), Division of Col-
lege Extension.
B. S., 1918. Columbus, Kan.

1. Resigned.

- HERMAN FREDERICK TAGGE, B. S.,
Atchison County Agricultural Agent (Feb. 1, 1920), Division of College Extension.
B. S., 1914. Effingham, Kan.
- WILLIAM HURBERT BROOKS, B. S.,
Miami County Agricultural Agent (Feb. 1, 1920), Division of College Extension.
B. S., 1920. Paola, Kan.
- JOHN ALBERT HENDRICKS, B. S. A.,
Chase County Agricultural Agent (Feb. 1, 1920), Division of College Extension.
B. S. A., Iowa State College, 1913. Cottonwood Falls, Kan.
- ERNEST LEE McINTOSH, B. S.,
Nemaha County Agricultural Agent (Feb. 1, 1920), Division of College Extension.
Seneca.
- HARRY CHARLES BAIRD, B. S.,
Ford County Agricultural Agent (Feb. 10, 1920), Division of College Extension.
B. S., 1914. Dodge City, Kan.
- TELFORD REDDELL PHARR, B. S.,
Jewell County Agricultural Agent (Feb. 10, 1920), Division of College Extension.
B. S., 1920. Mankato, Kan.
- HOMER BRYAN WILLIS, B. S.,
Barber County Agricultural Agent (Feb. 10, 1920), Division of College Extension.
B. S., 1920. Medicine Lodge, Kan.
- CLARENCE OWEN GRANFIELD, B. S.,
Wilson County Agricultural Agent (Mar. 1, 1920), Division of College Extension.
B. S., 1917. Fredonia, Kan.

HOME DEMONSTRATION AGENTS²

- ELSIE LORETTA BAIRD,¹ B. S.,
Anderson County Home Demonstration Agent (1917; July 1, 1919 - Feb. 29, 1920), Division of College Extension.
B. S., 1915. Garnett, Kan.
- MOLLIE LINDSEY,
Ness County Home Demonstration Agent (1917; July 1, 1919), Division of College Extension.
Ness City, Kan.
- MAUDE MILDRED COE, B. S.,
McPherson County Home Demonstration Agent (1917; July 1, 1919), Division of College Extension.
B. S., 1902. McPherson, Kan.

1. Resigned.

2. In cooperation with the U. S. Department of Agriculture.

- EDITH ANTONETTE HOLMBERG, B. S.,
Morris County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.
B. S., 1908. Council Grove, Kan.
- IRENE ALMA TAYLOR, B. S.,
Shawnee County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.
B. S., 1908. Topeka, Kan.
- SARA JANE PATTON, B. S.,
Cherokee County Home Demonstration Agent (1918; July 1, 1919),
Division of College Extension.
B. S., 1915. Columbus, Kan.
- ELLEN MARGARET BATCHELOR, B. S.,
Atchison County Home Demonstration Agent (1917; Sept. 1, 1919),
Division of College Extension.
B. S., 1911. Effingham, Kan.
- ETHEL McDONALD, B. S.,
Meade County Home Demonstration Agent (Sept. 1, 1919), Division of
College Extension.
B. S., 1907. Meade, Kan.

COUNTY LEADERS IN BOYS' AND GIRLS' CLUB WORK

- CHARLES A. BOYLE,¹
Lyon County Club Leader (1917; July 1 - Oct. 31, 1919), Division of
College Extension.
- JESSIE STEVENS McCAFFERTY,
Jefferson County Club Leader (1918; July 1, 1919), Division of Col-
lege Extension.
Oskaloosa, Kan.
- LOLA BELLE THOMPSON,¹² A. B.,
Rice County Club Leader (1918; July 1, 1919), Division of College
Extension.
A. B., College of Emporia, 1916. Lyons, Kan.
- JESSIE GERTRUDE ADEE,
Ottawa County Club Leader (1918; Aug. 1 - Sept. 30, 1919), Division
of College Extension.
Delphos, Kan.
- JOHN LAWRENCE PREHN,¹
Poultry Club Leader (June 1-Dec. 31, 1919), Division of College Ex-
tension.
- FLORENCE WHIPPLE, B. S.,
Leavenworth County Club Leader (July 15, 1919), Division of College
Extension.
B. S., 1912. Leavenworth, Kan.

1. Resigned.

12. Assistant Club Leader, Feb. 1 to 29, 1920.

FELLOWS

- EMILY HARRIET ANDERSON, B. S.,
Fellow in Household Economics (Sept. 1, 1919).
B. S., University of Wyoming, 1919. L 53; 1408 Fairchild.
- WILLIAM CHARLES BELLIS, B. S.,
Fellow in Animal Husbandry (Sept. 1, 1919).
B. S., University of Arizona, 1919. Ag 13; 1623 Anderson.
- ERNEST EDWARD DALE, A. B.,
Fellow in Botany (1917; Sept. 1, 1919).
A. B., University of Nebraska, 1913. H 56A; 1623 Anderson.
- HENRY WHITE MARSTON, B. S. A.,
Fellow in Animal Husbandry (Sept. 1, 1919).
B. S. A., Delaware State College, 1919. Ag 13; 1020 Leavenworth.
- CLARA VICTORIA THOMAS, A. B.,
Fellow in Food Economics and Nutrition (Sept. 1, 1919).
A. B., Nebraska Wesleyan University, 1919. L 53; 1408 Fairchild.

OTHER OFFICERS

- JESSIE McDOWELL MACHIR,
College Registrar (1913).
A 29; 1641 Fairchild.
- STEPHEN ARNOLD GEAUQUE,
Assistant Custodian (1918; July 1, 1919).
G 33; 420 Humboldt.

Agricultural Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

F. D. FARRELL, Director.
JAMES A. KIMBALL, Business Manager.
HUGH DURHAM, Assistant to Director.

AGRICULTURAL ECONOMICS—

W. E. GRIMES, Farm Management, in Charge.
F. L. THOMSEN, Marketing.

AGRONOMY—

L. E. CALL, in Charge (since Sept. 1, 1919).
S. C. SALMON, Crops, in Charge (till Sept. 1, 1919).
R. I. THROCKMORTON, Soils.
J. H. PARKER, Plant Breeding.
M. C. SEWELL, Soils.
R. L. HENSEL, Pasture Investigations.
J. W. ZAHNLEY, Crops.
B. S. WILSON, Coöperative Experiments.
G. H. PHINNEY, Farm Foreman.
ELIZABETH HARLING, Seed Analyst.

ANIMAL HUSBANDRY—

C. W. McCAMPBELL, Cattle, in Charge.
H. L. IBSEN, Animal Breeding.
F. W. BELL, Horse Investigations.
E. F. FERRIN, Swine Investigations.
A. M. PATERSON, Sheep Investigations.
H. B. WINCHESTER, Feeding Investigations.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.
O. W. HUNTER, Dairy Bacteriology.
P. L. GAINNEY, Soil Bacteriology.
F. R. BEAUDETE, Poultry Disease Investigations.

BOTANY—

L. E. MELCHERS, Plant Pathology, in Charge.
E. C. MILLER, Plant Physiology.

CHEMISTRY—

H. H. KING, in Charge.
J. T. WILLARD, Consulting Chemist.
C. O. SWANSON, General Investigations.
W. L. LATSHAW, Soil, Feeding-stuffs, and Fertilizer Analysis.
E. L. TAGUE, Protein Investigations.
J. S. HUGHES, Animal Nutrition.
GEORGE VANDERVEEN, Feeding-stuffs Analysis.
C. H. GREINER, Live-stock Remedy Analysis.
———, Animal Nutrition.

DAIRY HUSBANDRY—

J. B. FITCH, in Charge.
H. W. CAVE, Dairy Production.
N. E. OLSON, Dairy Manufactures.
F. W. ATKESON, Supervisor Advanced Registry Testing.
H. M. JONES, State Dairy Commissioner.
R. H. WHITENACK, Deputy Dairy Commissioner.
C. C. VASEY, Deputy Dairy Commissioner.
C. O. BIGFORD, Herdsman.

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Fruit Insect Investigations.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.
M. C. TANQUARY, Staple Crop Insect Investigations (till Feb. 1, 1920).
ROGER C. SMITH, Staple Crop Insect Investigations (since Feb. 1, 1920).

HORTICULTURE—

ALBERT DICKENS, in Charge.
M. F. AHEARN, Vegetables and Forcing Crops.
W. F. PICKETT, Orchard Investigations.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
C. W. OAKES, Miller.
A. E. LANGWORTHY, Feed Control.
F. M. AIMAN, Feed Control.
C. E. BUCHANAN, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
F. E. FOX, General Investigations.
H. B. MUGGLESTONE, Superintendent of Poultry Plant.

VETERINARY MEDICINE—

R. R. DYKSTRA, in Charge.
C. W. HOBBS, Field Veterinarian.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
MARTHA DENNY, Genetics.
F. L. HISAW, Injurious Mammals.

BRANCH EXPERIMENT STATIONS.

FORT HAYS—

C. R. WEEKS, Superintendent.
A. L. HALLSTED, Dry-farming Investigations.¹
R. E. GETTY, Forage Crop Investigations.¹
A. H. KERNS, Assistant to Superintendent.
C. R. JACCARD, Forest Nurseryman.

1. In cooperation with the U. S. Department of Agriculture.

GARDEN CITY—

F. A. WAGNER, Superintendent.
F. E. KEATING, Dry-land Agriculture Investigations.¹

COLBY—

JOHN J. BAYLES, Superintendent.
ALBERT OSENBRUG, Dry-land Agriculture Investigations.¹

TRIBUNE—

IVAR MATTSON, Superintendent (till March 1, 1920).
G. E. LOWREY, Superintendent (since March 1, 1920).

1. In coöperation with the U. S. Department of Agriculture.

Engineering Experiment Station

OFFICERS OF THE STATION

W. M. JARDINE, President of the College.

ADMINISTRATION—

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

APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.
W. B. WENDT, Strength of Materials.
C. E. PEARCE, Machine Design.
C. H. SCHOLER, Road Materials.
A. D. CONROW, Assistant in Road Materials.
L. V. WHITE, Assistant in Road Materials.
J. H. ROBERT, General Investigations.

ARCHITECTURE—

C. F. BAKER, in Charge.
J. D. WALTERS, General Investigations.
———, Rural Architecture.
STANLEY A. SMITH, General Investigations.

CHEMISTRY—

H. H. KING, in Charge.
P. J. NEWMAN, General Investigations.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.
F. F. FRAZIER, General Investigations.
M. W. FURR, Assistant.
L. V. WHITE, Assistant.

ELECTRICAL ENGINEERING—

C. E. REID, in Charge.
R. G. KLOEFFLER, General Investigations.
H. H. FENTON, General Investigations.
E. W. MARKLE, Assistant (till Feb. 29, 1920).

FARM ENGINEERING—

———, in Charge.
W. H. SANDERS, Tractors.
J. D. PARSONS, Farm Machinery.

PHYSICS—

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

SHOP PRACTICE—

W. W. CARLSON, in Charge.
E. C. JONES, General Investigations.
G. A. SELLERS, Assistant.

STEAM AND GAS ENGINEERING—

J. P. CALDERWOOD, in Charge.
A. J. MACK, General Investigations.
L. S. HOBBS, Assistant.

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

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

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

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

Section 4 requires that the money from the sale of these lands—

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

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

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the pro-

visions 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 7,686.48 acres was not made up by Congress till 1907.

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

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1,000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life, and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from Federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this Federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotations 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 \$5,000, 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 \$5,000 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 of fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, the greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose

of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State. The number of professors and other instructors and the student enrollment grew steadily throughout this period up to the time of the outbreak of the war, when this College, along with all others, suffered heavily. Since 1899 additional buildings to the value of about \$500,000 have 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.

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

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

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

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in

social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or any of the various special courses for mechanics. For young women, training is offered in household economics, nutrition, food economics, clothing and textiles, home furnishing, home decoration, etc.

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

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

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

The Agricultural Experiment Station

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

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

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

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

Until 1908 the expenses of the Experiment Station were provided for entirely by the Federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5,000, and increasing each year by \$2,000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five percentum 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—means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

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

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

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

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

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

CONTROL WORK OF THE STATION

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

One of the important lines of control work is that of State dairy commissioner. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies,

butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, or ice cream, wherever he may find them."

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

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

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

Concerned with the live-stock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913):

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

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: Pure bred, grade, crossbred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

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."

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of live-stock remedy and every brand of commercial feeding stuffs offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the acts.

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.

Branch Agricultural Experiment Stations

FORT HAYS BRANCH STATION

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior, October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7,200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purpose of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work. In the division of this land, the College received 3,560 acres.

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

The work of this Station may be divided into two divisions: (A) experimental projects, (B) general farm and live-stock work. The experimental projects are as follows: Dry-farming investigations, forage-crop investigations, cereal-crop investigations, forest, nursery and park demonstrations and investigations, farm dairying, and experiments in the feeding and breeding of live stock. All this work is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the development of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

GARDEN CITY BRANCH STATION

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

The land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expenses of pumping and the cost of equipment necessary for plants of this type, which are common in the shallow-water districts between Garden City and Scott City and along the Arkansas Valley. The Experiment Station's investigations in irrigation agriculture are centered at this branch station.

COLBY BRANCH STATION

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

TRIBUNE BRANCH STATION

At the Tribune Station experimental and demonstration work is conducted for the benefit of the surrounding territory. Special attention is paid to the problems of producing, storing, and utilizing crops for winter feeding of cattle which in summer graze the extensive range areas of the extreme western part of the State.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

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

Among the tests now being carried on are investigations on the strength of concrete, the road-making properties of various Kansas stones, gravels, and sands, the relative costs of concrete of a given quality when made with and without coarse aggregates, bituminous sand cushions for brick roads, power-plant economics, the use of the windmill for driving electric generators for farm lighting, the losses in electric transmission lines, and in town and city distribution systems, the mechanical and electrical properties of commercial copper wire used in pole-line construction, the economy of electric cooking and heating devices, and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, lubricating oils, pipe coverings, insulation for refrigeration, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, and problems in farm architecture.

A continuous record is being made of the stage of the Kansas river at Manhattan, to be used in computing the flood discharge of that stream, as a basis for designing works for flood protection.

The testing laboratories of this Station have been designated by law* as the testing laboratories for the State Highway Commission and the State Highway Engineer, and as such have charge of the testing of all road materials for use in Federal-aid road construction in this State.

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

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

* Sec. 5, ch. 64, Laws of 1917.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaped macadamized avenues lead to all parts of the grounds. Cement walks connect the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 1,136 acres of land at Manhattan, valued at \$340,600. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental plantings is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. These buildings are listed below.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a social center hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture, Economics, Education, English, Applied Art, and Mathematics. Value of equipment, \$29,049.*

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2,300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$5,414.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8,000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of \$5,000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, \$14,147.

DAIRY COMMISSION HALL. Erected, 1888; cost, \$5,000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State dairy commissioner. Value of equipment, \$1,040.

* The figures for equipment are taken from the reports of June 30, 1919.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet, one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$7,456.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment: Chemistry, \$36,264; Electrical Engineering, \$29,980; Executive, \$947; Physics, \$13,553.

ENGINEERING HALL. The main portion of this building is now under construction at a cost of \$190,000. The east wing, erected in 1909, cost \$80,000. Dimensions of part now under construction, 60 x 236 feet; three and four stories in height, fireproof construction throughout. Dimensions of part previously erected, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building will contain, when completed, the general offices and library of the Division of Engineering, and the offices, drafting rooms and laboratories of the Departments of Applied Mechanics, Architecture, Civil Engineering, Electrical Engineering, and Steam and Gas Engineering. The engines, turbines, generators and boilers that furnish power and light for the College are also installed in this building. Value of equipment, \$56,804.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the wood-working shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9,260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Department of Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipment. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general-supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$47,671.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College Library and reading rooms, a newspaper reading room, offices of the Librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of

Zoölogy, Entomology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment: Entomology, \$14,350; Executive, \$685; History and Civics, \$831; Library, \$146,567; Zoölogy, \$17,986.

FARM BARN. Erected, 1913; cost, \$25,000; dimensions, 80 x 160 feet; two stories and basement. Consists of three sections, arranged like the letter H, and a glazed tile silo of 200 tons capacity. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks, and is designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and the show herd. The central section has an office, feed rooms, a washing floor, and a basement containing the engine room. The loft, to which a driveway leads, has storage space for ten carloads of grain and 100 tons of hay and straw and contains the grinding apparatus. This barn is used by the Department of Animal Husbandry.

FARM MACHINERY HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years as an armory. The entire building has been given over for the use of the Department of Farm Engineering, and is filled with all types of farm machinery. Value of equipment: Executive, \$210; Farm Engineering, \$2,542.

HOME ECONOMICS HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms, and offices of the Departments of Food Economics and Nutrition, and Household Economics; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Clothing and Textiles. Value of equipment: Clothing and Textiles, \$6,462; Dean's offices, \$872; Executive, \$440; Food Economics and Nutrition, \$9,974; Household Economics, \$2,878.

HORTICULTURAL BARN. Erected, 1917; cost, \$1,500; dimensions, 38 x 55 feet. Two stories, first story stone, second story frame. This building is located one mile west of the College campus.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany and Horticulture. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$17,375; Executive, \$551; Horticulture, \$11,633.

ILLUSTRATIONS HALL. Erected, 1877; cost, \$4,000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; later the headquarters for general College repairs; since the summer of 1919 used by the Department of Illustrations. Value of equipment (Jan. 1, 1920), \$1,200.

INFIRMARY. Erected, previous to 1884; rebuilt, 1919; dimensions, 34 x 34 feet; two stories. Originally a farm house, later used as dwelling by the Professor of Agriculture and more recently by the Custodian. Contains separate wards for men and women, five rooms in each ward.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria since the summer of 1915, and by offices of the Department of English; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and English. Value of equipment: Cafeteria, \$7,264; English, \$1,000; Executive, \$254; Industrial Journalism and Printing, \$6,270.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of Modern Languages, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$7,102.

SCHOOL OF AGRICULTURE HALL. Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the President's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture and of the Department of Public Speaking. Value of equipment, \$2,835.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms, and offices of the Department of Anatomy and Physiology, Bacteriology, Pathology, and Vaccine Laboratories, and by the offices of the Dean of the Division of Veterinary Medicine. Value of equipment, \$29,004.

WATERS HALL. Erected 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories; and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these

rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agricultural Economics, Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station and of the Dean of the Division, a complete small flour mill, and laboratories for grain judging. Value of equipment: Agricultural Economics, \$1,116; Agricultural Experiment Station, \$1,362; Agronomy, \$15,300; Animal Husbandry, \$4,582; Dean's offices, \$2,054; Executive, \$956; Milling Industry, \$14,998; and Poultry Husbandry, \$584.

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

EXPERIMENT STATION BUILDING. Erected, 1918; dimensions, 40 x 176 feet; two stories. Built as barracks No. 4 for the S. A. T. C., now used by the Agricultural Experiment Station.

GENERAL PURPOSE BUILDING. Erected, 1918; dimensions, 40 x 80 feet; two stories. Built as barracks No. 6 for the S. A. T. C. The east half of the first floor is used by the Department of Music; the west half of the second floor is used by the Department of Electrical Engineering; and the east half of the second floor is used for the storage of auto parts.

GREENHOUSES. Erected, 1909; cost, \$7,000; dimensions, 114 x 150 feet. Contains six sections used by various departments as follows: Horticulture, three; Botany, one; Agronomy, one; Entmology and Zoölogy, one. Value of equipment, \$4,196.

MESS HALL. Erected, 1918; dimensions, 42 x 176 feet; two stories. Built for the S. A. T. C. as mess hall and still used for that purpose.

PLANT MUSEUM. Erected, 1907; cost, \$2,500; dimensions, 20 x 100 feet. Used by the Department of Horticulture. Contains a large number of rare growing plants, including many subtropical species. Value of equipment, \$600.

REPAIR SHOP. Erected, 1918; dimensions, 40 x 176 feet; one story. Built as barracks No. 1 for the S. A. T. C. Value of equipment, \$1,756.

SERUM BARN. Erected, 1914; cost, \$3,000; dimensions, 92 x 96 feet; contains 30 pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM PLANT. Erected, 1914; cost, \$7,000; constructed of brick; dimensions, 20 x 60 feet; two stories. Value of equipment, \$8,693.

TRACTION ENGINE LABORATORIES. Erected, 1918; cost, \$20,000; two buildings, each 40 x 176 feet. These are two frame buildings on concrete foundations, built originally as barracks Nos. 2 and 3 for the S. A. T. C.

POWER AND WATER SYSTEMS. The College maintains and operates its own modern heat, light, power, water and sewer systems. A central boiler plant of 2,400 horse power furnishes steam for both the heating system and the power plant. The central power plant contains steam

engines and turbines, totaling 700 horse power, connected to electric generators which furnish power and light for the entire campus. A complete system of underground tunnels connects the various buildings and through these are carried the steam mains and electric cables which distribute steam and electrical energy to the different parts of the campus.

The water works pump house contains electric motor-driven pumps of an aggregate capacity of 600 gallons per minute. Cast-iron water mains distribute this over the campus, and a steel tank of 110,000 gallons capacity supported on a steel tower provides a reserve supply.

Value of the equipment in connection with the power and water systems amounts to \$127,470. In addition to this and other totals for equipment listed above, there are other items which might be mentioned, *e. g.* live stock valued at \$160,320.

The College Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1920, the Library contained 65,774 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

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

READING ROOMS. Three reading rooms are maintained in connection with the Library; the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

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

Requirements for Admission

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

Any person who has completed a four-year course of study in any high school or academy accredited by the State Board of Education will be admitted to the freshman class.

Persons who are not graduates of accredited high schools or academies will be admitted to the freshman class if they have completed fifteen acceptable units of high-school work. (A unit is defined to be the work in an accredited high school or academy in five recitation periods a week for one school year.) One who offers fourteen such units will be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time College credits are taken in its place.

In order to enter upon the several curricula without loss of time the following subjects must have been completed:

Curriculum in Agriculture	English, three units; physics, one unit; algebra, one unit; geometry, one unit
Curriculum in Veterinary Medicine...	Same as above
Curriculum in Animal Husbandry and Veterinary Medicine	Same as above
Curriculum in Industrial Journalism..	Same as above
Curriculum in Home Economics.....	Same as above
Curriculum in General Science.....	English, three units; physics, one unit; algebra, one and one-half units; geometry, one unit
Curricula in Agricultural Chemistry, Industrial Chemistry, and Biochemistry	Same as above
Curricula in Engineering	English, three units; physics, one unit; algebra, one and one-half units; geometry, one and one-half units
Curriculum in Architecture	Same as above

Subjects acceptable for entrance, arranged in eight groups, together with the number of units that may be offered, are shown as follows:

GROUP I	
English	Three or four units

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

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is considered a candidate for graduation in the spring who is deficient more than nine semester hours in addition to his regular assignment at the beginning of the first semester. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any semester, is allowed to carry extra work during the succeeding semester.

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

ADVANCED CREDIT

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

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Monday, September 13, 1920; Tuesday, February 1, 1921; and Friday, June 3, 1921.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose.

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

LATE REGISTRATION

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

SPECIAL STUDENTS

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

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

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED
RELATIONS WITH THE COLLEGE

(Graduates admitted without examination.)

Abbyville	Bushong	Edna
Abilene	Bushton	Edwardsville
Ada	Byers	Effingham
Adams	Caldwell	(Atchison County)
Admire	Caney	El Dorado
Agenda	Canton	Elk City
Agra	Carbondale	Elkhart
Alden	Cassoday	Ellinwood
Alexander	Carlyle	Ellis
Allen	Cawker City	Elsmore
Alma	Cedar	Ellsworth
Almena	Cedar Vale	Elwood
Altamont	Centralia	Emporia
(Labette County)	Chanute	(City High School)
Alta Vista	Chapman	(Normal High School)
Alton	(Dickinson County)	Englewood
Altoona	Chase	Enterprise
Americus	Cheney	Erie
Andover	Cherokee	Esbon
Anthony	(Crawford County)	Eskridge
(City)	Cherryvale	Eudora
(Spring Township)	Chetopa	Eureka
Arcadia	Cimarron	Everest
Argonia	Circleville	Fairview
Arkansas City	Clafin	Fall River
Arlington	Clay Center	Falun
Asherville	(Clay County)	Fellsburg
Ashland	Clayton	Florence
Assaria	Clearwater	Ford
Atchison	Climax	Formoso
(City High School)	Clifton	Fort Scott
(Mount Saint Scholastica	Clyde	Fowler
Academy)	Coats	Frankfort
Athens	Codell	Fredonia
Atlanta	Coffeyville	Frontenac
Attica	Colby	Fulton
Atwood	(Thomas County)	Galena
(Rawlins County)	Coldwater	Galesburg
Auburn	Colony	Galva
Augusta	Columbus	Garden City
Axtell	(Cherokee County)	Garden Plain
Baldwin	Concordia	Gardner
Bancroft	(City High School)	Garfield
Barclay	(Nazareth Academy)	Garnett
Barnard	Conway Springs	Garrison
Barnes	Copeland	Gaylord
Baxter Springs	Corning	Geneseo
Beattie	Cottonwood Falls	Girard
Belle Plaine	(Chase County)	Glasco
Belleville	Council Grove	Glen Elder
Beloit	Courtland	Goddard
Belpre	Covert	Goff
Benedict	Cuba	Goodland
Bennington	Cullison	(Sherman County)
Bentley	Culver	Grainfield
Benton	Cunningham	Great Bend
Bern	Deerfield	Greeley
Berryton	Delia	Greenleaf
Beverly	Delphos	Greensburg
Blue Mound	Denison	(Kiowa County)
Blue Rapids	Denton	Grenola
Bonner Springs	Derby	Gridley
Bronson	De Soto	Grinnell
Brookville	Dexter	Gypsum
Brownell	Dighton	Halstead
Bucklin	(Lane County)	Hamilton
Buffalo	Dodge City	Hamlin
Buhler	(City High School)	Hanover
Bunker Hill	(Saint Mary of the	Hardtner
Burden	Plains Academy)	Harlan
Burlingame	Dorrance	Harper
Burlington	Douglass	Hartford
Burns	Downs	Harveyville
Burr Oak	Dunlap	Haven
Burrtown	Easton	Havensville

Haviland (City High School) (Haviland Academy)	Le Roy	Newton (Bethel College Academy)
Hays	Lewis	(City High School)
Hazelton	Liberal	New Ulysses (Grant County)
Herington	Lincoln	Nickerson (Reno County)
Hesston (Hesston Academy)	Lindsborg (Bethany College Academy)	Norcatar
Hiawatha	(City High School)	Northbranch (Northbranch Academy)
Highland	Linn	Norton (Norton County)
Hill City	Little River	Nortonville
Hillsboro (City High School)	Logan	Norway
(Tabor College Academy)	Longford	Norwich
Hoisington	Long Island	Oakland
Holcomb	Longton	Oakley
Hollenburg	Lost Springs	Oberlin (Decatur County)
Holtton	Louisburg	Offerle
Hope	Louisville	Oketo
Horton	Lovewell	Olathe
Howard	Lucas	Olsburg
Hoxie	Luray	Onaga
Hoyt	Lyndon	Oneida
Hugoton (Stevens County)	Lyons	Osage City
Humboldt	Macksville	Osawatomie
Hutchinson	Madison	Osborne
Independence (Montgomery County)	Mahaska	Oskaloosa
Ingalls	Maize	Oswego
Iola	Manhattan (City High School)	Ottawa (City High School)
Irving	(Sacred Heart Academy)	(University Academy)
Isabel	Mankato	Overbrook
Jamestown	Maple Hill	Overland Park
Jarbalo	Marion	Oxford
Jetmore (Hodgeman County)	Marquette	Ozarkie
Jewell	Marysville	Padonia
Johnson (Stanton County)	Mayetta	Paleo
Junction City	McCune	Paola (City High School)
Kanopolis	McDonald	(Ursuline Academy)
Kansas City (Argentine)	McLouth	Paradise
(Catholic)	McPherson	Parkerville
(Central)	(City High School)	Parsons
(Sumner)	(Central College Academy)	Partridge
(Wilson)	(McPherson College Academy)	Pawnee Rock
Keats	Meade	Paxico
Kensington	Medicine Lodge	Peabody
Kincaid	Melvorn	Perry
Kingman	Meriden	Peru
Kinsley	Merriam	Phillipsburg
Kiowa	Mildred	Piedmont
Kipp	Milton	Pittsburg
Kirwin	Miltonvale (Wesleyan Academy)	Plainville
La Crosse	Minneapolis	Pleasanton
La Cygne	Minneola	Plevna
La Harpe	Moline	Pomona
Lakin	Montezuma	Portis
Lane	Monument	Potter
Langdon	Moran	Potwin
Lansing	Morehead	Powhattan
Larned	Morganville	Pratt
Latham	Morland	Pretty Prairie
Lawrence (City High School)	Morrill	Preston
(Oread High School)	Mound City	Princeton
Leavenworth (Catholic High School)	Moundridge	Protection
(City High School)	Mound Valley	Quenemo
(St. Mary's Academy)	Mount Hope	Quinter
Lebanon	Mulberry	Ramona
Lebo	Mullinville	Randolph
Lecompton	Mulvane	Ransom
Lenora	Munden	Rantoul
Leon	Muscotah	Reading
Leonardville	Narka	Redfield
Leoti (Wichita County)	Natoma	Reece
	Neal	Republic
	Neodesha	Reserve
	Neosho Falls	
	Neosho Rapids	
	Ness City	
	Netawaka	

Richmond	Soldier	Wa Keeney
Riley	Solomon	(Trego County)
Robinson	South Haven	Wakefield
Rock Creek	Spearville	Waldo
Rosalia	Spivey	Walnut
Rosedale	Spring Hill	Walton
Rose Hill	Stafford	Wamego
Rossville	Stark	Washington
Rozel	Sterling	Waterville
Russell	Stilwell	Wathena
Russell Springs	Stockton	Waverly
Sabetha	Summerfield	Webster
Saffordville	Sylvan Grove	Welda
Saint Francis	Sylvia	Wellington
Saint John	Syracuse	(Sumner County)
(Antrim High School)	Tampa	Wellsville
(City High School)	Tescott	Westmoreland
Saint Marys	Thayer	Westphalia
(City High School)	Tonganoxie	Wetmore
(Immaculate Conception	Topeka	Wheaton
High School)	(City High School)	White City
Salina	(Catholic High School)	White Cloud
(City High School)	(College of the Sisters	Whitewater
(Kansas Wesleyan	of Bethany)	Whiting
Academy)	(Highland Park High	Wichita
(Sacred Heart Academy)	School)	(Cathedral High School)
Santa Fe	(Washburn Rural High	(City High School)
(Haskell County)	School)	(Friends University
Savonburg	Toronto	Academy)
Sawyer	Towando	(Mount Carmel
Scandia	Tribune	Academy)
Scott City	(Greeley County)	Williamsburg
Scottsville	Troy	Willis
Scranton	Turner	Wilmore
Sedan	Turon	Wilsey
Sedgwick	Udall	Wilson
Seneca	Uniontown	Winchester
Severance	Utica	Windom
Severy	Valley Center	Winfield
Sharon	Valley Falls	Winona
Sharon Springs	Vermilion	Woodbine
Silver Lake	Vinland	Woodston
Simpson	Viola	Yates Center
Smith Center		

Undergraduate Degrees and Certificates

For graduation, one must complete one of the four-year curricula as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 134 hours, or semester credits, a semester credit being one hour of recitation or lecture work, or three hours of laboratory work a week, for one semester of eighteen weeks. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year curriculum in agriculture, agricultural engineering, mechanical engineering, electrical engineering, civil engineering, flour-mill engineering, architecture, home economics, industrial journalism, agricultural chemistry, bio-chemistry, industrial chemistry, or general science.

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

CERTIFICATES

An appropriate certificate is granted upon completion of any one of the following:

1. The three-year curriculum in music.
2. The first two years of the four-year course in agriculture.
3. The short course in agriculture.
4. The two-year curriculum in public-school music.
5. The one-year course in lunch-room management.
6. The housekeepers' course, lasting about fifteen weeks.
7. The eight-week creamery short course.
8. Any one of the special courses related to engineering.

Graduate Study

THE ADMINISTRATION OF GRADUATE COURSES

The administration of the graduate courses is vested in the Graduate Council. This body consists of seven members, selected from the different divisions of the College as follows: Agriculture, two; Engineering, one; General Science, two; Home Economics, one; and Veterinary Medicine, one. The members of the Graduate Council are appointed and its chairman designated by the President.

Graduate courses may be offered by members of the Graduate Faculty only. The Graduate Faculty consists of all those recommended by the department heads and approved by the Graduate Council as qualified to give graduate instruction. Its chairman is the chairman of the Graduate Council.

The Graduate Council determines, subject to the authority of the President and the Board of Administration, and in accordance with any general regulations adopted by the Graduate Faculty, matters of curriculum, admission to graduate study and to candidacy to advanced degree, and other matters which relate to the proper administration and development of graduate work in the College.

ADMISSION

Admission to graduate courses is granted to graduates of institutions whose requirements for the bachelor's degree are substantially equivalent to those of the Kansas State Agricultural College. Admission to the graduate courses, however, may not be construed to imply admission to candidacy for an advanced degree. Such candidacy is determined by the Graduate Council upon the recommendation of the major instructor after the student has demonstrated by his work for a period of two months or longer that he has the ability to do major work of graduate grade. A mere accumulation of grades will not lead to a degree.

Three classes of applicants are recognized: (1) those who have received a bachelor's degree and wish to broaden their education without reference to an advanced degree; (2) those who wish to become candidates for advanced degrees, but are deficient in undergraduate preparation; and (3) those who wish to become candidates for an advanced degree and whose preparation is adequate.

Applicants of Class 1 are admitted at once, on evidence of graduation, to approved graduate courses. Those of Class 2 are admitted to graduate standing, but must at once make up their deficiencies by taking the necessary work in the undergraduate courses or by arrangement with the head of the department involved. Upon making up all deficiencies, Class 2 applicants are recognized as of Class 3. The latter are admitted to candidacy as previously provided.

Application blanks for admission to graduate courses may be secured from the Registrar. Every applicant for admission must submit with his application an official transcript of his college record.

Students applying for graduate work should present themselves to the chairman of the Graduate Council, after registering at Nichols Gymnasium, for instructions concerning assignment to classes. On regular registration days (see College Calendar), the chairman will be found at Nichols Gymnasium, on other days in Room 38, Waters Hall.

REGISTRATION

Students who have been admitted to the graduate courses are required to register with the College Registrar and with the chairman of the Graduate Council, at the beginning of each semester, unless special permission for later registration has been granted by the chairman of the Graduate Council. Credit toward the fulfillment of the residence requirements dates from the time of registration and not from the beginning of the semester when the student enters.

CANDIDACY FOR MASTER'S DEGREE

Candidates for the degree of master of science (M. S.) are required to spend at least one collegiate year in residence, except under the special conditions noted below. The equivalent of thirty-two semester credits including a thesis must be satisfactorily completed. Not more than sixteen credits, including thesis, may be secured in a single semester. Students holding half-time graduate assistantships may not obtain more than eight credits, including thesis, in one semester.

GRADES. Graduate students' work is graded in five classes: E, G, M, P, and F. The last indicates a failure. P indicates unsatisfactory though passable work. The degree will not be conferred on any student who does not receive a grade of G or higher in three-fourths of the courses taken, including thesis. A failure or absence from examination in any course may prevent the conferring of the degree, and failure in any course in the major field precludes conferring the degree in the same year.

LANGUAGE REQUIREMENTS. A reading knowledge of a modern language in the field of the major subject is highly desirable. At the discretion of the department in which the major work is done, this may be required for the degree. This requirement must be met before the beginning of the last semester preceding the conferring of the degree by the student's presenting himself to the head of the Department of Modern Languages for examination. An earlier meeting of this requirement is highly desirable.

MASTER'S THESIS. Each candidate for a master's degree is required to present a thesis on some subject approved by the Graduate Council upon the recommendation of the instructor in charge of his major work.

The thesis ordinarily demands one-fourth of the student's time and may not exceed one-third of it. The thesis must be typewritten according to the specifications to be obtained from the office of the chairman of the Graduate Council.

Under proper conditions, a student of unusual attainment may be allowed to complete *in absentia* the last fourth of his work if this is devoted to his thesis. To secure this privilege, the student must have spent the equivalent of one semester and a half in residence and have creditably passed not less than twenty-four credits of graduate work; must petition for the privilege; must submit to the chairman of the Graduate Council an outline of his proposed investigation, approved by the head of his major department; and must submit satisfactory evidence that adequate facilities are available to him at the place where he proposes to do the work.

A preliminary report on the progress of all theses must be made by the major instructors to the chairman of the Graduate Council before April 1 of the year when the degree is conferred. Three complete copies of the theses as approved must be furnished not later than May 15 to the chairman of the Graduate Council. One of these copies will be deposited in the College Library, one with the dean of the division involved, and the other placed on file in the department in which the major subject is taken.

A candidate for the master's degree is subject to a rigid oral examination covering his major and minor subjects and thesis by a committee consisting of the dean of the division in which his major subject was taken, the member of the Graduate Council from that division, and the instructors with whom he has taken major and minor work.

PROGRAM OF STUDY

In carrying graduate work, the student is expected to assume the initiative and the responsibility. It is important to recognize in the beginning that graduate work does not consist in the fulfillment of routine requirements alone. The various courses as well as the assistance and advice of the instructors are to be regarded simply as aids in acquiring the methods, discipline, and spirit of independent research.

Each candidate for a degree is expected to have a wide knowledge of his subject and of related lines of work. This is usually obtained only by a wide range of private reading and study outside the immediate field covered by the formal courses to which he may be assigned.

The branch of knowledge to which the student expects to devote the larger part of his time is termed his major subject. The other fields of study selected, which will necessarily be more restricted in scope, are termed minor subjects. The latter should be chosen with reference to their direct bearing on the major subject.

Approximately two-thirds of a student's time is devoted to his major subject and one-third to one or more minor subjects. The word subject is used to designate a recognized field of study, and is not defined by the limits of a department. The nature and distribution of the majors and minors are approved by the Graduate Council, upon the recommendation of the instructor with whom the major is taken.

The program of study suggested by the major instructor and approved by the Graduate Council is made the basis of the formal assignment to courses at the beginning of each semester and of the summer session.

It will be noted that in the announcements of the various departments of the College that certain courses are open to both graduate and undergraduate students. No credit earned during the undergraduate course may be counted for graduate credit, unless registered, at the time taken, with the chairman of the Graduate Council as credits in excess of those required for the bachelor's degree.

GRADUATE ASSISTANTSHIPS

In order to encourage graduates of this and similar institutions to continue their studies and to pursue advanced work leading to a master's degree, the College has established graduate assistantships in several departments. These assistantships demand half the time of the student for laboratory or research assistance along the line of his major work. The remainder of his time is given to graduate work. No graduate assistant may receive more than eight graduate credits per semester nor satisfy the residence requirement in less than two years.

Graduate assistantships paying a salary fixed each year by the Board of Administration have been established as follows:

<i>Subject</i>	<i>Number</i>	<i>Date vacant</i>
Animal Husbandry	2	September, 1921
Bacteriology	1	September, 1920
Crops	1	September, 1920
Dairy Husbandry	1	September, 1920
Electrical Engineering	1	September, 1920
Food Economics and Nutrition.....	1	September, 1921
Household Economics	1	September, 1921
Plant Pathology	1	September, 1920
Poultry Husbandry	1	September, 1920
Soils	1	September, 1920
Steam and Gas Engineering.....	1	September, 1920
Zoölogy	1	September, 1920

Appointments for all assistantships are made annually in March or soon thereafter for the following year. Students desiring such appointments may obtain application blanks from the chairman of the Graduate Council.

GRADUATE WORK IN THE SUMMER SESSION

Graduate students desiring to do a part or all of the work for the master's degree in the summer may complete the residence requirements by pursuing graduate work for four summer sessions. In special cases it may be possible to complete the residence requirements for the master's degree as indicated above under Candidacy for Advanced Degree.

A detailed announcement concerning the graduate work in the Summer School may be had on application to the Dean of the Summer School, Kansas State Agricultural College, Manhattan, Kan.

Professional Degrees

ENGINEERING AND ARCHITECTURE

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

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

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 good character, is given by the various Christian organizations of the College and the town and by the College itself. Every student is expected to render a good account of himself in the College community life. For those who are highminded and reasonable, no other requirements need be expected. College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

In order that a fine type of democratic sociability may be fostered among students and faculty a large community recreation and rest center has been recently established (1920) in Anderson hall, the administrative building. This center, one of the largest rooms on the campus, is furnished with divans, arm chairs, and writing tables in wicker and is neatly and beautifully decorated. During vacant hours and between classes students and faculty gather here for rest and conversation. The room is also available for student and faculty receptions and parties during the late afternoon and the evening hours.

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 cannot honorably leave the College before the close of a semester except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

TUITION. There is no charge for tuition. Class instruction in music is free, but fees are charged for individual instruction. (See Department of Music for statement of fees for music.)

MATRICULATION FEE A matriculation or entrance fee of \$10 for residents of Kansas, or \$15 for nonresidents, is charged all students in College curricula and in the School of Agriculture. This fee is not charged Summer School students or short course students.

INCIDENTAL FEE. An incidental fee of \$10 a semester or summer term for residents of Kansas, or \$15 a semester or summer term for nonresidents, is charged. Students in short courses of more than eight weeks duration pay an incidental fee of \$10. The incidental fee for students in short courses related to engineering is \$10; such students are entitled to remain at the College as long as it is necessary for them to complete their course of study, but not to exceed eighteen weeks. Eight-week short-course students pay an incidental fee of \$5.

SICK-BENEFIT FEE Each student in the College or School of Agriculture pays a sick-benefit fee of \$1.50 for each semester or summer term. Students in special courses related to engineering (short courses in mechanic arts) and students in short courses of more than eight weeks duration pay a sick-benefit fee of \$1.50. For students in the farmers' short course or the commercial creamery short course this fee is \$1.

The sick-benefit fee entitles the student to receive the service of the College physician for any illness contracted while in College. The fee does not include the cost of medicine, surgical operations, reduction of fractures, hospital fees, or the treatment of chronic conditions. As far as possible, and provided the students requesting such services live within the city limits, the College physician visits in their rooms students who are too ill to go to the physician's office.

The College maintains on the campus a contagion hospital having separate wards for men and women. This hospital is in charge of a matron who resides continuously in the building and cares for the patients under the direction of the College physician. Students, when suffering from or suspected of having any contagious disease, are admitted to the hospital on the recommendation of the College physician. The student's only expense for hospital service is a fixed charge of \$1.50 a day. The aim of the College in providing this hospital is to prevent contagious diseases among the students and, in case the student should contract such a disease, to make it unnecessary to quarantine a rooming house where there are many students.

LATE REGISTRATION FEE. For unexcused late registration the student is charged \$1.

LABORATORY EXPENSE. In all laboratories students are required to pay for supplies used and for apparatus broken or lost. The cost in the several subjects ranges from 50 cents to \$7.50 a semester. In the special courses related to engineering, the laboratory charges are fixed at from \$18 to \$36 for the entire course.

COMMENCEMENT FEE. On graduation students pay a commencement fee of \$5 to cover the cost of the diploma and other commencement expenses.

TEXTBOOKS. The average cost of textbooks is about \$8 a semester in most of the curricula. For the first semester the cost is about \$12. There is considerable variation from term to term and in the different curricula.

GYMNASIUM SUITS. Each young woman taking physical training must have an approved gymnasium suit costing about \$4.50. Complete gymnasium suits for young men cost about \$5.

ROOMS. Rooms are not furnished by the College. They are readily obtainable in the city at a cost of from \$10 to \$15 a month for a room suitable for two occupants. Less desirable quarters and less desirable locations may be obtained at a lower rate. There are great differences in the accommodations offered. Those for which the higher prices are charged are modern in all respects, and light, heat, and bath are included in the cost stated.

BOARD. The cost of board depends largely upon individual requirements. In clubs and private boarding houses the cost is usually from \$5 to \$7 a week. Students may board themselves at a smaller money outlay. The College operates a first-class cafeteria, where all meals may be obtained, except on Sundays, at moderate prices. Food is furnished at cost and the expense to the student depends upon the care and judgment which he employs. The College also operates a mess-hall where meals are served every day in the week at thirty cents each. This is especially convenient for men in the special courses related to engineering.

LAUNDRY. The expense for laundry may be estimated at 40 cents to 70 cents a week, depending upon individual requirements.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, corner of Eleventh and Fremont streets, or to the office of the Y. M. C. A. secretary, in Anderson Hall on the College campus. Young women upon arrival should go directly to the Y. W. C. A. offices in Home Economics Hall on the campus. The cars from the Union Pacific station pass directly by the Y. M. C. A. building. Jitney service may be had from either station.

For three days before the opening of the fall semester and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects cannot be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a semester, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1,200 a month, at rates varying from 20 to 35 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country.

Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, over one-third of the students support themselves wholly, while a third support themselves in part. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

STUDENT LOAN FUNDS

THE ALUMNI LOAN FUND. The Alumni Association of the Kansas State Agricultural College has created a loan fund, chiefly by means of payments by which the alumnus is relieved from further regular dues in the association. Members are due to pay the association \$1 a year, and on payment of \$20 in one sum they are relieved from such dues. The fund so created is lent to students at 5 per cent per annum. The fund is administered by a committee appointed by the directors of the Alumni Association. The committee announces no specific rules governing the granting of loans, but in general gives preference to smaller amounts on short time over larger amounts which cannot be paid for several years.

Alumni are urged to add to the funds thus made available to worthy students. Students wishing loans from this fund may address Dean J. T. Willard, Chairman of the Alumni Loan Fund Committee, Manhattan, Kan.

THE HENRY JACKSON WATERS LOAN FUND. The Henry Jackson Waters loan fund consists of the royalties received from the Kansas sales of President Waters' textbook, *The Essentials of Agriculture*. The royalties so far have amounted to more than \$1,000, which sum has been augmented by gifts of \$100 each from Senator Capper and L. R. Eakin, of Manhattan, and by smaller amounts received from some others. The entire amount has been loaned nearly all the time. The fund is administered by a committee appointed by the President of the College and approved by the Board of Administration. The rules for the loans are likewise approved by the Board. The rules allow emergency loans of \$25 to any student who has completed two semesters of work in this College. Juniors may borrow \$100 and seniors may borrow \$150. Applications for loans should be made to Professor Albert Dickens, Chairman of the Waters Loan Fund Committee, Manhattan, Kan.

THE MANHATTAN STUDENT LOAN FUND. The members of the Chamber of Commerce of Manhattan have raised a fund which now amounts to \$2,800 and is being augmented constantly. This is loaned to deserving students at 5 per cent per annum. Applications for loans from this fund should be addressed to the secretary, Chamber of Commerce, Manhattan, Kan.

THE STATE FEDERATION OF WOMEN'S CLUBS' LOAN FUND. Each year several of the young women students of the Kansas State Agricultural College are beneficiaries of the State Federation of Women's Clubs through the administration of its liberal young women's student loan fund. Information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Manhattan, Kan.

PRIZES AND MEDALS

STOCK JUDGING. The Block and Bridle Club offers four medals, one gold, one silver, and two bronze, to students obtaining the highest four places in the club's stock-judging contest. The same organization offers prizes of books for stock judging. The Faculty of the Department of Animal Husbandry offers prizes of books or papers on stock judging.

DAIRY JUDGING. The Student Dairy Association each year holds a dairy-judging contest, and offers a gold, a silver, and a bronze medal to students obtaining the highest three places.

PLAY WRITING. The Purple Masque Dramatic Fraternity offers each year a prize of \$50 for the best original play written by a student of the Kansas State Agricultural College and suitable for presentation by the fraternity.

FESTIVAL WEEK PRIZE. The Festival Week Management (Departments of Music and Public Speaking) announce a prize of \$200 for the best play written by a student or Faculty member and suitable for presentation during Festival Week of 1921. As an alternative, the judges are authorized to apportion this amount for three one-act plays (\$100 for first, \$60

for second, and \$40 for third) in case no play is of sufficient merit to warrant its presentation during Festival Week.

ORATORY. The literary societies, through the Oratorical Board, offer each year, in the Intersociety Oratorical Contest, the following prizes:

- First prize, gold medal and \$25.
- Second prize, silver medal and \$15.
- Third prize, bronze medal and \$10.

The Oratorical Board also finances the sending of a representative from the College to the annual Peace Oratorical Contests, to the winners of which valuable prizes in money are awarded.

The Department of Public Speaking sends to the annual Missouri Valley Contest an orator as the representative of the College. In this contest valuable prizes in money and medals are awarded.

SHORT-STORY WRITING. The Quill Club offers annually a gold medal to the student of Kansas State Agricultural College writing the best short story in a contest held by this organization.

MILITARY TRAINING. In the Department of Military Training prizes and medals are offered as follows:

1. The Knostman cup, offered by the Knostman Clothing Company, of Manhattan, to the company winning the intercompany basket-ball series.
2. The Henderson Ames cup, donated by the Henderson Ames Company, of Kalamazoo, Mich., to the company winning the outdoor Henderson Ames match.
3. The Governor Hodges cup, donated by ex-Governor Hodges to the company having the highest percentage on outdoor range.
4. The Metcalf cup, donated by General W. S. Metcalf to the member of the Rifle Club having the highest aggregate in gallery matches of the United States military colleges.
5. A saber or pistol to the captain having the best-drilled company.
6. A silver-mounted saber knot to the first lieutenant of the best-drilled company.
7. A silver-mounted saber knot to the second lieutenant of the best-drilled company.
8. A silver medal to the corporal of the best-drilled squad.
9. A bronze medal to each private of the best-drilled squad.
10. A gold medal to the best-drilled cadet.

The team members of the College Rifle Club winning the series of intercollegiate matches in gallery-practice competition are issued individual marksmanship medals by the National Rifle Association of America.

SCHOLARSHIPS

MILLING INDUSTRY. The Kansas Flour Mills Company offers \$300 annually to advanced students specializing in milling industry. This sum has been divided into three scholarships which are open to students in the Divisions of Agriculture, General Science, and Engineering who are specializing in flour milling and other milling-industry work. They are awarded on or before June 1 of each year, and except in unusual cases are not awarded to students below junior standing. Other things being equal, preference is given to residents of the State of Kansas.

In awarding these scholarships, the following points regarding the student are considered: Course of study pursued, scholarship, character

and personality, and financial condition. The stipend is divided into ten monthly payments, the first payment being made September 1 and the last, June 1.

DEBATE. In the Department of English two scholarships of the value of \$100 each, one for men and one for women students, are offered annually for proficiency in intercollegiate debating.

FELLOWSHIPS

Fellowships, or graduate assistantships, have been established for some years by action of the Board, and are available in several departments of the College. For full details, see a previous paragraph under the heading "Graduate Assistantships."

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Business Manager, State Board of Administration, Topeka, Kan.

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

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

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

STUDENT ASSEMBLY

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

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published and printed at the College weekly by the Department of Industrial Journalism and Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention

is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Division of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members.

The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

EXAMINATIONS

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

Any student who receives a grade of E for the semester, in any subject, and whose absences for all causes from the class in such subject do not exceed one-tenth of the number of times the class is scheduled to meet during the semester, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are held on the fourth Saturday of each semester. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

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

GRADES

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

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

The grade G represents superior achievement, better than that exhibited by the average student, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and

fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five per cent of all grades assigned.

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

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

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (a) that which is deficient in quality, and (b) that which is satisfactory as to quality but inadequate as to quantity. The results of examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken are recorded as F.

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

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

PENALTIES

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

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

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

HONORS

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

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

HONOR SOCIETIES

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

CREDITS FOR EXTRA WORK

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

Credit for extra work may be given when the student is regularly assigned to the work in accordance with the general rules governing assignments. A student may be assigned to extra work for credit upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

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

The number of semester credits that may be allowed for extra work is as follows:

<i>Subject</i>	<i>Per semester</i>	<i>Total</i>
Physical Training	1	4
Orchestra	1	4
Band	1	4
Choral Society	1	4
Debate	2	4
Oratorical Contest	2	4
<i>Kansas State Collegian</i> journalism.....	1	4
Military Science	2	8

BIBLE STUDY

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

COURSE NUMBERS

Each course offered bears a number indicating in a general way the standing of students for whom it is given. Courses for undergraduates bear numbers 101 to 199, courses for undergraduates and graduates bear

numbers 201 to 299, and courses for graduates only bear numbers 301 to 399. The numbers 1 to 29 are applied to studies offered for short course students, the numbers 31 to 49 are assigned to summer school subjects not taught for entrance credit or for college credit, and subjects which give credit in the School of Agriculture are numbered 51 to 99.

In applying this system, the courses offered by any department are numbered independently of all other departments of the College.

CLASSES

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

School of Agriculture.....	18
Freshmen or sophomores.....	12
Juniors or seniors.....	7

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

Division of Agriculture

FRANCIS DAVID FARRELL, *Dean*

The teaching of rational, practical agriculture is fundamental to development in a state whose principal industries are agricultural. Kansas prospers in direct proportion to the productivity of her soil and to the effectiveness with which it is utilized. Effective utilization of the agricultural resources of the state depends upon the success with which the agricultural industries of the state are developed. In order to succeed in farming it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings, and the equipment of the farm and the farm home with modern conveniences; the best methods of marketing the products of the farm; and in addition to all this, how to make the farm home the center of influence for good citizenship in the agricultural community.

A man may learn many of these things through practical experience, and thus become successful in modern farming. But practical experience alone is slow and expensive. The Agricultural College furnishes a means of acquiring systematic training in agriculture which fits young men adequately for the farm for a moderate expenditure of time and money.

In addition to training men for service as farmers, the College prepares students for various other activities which must be carried on if the agriculture of the state and nation is to be developed properly. These activities include scientific investigation of agricultural problems in state and national institutions, agricultural extension work, teaching of agriculture, service in the industries directly involving agriculture, and a variety of other lines of public and private service of an agricultural nature. The demand for well-trained, reliable men in all these lines is always extensive. The primary aim of the College in training men in agriculture is to fit them for service in which they will develop into agricultural leaders, either as farmers or in some other capacity, and as such, contribute to the upbuilding of rural institutions and the improvement of American country life.

EQUIPMENT

The facilities for such training at this College are of a high order. The College owns 1,136 acres of land, which is used for investigation, instruction, and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, is one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain

an appreciation or love for the beautiful. A tract of 320 acres is devoted to the work in agronomy; for horticulture and forestry work, 80 acres are used; for dairy work, about 160 acres; and for animal husbandry, about 400 acres. The herds and flocks contain all important breeds of dairy and beef cattle, hogs, horses, and sheep. Many of these animals have won championships at local and State fairs in recent years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

CURRICULA IN AGRICULTURE

The various needs of the student of agriculture are met by the following curricula:

A four-year curriculum in agriculture.

A six-year curriculum in animal husbandry and veterinary medicine.

Various special courses. (The work of these courses is discussed in another section of the catalogue.)

DEGREES

The four-year course in agriculture leads to the degree of bachelor of science (in agriculture).

The six-year curriculum in animal husbandry and veterinary medicine, the last two years of which are given in the Division of Veterinary Medicine, leads to the degree of bachelor of science at the end of four years, and to the degree of doctor of veterinary medicine at the end of two more years.

THE CURRICULUM IN AGRICULTURE

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

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year curriculum. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that underlie every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions which

should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher of farming must possess both kinds of training, and the curriculum has been revised with this fact in view, and has been so arranged that *the student begins his practical training in agriculture on the first day he enters College.*

ANALYSIS OF THE CURRICULUM

One hundred thirty-one semester credits in addition to military science are required for graduates, as follows:

	<i>Semester credits</i>	
Prescribed agriculture	43	
Electives in agriculture, required with their prerequisites	21	
Required in agriculture	—	64
Prescribed in nonagriculture	45	
Electives in nonagriculture, required	6	
Electives that may be nonagriculture	16	
Total allowed in nonagriculture	—	67
Required in military science	—	4
		—
Total semester credits for graduation		135

As shown in the above general outline and in the tabulated curriculum given hereafter, the candidate for graduation must have completed one hundred thirty-five College semester credits. The twelve major electives required must be taken from some one of the departments of the Division of Agriculture. The nine minor electives must support the major work. They may be taken from more than one department, and may even be selected from departments in other divisions of the College, but they must directly strengthen the student's preparation in agriculture. At the discretion of the student, twenty-one elective credits may be nonagricultural. However, six semester credits of the junior electives and the seven senior semester credits, designated "free electives," may be earned in any College credit courses and may be chosen without restriction. Any candidate for a degree in agriculture must also have had at least six months' farm experience approved by the Dean of the Division of Agriculture.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, botany, English, and physics, practical studies in the physiology of plants and plant diseases, farm crops, live stock, dairying, poultry, and horticulture. These two years give the student a general knowledge of the whole range of practical agriculture, more than one-third of his time in the freshman and sophomore years being devoted to strictly agricultural subjects.

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to agriculture. He is led step by step to understand the scientific relations of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to determine which of the general lines he should emphasize most. This is made possible by numerous electives in soils, crops, agricultural economics, animal husbandry, dairy husbandry, horticulture, milling, and poultry husbandry.

STATE TEACHERS' CERTIFICATES

By the selection of proper electives in the Department of Education, the four-year curriculum in agriculture may not only lead to the degree of bachelor of science (in agriculture), but at the same time qualify the student for the three-year Kansas state teachers' certificate, renewable for life and valid in any high school or any other public school in the State. A student desiring to qualify for teaching should begin his professional preparation by electing psychology, first semester, junior year. A total of eighteen semester credits in the Department of Education is required for this certificate. These must include the following courses: psychology, educational administration, and educational psychology or educational sociology.

STATE CERTIFICATES FOR TEACHERS OF VOCATIONAL AGRICULTURE

The forty-three semester hours of electives provided in this curriculum in agriculture may be so chosen as thoroughly to prepare the student for the teaching of vocational agriculture in schools participating in the Federal Smith-Hughes funds. The following are the electives suggested for those preparing to be supervisors or teachers of vocational agriculture:

	<i>Semester credits</i>
Professional work in education.....	18
Psychology.....	3
Educational Administration.....	3
Educational Psychology, or Educational Sociology.....	3
Methods of Teaching Agriculture.....	3
Agricultural Education.....	2
Electives in Education.....	4
Farm Management.....	3
Soil Management.....	2
Market Gardening, or Farm Animals in Health and in Disease.....	3
Rural Architecture.....	3
Agricultural Economics.....	3
Tractors and Trucks, or Farm Motors.....	3
Field Machinery.....	2
Woodwork.....	2
Forging.....	2
Concrete Construction.....	2
Total.....	43

Candidates for the certificate in vocational agriculture must also have had not less than two full years of actual farm experience in labor or management, at least one of which shall have been continuous so as to give practical contact with farm conditions during all seasons.

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

A combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours of recitation each week; the second shows the number of hours to be spent in laboratory work each week; and the third, where there is one, indicates the number of hours of outside work in connection with the laboratory required each week.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
General Botany I Bot. 101 3(1-4, 2)	General Botany II Bot. 105 3(1-4, 2)
Market Grades and Classes of Live Stock An. Husb. 131 3(1-6)	Plant Propagation Hort. 101 3(2-3)
Dairy Judging Dairy Husb. 104 1(0-3)	Elements of Dairying Dairy Husb. 101 3(2-3)
Library Methods Lib. Ec. 101 1(1-0)	Military Science II Mil. Tr. 102 1(0-4)
Agricultural Lectures Gen. Agric. 101 R(1-0)	Physical Education M-II Phys. Ed. 104 R(0-2)
Military Science I Mil. Tr. 101 1(0-4)	
Physical Education M-I Phys. Ed. 103 R(0-2)	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry Chem. 120 3(2-3)	Quantitative Analysis I Chem. 150 2(0-6)
Agricultural Physics Physics 111 3(3-0)	Principles of Feeding An. Husb. 152 3(3-0)
Anatomy and Physiology ¹ Anat. 131 3(2-3)	General Zoölogy Zoöl. 105 5(3-6)
Grain Crop Production Agron. 101 3(2-3)	Forage Crop Production Agron. 102 3(2-3)
Plant Pathology I Bot. 116 3(1-4, 2)	Breeding Types and Classes of Live Stock An. Husb. 137 2(0-6)
Farm Poultry Production Poult. Husb. 101 2(1-2, 1)	Orcharding Hort. 107 2(1-3)
Military Science III Mil. Tr. 103 1(0-4)	Military Science IV Mil. Tr. 104 1(0-4)
Physical Education M-III Phys. Ed. 105 R(0-2)	Physical Education M-IV Phys. Ed. 106 R(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Genetics An. Husb. 221 3(3-0)	Soil Fertility Agron. 132 3(2-3)
Soils Agron. 131 4(3-3)	Agricultural Journalism Ind. Jour. 121 1(1-0)
Agricultural Microbiology Bact. 106 3(1-6)	General Entomology Ent. 101 3(2-3)
Electives ² 6	Electives ² 9

¹ Students who do not expect to major in animal husbandry or dairy husbandry may, with the approval of the Dean of Agriculture, substitute Plant Physiology I (Bot. 208) for this course.

² Six semester credit hours of junior electives must be chosen from the work offered in history, economics, education, modern languages, or mathematics. Students preparing to teach should take not less than eleven semester credit hours of junior electives in the Department of Education.

FIRST SEMESTER		SENIOR	SECOND SEMESTER	
Agricultural English ³			Agricultural Relationships ³	
Engl. 137	3 (3-0)		Gen. Agric. 201	1 (1-0)
Major electives ⁴	6		Major electives ⁴	6
Minor electives ⁵	4		Minor electives ⁵	5
Free electives ⁶	3		Free electives ⁶	4

Agricultural Electives for Students in the Curriculum in Agriculture

AGRICULTURAL ECONOMICS

FIRST SEMESTER	SECOND SEMESTER
Farm Cost Accounting 2 (1-3)	Agricultural Economics 3 (3-0)
	Marketing and Coöperation 2 (2-0)
	Advanced Farm Management 3 (1-6)
	Agricultural Industries 2 (2-0)
	Agricultural Land Problems 1 (1-0)
	Farm Management 3 (2-3) (Each semester)
	Research in Agricultural Economics (2 to 6 semester credits for graduates)
	Research in Farm Management (1 to 5 semester credits) (Each semester, for graduates)

AGRONOMY

FIRST SEMESTER	SECOND SEMESTER
Seed Identification and Weed Control 2 (1-3)	Crop Improvement 3 (2-3)
Advanced Forage Crops 2 (1-3)	Advanced Grain Crops 2 (1-3)
Advanced Soil Fertility 2 (1-3)	Special Crops 1 (1-0)
	Dry-land Farming 2 (2-0)
Soil Problems 2 (1-3)	
Principles of Agronomic Experimentation 1 (1-0)	Soil Survey 2 (1-3)
Pasture Management 2 (1-3)	Agronomy Seminar 1 (1-0)
Plant Genetics 3 (3-0)	

EACH SEMESTER

Crops Research (for graduates)
Crops Problems
Soils Research (for graduates)
Advanced Soils Laboratory
Pasture Management Research (for graduates)
(One or more semester credits each, according to work done.)
Genetics Seminar 1 (1-0)

³ The courses in Agricultural English and Agricultural Relationships are open to seniors only.

⁴ Major electives must be chosen from one department in the Division of Agriculture and approved by the head of the department.

⁵ Minor electives may be chosen from more than one department. They must be agricultural courses, or closely related science, and they must support the major work.

⁶ Students preparing to teach must use senior free electives in completing their requirements for the state teachers' certificate.

ANIMAL HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Advanced Stock Judging I 2(0-6)	Systems of Live-stock Production 3(3-0)
Form and Function in Live Stock 2(0-6)	Advanced Stock Judging II 2(0-6)
Swine Production 3(2-3)	Beef Cattle Production 3(2-3)
History of Breeds and Pedigrees 3(2-3)	Horse Production 3(2-3)
Sheep Production 3(2-3)	Advanced Studies in Pedigrees 3(1-6)
SECOND SEMESTER	EACH SEMESTER
Animal Breeding 3(3-0)	Meats 2(1-3)
Advanced Genetics 4(3-3)	Genetics Seminar 1(1-0)
Advanced Meats (2 to 4 semester credits)	Research in Genetics (4 to 10 semester credits)
	SUMMER SCHOOL
	Teachers' Course in Animal Husbandry 4(6-6)

DAIRY HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Butter Making and Creamery Management 3(2-3)	Dairy Inspection I 2(1-3)
Market Milk 2(1-3)	Milk Production 3(3-0)
	Cheese and Ice Cream Making 3(2-3)
	Advanced Dairy Judging 1(0-3)
	Dairy Herd Management 2(1-3)
	Dairy Seminar 1(1-0)
	Dairy Research (3 semester credits) (Each semester, for graduates)

HORTICULTURE

FIRST SEMESTER	SECOND SEMESTER
Systematic Pomology 3(1-6)	Small Fruits 2(2-0)
Farm Forestry 4(3-3)	Dendrology 3(1-6)
Practical Pomology 3(2-3)	Silviculture 3(2-3)
Spraying 2(1-3)	Orchard Management 4(3-3)
	Market Gardening 3(2-3)
	Landscape Gardening I 4(2-6)
	School Gardening 3(2-3)
	Plant Materials in Landscape Gardening 3(2-3)

Greenhouse Construction and Management 3(3-0)	Landscape Gardening II 3(0-9) (for graduates)
History and Literature of Landscape Gardening 2(2-0)	Tree Surgery 2(1-3)
The Theory and Aesthetics of Landscape Gardening 3(2-3) (for graduates)	City and Town Planting 3(1-6) (for graduates)

EACH SEMESTER (for graduates)

- Orchard Economics
 - Market Gardening Problems
 - Pomological Research Work
 - Forcing Flowers and Vegetables
- (One or more semester credits each, according to work done)

MILLING INDUSTRY

FIRST SEMESTER	SECOND SEMESTER
Grain Marketing 3(3-0)	Principles of Milling 1(0-3)
Wheat and Flour Testing 4(1-9)	Grain Products 2(2-0)
	Milling Practice I 3(1-6)
	Milling Practice II 2(0-6)
	Experimental Baking A 2(0-6)

POULTRY HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Practice in Poultry Feeding (1 semester credit)	Practice in Incubation (1 or 2 semester credits)
Practice in Milk Feeding (1 semester credit)	Practice in Brooding (1 to 3 semester credits)
Poultry Breeds and Types 2(1-3)	Advanced Poultry Judging 1(0-3)
Market Poultry 2(1-3) or 3(1-6)	Poultry Breeding 2(0-6)
	Poultry Farm Management 3(2-3)
	Poultry Bacteriology 3(1-6)
	Comparative Anatomy of Domestic Birds 3(1-6)

BOTH SEMESTERS AND SUMMER SCHOOL

- Poultry Research
(2 or more semester credits)

Electives for Agricultural Students, with Their Prerequisites

MAJOR ELECTIVES

<i>Subject</i>	<i>Prerequisites</i>
AGRICULTURAL ECONOMICS:	
Agricultural Economics	Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility
Farm Management	Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility
Farm Cost Accounting	None
Marketing and Coöperation	Agricultural Economics
Advanced Farm Management	Farm Management
Agricultural Industries	Agricultural Economics, or Farm Management
Agricultural Land Problems	Agricultural Economics
Research in Agricultural Economics	Agricultural Economics
Research in Farm Management	Farm Management, and Farm Cost Accounting

<i>Subject</i>	<i>Prerequisites</i>
AGRONOMY:	
Seed Identification and Weed Control..	Grain Crop Production, Forage Crop Production
Special Crops	Grain Crop Production, Forage Crop Production
Crop Improvement	Grain Crop Production, Forage Crop Production, Genetics
Advanced Grain Crops.....	Grain Crop Production
Advanced Forage Crops.....	Forage Crop Production
Principles of Agronomic Experimentation,	Crop Improvement, Soil Fertility
Agronomy Seminar	Grain Crop Production, Forage Crop Production, Soils
Pasture Management	General Botany II, Forage Crop Production
Plant Genetics	Genetics
Genetics Seminar	For prerequisites, consult instructors
Crop Problems	Advanced Grain Crops, Advanced Forage Crops
Crops Research (for graduates).....	Advanced Grain Crops, Advanced Forage Crops
Pasture Management Research (for graduates)	Pasture Management, Surveying II, Ecology, Taxonomic Botany
Dry-land Farming	Soils
Advanced Soil Fertility.....	Soil Fertility
Soil Survey	Soils
Soil Problems	Soil Fertility
Advanced Soils Laboratory.....	Soil Fertility
Soils Research (for graduates).....	Soil Fertility, Quantitative Analysis I
ANIMAL HUSBANDRY:	
Advanced Stock Judging I.....	Breeding Types and Classes of Live Stock
Advanced Stock Judging II.....	Advanced Stock Judging I
Form and Function in Live Stock.....	Advanced Stock Judging II
History of Breeds and Pedigrees.....	Market Grades and Classes of Live Stock
Beef Cattle Production.....	Breeding Types and Classes of Live Stock, Principles of Feeding
Swine Production	Breeding Types and Classes of Live Stock, Principles of Feeding
Sheep Production	Breeding Types and Classes of Live Stock, Principles of Feeding
Horse Production	Breeding Types and Classes of Live Stock, Principles of Feeding
Meats	Breeding Types and Classes of Live Stock, Principles of Feeding
Animal Breeding	Genetics
Advanced Genetics	Genetics
Genetics Seminar	For prerequisites, consult instructors
Research in Genetics.....	Advanced Genetics
Advanced Studies in Pedigrees.....	History of Breeds and Pedigrees
Advanced Feeding	Principles of Feeding
Advanced Meats	Meats
The Wool Industry.....	Sheep Production
Systems of Live-stock Production.....	Beef Cattle Production, Swine Production, Sheep Production, Horse Production
Live-stock Marketing	Beef Cattle Production, Swine Production, Sheep Production, Horse Production
Animal Husbandry Seminar.....	Principles of Feeding
DAIRY HUSBANDRY:	
Dairy Inspection I.....	Agricultural Microbiology, Dairy Chemistry, Elements of Dairying
Milk Production	Elements of Dairying, Principles of Feeding
Butter Making and Creamery Management	Elements of Dairying, Dairy Bacteriology
Cheese and Ice Cream Making.....	Elements of Dairying, Dairy Bacteriology, Dairy Chemistry
Market Milk	Elements of Dairying, Dairy Bacteriology
Advanced Dairy Judging.....	Dairy Judging
Dairy Herd Management.....	Milk Production
Dairy Seminar	Elements of Dairying, Dairy Inspection I, Milk Production
Dairy Research (for graduates).....	Milk Production, Butter Making and Creamery Management
HORTICULTURE:	
Systematic Pomology	None
Small Fruits	Plant Propagation
Farm Forestry	None
Dendrology	None

<i>Subject</i>	<i>Prerequisites</i>
MAJOR ELECTIVES—concluded	
Silviculture	Farm Forestry or Dendrology
Gardening	None
Landscape Gardening I	None
Greenhouse Construction and Management	None
School Gardening	None
Practical Pomology	Systematic Pomology
Orchard Management	None
Spraying	Chemistry II
Market Gardening	None
History and Literature of Landscape Gardening	None
Plant Materials of Landscape Gardening	Plant Propagation
Tree Surgery	Plant Physiology I
Landscape Gardening II (for graduates)	Landscape Gardening I
Theory and Aesthetics of Landscape Gardening (for graduates)	History and Literature of Landscape Gardening
City and Town Planting (for graduates)	None
Orchard Economics (for graduates)	For prerequisites, consult instructors
Market Gardening Problems (for graduates)	For prerequisites, consult instructors
Pomological Research Work (for graduates)	For prerequisites, consult instructors
Forcing Fruits and Vegetables (for graduates)	For prerequisites, consult instructors
MILLING INDUSTRY:	
Principles of Milling	None
Grain Marketing	Grain Crop Production
Grain Products	Grain Marketing
Milling Practice I	Principles of Milling
Milling Practice II	Milling Practice I
Wheat and Flour Testing	Grain Products, Organic Chemistry, and Advanced Quantitative Analysis
Experimental Baking A	Wheat and Flour Testing
POULTRY HUSBANDRY:	
Practice in Poultry Feeding	Farm Poultry Production
Practice in Incubation	Farm Poultry Production
Practice in Brooding	Farm Poultry Production
Practice in Milk Feeding	Farm Poultry Production
Poultry Breeds and Types	None
Advanced Poultry Judging	Poultry Breeds and Types
Market Poultry	Farm Poultry Production
Poultry Breeding	Genetics
Poultry Farm Management	Farm Management
Poultry Bacteriology	Microbiology
Poultry Anatomy	Anatomy and Physiology
Comparative Anatomy of Domestic Birds	Embryology
Poultry Research	Farm Poultry Production, Practice in Poultry Feeding, Practice in Incubation, and Practice in Brooding
OTHER ELECTIVES	
ANATOMY AND PHYSIOLOGY:	
Anatomy I	None
Anatomy II	Anatomy I
Anatomy III	Anatomy II
Anatomy IV	Anatomy III
APPLIED MECHANICS:	
Engineering Drawing	None
BACTERIOLOGY:	
Soil Microbiology	Agricultural Microbiology
Dairy Bacteriology	Agricultural Microbiology
Poultry Bacteriology	Agricultural Microbiology
BOTANY:	
Plant Physiology I	General Botany II
Taxonomic Botany	General Botany II
Field Crops and Vegetable Diseases	Plant Pathology I
Fruit Crop Diseases	Plant Pathology I
Economic Botany	General Botany II
Plant Pathology II	Plant Pathology I
Plant Pathology III	Plant Pathology II

<i>Subject</i>	<i>Prerequisites</i>
CHEMISTRY:	
Advanced Inorganic Chemistry.....	Chemistry II
Inorganic Preparations	Chemistry II
Organic Chemistry I.....	Chemistry II
Organic Chemistry II.....	Organic Chemistry I
Organic Preparations	Organic Chemistry II
Principles of Animal Nutrition.....	Organic Chemistry
Physiological Chemistry	Organic Chemistry
Physical Chemistry	Quantitative Analysis
Quantitative Analysis II.....	Chemistry II
Quantitative Analysis III.....	Quantitative Analysis II
Chemistry of Soils and Fertilizers.....	Quantitative Analysis I
Chemistry of Plant Products.....	Quantitative Analysis I, Organic Chemistry
Chemistry of Dairy Products.....	Quantitative Analysis I, Organic Chemistry
Chemistry of Meats.....	Quantitative Analysis I, Organic Chemistry
Research in Agricultural Chemistry.....	(Depends upon work undertaken)
CIVIL ENGINEERING:	
Surveying I	Trigonometry
Surveying II	Surveying I
Elements of Irrigation and Drainage.....	None
ECONOMICS AND SOCIOLOGY:	
Economics	None
Sociology	None
Rural Sociology	None
Business Organization	Economics
Labor Problems	Economics
Money and Banking.....	Economics
Public Finance	Economics
Business Management	Economics
Current Economic Problems.....	Economics
Social Problems	Sociology or Economics
Community Problems	Sociology or Economics
EDUCATION:	
Psychology	None
Educational Administration I.....	None
Educational Psychology	Psychology
Educational Sociology I.....	None
Agricultural Education	Educational Administration I
Special Methods in the Teaching of Agriculture	Educational Psychology
Rural Education	Educational Administration I
Supervised Observation and Teaching in Agriculture.....	Educational Psychology
ELECTRICAL ENGINEERING:	
Electrical Engineering C.....	College Physics
Illuminating Engineering	College Physics
ENGLISH:	
Argumentation and Debate.....	College Rhetoric II
Oral English I.....	College Rhetoric II
Farm Advertising	College Rhetoric II
Farm Bulletins	College Rhetoric II
ENTOMOLOGY:	
Apiculture	General Entomology
Milling Entomology	General Entomology
Horticultural Entomology.....	General Entomology
General Economic Entomology.....	General Entomology
Insect Morphology I.....	General Entomology
FARM ENGINEERING:	
Rural Architecture	None
Field Machinery	None
Tractors and Trucks.....	None
Farm Motors	None
Power Machinery	Field Machinery
Advanced Farm Machinery.....	Power Machinery
Farm Machinery Research.....	Power Machinery
Farm Equipment	None
Farm Sanitation and Water Supply.....	None
FRENCH:	
French I	None
Beginning French I.....	None
French II	French I
Beginning French II.....	Beginning French I
French Readings	French II
French Short Stories.....	French Readings

<i>Subject</i>	<i>Prerequisites</i>
GEOLOGY:	
Dynamic and Structural Geology.....	None
Engineering Geology	None
Historical Geology	Dynamic and Structural Geology
GERMAN:	
German I	None
Beginning German I.....	None
German II	German I
Beginning German II.....	Beginning German I
German Readings	German II or Beginning German I
German Comedies	German Readings
German Short Stories.....	German Readings
Scientific German I.....	German II or Beginning German I
Scientific German II.....	Scientific German I
HISTORY AND CIVICS:	
American History I.....	None
American History II.....	None
American History III.....	None
American Agricultural History.....	None
American Industrial History.....	None
American Political History.....	None
Pan-America	None
Modern Europe	None
Current History	None
American Government	None
Comparative Government	None
Business Law I.....	None
Business Law II.....	Business Law I
Farm Law	None
INDUSTRIAL JOURNALISM:	
Elementary Journalism	None
Industrial Writing	Elementary Journalism or Agricultural Journalism
Industrial Feature Writing.....	Industrial Writing
Journalism Practice I.....	May be taken with Agricultural Journalism
Journalism Practice II.....	Journalism Practice I
MATHEMATICS:	
Plane Trigonometry	Plane Geometry, and 1½ units of high-school algebra
College Algebra	Plane Geometry, and 1½ units of high-school algebra
Analysis of Statistics.....	None
PATHOLOGY:	
Histology I.....	None
Histology II	Histology I
Pathology I	Histology II, Comparative Physiology II, Pathogenic Bacteriology I
Pathology II	Pathology I
Meat Inspection	Consult instructor
PHYSICS:	
General Physics I.....	Trigonometry
General Physics II.....	General Physics I
Photography	None
SHOP PRACTICE:	
Woodwork I	None
Woodwork II	Woodwork I
Woodwork III	Woodwork II
Woodworking for Grammar Grades.....	None
Woodworking I for High Schools.....	Woodworking for Grammar Grades
Woodworking II for High Schools.....	Woodworking I for High Schools
Wood Turning	Woodworking II for High Schools
Farm Shop Practice.....	None
Farm Woodwork	None
Forging I	None
Forging II	Forging I
SPANISH:	
Spanish I	None
Spanish II	Spanish I
Spanish Readings	Spanish II
STEAM AND GAS ENGINES:	
Dairy Refrigeration	None

<i>Subject</i>	<i>Prerequisites</i>
SURGERY AND MEDICINE:	
Surgery I	None
Surgery II	Surgery I
Horseshoeing	Anatomy and Physiology
Obstetrics	Anatomy and Physiology, Embryology
Farm Animals in Health and in Disease	Anatomy and Physiology
ZOOLOGY:	
Embryology	General Zoölogy
Parasitology	General Zoölogy
Economic Zoölogy	General Zoölogy
Advanced Invertebrate Zoölogy	General Zoölogy
Advanced Vertebrate Zoölogy	General Zoölogy
Taxonomy of Invertebrates	General Zoölogy, Principles of Taxonomy
Taxonomy of Vertebrates	General Zoölogy, Principles of Taxonomy
Animal Ecology	General Zoölogy, General Entomology
Cytology	Embryology and Physiology, or Embryology
Evolution and Heredity	Consult instructor

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry Chem. 120	Quantitative Analysis I Chem. 150
General Zoölogy Zoöl. 105	Pathogenic Bacteriology I Bac. 111
Anatomy I Anat. 101	Anatomy II Anat. 106
Grain Crop Production Agron. 101	Forage Crop Production Agron. 102
Military Science III Mil. Tr. 103	Agricultural Journalism Ind. Jour. 121
Physical Education M-III Phys. Ed. 105	Military Science IV Mil. Tr. 104
	Physical Education M-IV Phys. Ed. 106

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Embryology Zoöl. 117	Principles of Feeding An. Husb. 152
Anatomy III Anat. 111	Anatomy IV Anat. 116
Histology I Path. 101	Histology II Path. 106
General Entomology Ent. 101	Electives†
Electives†	

* This curriculum is so arranged that students may receive the degree of bachelor of science (in agriculture) at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Genetics	Agricultural Relationships
An. Husb. 221..... 3(3-0)	Gen. Agric. 201..... 1(1-0)
Comparative Physiology I	Soil Fertility
Anat. 121..... 5(4-3)	Agron. 132..... 3(2-2, 1)
Soils	Comparative Physiology II
Agron. 131..... 4(3-3)	Anat. 126..... 3(2-3)
Agricultural English	Materia Medica I
Engl. 137..... 3(3-0)	Surg. 151..... 2(2-0)
Electives..... 1	Electives..... 7

FIFTH YEAR

Junior year of the Curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the Curriculum in Veterinary Medicine

Agricultural Economics

Professor _____
Associate Professor GRIMES

Assistant Professor THOMSEN
Assistant FRENCH

The realization of a more profitable agriculture depends as much upon the utilization of sound business principles, management and methods as upon the practice of technical knowledge emphasized in other departments of an agricultural college. The business side of farming deals essentially with two important groups of forces and conditions, which may be classified, on the one hand, as those centering about the individual and his particular farm, while on the other hand are those having to do largely with group activities and relationships operating from within the locality as well as from outside regions. Local, state, and federal governments in their relations to farmers, middlemen and consumers have a definite part in programs of modern agriculture. The farmer makes relatively large or small profits according to the degree of his personal efficiency in the organization and management of the farm and the marketing of its products. The courses in this department are therefore designed to equip the student with principles and facts, and the habits of clear thinking which will lead to more efficient and profitable farming both for the individual and for the community.

The department engages not only in teaching, but also conducts investigations of the various economic problems of agriculture. A number of studies have been completed, others are being conducted, and many more are contemplated for the future. These studies provide ample material for class work and present opportunities for advanced students to engage in original investigation and research. Farm credit, tenancy, the marketing of farm products, and other subjects, together with special farm-management investigations, center the student's attention on facts which are up-to-date and of vital importance to those who desire to make their farming profitable and interesting.

Farm-management studies have been made in many parts of the State, and are being extended each year. These studies of the farm business furnish abundant material for class and laboratory work, and

give an excellent knowledge of the business problems of individual farmers in the various parts of the State. A number of the more successful farms of the State are visited by the students in the advanced courses in farm management. These farms furnish the student an opportunity to study the personality of the farmer as well as his business methods and results.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATES

101.* AGRICULTURAL ECONOMICS. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 152, and Agron. 101, 102, and 132. In case student desires, Agricultural Economics may be taken along with Agron. 132. Professor ——— and Associate Professor Grimes.

Clear thought and sound judgment upon the problems that confront the individual are essential to success in any phase of agricultural production. The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics* and Ely and Wicker's *Elementary Principles of Economics*.

106. FARM MANAGEMENT. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101, 102, and 132, and An. Husb. 152. Associate Professor Grimes.

The economic factors affecting the organization and operation of the farm business are studied with respect to their effect on the profits from farming enterprise. Discussions and problems are confined chiefly to the economic problems of the individual farmer on his farm. Methods of leasing are studied in their effect upon the opportunities of the tenant and the landlord. Results from actual farms are studied in the laboratory to give the student opportunity to observe the effects of the various economic factors in their influence on the farm business.

111. FARM COST ACCOUNTING. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Grimes.

Various systems of farm records and accounts are studied to acquaint the student with the more practical methods. The principles of cost finding as applied to agricultural enterprises are given. The laboratory work affords opportunity to work out problems from actual farms in which these principles are involved. Particular attention is given to determining the cost of producing farm products and to the analysis and utilization of cost of production data.

FOR GRADUATES AND UNDERGRADUATES

201. MARKETING AND COÖPERATION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Professor ———.

American farmers' organizations have attempted much in the way of reorganizing the process by which agricultural products are transferred

* For an explanation of the system used in numbering courses, see the paragraph on "Course Numbers," given elsewhere in this catalogue.

from the farm to the consumer as well as in the bettering of farmers as a class. Knowledge of their experience in coöperative undertakings, whether in the line of marketing or production, is essential to a thorough understanding of the situation regarding farmers' coöperative organizations and the problems of greater economy in marketing. Following the sketch of the important farmer movements, speculation, market organization, coöperative production, exchange and credit are studied in detail. The course consists of lectures, special topics, assigned readings, and discussions. Text: Weld's *The Marketing of Farm Products*.

206. ADVANCED FARM MANAGEMENT. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Ag. Ec. 106. Associate Professor Grimes.

The factors affecting the successful organization and operation of the farm businesses are studied by visiting farms in various parts of the State. The effects of external factors are also observed. A number of the better and more profitable farms in Kansas are visited during the course.

211. AGRICULTURAL INDUSTRIES. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101 or 106. Dean Farrell.

This course deals with some of the more important phases of agriculture from the standpoint of their industrial requirements and relationships. Consideration is given to the principal geographic, economic, and social factors involved in the establishment and maintenance of the world's leading agricultural industries. The course is designed primarily to fit students to make an agricultural reconnaissance either in a settled or unsettled region; to determine what agricultural industries are suitable for a region; and to devise methods of establishing new agricultural industries or of improving industries already established. The course consists of lectures, reference work, assigned topics, and discussions.

216. AGRICULTURAL LAND PROBLEMS. Elective, second semester. Class work, one hour. One semester credit. Prerequisite: Ag. Ec. 101. Professor _____.

The practical exhaustion of free land, rising prices, increasing tenancy and declining soil fertility have produced unusual interest in land problems. The conditions essential to the best productive use of land, together with the various attempts in different countries to promote the proper use of land by various land policies, provide the basis for the development of helpful views respecting land reforms which are now pressing for public recognition. The course consists of lectures, reference work, assigned topics, and discussions.

FOR GRADUATES.

301. RESEARCH IN AGRICULTURAL ECONOMICS. Elective, both semesters. Credit to be based on the quality and quantity of the work accomplished. Prerequisite: Ag. Ec. 101. Professor _____.

This course is open only to a limited number of advanced students. A study is made of the economic problems of immediate interest to the farmers of Kansas. The facts and the processes of present marketing systems must be known before intelligent changes in them can be suggested. The forces causing undesirable tenancy must be determined before the evils can be eradicated. These subjects and many others are topics for careful research in this course.

306. RESEARCH IN FARM MANAGEMENT. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semes-

ter credits. Prerequisites: Ag. Ec. 106 and 111. Associate Professor Grimes.

Students are assigned special farm-management problems. The completion of the work entitles them to credit according to the amount of work done.

Agronomy

Professor CALL	Assistant Professor SEWELL
Professor SALMON	Assistant Professor ZAHNLEY
Professor THROCKMORTON	Instructor SCOTT
Associate Professor PARKER	Assistant WILSON
Associate Professor HENSEL	Assistant HARLING
Associate Professor CUNNINGHAM	Assistant PHINNEY

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

Large and well-equipped laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the State. Ample greenhouse space is provided for germinating seeds under varying conditions, and for research work in soils during the winter months.

The Department of Agronomy offers courses in cereal and forage crop production and improvement in pasture management, in soils, soil fertility, soil survey, and dry-land farming.

COURSES IN FARM CROPS

FOR UNDERGRADUATES

101. GRAIN CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Associate Professor Parker and Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

102. FORAGE CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

103. FARM CROPS. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Assistant Professor Zahnley.

This course consists of a study of the more important grain and forage crops, especially from the production viewpoint.

105. SEED IDENTIFICATION AND WEED CONTROL. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley and Mrs. Harling.

Methods of propagation, control, and eradication of weeds are discussed in lectures. The laboratory period is devoted to the identification of weed plants, and seeds; to germination and purity testing; and to field trips.

106. SPECIAL CROPS. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101 and 102. Assistant Professor Zahnley.

The distribution, climatic and soil requirements, relative importance, and production of sugar beets, cotton, flax for fiber, hemp, tobacco, and other minor crops are studied.

FOR GRADUATES AND UNDERGRADUATES

201. CROP IMPROVEMENT. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101 and 102, and An. Husb. 221. Associate Professor Parker.

This course reviews the principles of plant breeding and applies them to the principal groups of field crops. Methods of selection, hybridization, and breeding for special qualities are discussed. Laboratory work is a study of heritable characters and of their behavior in several generations following the cross.

202. ADVANCED GRAIN CROPS. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 101. Professor Salmon.

Special phases of grain crop production are discussed in class. The laboratory work is devoted largely to identification and judging of threshed grain.

203. ADVANCED FORAGE CROPS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite, Agron. 102. (Not offered until 1921) Assistant Professor Zahnley.

Results of the most recent investigations carried on with forage crops in this and in other countries are studied, together with a more intensive study of the sorghums, alfalfa, sweet clover, soybeans, and other important or promising forage crops.

Laboratory.—The laboratory work is devoted to a study of the growth habits of the crops considered in the lecture, especially as they are related to the production and improvement of these crops. Storing, market grading, and marketing of hay are also considered.

205. PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Agron. 201 and 132. Professor Salmon.

A discussion of the principles of experimentation in general is followed by their application to agronomic problems. Important contributions to agronomic science are studied from the historical viewpoint.

206. AGRONOMY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101, 102, and 131. Professor Call.

In this course students are required to review before the class timely articles appearing in bulletins and current periodicals.

207. PASTURE MANAGEMENT. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bot. 102 and Agron. 102. Associate Professor Hensel.

This course will be taken up in two parts: First, native forage plants, their distribution, value, life history and habits, and their management. Second, management of pastures and ranges, including the determination of carrying capacity, character of stock best suited to a range or pasture and the proper methods of handling areas to maintain or increase the forage cover.

208. PLANT GENETICS. Elective, first semester (not offered until fall of 1921). Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Associate Professor Parker.

This course is an advanced course in genetics and is offered to those students interested in plant breeding. Lectures and reference reading will deal with fundamental principles of breeding as they have been worked out in plants.

209. GENETICS SEMINAR. Elective, first and second semesters. One semester credit. (For prerequisites, consult instructors.) Associate Professor Parker and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and the validity of conclusions drawn.

210. CROP PROBLEMS. Elective, both semesters and summer school. Laboratory, three to twelve hours. One to four semester credits. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems for study. The completion of the work with a written report entitles them to credit according to the amount and quality of the work done.

FOR GRADUATES

301. CROPS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits according to the work done. Prerequisites: Agron. 202 and 203. Professor Salmon and Associate Professor Parker.

Students choose or are assigned special problems for investigation. The completion of the work entitles them to credit according to the amount of work done.

302. PASTURE MANAGEMENT RESEARCH. Elective, both semesters and summer school. One to five semester credits, depending on the work done. Prerequisites: Agron. 207, Civ. Eng. 111, Bot. 223 and 225. Associate Professor Hensel.

Students choose or are assigned special problems for investigation.

COURSES IN SOILS

FOR UNDERGRADUATES

131. SOILS. Junior and senior years, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Chem. 102. Professor Call, Professor Throckmorton, Assistant Professor Sewell, and Mr. Scott.

This course deals with the origin and formation of soils and their classification and composition as influenced by method of formation and climatic condition. Special attention is given to the management of soils required to conserve moisture and liberate plant food.

132. SOIL FERTILITY. Junior and senior years, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 150 and Agron. 131. Professor Call, Professor Throckmorton, Assistant Professor Sewell, and Mr. Scott.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive most attention in this course.

FOR GRADUATES AND UNDERGRADUATES

231. DRY-LAND FARMING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

The principles underlying the cultivation methods and farming systems under light rainfall conditions are studied.

232. ADVANCED SOIL FERTILITY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the use of commercial fertilizers and their effects upon plants and soil.

233. SOIL SURVEY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton, and Mr. Scott.

Types of soils of the United States and methods of mapping soil areas are studied in this course. Special attention is given to the study of Kansas soils in the field.

234. SOIL PROBLEMS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the management of soils under irrigation and with the management of wet, sandy, and eroded soils and with other types requiring special methods of working.

235. ADVANCED SOILS LABORATORY. Elective, first and second semester, or both. One to four semester credits, according to the amount of work done. Prerequisites: Agron. 131 and 132. Professor Throckmorton and Mr. Scott.

This course deals with the more advanced problems of soil physics and fertility and includes the making of mechanical analyses, the determination of moisture equivalent, specific heat, and pot work with soils in the greenhouse.

FOR GRADUATES

331. SOILS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits, according to the work done. Prerequisites: Agron. 132 and Chem. 150. Professors Call and Throckmorton and Assistant Professor Sewell.

Students are assigned special soil problems. The completion of the work entitles them to credit according to the amount of work done.

Animal Husbandry

Professor McCAMPBELL
Associate Professor BELL
Associate Professor FERRIN
Associate Professor PATERSON
Assistant Professor IBSEN

Assistant Professor WINCHESTER
Instructor AUBEL
Instructor ZIMMERMAN
Assistant _____
Assistant _____

The Department of Animal Husbandry owns 400 acres of land, and rents 256 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among breeders and feeders on account of the many prize-winning animals produced.

The feedyards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feedyard and the animal. He

studies the animal from the standpoint of the breeder and of the feeder. He learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

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

COURSES IN ANIMAL HUSBANDRY

FOR UNDERGRADUATES

131. MARKET GRADES AND CLASSES OF LIVE STOCK. Freshman year, first semester. (Also given in second semester and in summer school.) Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Ferrin, Associate Professor Paterson, Mr. Aubel, and Mr. Zimmerman.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and judging market animals.

134. TYPES AND CLASSES OF LIVE STOCK (Vet.). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Ferrin.

One-fourth of this course is given by members of the Dairy Husbandry Department. A study is made of the market types and classes of horses, beef cattle, dairy cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Live Stock*.

Laboratory.—Practice is given in scoring and judging market animals.

137. BREEDING TYPES AND CLASSES OF LIVE STOCK. Sophomore year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 131. Associate Professor Ferrin, Associate Professor Paterson, and Mr. Aubel.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

Laboratory.—Practice is given in scoring and judging breeding animals.

140. ADVANCED STOCK JUDGING I. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 137. Associate Professor Bell.

This course deals with the judging of market classes as well as with all different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner as is customary at county or state fairs.

143. ADVANCED STOCK JUDGING II. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 140. Associate Professor Bell.

This is a continuation of An. Husb. 140. During the work of the semester occasional trips are made to the best live-stock farms of the State, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the State.

146. FORM AND FUNCTION IN LIVE STOCK. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 143. Associate Professor Bell.

A detailed and specific study is made of animal form and type, and influence of type upon function; also of the relation of form, type, and condition to growth and development. Comparative measurements are taken of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon types of hogs. Special training is given in presenting orally the relative merits of animals of all breeds.

149. HISTORY OF BREEDS AND PEDIGREES. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 131. Mr. Zimmerman.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herdbooks and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

152. PRINCIPLES OF FEEDING. Sophomore year, second semester. (Also given in summer school.) Class work, three hours. Three semester credits. Prerequisites: Anat. 131, and Chem. 120. Associate Professor Ferrin.

This course involves a study of the digestive system and the processes of nutrition, the origin, chemical analysis, grades, and feeding values of different feeds, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

155. BEEF CATTLE PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Professor McCampbell.

This course includes the study of economical methods of growing and fattening market cattle and up-to-date methods of breeding, developing, fitting, and marketing pure-bred beef cattle. The laboratory includes practice in feeding, management, and housing of cattle.

158. SWINE PRODUCTION. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Ferrin.

This course comprises a systematic study of economical methods of growing, fitting, and finishing swine both for breeding purposes and for the market. The laboratory work includes practice in feeding, management, and housing of swine.

161. SHEEP PRODUCTION. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Paterson.

A systematic study is made of economic methods of growing, fitting, and finishing sheep both for breeding purposes and for market. The laboratory work includes practice in feeding, management, and housing of sheep.

164. HORSE PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Bell.

This course includes a study of economic methods of growing, handling, and housing horses for breeding purposes, for work, and for the market. The laboratory work includes practice in feeding, handling, and housing horses.

167. MEATS. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: An. Husb. 137 and 152. Associate Professor Paterson.

This is a course in killing, and in dressing, cutting, and curing meats.

170. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Elective, summer school. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell.

This course is planned to give a general review of the live-stock industry, with the purpose of encouraging a better standard of teaching animal husbandry in secondary schools. The course includes work in feeding, breeding, management, and history of the various breeds of live stock.

FOR GRADUATES AND UNDERGRADUATES

221. GENETICS. Elective, first or second semester; also, summer school. Class work, three hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105. Assistant Professor Ibsen.

This course embraces a general discussion of variation, Mendelian inheritance, and related subjects.

223. ANIMAL BREEDING. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: An. Husb. 221. Mr. Aubel.

This course embraces a study of the physiology of reproduction; general principles of heredity; variation; systems of mating; influence of pedigrees and herdbook standards; and an analysis of the breeding practices of leading breeders.

225. ADVANCED GENETICS. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: An. Husb. 221. Assistant Professor Ibsen.

Particular attention is given to the relation of the chromosomes to heredity. The subject as a whole is studied in greater detail than in An. Husb. 221.

227. GENETICS SEMINAR. Elective, first and second semester. One semester credit. (For prerequisites, consult instructors.) Associate Professor Parker and Assistant Professor Ibsen.

This course continues through the first and second semesters and includes the study and criticism of genetic experiments in plants and animals, the biological and mathematical methods employed, and validity of conclusions drawn.

229. RESEARCH IN GENETICS. Elective, first and second semesters. Four to ten semester credits. Prerequisite: An. Husb. 225. Assistant Professor Ibsen.

This course continues through the year and offers opportunity for individual study of problems in which small mammals are used as the experimental animals.

231. ADVANCED STUDIES IN PEDIGREES. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: An. Husb. 149. Professor McCampbell.

This course consists of a careful study of the pedigrees and the prepotency of individuals representing the more important strains and families of beef cattle, horses, sheep, and swine.

233. ADVANCED FEEDING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 152. Associate Professor Ferrin.

This course consists of a survey of the experimental feeding of horses, cattle, sheep, and hogs, together with a study of the fundamental and practical feeding problems of the various sections of the country. Emphasis is placed upon the results obtained in the experimental investigation of these problems.

235. ADVANCED MEATS. Elective, second semester. Two to four semester credits. Prerequisite: An. Husb. 167. Associate Professor Paterson.

This course includes grading of carcasses, studies in nutritive values of different grades of meats, factors influencing the quality of meats, factors influencing dressing percentage of meat animals, and the identification of meats from different animals.

237. THE WOOL INDUSTRY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 161. Associate Professor Paterson.

This course includes a study of the supply of wool and the demand for it, and the method of producing, marketing, storing, grading, and manufacturing wool.

239. SYSTEMS OF LIVE-STOCK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell.

This course includes a study of the relation of live-stock production to agriculture. It also includes a study of management, climate, soil, topography, location of markets, land, labor, capital, and managing ability as factors influencing the choice and adaptation of systems of production.

241. LIVE-STOCK MARKETING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: An. Husb. 155, 158, 161, and 164. Professor McCampbell and Assistant Professor Winchester.

This course includes a study of the art of marketing live stock and live-stock products; freight and insurance rates in transit, liability of carrier and shipper, terminal charge, etc.; commissions for sale of storage; the relation of market prices of grain and hay to contemporary values of live-stock meat.

243. ANIMAL HUSBANDRY SEMINAR. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 152. Professor McCampbell and Assistant Professor Winchester.

FOR GRADUATES

301. RESEARCH IN ANIMAL HUSBANDRY. Elective, first and second semesters. Prerequisites: An. Husb. 155, 158, 161, and 164. Six to sixteen semester credits. Professor McCampbell.

Students are assigned special problems for investigation.

Dairy Husbandry

Professor FITCH
Assistant Professor CAVE
Assistant Professor OLSON

Instructor ATKESON
Assistant HUFFMAN

The College dairy farm, including the building and yards, consists of 160 acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for 110 cows. Four silos of modern type, feed rooms, a milk room, and a laboratory, exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure bred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by the yearly records of the cows in the herd that have been officially tested. The average for the Guernseys is 8,717 pounds of milk and 425 pounds of

butterfat; for the Ayrshires, 11,805 pounds of milk and 454 pounds of butterfat; for the Holsteins, 14,777 pounds of milk and 491 pounds of butterfat, and for the Jerseys, 9,176 pounds of milk and 484 pounds of butterfat. Maid Henry, a thirteen-year-old Holstein, produced 19,000 pounds of milk, yielding 715 pounds of butterfat in one year. Canary Bell, an Ayrshire, produced in one year 19,863 pounds of milk, containing 744 pounds of butterfat, which is equivalent to 930 pounds of average butter, 80 per cent fat. This is the highest record ever made in Kansas. Melrose Canary Bell, a daughter of Canary Bell, was the highest tested junior two-year-old for the Ayrshire breed in 1917. Canary Bell was the highest tested mature Ayrshire in the United States during 1918. Bangora's Melrose was the highest tested senior three-year-old for the same year, with 14,515 pounds of milk and 568 pounds of butterfat. Owl's Design is the highest record Jersey in the State with her record of 14,606 pounds of milk and 650 pounds of butterfat.

In the National Dairy Judging contests, the students specializing in dairying from the Kansas State Agricultural College have always been placed high. In 1919 the team from this institution won first place in this contest, in competition with judging teams from fifteen other agricultural colleges.

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

COURSES IN DAIRY HUSBANDRY

FOR UNDERGRADUATES

101. ELEMENTS OF DAIRYING Freshman year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Fitch, Assistant Professor Olson, Mr. Atkeson and Mr. Huffman.

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

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

102. TYPES AND CLASSES OF LIVE STOCK (VET). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Assistant Professor Cave.

One-fourth of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

104. DAIRY JUDGING. Freshman year, first and second semesters. Laboratory, three hours. One semester credit. Assistant Professor Cave, Mr. Atkeson, and Mr. Huffman.

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

106. DAIRY INSPECTION I. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bact. 106, Chem. 254, and Dairy Husb. 101. Assistant Professor Olson.

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

108. MILK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and An. Husb. 152. Professor Fitch.

This course deals with the economical production of milk and with the most approved method of handling the dairy herd, also the construction of dairy barns and buildings, and other subjects which relate to the dairy farmer.

110. BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text: Guthrie's *The Book of Butter*.

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

112. HOME DAIRYING. Elective, last half of second semester. Class work, two hours; laboratory, three hours. One and one-half semester credits. Assistant Professor Cave.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course, Poultry Husb. 102, which is offered the first half of the second semester.

114. CHEESE AND ICE-CREAM MAKING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 254, Bact. 211, and Dairy Husb. 101. Assistant Professor Olson.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the semester; the manufacture and handling of ice cream and ices for the retail and

wholesale trade in the second half. Text: Van Slyke-Publow's *The Science and Practice of Cheese Making*.

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

116. MARKET MILK. Elective, first semester. Lecture, one hour; laboratory, three hours. Two semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to producer, dealer, and consumer. Also systems of milk inspection, score cards, and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the College milk plant.

118. DAIRY INSPECTION II. Senior year, second semester. Laboratory, three hours. One semester credit. Assistant Professor Olson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text: Farrington and Woll's *Testing Milk and Its Products*.

120. ADVANCED DAIRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Assistant Professor Cave.

This course is a continuation of Dairy Husb. 104. Visits are made to the best farms in the State and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

FOR GRADUATES AND UNDERGRADUATES

202. DAIRY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Dairy Husb. 101, 106, and 108. Professor Fitch.

This course includes a study and review of dairy periodicals and experiment station bulletins, books and others dairy literature.

203. DAIRY HERD MANAGEMENT. Elective, second semester, senior year. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Dairy Husb. 108. Professor Fitch and Assistant Professor Cave.

This course is an advanced course in the feeding and management of the dairy herd. It takes up the study of pedigrees, feeding and management of advanced registry cows, the fitting of animals for show and sale, and other subjects pertaining to the management of dairy herds.

Reference Texts: Larson and Putney's *Dairy Cattle Feeding and Management*, and Eckles' *Dairy Cattle and Milk Production*.

FOR GRADUATES

301. DAIRY RESEARCH. Elective, both semesters. By appointment. Three semester credits. Prerequisites: Dairy Husb. 108 and 110. Professor Fitch.

This course gives credit on special problems assigned to students.

General Agriculture

Dean FARRELL

FOR UNDERGRADUATES

101. AGRICULTURAL LECTURES. Freshman year, first semester. Lectures, one hour a week. Required of all freshmen in agriculture. Deans of the Divisions of Agriculture, Veterinary Medicine, Extension, and the Summer School, and heads of departments in the Agricultural Experiment Station.

These lectures are designed to inform freshmen regarding the prospective opportunities for those who prepare themselves for service in the various fields of work open to agricultural students, and regarding the requirements for success in those fields.

FOR GRADUATES AND UNDERGRADUATES

201. AGRICULTURAL RELATIONSHIPS. Senior year, second semester. Class work, one hour. One semester credit. Required of all seniors in agriculture, and open to them and to graduates only. Dean Farrell.

This course is designed for agricultural students who are about to enter upon their life work. It is given for the purpose of directing the attention of these students to their duties, responsibilities, and opportunities for service as citizens of the agricultural community and as specialists in various phases of agricultural activity. It consists of lectures and discussions relating to the broad, fundamental relationships of individual farmers and other agricultural people with each other, and of the agricultural community with other communities. The course places special emphasis in this connection on the responsibilities, obligations, and opportunities of agricultural graduates as American citizens.

Horticulture

Professor DICKENS
Professor AHEARN
Instructor PICKETT

Instructor _____
Assistant VIRTANEN

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

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work in gardens, nurseries, orchards, and vineyards. A new small-fruit plantation is being developed, in which will be planted all standard varieties of small fruits. A full equipment of garden tools, spraying machinery and accessories, pruning tools, and special apparatus for floriculture is available at all times for the use of students. The College grounds furnish one of the finest and most complete laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, greenhouse problems, and the various branches of landscape gardening.

COURSES IN HORTICULTURE

FOR UNDERGRADUATES

101. PLANT PROPAGATION. Freshman year, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Mr. Pickett.

This course includes a discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. The work is given by means of lectures and assigned readings.

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

104. SYSTEMATIC POMOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This course comprises exercises in identification and description of the different types of fruits, such as grapes, peaches, apples, pears, and citrus fruits. An intercollegiate exchange of fruit makes possible a valuable study of the effect of climatic conditions upon variety and characteristics. Work is also done in the selection, preparation, and judging of fruits for exhibits. Text: Waugh's *Systematic Pomology*.

107. ORCHARDING. Sophomore year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Hort. 101. Professor Ahearn and Mr. Pickett.

This course includes studies of the conditions necessary for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods, and pruning. Spraying and pruning practice are given in the laboratory.

Laboratory.—In the laboratory a study is made in laying out plantations and orchards. Various systems of setting, topography of various localities, adaptability of level and hilly sections, methods of setting, pruning for setting, work in orchards with trees of various species and varying ages and a study and observation of cover crops, methods of cropping and general orchard practices up to bearing age are given consideration.

110. SMALL FRUITS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Hort. 101. Professor Ahearn.

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

113. FARM FORESTRY. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens.

This course consists of a study of the needs of Kansas farms for windbreaks and wood lots for post and fuel production; also a study of forest conservation and methods of handling timber. The growing of trees in locations better suited for timber than for other crops is considered; also the composition of windbreaks and their value as a protection to home orchards and fields.

Laboratory.—Laboratory work includes identification of species, methods of forming windbreaks, and nursery work in transplanting trees of various sizes and a determination of the rate of growth of trees under various conditions.

116. DENDROLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a study is made of the classification and identification of forest trees, including a study of forest ecology and taxonomy; of the classification of commercial species; the relative importance of timber species; and the life history and requirements of trees.

Laboratory.—The laboratory work consists of studies in the College arboretum and excursions to near-by wood lots. The student is given an opportunity to become acquainted with trees that succeed well in this State.

119. SILVICULTURE. Elective, second semester. Class work, two hours; field work, three hours. Three semester credits. Prerequisite: Hort. 113 or 116. Professor Dickens.

The business of tree growing for timber and economic purposes is studied. Requirements of species, their range and requirements as to soils, climate and the various factors that determine their reproduction and rate of growth are discussed. Protection of forests from fire and insects and the application of various systems of silviculture are given consideration.

122. GARDENING. Sophomore year, second semester. Class work, three hours. Three semester credits. Professor Ahearn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, the relation of soils to plants, and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds. Playgrounds, public parks, and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is placed upon acquaintance with materials that are used for garden purposes. The College campus, gardens, and greenhouses furnish a wealth of material that is best adapted to garden problems and landscape composition.

125. LANDSCAPE GARDENING I. Elective, second semester and summer school. Class work, two hours; laboratory, six hours. Four semester credits. Professor Ahearn.

This course is designed for the individual needs of students and for those who expect to take advanced work in landscape art. The principles of landscape gardening are studied and civic improvement problems discussed, special attention being given to rural and city problems.

Laboratory.—The laboratory consists of field trips and work in fields, in excavation and leveling. Students are instructed in the delineation of landscape plans with special reference to home and city planning.

128. GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, first semester. Class work, three hours. Three semester credits. Professor Ahearn.

This course consists of work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

131. SCHOOL GARDENING. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Mr. _____.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeders, and wheel hoes. Allotments of ground areas required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

FOR GRADUATES AND UNDERGRADUATES

201. PRACTICAL POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 104. Professor Ahearn.

The class work is given by means of lectures, and includes practical information on harvesting, grading, packing, storage, marketing, and the use of fruit by-products.

Laboratory.—The laboratory work consists of field work in the harvesting, grading, and packing of fruits. Several types of mechanical graders are used for demonstrations. Intensive work is given in packing of the various types in boxes and barrels. A thorough study is made of storage practice. Practice in pruning work is also given.

204. ORCHARD MANAGEMENT. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens and Mr. Pickett.

The class work includes studies of the following factors that are of vital importance to fruit growers: Location, soil improvement, cultural methods, pruning, capital and equipment for handling orchards, and crop disposition.

Laboratory.—This course offers practice in establishing young orchards, spraying (orchard work), pollination studies, thinning of fruit, summer pruning, and problems in orchard management.

207. SPRAYING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Chem. 102. Mr. Pickett.

The class work consists of lectures on spraying machinery, accessories, and the principal materials used as insecticides and fungicides.

Laboratory.—The laboratory work offers exercise in the preparation and testing of spray materials. Special study is given to the construction of the various types of spray machinery. Nozzles and spray guns are carefully tested.

210. MARKET GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Ahearn.

This course is made as practical as possible. In the classroom the lecture work is reinforced with problems concerning the business end of market gardening. The students are required to prepare seed orders and estimate the cost per acre of growing various garden crops. Particular stress is laid upon the harvesting, storing, and marketing of vegetables.

Laboratory.—The laboratory work is given in the College gardens. Each student is assigned a plot of ground to plant and care for during the semester. Careful records are kept of cultural operations and the yields. Disease and insect control are studied in a practical way.

222. HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours. Two semester credits. Mr. ———.

This course consists of a study of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

225. PLANT MATERIALS IN LANDSCAPE GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 101. Professor Ahearn.

A thorough study is made of the hardiness, form, color, habits, and adaptations of trees, both deciduous and evergreen, shrubs, hardy perennials, biennials, and annuals with a view to giving the student a working knowledge of the materials essential to formulate a working landscape plan.

233. TREE SURGERY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Bot. 208. Mr. ———.

This course consists of a study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining, and cavity work. Shade tree legislation and the duties of shade-tree commissions and tree wardens are discussed.

FOR GRADUATES.

301. LANDSCAPE GARDENING II. Elective, second semester. Laboratory, nine hours. Three semester credits. Professor Ahearn.

A study is made of the more advanced problems of designing and reconstruction from topographic and transit surveys as offered by large areas of parks, playgrounds, and country estates.

303. THE THEORY AND ESTHETICS OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 222. Professor Ahearn.

A careful study is made of the underlying principles of landscape art and design. This course is primarily intended for students who wish to specialize in landscape work, but will be of interest to all those who intend to teach.

306. CITY AND TOWN PLANTING. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This course has to do with laying out parks, boulevards, streets, etc., and with special studies in civic improvement. A special study is also made of cities and towns located in different parts of the world.

309. ORCHARD ECONOMICS. Credit determined by instructor. Professor Dickens.

An opportunity is given the students in this course to do research work in the cost of production and distribution, including storage, methods of packing, and transportation. The course is elastic and may extend

over the full year with its crops. Some traveling expenses incident to visiting various sections of the State in investigating storage and markets may be required.

312. MARKET GARDENING PROBLEMS. Credit determined by instructor. Professor Ahearn.

This course includes a study of the important methods of production of standard vegetables of both garden and greenhouse. Special attention is given to the problems of marketing, including organization and formation of first-hand markets in cities by express and parcel post shipments and the possibilities of improving storage and shipping facilities in order to prolong the period of salable condition.

315. POMOLOGICAL RESEARCH WORK. Credit determined by instructor. Professor Ahearn.

Graduate students will be permitted to select any special problem that will have a direct bearing on promotion of the fruit industry. Fruit-bud formation, soil adaptation of varieties, and the effect of fertilizers are a few of the problems that offer splendid opportunities for graduate study.

318. FORCING FLOWERS AND VEGETABLES. Credit determined by instructor. Professor Ahearn.

The propagation and cultural methods, soil studies, ventilation, heating, watering, and control of greenhouse pests are among the problems studied.

Milling Industry

Professor FITZ
Assistant Professor DUNTON
Miller OAKES

The Department of Milling Industry was established primarily to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSES IN MILLING INDUSTRY

FOR UNDERGRADUATES

101. PRINCIPLES OF MILLING. Sophomore year and elective, second semester. Laboratory, three hours. One semester credit. Miller Oakes.

This course includes a study of the theory and practice of milling with demonstrations on a small experimental mill.

102. GRAIN MARKETING. Junior year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Agron. 101. Professor Fitz.

This course includes a study of methods of handling, storing, marketing and grading of grain; the history of the origin and development of grain inspection and grades; a study of commercial grain grades and government standards; the classification and organization of inspection systems; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

103. GRAIN PRODUCTS. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Mill. Ind. 102. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products are included in this course.

109. MILLING PRACTICE I. Junior year and elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Mill. Ind. 101. Miller Oakes.

This course consists of practice in the art of milling, with demonstrations on a model mill.

110. MILLING PRACTICE II. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 109. Miller Oakes.

This course is a continuation of Milling Practice I.

FOR GRADUATES AND UNDERGRADUATES

203. WHEAT AND FLOUR TESTING. Senior year and elective, first semester. Class work, one hour; laboratory, nine hours. Four semester credits. Prerequisites: Mill. Ind. 103, Chem. 120, 150 and 260. Assistant Professor Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods of analysis and interpretation of results.

204. EXPERIMENTAL BAKING A. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Mill. Ind. 203. Assistant Professor Dunton.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and interpretation of results.

205. EXPERIMENTAL BAKING H. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Food and Nut. 106. Assistant Professor Dunton.

This course includes demonstration in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

Poultry Husbandry

Professor LIPPINCOTT
Assistant Professor FOX
Superintendent MUGGLESTONE

The poultry plant, occupying twelve acres and situated just north of the northeast corner of the College campus, is devoted to the breeding and rearing of the stock used for class work. It is equipped with various types of houses, runs, incubators, and brooders, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and

systematic training in handling poultry. There is likewise a growing demand for men to enter poultry-packing houses and for men capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

101. FARM POULTRY PRODUCTION. Sophomore year, both semesters and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott and Assistant Professor Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, housing, breeding, incubation, brooding, and preparing poultry for market are studied.

102. HOME POULTRYING. Elective, second semester. Class work, three hours for the first half of the semester. One and one-half semester credits. Professor Lippincott and Assistant Professor Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied. It is given with the elective course, Dairy Husb. 112, the second half of the semester.

104. PRACTICE IN POULTRY FEEDING. Elective, first semester. Three times a day, seven days a week, for a period of six weeks, at hours outside of the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of the actual care of a flock of fowls by the student under the supervision of an instructor. Careful records are kept of the feeds consumed and the eggs produced. A financial statement is required at the end of the feeding period.

105. PRACTICE IN INCUBATION. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks at hours outside of regular schedule. One to two semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. For one credit one successful hatch must be brought off in either a hot-air or hot-water incubator; for further credit other types must be operated. Students specializing in poultry husbandry must take two credits.

107. PRACTICE IN BROODING. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to three semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A report of cost of fuel and feed, of gains in weight and of mortality is required. This course must be preceded or accompanied by practice in incubation. For one credit, a group of at least fifty chicks must be successfully brooded for four weeks, in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders for at least six weeks. Students specializing in poultry husbandry must take three credits.

108. PRACTICE IN MILK FEEDING. Elective, first semester. Twice a day, seven days a week, for a period of six weeks, at hours outside the

regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

This course consists of milk feeding poultry confined in crates. The time is divided into periods of two weeks, so that the student will have an opportunity to fatten three lots of chickens. A financial statement is required.

110. POULTRY BREEDS AND TYPES Elective, first semester and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Assistant Professor Fox.

In this course a historical study is made of the various breeds commonly found on the Kansas farm. Particular attention is paid to tracing the evolution of the present types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

111. ADVANCED POULTRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Poult. Husb. 110. Offered alternate years; given in 1920-'21. Assistant Professor Fox.

This course is a continuation of Poult. Husb. 110. It gives further practice in judging the more common varieties, and takes up some of the rarer breeds.

112. MARKET POULTRY. Elective, first semester and summer school. Class work, one hour; laboratory, three to six hours. Two to three semester credits. Prerequisite: Poult. Husb. 101. Assistant Professor Fox.

In this course the lectures cover the methods of handling market poultry, alive and dressed. For three hours of laboratory work, practice is given in candling and grading eggs, caponizing, killing, cooling, grading and packing poultry for market. When six hours of laboratory work is taken, the student will also feed three lots of chickens for a period of two weeks.

FOR GRADUATES AND UNDERGRADUATES

202. POULTRY BREEDING. Elective, second semester. Conferences and laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 112. Professor Lippincott.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments.

POULTRY FARM MANAGEMENT. See Ag. Ec. 206.

POULTRY BACTERIOLOGY. See Bact. 216.

POULTRY ANATOMY. See Anat. 210.

204. COMPARATIVE ANATOMY OF DOMESTIC BIRDS. Elective, second semester. Offered alternate years; given in 1920-'21. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Zoöl. 117. Professor Lippincott.

This course is designed particularly for those intending to teach, or carry on research in, poultry husbandry, or who are particularly interested in bird study. The various structures of domestic birds are discussed in the lectures, in their relation to the same structure in wild forms, and in a limited measure to other vertebrates, as well as from a development standpoint.

The laboratory work is given over to the dissection and the first-hand comparison of the structures of the several species of domestic birds common in the Central West.

205. POULTRY RESEARCH. Elective, both semesters and summer school. Credit as arranged. Prerequisites: Poult. Husb. 101, 104, 105, and 107,

and such other courses as the problem undertaken may require. Professor Lippincott, and Assistant Professor Fox.

In this course the student pursues a definite investigation concerning some phase of poultry work. Arrangements must be made to continue this work through more than one semester when the problem attacked cannot be solved within the limits of a single semester.

Agriculture in the Summer School

During recent years the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State has been the lack of properly prepared teachers. The recent Federal Smith-Hughes act and its acceptance by the State of Kansas will within a few years lead to a large demand for teachers of vocational agriculture in Kansas high schools. The World War has both increased the demand for teachers of agriculture and demonstrated the necessity of the introduction of vocational agriculture into the high schools. The Agricultural College stands ready to aid teachers of the State, young women as well as young men, in their preparation to meet these demands, and the Summer School offers to active teachers an exceptional opportunity in this respect.

The work offered in the summer session includes courses in grain crop production, soils, soil fertility, common-school agriculture, live-stock judging, principles of feeding, teachers' course in animal husbandry, elements of dairying, dairy judging, poultry production, poultry judging, practice in incubation and brooding, plant propagation, orcharding, school gardening, and methods of teaching agriculture in high schools. Special emphasis is laid upon the subject matter and methods adapted to secondary and elementary schools.

Brief information regarding many of these courses in the Summer School may be found in the department descriptions in this catalogue. For further information write to the Dean of the Summer School.

Special Courses in Agriculture

The Farmers' Short Course and the Course in Testing Dairy Products are grouped with other special courses in another part of the catalogue, and are there described. They may be found by reference to the general index in the back of this book.

Division of Veterinary Medicine

RALPH RALPH DYKSTRA, *Dean*

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

The Department of Veterinary Medicine gives most of the technical work in the curriculum in veterinary medicine, a general description of which is given below. 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 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 curriculum practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary curriculum it is implied that the courses should be followed in regular sequence, as each year's work depends upon the work done the previous year. Certain courses, however, may be selected as electives if a student has the necessary prerequisites. These courses are listed in the list of electives.

THE CURRICULUM IN VETERINARY MEDICINE

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

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food. The public is now demanding that milk and other food products be free from contamination and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The curriculum in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this curriculum is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook. Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in live-stock feeding, breeding and judging, and in milk inspection, zoölogy, and embryology, in addition to his purely professional work.

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

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Veterinary Medicine

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Anatomy I Anat. 101 6(8-9)	Anatomy II Anat. 106 7(8-12)
Histology I Path. 101 3(1-6)	Histology II Path. 106 3(1-6)
Chemistry AV-I Chem. 105 5(3-4, 2)	Chemistry V-II Chem. 106 5(3-6)
General Zoölogy Vet. Zoöl. 111 3(2-3)	Embryology Vet. Zoöl. 114 2(1-3)
Military Science I Mil. Tr. 101 1(0-4)	Military Science II Mil. Tr. 102 1(0-4)
Physical Education M-I Phys. Ed. 103 R(0-2)	Physical Education M-II Phys. Ed. 104 R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Anatomy III Anat. 111 5(1-12)	Anatomy IV Anat. 116 3(1-6)
Comparative Physiology I Anat. 121 5(4-3)	Comparative Physiology II Anat. 126 3(2-3)
Medical Botany Bot. 126 2(1-3)	Pathogenic Bacteriology I Bact. 111 4(2-6)
College Rhetoric I Engl. 101 3(3-0)	Materia Medica I Surg. 151 2(2-0)
Types and Classes of Live Stock (Vet.) An. Husb. 134 3(1-6)	Principles of Feeding An. Husb. 152 3(3-0)
Military Science III Mil. Tr. 103 1(0-4)	Genetics An. Husb. 221 3(3-0)
Physical Education M-III Phys. Ed. 105 R(0-2)	Military Science IV Mil. Tr. 104 1(0-4)
	Physical Education M-IV Phys. Ed. 106 R(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Surgery I Surg. 101 3(3-0)	Surgery II Surg. 106 3(3-0)
Diagnosis Surg. 170 2(2-0)	Medicine I Surg. 173 4(4-0)
Materia Medica II Surg. 156 2(2-0)	Horseshoeing Surg. 126 1(1-0)
Pharmacy Surg. 166 2(0-3)	Therapeutics Surg. 161 3(3-0)
Pathology I Path. 201 5(4-3)	Pathology II Path. 206 6(4-6)
Pathogenic Bacteriology II Bact. 116 4(2-6)	Clinics II Surg. 139 3(0-9)
Clinics I Surg. 136 3(0-9)	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Surgery III Surg. 111 3(3-0)	Surgery IV Surg. 116 3(3-0)
Medicine II Surg. 176 5(5-0)	Medicine III Surg. 180 5(5-0)
Pathology III Path. 211 3(2-3)	Ophthalmology Surg. 183 1(1-0)
Meat Inspection Path. 216 2(2-0)	Operative Surgery Surg. 121 1(0-3)
Parasitology Zoölogy 123 2(1-3)	Jurisprudence Anat. 161 1(1-0)
Clinics III Surg. 142 4(0-12)	Obstetrics Surg. 131 3(3-0)
	Dairy Inspection II Dairy Husb. 118 1(0-3)
	Clinics IV Surg. 145 4(0-12)

Curriculum in Animal Husbandry and Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Organic Chemistry		Quantitative Analysis I	
Chem. 120	3(2-2, 1)	Chem. 150	2(0-6)
General Zoölogy		Pathogenic Bacteriology I	
Zoöl. 105	5(3-6)	Bact. 111	4(2-6)
Anatomy I		Anatomy II	
Anat. 101	6(3-9)	Anat. 106	7(3-12)
Grain Crop Production		Forage Crop Production	
Agron. 101	3(2-2, 1)	Agron. 102	3(2-2, 1)
Military Science III		Agricultural Journalism	
Mil. Tr. 103	1(0-4)	Ind. Jour. 121	1(1-0)
Physical Education M-III		Military Science IV	
Phys. Ed. 105	R(0-2)	Mil. Tr. 104	1(0-4)
		Physical Education M-IV	
		Phys. Ed. 106	R(0-2)

JUNIOR

FIRST SEMESTER		SECOND SEMESTER	
Embryology		Principles of Feeding	
Zoöl. 117	3(2-3)	An. Husb. 152	2(3-0)
Anatomy III		Anatomy IV	
Anat. 111	5(1-12)	Anat. 116	3(1-6)
Histology ¹		Histology II	
Path. 101	3(1-6)	Path. 106	3(1-6)
General Entomology		Electives†	7
Ent. 101	3(2-3)		
Electives†	3		

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Genetics		Agricultural Relationships	
An. Husb. 221	3(3-0)	Gen. Agric. 201	1(1-0)
Comparative Physiology I		Soil Fertility	
Anat. 121	5(4-3)	Agron. 132	3(2-2, 1)
Soils		Comparative Physiology II	
Agron. 131	4(3-3)	Anat. 126	3(2-3)
Agricultural English		Materia Medica I	
Engl. 137	3(3-0)	Surg. 151	2(2-0)
Electives	1	Electives	7

FIFTH YEAR

Junior year of the curriculum in Veterinary Medicine

SIXTH YEAR

Senior year of the curriculum in Veterinary Medicine

* This curriculum is so arranged that students may receive the degree of bachelor of science (in agriculture) at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

Anatomy and Physiology

Professor BURT
Instructor MCLEOD

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one semester is required in the curriculum in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum. The horse is taken as a type and the other domestic animals are compared with the horse. As often as necessary parts of other animals are dissected to show the differences.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts; namely, the head and neck, fore limb and thorax, hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is so arranged that bones are first studied, then the muscles and joints. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

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

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a text-book and Sisson's *Dissecting Guide* as a laboratory guide.

COURSES IN ANATOMY

FOR UNDERGRADUATES

101. ANATOMY I. Freshman year, first semester. Class work, three hours; laboratory and dissection, nine hours. Six semester credits. Doctors Burt and McLeod.

This course consists of the osteology, or the study of the bones, and the dissection of one-third of the horse. The bones of the horse are studied in detail and a comparison of the bones of other domestic animals, including man and chicken, is made. Drawings of the bones are made by the student in order that he may obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head and points of ossification. For convenience the horse is divided into three regions or parts for dissection; therefore, the one-third dissected during this semester may be any third of the subject, depending upon the part upon which the student is working.

106. ANATOMY II. Freshman year, second semester. Class work, three hours; dissection, twelve hours. Seven semester credits. Prerequisite: Anat. 101. Doctors Burt and McLeod.

This course is a continuation of the work begun in Anatomy 101. The course deals with myology and arthrology. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another, as well as their relations to other important structures. After the muscles are dissected and learned the student dissects the ligaments of the various joints. The student also studies the viscera of the respective parts at the time of dissection of that part. Check cards and drawings indicating the different stages of dissection are kept, and the work is checked at frequent intervals.

111. ANATOMY III. Sophomore year, first semester. Class work, one hour; dissection, twelve hours. Five semester credits. Prerequisite: Anat. 106. Doctor Burt.

This course and Anatomy 116 consist of the study of angiology and neurology and all parts not previously dissected. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relation of the blood vessels and nerves. As in Anatomy II, the subject is divided into three parts. During this semester two parts will be dissected, leaving one part for Anatomy IV. Drawings are required as in Anatomy II.

116. ANATOMY IV. Sophomore year, second semester. Class work, one hour; dissecting, six hours. Three semester credits. Prerequisite: Anat. 111.

This course is a continuation of Anatomy 111. The student will now complete the dissection of every part of the subject, including special parts, as the foot, brain, eye, etc. In addition to the completion of the dissection of the horse, a comparative study of the principal structural differences of the various domestic animals, not studied concurrently with the previous courses, will now be made.

FOR GRADUATES AND UNDERGRADUATES

201. SPECIAL ANATOMY. Elective, first or second semester. Class work, one hour; dissection, nine hours. Four semester credits. Prerequisite: Any of the courses in Anatomy 101, 106, 111, 116, and 131, or their equivalent. Doctor Burt.

This course is adaptable to the requirements of the line of work in which the student is specializing. The work consists of the study of any part of the horse, as the digestive system, the genital system, etc., or may take up the study of similar parts of the ox, sheep, pig, etc. For any one so desiring, poultry anatomy may be chosen.

COURSES IN PHYSIOLOGY

FOR UNDERGRADUATES

121. COMPARATIVE PHYSIOLOGY I. Sophomore year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Anat. 101 and 106, and Chem. 106. Doctors Burt and McLeod.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook: *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus, such as hymographs, manometers, tambours, inductoriums, signal magnets, and electric clocks, to make the work interesting and practical, as well as instructive. Many

experiments are made by the students upon themselves, as well as upon the domestic animals. Graphic records are made by the students of the blood pressure, rate and amplitude of the pulse, and respiration; also the changes produced by stimulating certain nerves, exercise changes in position, the action of certain drugs, etc. The time of coagulation of the blood of various species of animals and the conditions that influence the rapidity of coagulation are considered. The secretion of the various digestive juices, the conditions that will influence the rate of their secretion and their actions are studied in detail. Laboratory directions are furnished the student. References: *Practical Physiology*, Pembry; Halliburton's *Essentials of Chemical Physiology*; *Manual of Physiology*, Stewart; *Urine of the Horse and Man*, Fish; and other standard textbooks on physiology.

126. COMPARATIVE PHYSIOLOGY II. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Burt and McLeod.

The work of this semester is a continuation of Anat. 121, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook: Smith's *A Manual of Veterinary Physiology*

Laboratory.—The work done exemplifies the lectures given in the classroom. Graphic records are made of the normal muscle contraction, the changes brought about by fatigue, tetanus, variations in temperature, application of drugs, etc. The conductivity of the nerves, nerve blocking, the effects of anesthetics upon the conductivity of the nerves, reflexes, and other phenomena relating to the nervous system are studied. The composition of the normal urine and the tests applicable for the detection of abnormal constituents in pathologic urine are carefully considered. Directions and references are the same as in the laboratory course in Comparative Physiology I.

FOR GRADUATES AND UNDERGRADUATES

215. RESEARCH IN PHYSIOLOGY. Elective, both semesters. Three to five semester credits. Prerequisites: Anat. 121, 126, and 131, or their equivalent. Doctor Burt.

Individual research problems in the physiology of digestion, reproduction, endocrin glands, etc., are assigned.

COURSE IN ANATOMY AND PHYSIOLOGY

FOR UNDERGRADUATES

131. ANATOMY AND PHYSIOLOGY. Sophomore year, first semester. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Doctor Burt.

This combined course is intended principally for students in agriculture, and treats chiefly of physiology of the domestic animals; however, sufficient anatomy is taught to enable the student to thoroughly comprehend the correlation between the two subjects, and the physiologic relations existing among the various organs of the body.

Special emphasis is placed on the physiology of digestion, absorption, metabolism, and excretion, so that the student may have a good foundation to understand the principles of feeding, etc., but due consideration is paid to the functions of the circulatory, respiratory, and nervous systems, etc. Text: Captain Fred Smith's *Manual of Veterinary Physiology*.

COURSE IN JURISPRUDENCE

FOR UNDERGRADUATES

161. JURISPRUDENCE. Senior year, second semester. Class work, one hour. One semester credit. Doctor Burt.

This course deals with the veterinarian's legal responsibilities, with national and state live-stock laws, quarantine regulations, etc.

Pathology

Assistant Professor LIENHARDT
Instructor SCOTT

Instructor VAWTER
Assistant KITSELMAN

The Department of Pathology presents courses in histology, pathology and meat inspection. The instruction is presented by lectures or recitations, laboratory periods, and demonstrations which are carried out by the use of the projectoscope, and by autopsies held on dead animals.

The laboratory is fully equipped and entirely up to date. The equipment consists of microtomes, paraffin ovens, microphotographic and projection apparatus, centrifuge, shaking machine, sterilizers, etc. Each student is furnished a drawer, microscope, prepared slides for study, and all other essentials needed for study in the laboratory courses.

The department is also in possession of quite a complete pathological museum, which contains specimens of organs and tissues that show lesions typical of the various infectious, and some non-infectious diseases. These specimens are used in the study of pathology and together with the specimens sent in from over the State and fresh material from the immediate vicinity they furnish ample material for the courses in pathology.

The department library contains text and reference books on pathology and allied subjects, also the current files of the important technical periodicals relating to pathology. These books are at the constant disposal of the student for reference.

The course in meat inspection together with the allied subjects required for a degree in veterinary medicine make the student eligible to take the civil-service examination for meat inspection. In this course advantage is taken of the local packing plant for instruction. Visits are also made to plants in Topeka and Kansas City.

COURSES IN HISTOLOGY

FOR UNDERGRADUATES

101. HISTOLOGY I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Vawter.

The first part of the semester is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. Also, the blood-forming organs, as bone-marrow, lymph glands, and spleen, are studied. The histology of the digestive tract is studied, including study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the oesophagus. In this semester the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

106. HISTOLOGY II. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Lienhardt and Vawter.

In this semester the student takes up the study of the stomachs of the dog, the horse, and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum and anus; liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, bronchi and lungs; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. During this semester the student stains, mounts, studies with microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatine mass to bring out the blood vessels. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

FOR GRADUATES AND UNDERGRADUATES

225. SPECIAL HISTOLOGY. Second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctor Lienhardt.

This course is arranged to meet the requirements of those who are desirous of taking a histology course dealing with specific organs, as those concerned with digestion, respiration, etc. Tissues are fixed, dehydrated, imbedded, sectioned, stained, and mounted, and are studied after being properly prepared.

COURSES IN PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES

201. PATHOLOGY I. Junior year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Path. 106, Anat. 126, and Bact. 111. Doctors Lienhardt and Vawter.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification and concretum formation; and process of repair, tumors, and functional disturbances. Text: *Comparative General Pathology*, by Kitt.

206. PATHOLOGY II. Junior year, second semester. Class work, four hours; laboratory, six hours. Six semester credits. Doctors Lienhardt and Vawter.

This course is devoted to special pathology and pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbooks: *Pathology*, by Delafield and Prudden; *Pathologische Anatomie*, by Kitt; and *Pathology*, Vol. II, by Adams and Nichols.

211. PATHOLOGY III. Senior year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Lienhardt and Vawter.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all

animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turns in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text: *Pathology of Infectious Diseases*, by Moore.

216. MEAT INSPECTION. Senior year, first semester. Class work, two hours. Two semester credits. Doctor Lienhardt.

The course in meat inspection is designed to prepare men for national, state, and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City or Wichita. Text: Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

FOR GRADUATES

301. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: Path. 211. Doctors Lienhardt and Vawter.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the State.

306. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Elective, first and second semesters. Laboratory, twelve hours. Four semester credits. Doctors Lienhardt and Vawter.

This course is a continuation of Path. 301.

Surgery and Medicine

Professor DYKSTRA
Associate Professor MULDOON
Instructor SCOTT

Instructor McLEOD
Instructor FRICK

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

For the study of materia medica and pharmacy there are 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.

COURSES IN SURGERY

FOR UNDERGRADUATES

101. SURGERY I. Junior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anaesthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood streams, trachea, spinal canal. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

106. SURGERY II. Junior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

111. SURGERY III. Senior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

116. SURGERY IV. Senior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

Surgery as taught during this course includes special operations, such as neurectomies, autoplasties, desmotomies, actual cauterization, tenotomies, myotomies, enterotomy and enteroanastomosis, and surgery of the eye. Reference books: Dollar's *Regional Veterinary Surgery*; Merillat's *Veterinary Surgery*, Vols. I, II, and III; Williams' *Surgical Operations*; Fleming's *Operative Veterinary Surgery*, Parts I and II; White's *Restraint of Domestic Animals*

121. OPERATIVE SURGERY. Senior year, second semester. Laboratory, three hours. One semester credit. Doctors Dykstra and Gingery.

Old horses are purchased by the department, placed on the operating table, anaesthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

126. HORSESHOEING. Junior year and elective, second semester. Class work, one hour. One semester credit. Doctor McLeod.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with the study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

COURSES IN OBSTETRICS

FOR UNDERGRADUATES

131. OBSTETRICS. Senior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Anat. 204 and Zoöl. 114, or Anat. 131 and Zoöl. 117. Doctor McLeod.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals, care of new-born animals, abnormal presentations during parturition, surgery of obstetrics, etc. This work is supplemented by demonstrations on an obstetrical phantom and foetus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. References: Williams' *Veterinary Obstetrics*, Williams' *Surgical and Obstetrical Operations*, De Bruin's *Bovine Obstetrics*, and Fleming's *Veterinary Obstetrics*.

COURSES IN CLINICS

FOR UNDERGRADUATES

136. CLINICS I. Junior year, first semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of anti-septics and other medicinal agents, is taken in charge by the junior students.

139. CLINICS II. Junior year, second semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra, Muldoon, and Frick.

This work is a continuation of Clinics I.

142. CLINICS III. Senior year, first semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the Division of Veterinary Medicine. These are taken care of by one of the clinicians, who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

145. CLINICS IV. Senior year, second semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra, Muldoon, and Frick.

This work is a continuation of Clinics III.

COURSES IN MATERIA MEDICA

FOR UNDERGRADUATES

151. MATERIA MEDICA I. Sophomore year, second semester. Class work, two hours. Two semester credits. Doctor Frick.

The course includes definitions of terms, modes of action of drugs in

general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

156. MATERIA MEDICA II. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Frick.

This course is a continuation of Materia Medica I.

161. THERAPEUTICS. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Materia Medica I and II. Doctor Frick.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Milk's *Practical Veterinary Pharmacology and Therapeutics*; Froehner's *Textbook of General Therapeutics*; Winslow's *Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; Wood's *Therapeutics, its Principles and Practice*.

166. PHARMACY. Junior year, first semester. Class and laboratory work, three hours. One semester credit. Doctor Frick.

In the lectures the meanings of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparation of each is studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, an avolus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; Maltbie's *Practical Pharmacy*; Remington's *Practice of Pharmacy*; Fish's *Exercises in Materia Medica and Pharmacy*.

COURSES IN MEDICINE

FOR UNDERGRADUATES

170. DIAGNOSIS. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Muldoon.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

173. MEDICINE I. Junior year, second semester. Class work, four hours. Four semester credits. Doctor Muldoon.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities the larynx, bronchi, lungs, and pleura.

176. MEDICINE II. Senior year, first semester. Class work, five hours. Five semester credits. Doctor Muldoon.

This course is devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, diseases of metabolism, of the nervous system, of the organs of locomotion, and of the skin.

180. MEDICINE III. Senior year, second semester. Class work, five hours. Five semester credits. Doctor Muldoon.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: Acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa. In addition particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

183. OPHTHALMOLOGY. Senior year, second semester. Class work, one hour. One semester credit. Doctor Scott.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Glass' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

190. FARM ANIMALS IN HEALTH AND IN DISEASE. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Anat. 131. Doctor Frick.

First-aid treatment of diseases of domestic animals. Understanding of contagious and non-contagious diseases. Special emphasis given to the cause and prevention of disease in farm animals. Study of the domestic animals in relation to their surroundings; the healthy animal. Text: Craig's *Common Diseases of Farm Animals*.

Division of Engineering

ANDREY ABRAHAM POTTER, *Dean*

The Division of Engineering offers curricula in agricultural engineering, architecture, civil engineering, electrical engineering, flour-mill engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

While the curricula, as scheduled, are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of them 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 courses from the departments of chemistry and geology for some of those in the curriculum in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the courses in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some 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 of the country. By combining courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the curricula of the division.

It is believed that the curricula as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what particular branch of the profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional curricula, the Division of Engineering offers:

A three-year curriculum in mechanic arts in the School of Agriculture, with trade practice electives in blacksmithing, carpentry, concrete construction, and stationary and traction engines, and

Short special courses for automobile mechanics, tractor operators, carpenters, machinists, blacksmiths, electricians, and foundrymen.

These are all discussed elsewhere in this catalogue.

CURRICULUM IN AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is designed to qualify men for engineering work in rural communities; for positions in the farm-machinery and farm-motor industry; for the management of farms where drainage, irrigation or power-farming methods are prevalent; and for the positions of advisors, consulting engineers or architects in connection with farm buildings and equipment.

The work of the first year is the same as in the other engineering curricula. During the last three years about one-third of the time is devoted to agricultural subjects, in order to familiarize the students with the modern methods of scientific agriculture and to enable them to apply engineering principles to agricultural problems in a practical way. Considerable time is also devoted to farm machinery, farm motors, rural architecture, highway engineering, irrigation, drainage, and concrete construction.

The agricultural engineering students are also given considerable training in drawing, shop practice, physics, chemistry, surveying, steam engineering, gas engineering, and electrical engineering.

CURRICULUM IN ARCHITECTURE

The curriculum in architecture aims to provide the technical training which will give a broad and sound foundation for the needs of the practicing architect, as well as the essentials of a liberal education. Although closely associated with, and somewhat dependent upon, science and engineering, architecture is primarily a fine art; hence the training of the architect, while including the general fundamentals of engineering and science, must be based primarily upon a study and understanding of the basic architectural principles together with the canons of art and good taste. A major portion of the curriculum is therefore devoted to the study of architectural design, supplemented by those subjects preparatory or contributory to it.

Supporting this line of study the student is given a comprehensive view of the development of civilization together with a more detailed study of the history of architecture and of art. Throughout the course draughtsmanship as applied to architectural design and construction, as well as to free-hand drawing and sketching, is given constant attention. Courses dealing with the fundamental principles of building construction, sanitation, heating and lighting, together with a careful study of the properties and uses of building materials, are given simultaneously with the courses in design and drawing.

In addition to the above-outlined professional and technical studies, approximately one-quarter of the curriculum is devoted to more general studies designed to broaden the student's view and to give him the essentials of a liberal education. Thus it is the aim not only to provide a fundamental training upon which the student may base his professional development and advancement, but to afford a training which is in the broadest sense educational.

CURRICULUM IN CIVIL ENGINEERING

The aim of the curriculum in civil engineering, as outlined in this catalogue, is to give the young men taking the work 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 are devoted largely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering curricula of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. An introduction to the technical work is given in these years through courses in drawing, shopwork, surveying, and the elementary phases of engineering.

The last two years are devoted largely to technical work. In recognition of the mechanical trend of the age, liberal provision is made for class and laboratory work in mechanical and electrical engineering. In view of the growing importance of municipal problems, such as paving, sewerage, and water-supply, the curriculum in civil engineering includes required courses in these subjects.

Advanced elective courses in railway, highway, and irrigation and drainage engineering are offered in the second semester of the senior year.

CURRICULUM IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. These studies, together with introductory courses in drawing, shopwork, surveying, and the elementary phases of engineering, occupy most of the time of the first two years. The professional work of this curriculum begins in the junior year and continues throughout the last two years. General culture subjects are included in the work of each of the four years.

Emphasis is placed upon training to deal with the forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The curriculum provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice.

The laboratory experiments selected for the students are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

CURRICULUM IN FLOUR-MILL ENGINEERING

The milling of wheat and other cereals is an important industry in this State. The curriculum in flour-mill engineering is designed to prepare men for the management of mills, for work in connection with the designing of milling plants, and for research work in the preparation and utilization of mill products.

The work of the freshman year is the same as in the other engineering courses. The sophomore year is similar to that of the mechanical engineering course, but includes additional chemistry and a beginning course in milling practice. In the junior and senior years, besides the courses dealing with the production, marketing, testing, and milling of grain products, a considerable amount of time is devoted to mechanics, chemistry, history, economics, business law and organization, steam and gas engineering, and flour-mill design.

CURRICULUM IN MECHANICAL ENGINEERING

The work in mechanical engineering 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 engineering buildings and factories, including the selection, purchasing, and location of the equipment.

The curriculum has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the four years the theoretical studies in the classroom are supplemented by the practical work in the laboratories in such a manner as very materially to strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and expenditure of human effort will be a minimum.

The professional courses in mechanical engineering are given mainly in the departments of steam and gas engineering, shop practice, and applied mechanics and machine design.

Students pursuing a mechanical engineering curriculum are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Curriculum in Agricultural Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours of recitation each week; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155 2(0-6)	Descriptive Geometry Ap. Mech. 158 2(0-6)
Surveying I Civ. Engr. 102 2(0-6)	Surveying II Civ. Engr. 111 2(0-6)
Extempore Speech I Pub. Spk. 106 2(2-0)	Woodwork Shop 101 1(0-3)
	Forging I Shop 150 1(0-3)
Military Science I Mil. Tr. 101 1(0-4)	Military Science II Mil. Tr. 102 1(0-4)
Engineering Lectures Gen. Engr. 101 R	Engineering Lectures Gen. Engr. 101 R
Physical Education M-I Phys. Ed. 103 R(0-2)	Physical Education M-II Phys. Ed. 104 R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 150 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
American Industrial History Hist. 105 3(3-0)	Farm Crops Agron. 103 4(3-3)
Organic Chemistry Chem. 120 3(2-3) or	Field Machinery Farm Engr. 106, 107... 2(1-3)
{ Metallurgy Shop 165 2(2-0) }	
{ Forging II Shop 155 1(0-3) }	
Mechanical Drawing I Ap. Mech. 161 2(0-6)	Foundry Practice Shop 160 1(0-3)
Military Science III Mil. Tr. 103 1(0-4)	Military Science IV Mil. Tr. 104 1(0-4)
Seminar Gen. Engr. 105 R	Seminar Gen. Engr. 105 R
Physical Education M-III Phys. Ed. 105 R(0-2)	Physical Education M-IV Phys. Ed. 106 R(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120 4(3-3)
Calculus II Math. 116 3(3-0)	Economics Econ. 101 3(3-0)
Soils Agron. 131 4(3-3)	Power Machinery Farm Engr. 111, 112... 2(1-3)
Farm Motors Farm Engr. 125, 126... 3(2-3)	Kinematics Ap. Mech. 180 3(3-0)
Market Grades and Classes of Live Stock An. Husb. 131 3(1-6)	Tractors and Trucks Farm Engr. 116, 117... 3(2-3) or
Seminar Gen. Engr. 105 R	Mechanical Drawing II Ap. Mech. 170 3(0-9) or
	Hydraulics Ap. Mech. 130, 135 4(3-3)
	Machine Tool Work I Shop 170 2(0-6)
	Seminar Gen. Engr. 105 R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Farm Management	Drainage and Irrigation I
Ag. Ec. 106..... 3(2-3)	Civ. Engr. 161..... 2(2-0)
Principles of Feeding	Engineering English
An. Husb. 152..... 3(3-0)	Engl. 110 2(2-0)
Rural Architecture	Electrical Engineering C
Farm Engr. 102..... 3(0-9)	Elect. Engr. 160, 165.. 3(2-2, 1)
Highway Engineering I	Concrete Construction
Civ. Engr. 230 and Ap.	Ap. Mech. 140, 145.... 2(1-3)
Mech. 250 3(2-3)	Steam and Gas Engineering C
Business Law I	Steam and Gas 120, 125, 3(2-3)
Hist. 153 1(1-0)	Elements of Dairying
Business Organization	Dairy Husb. 101..... 3(2-3) or
Econ. 106 1(1-0)	Soil Fertility
Advanced Farm Machinery	Agron. 132 3(2-2, 1)
Farm Engr. 130..... 2(0-6)	
Pattern Making	
Shop 145 1(0-3)	
Seminar	Seminar
Gen. Engr. 105..... R	Gen. Engr. 105..... R
Thesis	Thesis
Ap. Mech. 150, Civ. Engr.	Ap. Mech. 150, Civ. Engr.
170, Farm Engr. 175, Shop	170, Farm Engr. 175, Shop
195, or Steam and Gas 195, R	195, or Steam and Gas 195, R

Curriculum in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Plane Trigonometry	College Algebra
Math. 101 3(3-0)	Math. 104 3(3-0)
Perspective	Shades and Shadows
Arch. 127 2(0-6)	Arch. 130 2(0-6)
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Engineering Drawing	Descriptive Geometry
Ap. Mech. 2(0-6)	Ap. Mech. 158..... 2(0-6)
Freehand Drawing I	Freehand Drawing II
Arch. 111 2(0-6)	Arch. 114 2(0-6)
Architectural Drawing I	Architectural Drawing II
Arch. 108 2(0-6)	Arch. 109 2(0-6)
Materials of Construction I	Materials of Construction II
Arch. 135 2(2-0)	Arch. 138 2(2-0)
Military Science I	Military Science II
Mil. Tr. 101..... 1(0-4)	Mil. Tr. 102..... 1(0-4)
Engineering Lectures	Engineering Lectures
Gen. Engr. 101..... R	Gen. Engr. 101..... R
Physical Education M-I	Physical Education M-II
Phys. Ed. 103..... R(0-2)	Phys. Ed. 104..... R(0-2)

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Engineering Physics I		Engineering Physics II	
Physics 145	5(4-2, 1)	Physics 150	5(4-2, 1)
French I		French II	
Mod. Lang. 151.....	3(3-0)	Mod. Lang. 152.....	3(3-0)
History of Architecture I		History of Architecture II	
Arch. 153	2(2-0)	Arch. 156	2(2-0)
Working Drawings and Specifications I		Working Drawings and Specifications II	
Arch. 168	2(0-6)	Arch. 169	2(0-6)
Freehand Drawing III		Freehand Drawing IV	
Arch. 116	2(0-6)	Arch. 117	2(0-6)
Design I		Design II	
Arch. 142	3(0-9)	Arch. 144	3(0-9)
Military Science III		Military Science IV	
Mil. Tr. 103.....	1(0-4)	Mil. Tr. 104.....	1(0-4)
Seminar		Seminar	
Gen. Engr. 105.....	R	Gen. Engr. 105.....	R
Physical Education M-III		Physical Education M-IV	
Phys., Ed. 105.....	R(0-2)	Phys. Ed. 106.....	R(0-2)

JUNIOR

FIRST SEMESTER		SECOND SEMESTER	
Applied Mechanics A-I		Applied Mechanics A-II	
Ap. Mech. 102.....	3(3-0)	Ap. Mech. 116, 121....	4(3-3)
Graphic Statics			
Ap. Mech. 125.....	1(0-3)		
History of Architecture III		History of Architecture IV	
Arch. 159	2(2-0)	Arch. 161	2(2-0)
Freehand Drawing V		Freehand Drawing VI	
Arch. 118	2(0-6)	Arch. 120	2(0-6)
Design III		Design IV	
Arch. 145	5(0-15)	Arch. 147	5(0-15)
Elective*	5(-)	Elective*	5(-)
Seminar		Seminar	
Gen. Engr. 105.....	R	Gen. Engr. 105.....	R

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Civilization and Art I		Civilization and Art II	
Arch. 183	3(3-0)	Arch. 185	3(3-0)
Freehand Drawing VII		Freehand Drawing VIII	
Arch. 121	2(0-6)	Arch. 123	2(0-6)
Design V		Design VI	
Arch. 148	8(0-24)	Arch. 151	8(0-24)
Domestic Architecture		Office Practice	
Arch. 172	2(0-6)	Arch. 191	3(3-0)
Economics		Engineering English	
Econ. 101	3(3-0)	Engl. 110	2(2-0)
Seminar		Seminar	
Gen. Engr. 105	R	Gen. Engr. 105	R

* Electives are to be chosen with the advice and approval of the Dean of the Division and the Professor of Architecture.

Curriculum in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(2-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Surveying I Civ. Engr. 102..... 2(0-6)	Surveying II Civ. Engr. 111..... 2(0-6)
Extempore Speech I Pub. Spk. 106..... 2(2-0)	Woodwork Shop 101 1(0-3)
Military Science I Mil. Tr. 101..... 1(0-4)	Forging I Shop 150 1(0-3)
Engineering Lectures Gen. Engr. 101..... R	Military Science II Mil. Tr. 102..... 1(0-4)
Physical Education M-I Phys. Ed. 103..... R(0-2)	Engineering Lectures Gen. Engr. 101..... R
	Physical Education M-II Phys. Ed. 104..... R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 150 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
American Industrial History Hist. 105 3(3-0)	Metallurgy Shop 165 2(2-0)
Surveying III Civ. Engr. 151, 155.... 3(2-3)	Surveying IV Civ. Engr. 156, 157.... 3(2-3)
Mechanical Drawing I Ap. Mech. 161..... 2(0-6)	Civil Engineering Drawing I Civ. Engr. 125..... 2(0-6)
Military Science III Mil. Tr. 103..... 1(0-4)	Military Science IV Mil. Tr. 104..... 1(0-4)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Physical Education M-III Phys. Ed. 105..... R(0-2)	Physical Education M-IV Phys. Ed. 106..... R(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120.... 6(5-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Engineering Geology Geol. 102 4(2-6)	Railway Engineering I Civ. Engr. 145..... 2(2-0)
Masonry and Foundations Civ. Engr. 120..... 2(2-0)	Drainage and Irrigation I Civ. Engr. 161..... 2(2-0)
Economics Econ. 101 3(3-0)	Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3)
Business Law I Hist. 153 1(1-0)	Seminar Gen. Engr. 105..... R
Seminar Gen. Engr. 105..... R	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Bridge Stresses Civ. Engr. 201..... 4(4-0)	Bridge Design Civ. Engr. 246..... 3(0-9)
Civil Engineering Drawing II Civ. Engr. 205..... 2(0-6)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Astronomy and Geodesy Civ. Engr. 210, 215.... 4(3-3)	Engineering English Engl. 110 2(2-0)
Water Supply Civ. Engr. 220..... 2(2-0)	Business Organization Econ. 106 1(1-0)
Sewerage Civ. Engr. 225..... 2(2-0)	Concrete Design Civ. Engr. 250, 255.... 3(2-3)
Highway Engineering I Civ. Engr. 230 and Ap. Mech. 250..... 3(2-3)	Railway Engineering II Civ. Engr. 260, 265.... 4(2-6)or
	Highway Engineering II Civ. Engr. 270, 275.... 4(2-6)or
	Drainage and Irrigation II Civ. Engr. 280, 285.... 4(2-6)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Ap. Mech. 150 or Civ. Engr. 170..... R	Thesis Ap. Mech. 150 or Civ. Engr. 170..... R

Curriculum in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Extempore Speech I Pub. Spk. 106..... 2(2-0)	Woodwork Shop 101 1(0-3)
	Forging I Shop 150 1(0-3)
Electrical Machinery and Construction Elect. Engr. 170..... 2(0-6)or	Surveying I Civ. Engr. 102..... 2(0-6)or
Surveying I Civ. Engr. 102..... 2(0-6)	Electrical Machinery and Construction Elect. Engr. 170..... 2(0-6)
Military Science I Mil. Tr. 101..... 1(0-4)	Military Science II Mil. Tr. 102..... 1(0-4)
Engineering Lectures Gen. Engr. 101..... R	Engineering Lectures Gen. Engr. 101..... R
Physical Education M-I Phys. Ed. 103..... R(0-2)	Physical Education M-II Phys. Ed. 104..... R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 150 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
Kinematics Ap. Mech. 180 3(2-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 161 2(0-6)	Mechanical Drawing II Ap. Mech. 170 3(0-9)
Metallurgy Shop 165 2(2-0)	Foundry Practice Shop 160 1(0-3)
Forging II Shop 155 1(0-3)	Military Science IV Mil. Tr. 104 1(0-4)
Military Science III Mil. Tr. 103 1(0-4)	Seminar Gen. Engr. 105 R
Seminar Gen. Engr. 105 R	Physical Education M-IV Phys. Ed. 106 R(0-2)
Physical Education M-III Phys. Ed. 105 R(0-2)	

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120 4(3-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135 4(3-3)
Economics Econ. 101 3(3-0)	Direct-Current Machines II Elect. Engr. 110, 115 4(3-2, 1)
Direct-Current Machines I Elect. Engr. 101, 105 4(3-2, 1)	Alternating-Current Machines I Elect. Engr. 201, 205 3(2-2, 1)
Electrical Measurements Elect. Engr. 121, 126 2(1-2, 1)	Machine Tool Work I Shop 170 2(0-6)
Pattern Making Shop 145 1(0-3)	Seminar Gen. Engr. 105 R
Seminar Gen. Engr. 105 R	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Alternating-Current Machines II Elect. Engr. 210, 215 6(4-4, 2)	Electric Railways Elect. Engr. 240 2(2-0)
Electrical Machine Design I Elect. Engr. 150 1(0-3)	Electrical Machine Design II Elect. Engr. 155 2(0-6)
Telephony [*] Elect. Engr. 220, 225 3(2-3)	Illuminating Engineering Elect. Engr. 235, 236 3(2-3)
Factory Engineering Shop 245, 250 2(1-3)	Business Law I Hist. 153 1(1-0)
Seminar Gen. Engr. 105 R	Business Organization Econ. 106 1(1-0)
Thesis Elect. Engr. 195 R	Engineering English Engr. 110 2(2-0)
	Seminar Gen. Engr. 105 R
	Thesis Elect. Engr. 195 R

Curriculum in Flour-mill Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Extempore Speech I Pub. Spk. 106 2(2-0)	
Engineering Drawing Ap. Mech. 155 2(0-6)	Descriptive Geometry Ap. Mech. 158 2(0-6)
Woodwork Shop 101 1(0-3)	Elements of Steam and Gas Power Steam and Gas 130 2(0-6)
Forging I Shop 150 1(0-3)	Surveying I Civ. Engr. 102 2(0-6)
Military Science I Mil. Tr. 101 1(0-4)	Military Science II Mil. Tr. 102 1(0-4)
Engineering Lectures Gen. Engr. 101 R	Engineering Lectures Gen. Engr. 101 R
Physical Education M-I Phys. Ed. 103 R(0-2)	Physical Education M-II Phys. Ed. 104 R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 150 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
Organic Chemistry Chem. 120 3(2-2, 1)	Kinematics Ap. Mech. 180 3(3-0)
Business Law I Hist. 153 1(1-0)	
Mechanical Drawing I Ap. Mech. 161 2(0-6)	Mechanical Drawing II Ap. Mech. 170 3(0-9)
Quantitative Analysis I Chem. 150 2(0-6)	Principles of Milling Mill. Ind. 101 1(0-3)
Military Science III Mil. Tr. 103 1(0-4)	Military Science IV Mil. Tr. 104 1(0-4)
Seminar Gen. Engr. 105 R	Seminar Gen. Engr. 105 R
Physical Education M-III Phys. Ed. 105 R(0-2)	Physical Education M-IV Phys. Ed. 106 R(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120 4(3-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135 4(3-3)
Advanced Quantitative Analysis Chem. 260 2(0-6)	Economics Econ. 101 3(3-0)
Grain Crop Production Agron. 101 3(2-3)	Grain Products Mill. Ind. 103 2(2-0)
Grain Marketing Mill. Ind. 102 3(3-0)	Milling Practice I Mill. Ind. 109 3(1-6)
Machine Tool Work I Shop 170 2(0-6)	Milling Entomology Ent. 116 1(1-0)
Seminar Gen. Engr. 105 R	Seminar Gen. Engr. 105 R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Wheat and Flour Testing Mill. Ind. 203..... 4(1-9)	Experimental Baking A Mill. Ind. 204..... 2(0-6)
Flour Mill Design Ap. Mech. 215..... 2(0-6)	Milling Practice II Mill. Ind. 110..... 2(0-6)
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
American Industrial History Hist. 105..... 3(3-0)	Refrigeration, Heating, and Ventilation Steam and Gas 210, 215, 3(2-3)
Business Organization Econ. 106..... 1(1-0)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Factory Engineering Shop 245, 250..... 2(1-3)	Engineering English Engr. 110..... 2(2-0)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R	Thesis Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R

Curriculum in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107..... 4(3-3)	Chemistry E-II Chem. 108..... 4(3-3)
Plane Trigonometry Math. 101..... 3(3-0)	College Algebra Math. 104..... 3(3-0)
College Rhetoric I Engr. 101..... 3(3-0)	College Rhetoric II Engr. 104..... 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Extempore Speech I Pub. Spk. 106..... 2(2-0)	Surveying I Civ. Engr. 102..... 2(0-6)
Woodwork Shop 101..... 1(0-3)	Elements of Steam and Gas Power Steam and Gas 130.... 2(0-6) or
Forging I Shop 150..... 1(0-3)	Woodwork Shop 101..... 1(0-3)
Elements of Steam and Gas Power Steam and Gas 130.... 2(0-6)	Forging I Shop 150..... 1(0-3)
Military Science I Mil. Tr. 101..... 1(0-4)	Military Science II Mil. Tr. 102..... 1(0-4)
Engineering Lectures Gen. Engr. 101..... R	Engineering Lectures Gen. Engr. 101..... R
Physical Education M-I Phys. Ed. 103..... R(0-2)	Physical Education M-II Phys. Ed. 104..... R(0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 160 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
Kinematics Ap. Mech. 180..... 3(3-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 161..... 2(0-6)	Mechanical Drawing II Ap. Mech. 170..... 3(0-0)
Metallurgy Shop 165 2(2-0)	Foundry Practice Shop 160 1(0-3)
Forging II Shop 155 1(0-4)	Military Science IV Mil. Tr. 104..... 1(0-4)
Military Science III Mil. Tr. 103..... 1(0-3)	Seminar Gen. Engr. 105..... R
Seminar Gen. Engr. 105..... R	Physical Education M-IV Phys. Ed. 106..... R(0-2)
Physical Education M-III Phys. Ed. 105..... R(0-2)	

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120.... 6(5-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Business Law I Hist. 153 1(1-0)	Pattern Making Shop 145 1(0-3)
Mechanical Drawing III Ap. Mech. 175..... 1(0-3)	Machine Tool Work II Shop 192 2(0-6)
Graphic Statics Ap. Mech. 125..... 1(0-3)	Seminar Gen. Engr. 105..... R
Machine Tool Work I Shop 170 2(0-6)	
Seminar Gen. Engr. 105..... R	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Electrical Engineering M-I Elect. Engr. 130, 135... 4(3-2, 1)	Electrical Engineering M-II Elect. Engr. 140, 145... 4(3-2, 1)
Power Plant Engineering Steam and Gas 206.... 3(0-9)	Refrigeration, Heating and Ventilation Steam and Gas 210, 215, 3(2-3)
Machine Design I Ap. Mech. 201, 205.... 5(3-6)	Machine Design II Ap. Mech. 210..... 2(0-6)
Factory Engineering Shop 245, 250..... 2(1-3)	Factory Design Shop 255 2(0-6)
Economics Econ. 101 3(3-0)	Engineering English Engr. 110 2(2-0)
	Business Organization Econ. 204 1(1-0)
	Machine Tool Work III Shop 193 1(0-3)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R	Thesis Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R

Applied Mechanics and Machine Design

Professor SEATON
 Associate Professor WENDT
 Assistant Professor PEARCE
 Testing Engineer SCHOLER
 Instructor ROBERT

Instructor SMUTZ
 Instructor DURLAND
 Instructor _____
 Instructor _____
 Assistant BUDDEN

The courses in applied mechanics deal with the applications of the laws of the mechanics of solids and liquids to the problems of engineering. Graphical and analytical methods of analysis are used for determining the forces acting on the parts of structures or machines, either at rest or in motion, and the effects of these forces in causing stresses, deformations, or motions of the parts.

The work is intended to be of a highly practical character, based on a sound theoretical training. For the purpose of fixing in the mind of the student the principles taught, the solution of a large number of problems is required. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction.

The laboratory exercises also permit the student to observe at first hand the behavior of materials, machines, and apparatus under test and to become familiar with testing apparatus and methods. All tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required on all laboratory exercises.

The courses in drawing are intended to teach students to read and interpret drawings, to express themselves clearly and accurately in the graphical language, and to use this as a powerful aid in the development of plans and the analysis of problems. Commercial drafting-room methods of representation are used for all working drawings.

APPLIED MECHANICS LABORATORIES*

The strength of materials testing laboratory is provided with a number of universal testing machines, including a 200,000 pound Olsen machine with extension members for testing long beams and columns. Among the other pieces of apparatus are a 250,000-inch-pound torsion-testing machine, a beam-testing machine, an Upton-Lewis toughness-testing machine, a Brinnell hardness machine, a scleroscope, and a very complete equipment of extensometers and other auxiliary apparatus for use with these machines. A complete set of standard test weights from one grain to 600 pounds total capacity is provided for calibrating the weighing apparatus.

The cement and concrete laboratory contains full equipment for making standard and research tests on cements, sands, gravels, and concretes, including several automatic shot cement-testing machines, sieves, needles, ovens, tanks, moist closets, scales, and a large number of briquette and cylindrical molds for test specimens. It also contains con-

* These laboratories have been designated by law as the official testing laboratories for the State Highway Commission of Kansas.

crete building-block machines, and molds for various cast concrete products, such as drainage tile and fence posts.

The road materials testing laboratory contains apparatus for making all the usual tests and many special tests on stone, brick, and bituminous road materials. All of the equipment used in testing road materials for the State Highway Commission is available for student use.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits each of 25,000 gallons capacity, equipped with various types of weirs, an air-pressure tank, hydraulic rams, several centrifugal pumps, one 15-inch Layne and Bowler three-stage deepwell centrifugal pump, a positive rotary pump, a deepwell reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, current meters, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

101. APPLIED MECHANICS I RECITATION. Junior year, first semester and summer school. Class work, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Professor Seaton, Associate Professor Wendt, and Mr. Robert.

A study is made of the analytical and graphical composition, resolution, and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; friction; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; and of work, energy, and power. Text: Poorman's *Applied Mechanics*.

102. APPLIED MECHANICS A-I RECITATION. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Analytical Geometry (Math. 110), and Engineering Physics I (Physics 211). Professor Seaton and Associate Professor Wendt.

This course comprises a study of statics, with applications to stresses in structures; center of gravity; and moment of inertia. Algebraic methods are generally employed, supplemented by graphic construction and numerous examples.

105. APPLIED MECHANICS I LABORATORY. Junior year, first semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Associate Professor Wendt and Mr. Robert.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Carpenter and Diederichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Junior year, second semester and summer school. Class work, five hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

Behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Junior year, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

The subject matter of this course is similar to that of Applied Mechanics II, but much less time is devoted to the study of continuous girders and of reinforced concrete. Text: Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

116. APPLIED MECHANICS A-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Applied Mechanics A-I Recitation. Professor Seaton and Associate Professor Wendt.

Behavior of materials subjected to tension, compression, and shear; strength and stiffness of simple beams; moment and shear in flexure of beams, with diagrams; design of beams of wood, steel and reinforced concrete and design and investigation of columns.

120. APPLIED MECHANICS II OR E-II LABORATORY. Junior year, second semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Professor Seaton, Associate Professor Wendt, and Mr. Robert.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood, and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

121. APPLIED MECHANICS A-II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics A-II Recitation. Associate Professor Wendt and Mr. Robert.

This course comprises the use of micrometers, planimeters, and slide rules and a study of the various testing machines. Tension, compression, shear, and bending tests are made on specimens of iron, steel, wood, and concrete. Tests are also made on cement and on the fine and coarse aggregates for concrete.

125. GRAPHIC STATICS. Junior year, first semester. Drafting-room practice, supplemented by lectures, three hours. One semester credit. Must accompany or follow Applied Mechanics I or A-I. Professor Seaton and Associate Professor Wendt.

Graphical solutions are made of the stresses existing in a number of typical trusses, under a variety of loadings, and a detail design is made of one of the simpler forms of roof trusses.

130. HYDRAULICS RECITATION. Junior year, both semesters. Class work, three hours. Three semester credits. Must accompany or follow Applied Mechanics I. Professor Seaton and Mr. Robert.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of

head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines, and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. HYDRAULICS LABORATORY Junior year, both semesters. Laboratory work, three hours. One semester credit. Must accompany or follow Hydraulics Recitation (Ap. Mech. 130). Associate Professor Wendt and Mr. Robert.

Tests to determine the coefficients of weirs and orifices; use and calibration of water meters; tests to determine loss of head in pipes due to various causes, and tests on water wheels, water turbines, rams, and pumps.

140. CONCRETE CONSTRUCTION RECITATION. Senior year and elective, both semesters. Lectures and recitations, one hour. One semester credit. Professor Seaton and Associate Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the waterproofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

145. CONCRETE CONSTRUCTION LABORATORY. Senior year and elective, both semesters. Laboratory work, three hours. One semester credit. This course must accompany or follow Concrete Construction Recitation (Ap. Mech. 140). Associate Professor Wendt and Mr. Budden.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

150. THESIS. Senior year, continuing through the year. Professor Seaton, Associate Professor Wendt, Assistant Professor Pearce, and Mr. Robert.

The laboratories of the department furnish an excellent opportunity for experimental work in strength of materials, road materials, concrete and hydraulics, suitable for thesis projects of students in any branch of engineering. Projects in machine design may also be worked out as theses. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

250. HIGHWAY ENGINEERING I LABORATORY. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Applied Mechanics II Laboratory. Associate Professor Wendt and Testing Engineer Scholer.

This is a comprehensive course in the examination and testing of bituminous and nonbituminous road materials.

255. ADVANCED APPLIED STATICS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton.

This course includes advanced problems in equilibrium of forces and stresses in framed structures, including certain statically indeterminate cases.

260. ADVANCED APPLIED KINETICS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton.

Advanced problems in kinetics are given with special attention to the kinetics of rigid bodies.

265. ADVANCED MECHANICS OF MATERIALS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II or E-II. Professor Seaton or Associate Professor Wendt.

A study is made of the theory of elasticity and its applications, of elastic and masonry arches, and advanced problems in continuous girders involving the general three moment equations.

270. HYDRAULIC MACHINERY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics. Associate Professor Wendt and Mr. Robert.

A study is made of the characteristics and applications of water wheels, turbines, pumps, and other hydraulic machinery.

275. ROAD MATERIALS. Elective, first or second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Highway Engineering I Laboratory. Associate Professor Wendt and Testing Engineer Scholer.

An advanced course in the properties and testing of the various materials used in road construction is here given.

FOR GRADUATES.

301. RESEARCH IN MATERIALS OF CONSTRUCTION. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Seaton and Associate Professor Wendt.

Many problems related to materials used in engineering construction offer attractive fields for research. A number of special pieces of apparatus in addition to the usual equipment of strength of materials laboratory are available for this work. The results of such investigations, if suitable, may be incorporated in bulletins of the Engineering Experiment Station.

COURSES IN DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

155. ENGINEERING DRAWING. Freshman year, both semesters and summer school. Drafting, supplemented by lectures and recitations, six hours. Two semester credits. Mr. Smutz, Mr. Durland, and assistants.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections and sections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Freshman year, both semesters and summer school. Drafting practice with lectures and recitations, six hours. Two semester credits. Prerequisites: Engineering Drawing and Solid Geometry. Mr. Smutz, Mr. Durland, and assistants.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, and double-curved surfaces, with their sections, tangents and tangent planes, as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle. Text: Smith's *Practical Descriptive Geometry*.

161. MECHANICAL DRAWING I. Sophomore year, both semesters and summer school. Drafting, with lectures and recitations, six hours. Two semester credits. Prerequisite: Descriptive Geometry. Assistant Professor Pearce and Mr. Durland.

A study is made of conventional representations, working drawings, modern drafting-room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Sophomore and junior years, second semester and summer school. Drafting, nine hours. Three semester credits. Prerequisites: Mechanical Drawing I. Kinematics (Ap. Mech. 180) must accompany or precede this course. Assistant Professor Pearce and Mr. Durland.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages, and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, 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. Displacement and velocity diagrams are drawn for linkages and cams.

175. MECHANICAL DRAWING III. Junior year, first semester. Drafting, three hours. One semester credit. Prerequisite: Mechanical Drawing II. Steam and Gas Engineering I (Steam and Gas 101) must accompany or precede this course. Assistant Professor Pearce.

This includes the solution of a problem on the slide valve by the Bilgram diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. All calculations and sketches are carefully kept in note books. Kent's *Mechanical Engineers' Pocketbook* and Mark's *Mechanical Engineers' Handbook* are extensively used for reference, and each student is expected to have a copy of one of these books. Manufacturers' catalogues and blue prints are also used for reference.

180. KINEMATICS. Sophomore and junior years, both semesters and summer school. Lectures and recitations, three hours. Three semester credits. Prerequisites: Plane Trigonometry (Math. 101) and Descriptive Geometry (Ap. Mech. 158). Professor Seaton, Assistant Professor Pearce, and Mr. Durland.

A careful study is made of the fundamental elements of machinery with reference to the transmission of motion and force, and to their forms and arrangements in actual machines. Among the subjects discussed are: bearings; screws; worms and wheels; rolling cylinders, cones and discs; belts, ropes, and chains; cams, levers, and linkwork, with their motion, velocity, and force diagrams; special forms of linkages, such as quick return and straight-line motions; gear-tooth outlines, and trains of gears. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FOR GRADUATES AND UNDERGRADUATES

201. MACHINE DESIGN I RECITATION. Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisites: Applied Mechanics II and Mechanical Drawing II (Ap. Mech. 110,

170); Steam and Gas Engineering II (Steam and Gas 110). Must accompany Machine Design I Laboratory (Ap. Mech. 205). Professor Seaton and Assistant Professor Pearce.

A study is made of the straining actions in machine elements in general, with special attention to the design of springs, riveted fastenings, screw fastenings, keys, force fits, cylinders, plates, journals, bearings, shafting, clutches, couplings, and belt, rope, chain and gear transmissions. Some time is devoted to a study of friction and lubrication, to the action of reciprocating parts in engines, and to the problems arising in the design of high-speed machinery. Text: Leutwiler's *Machine Design* and Lanza's *Dynamics of Machinery*.

205. MACHINE DESIGN I LABORATORY. Senior year, first semester. Drafting, six hours. Two semester credits. Must accompany Machine Design I Recitation (Ap. Mech. 201). Professor Seaton and Assistant Professor Pearce.

A steam boiler is designed in strict conformity to the *A. S. M. E. Boiler Code*. Calculations are made for all parts except standard fittings, and working drawings are made. In the latter part of the course designs are made for a large pulley, shaft, and shaft coupling. All calculations and sketches are kept in note books.

210. MACHINE DESIGN II. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisites: Machine Design I (Ap. Mech. 201, 205). Professor Seaton and Assistant Professor Pearce.

This is a continuation of Machine Design I Laboratory. A small power shear is designed. Calculations are made for all parts, and a graphical analysis is made of the stresses in the shaft. Working drawings are made.

215. FLOUR-MILL DESIGN. Senior year, first semester. Drafting, supplemented by lectures and assigned reading, six hours. Two semester credits. Prerequisites: Applied Mechanics E-II (Ap. Mech. 115) and Milling Practice I (Mill. Ind. 201). Professor Seaton and Mr. ———.

A design is made for a medium capacity flour mill, including the selection and the planning of the arrangement of the machinery.

Architecture

Professor BAKER
Professor WALTERS (Emeritus)

Assistant Professor SMITH
Instructor ———

The courses in architecture are offered not only to provide for the fundamental training necessary for the practice of architecture, but also to give the student a facility and working knowledge which will be of immediate value to him upon graduation. The foundation which the student acquires in college should be supplemented by continual professional study, especially during those years immediately following graduation, when it is desirable that he should acquire practical experience in the employ and under the guidance of capable and experienced members of the profession. Students are most urgently advised to acquire practical experience in an architect's office during the summer vacations of their college course.

Throughout the course the instruction by lectures, recitations and drafting-room practice is fully amplified and expanded by a free use of the equipment of the Department of Architecture. Within the department is housed a good working library of the standard architectural works and leading professional magazines, together with the collections

of lantern slides and photographs, to all of which the student has free access. Placed about the amply lighted and well-equipped rooms of the department is a generous collection of plaster casts, including important examples of architectural fragments and ornament from historical monuments. On the walls of the drafting rooms, where they are constantly before the student, are hung selected examples from the department's collection of original drawings, including specimens of both academic and current professional work. From time to time this exhibit is changed.

At frequent intervals, representative men actually engaged in the practice of architecture and the allied arts and trades are invited to talk to and to advise the student. During the junior or senior year, under the direction of and in company with a member of the departmental faculty, each student is expected to make a visit to one or more of the neighboring cities, thus enabling him to acquaint himself with the representative work of the profession as well as with the operations and processes involved in the conduct of allied professions and industries.

All drawings or designs made during the student's course are to become the property of the department, to be used or returned at the discretion of the faculty.

COURSES IN ARCHITECTURE

FOR UNDERGRADUATES

108. ARCHITECTURAL DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Professor Baker and Assistant Professor Smith.

This course is outlined to give the student a working knowledge of architectural drafting-room practice, with a view to fitting him to enter an architect's office his first summer in college. The work covers the different methods of presenting architectural drawings, lettering, and the various symbols used in architectural practice. Special attention is given to the study of fundamental forms and their presentation.

109. ARCHITECTURAL DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Course 108. Professor Baker and Assistant Professor Smith.

This is a continuation of Architectural Drawing I, and consists of a more detailed study of architectural forms, in preparation for Design I in the sophomore year. Text: Pierre Esquire's *Traité Elementaire d'Architecture Comprenant l'Etude Complete des Cinq Ordres*.

111. FREE-HAND DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credit. Mr. _____.

This course comprises the drawing of simple objects and groups as exercises in developing the powers of observation as well as in training the hand. Special attention is given to representations of the third dimension.

114. FREE-HAND DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 111. Mr. _____.

This is an amplification and expansion of the principles taught in Free-hand Drawing I, as applied to architectural forms and architectural ornament. The work consists of drawing in charcoal or pencil from casts.

116. FREE-HAND DRAWING III. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 114. Mr. _____.

This is a continuation of Free-hand Drawing II, and consists of drawing from casts of architectural ornament and of the human figure, with occasional exercises in rapid sketching.

117. FREE-HAND DRAWING IV. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 116. Mr. _____.

In this course Free-hand Drawing III is continued.

118. FREE-HAND DRAWING V. Junior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 117. Mr. _____.

This is a continuation of Free-hand Drawing III and IV, and consists of a more detailed study and rendering in charcoal of architectural ornament and the human figure. More time is given than in the previous course to rapid sketching in pencil and pen and ink, as well as to drawing from memory.

120. FREE-HAND DRAWING VI. Junior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 118. Mr. _____.

In this course Free-hand Drawing V is continued.

121. FREE-HAND DRAWING VII. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 120. Mr. _____.

This is a continuation of Free-hand Drawing V and VI, but gives more time to the drawing of the human figure and to practice in original composition, as well as to sketching in water color.

123. FREE-HAND DRAWING VIII. Senior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 121. Mr. _____.

In this course Free-hand Drawing VII is continued.

127. PERSPECTIVE. Freshman year, first semester. Drafting room, six hours. Two semester credits. To be taken simultaneously with Ap. Mech. 155 and Arch. 108. Assistant Professor Smith.

This course, consisting of drafting-room exercises and examinations, covers the study and practical application of the theory of perspective as related to architectural practice. In the latter part of the course drafting-room exercises are given to train the student to visualize, in perspective, objects represented in orthographic projection.

130. SHADES AND SHADOWS. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 155, and Arch. 108, 127. To be taken simultaneously with Ap. Mech. 158 and Arch. 109. Assistant Professor Smith.

The course consists of a series of drafting-room exercises and examinations, applying the principles of descriptive geometry in casting conventional architectural shadows. In these exercises the student is required to give careful consideration to the elemental architectural forms and principles of rendering used in his study of this subject. Text: McGoodwin's *Architectural Shades and Shadows*.

135. MATERIALS OF CONSTRUCTION I. Freshman year, first semester. Class work, two hours. Two semester credits. Assistant Professor Smith.

This is a recitation course covering the study of the properties and uses of the various building materials, together with the conditions and limitations under which they may be used in different types of building construction. Text: Kidder's *Building Construction and Superintendence*, Vols. I and II.

138. MATERIALS OF CONSTRUCTION II. Freshman year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 135. Assistant Professor Smith.

In this course Materials of Construction I is continued.

142. DESIGN I. Sophomore year, first semester. Drafting room, nine hours. Three semester credits. Prerequisites: Arch. 114, 126, and 129. Professor Baker, Assistant Professor Smith, and Mr. ———.

This course is outlined to develop the student's understanding of architectural composition and his ability to present architectural conceptions, thus laying the foundation for his esthetic training. By means of problems in original design, accompanied by a constant study and analysis of the best historical examples, the student is led to develop his sense of proportion and conception of beauty, at the same time acquiring through the training of hand and eye a facility in architectural composition and rendering. In this course each student receives individual instruction, accompanied by frequent criticisms of students' work before the entire class.

144. DESIGN II. Sophomore year, second semester. Drafting room, nine hours. Three semester credits. Prerequisite: Arch. 142. Professor Baker, Assistant Professor Smith, Mr. ———.

In this course Design I is continued.

145. DESIGN III. Junior year, first semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 117 and 144. Professor Baker.

This is a continuation of Design I and II. At frequent intervals during the year, time problems or rapid design sketches are required to test the student's development and to give him practice in clear and concise expression. It is also required that at least one problem be presented in perspective.

147. DESIGN IV. Junior year, second semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 145. Professor Baker.

In this course Design III is continued.

148. DESIGN V. Senior year, first semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisites: Arch. 120 and 147. Professor Baker.

In this course Design IV is continued.

151. DESIGN VI. Senior year, second semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisite: Arch. 148. Professor Baker.

In this course Design V is continued.

153. HISTORY OF ARCHITECTURE I. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 114. Assistant Professor Smith.

This is a lecture and recitation course covering the history of architecture from the dawn of civilization to the end of the Roman Empire. Throughout the courses in the history of architecture the relation of architecture to the development of civilization is constantly emphasized. The lectures are given with the aid of lantern slides, and written papers, with sketches, are required of each student.

156. HISTORY OF ARCHITECTURE II. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 153. Assistant Professor Smith.

This course continues History of Architecture I and covers the period from the end of the Roman Empire to the end of the Gothic Period.

159. HISTORY OF ARCHITECTURE III. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Arch. 117 and 156. Assistant Professor Smith.

This course continues History of Architecture II and covers the Italian and French Renaissance period.

161. HISTORY OF ARCHITECTURE IV. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 159. Assistant Professor Smith.

This course continues History of Architecture III and finishes the Renaissance period to modern times.

168. WORKING DRAWINGS AND SPECIFICATIONS I. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 158, Arch. 109 and 138. Professor Baker and Assistant Professor Smith.

This course is designed to give the student experience in the execution of working drawings as required in actual practice, together with a simultaneous study of the specifications that must accompany such drawings. Special emphasis is laid upon the uses of various building materials and their influence upon architectural design. From time to time the class visits buildings under construction as well as the offices of successful practicing architects.

169. WORKING DRAWINGS AND SPECIFICATIONS II. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 168. Professor Baker and Assistant Professor Smith.

In this course Working Drawings and Specifications I is continued.

172. DOMESTIC ARCHITECTURE. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Arch. 144 and 169. Professor Baker.

This is a course of drafting-room exercises covering the history and development of the modern house. Following a historical survey a study is made of the problems of location, plan, and design; types of construction, systems of sanitation, heating, and lighting. Throughout the course the student, along with the study of plans and designs and actual visits to houses, is required to solve problems.

183. CIVILIZATION AND ART I. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Hist. 123 and Arch. 156. Professor Baker.

This course comprises a survey of civilization from earliest history, laying special emphasis on the Hellenistic, Roman, and Gothic periods, and tracing the economic, political, racial, and religious phases of history simultaneously with the artistic developments of each epoch. The course consists of lectures, recitations, written papers, and research, the accomplishment of which is greatly aided by a free use of lantern slides, photographs, and library references.

185. CIVILIZATION AND ART II. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Arch. 183. Professor Baker.

This continues Civilization and Art I to the close of the Renaissance.

191. OFFICE PRACTICE. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Senior standing. Professor Baker.

This course is designed to acquaint the student with the relations between the architect and the contractor, the client, the building trades, the recognized architectural societies, and the community. The problems of building laws, labor laws, contracts, and bonds are also discussed. The work includes lectures, recitations, research, and reports.

Civil Engineering

Professor CONRAD
Assistant Professor FRAZIER

Instructor FURR
Instructor WHITE

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The heaviest technical work of the department falls in the junior and senior years, during which 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, railways, highway engineering, astronomy, and geodesy. Considerable time is devoted to thesis work.

The seminar affords the students an opportunity to become acquainted with modern engineering practice through discussions and references to current periodicals.

In addition to the laboratory equipment found in other engineering departments, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. It also owns a precise level, a direction theodolite, a repeating theodolite, and a base-line outfit. A recording gauge makes a continuous record of the stage of the Kansas river, to be used in computing the flood discharge of that stream. This information will be of great value in future years as a basis for designing works for flood protection.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

102. SURVEYING I. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Plane Trigonometry (Math. 101). Assistant Professor Frazier, Mr. Furr, and Mr. White.

This is a brief course in the use and care of engineers' surveying instruments. Text: Breed and Hosmer's *Surveying*, Vol. I.

111. SURVEYING II. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Surveying I. Mr. Furr and Mr. White.

The course is devoted to work in land and topographic surveying. Text: Breed and Hosmer's *Surveying*, Vol. I.

120. MASONRY AND FOUNDATIONS. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Engineering Physics I (Physics 211). Professor Conrad.

In this course a study is made of the principles underlying the design and construction of foundations, the stresses in plain masonry structures, and the method of designing such structures.

125. CIVIL ENGINEERING DRAWING I. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Mechanical Drawing I (Ap. Mech. 160, 165). Assistant Professor Frazier.

This course is devoted to the application of stereotomy, shades and shadows, isometric drawing, and perspective and copying working draw-

ings of engineering structures. The principles are explained to the students by such short lectures as seem necessary for the purpose. No textbook is used.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Elective, first semester. Class work, two hours a week for the first half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

This course comprises a brief treatment of the subjects from the agriculturist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Elective, first semester. Field work, six hours a week for the second half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

Practice work in the field and drafting room is devoted to the laying out and plotting of simple farm drainage and irrigation systems. Same texts as in Civ. Engr. 130.

145. RAILWAY ENGINEERING I. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisites: Surveying II and Civil Engineering Drawing I (Civ. Engr. 111, 125). Assistant Professor Frazier.

This is a short course in the theory of railway engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and to the design of yards and terminals. Texts: Raymond's *Elements of Railroad Engineering*.

151. SURVEYING III RECITATION. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying II. Mr. Furr.

This course comprises a study of hydrographic, city and mine surveying. Text: Breed and Hosmer's *Surveying*, Vols. I and II.

155. SURVEYING III LABORATORY. Sophomore year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying II Laboratory. Mr. Furr.

The field exercises are devoted to practice work in topographic surveying. Time in the drafting room is devoted principally to topographic mapping. Texts: Same as in Civ. Engr. 151.

156. SURVEYING IV RECITATION. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Surveying III. Mr. Furr.

This course is devoted to a study of railroad curves and earthwork.

157. SURVEYING IV LABORATORY. Sophomore year, second semester. Field and drawing room, three hours. One semester credit. Prerequisite: Surveying II. Mr. Furr.

The time is devoted to field and drafting room exercises in railroad curves and earthwork.

161. DRAINAGE AND IRRIGATION I. Junior year, second semester. Class work, two hours. Two semester credits. Hydraulics (Ap. Mech. 130) must be taken with this course or precede it. Professor Conrad.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts: Elliott's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

170. THESIS. Senior year, continuing through both semesters. Professor Conrad.

All candidates for the degree of bachelor of science in civil engineering are required, during their senior year, to prepare a thesis. This thesis may be a report on a proposed design, an original investigation, or a library research. Civil engineering students may, with the approval of the head of the department, take their thesis work outside of the department. The thesis subject may be selected and approved by the head of the department in which the work is done before October first next preceding the commencement at which the candidate proposes to graduate.

FOR GRADUATES AND UNDERGRADUATES

201. BRIDGE STRESSES. Senior year, first semester. Class work, four hours. Four semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

This course involves a study of the algebraic and graphical methods of computing the stresses in bridges, leading up to the subject of bridge design in the following semester. Text: Merriman and Jacoby's *Roofs and Bridges*, Part I.

205. CIVIL ENGINEERING DRAWING II. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Civil Engineering Drawing I (Civ. Engr. 125). Professor Conrad.

This course is devoted to graphic statics and the design of simple roof trusses in timber and steel. Text: Merriman and Jacoby's *Roofs and Bridges*, Part II.

210. ASTRONOMY AND GEODESY RECITATION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Surveying III. Assistant Professor Frazier.

A brief course in the elements of practical astronomy followed by a study of the precise methods of surveying and leveling. Text: Breed and Hosmer's *Surveying*, Vol. II.

215. ASTRONOMY AND GEODESY LABORATORY. Senior year, first semester. Field work, three hours. One semester credit. Prerequisite: Surveying III Laboratory. Assistant Professor Frazier.

The work is devoted to simple astronomical observations, principally for determining the true meridian; to base line measurements and triangulation work. Each student is also required to run a short circuit with the precise level.

220. WATER SUPPLY. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Professor Conrad.

The course deals with the water supply for cities from the standpoints of consumption, collection, storage, distribution, and purification.

225. SEWERAGE. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Assistant Professor Frazier.

A study is made of the problems met in the design and construction of sewer systems and disposal plants for cities of moderate size. Text: Folwell's *Sewerage*.

230. HIGHWAY ENGINEERING I RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Mr. Furr.

A study of the principles underlying the location, construction, and maintenance of all ordinary types of roads and pavements. Text: Agg's *Construction of Roads and Pavements* (For the laboratory work in connection with this course, see Ap. Mech. 250.)

246. BRIDGE DESIGN. Senior year, second semester. Drawing, nine hours. Three semester credits. Prerequisite: Bridge Stresses (Civ. Engr. 201). Professor Conrad.

This course comprises general drawings for a highway truss bridge, a railroad truss bridge, and a railroad deck plate girder. Text: Merri-man and Jacoby's *Roofs and Bridges*, Part III.

250. CONCRETE DESIGN RECITATION. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

An application of the principles of reinforced concrete to the design of chimneys, buildings, retaining walls, dams, and bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

255. CONCRETE DESIGN LABORATORY. Senior year, second semester. Drafting-room work, three hours. One semester credit. Prerequisite: Applied Mechanics II (Ap. Mech. 110.) Professor Conrad.

In this course the students make drawings of reinforced concrete retaining walls, dams, slab and girder bridges, and arch bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

260. RAILWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Assistant Professor Frazier.

This course comprises the study of railway operation and maintenance.

265. RAILWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Engr. 145). Assistant Professor Frazier.

In the field, reconnoissance and survey of a short railroad is made, and the office work consists in making the maps, profiles, and estimates from the survey. Text: Allen's *Railroad Curves and Earthwork*.

270. HIGHWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Mr. Furr.

This course consists in a study of highway laws, highway administration in the various states, and highway economics.

275. HIGHWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Engr. 230). Mr. Furr.

In the field, a reconnoissance and survey for a highway a few miles long is made. The work in the drafting room consists in making the maps, profiles, and estimates from the survey.

280. DRAINAGE AND IRRIGATION II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Drainage and Irrigation I. Professor Conrad.

A continuation of the former course in Drainage and Irrigation, dealing with the design of irrigation structures and the management of irrigation projects.

285. DRAINAGE AND IRRIGATION II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Professor Conrad.

The field work consists in making the survey for a drainage or irrigation project. In the office the maps, estimates, and designs are made, using the survey as a basis.

Electrical Engineering

Professor REID
Assistant Professor KLOEFFLER

Assistant Professor FENTON
Instructor MARKLE

Instruction in this department is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is illustrated by means of demonstration apparatus and the projection lantern.

The electrical measurement and calibration laboratory is provided with standard instruments of measurement, including standards of resistance, and electromotive force, self-induction, and capacity, Wheatstone bridges, and potentiometers. More than 100 ammeters, voltmeters, and wattmeters, with 250 ranges, of the best types of American and foreign manufacture, are available for use. The instrument equipment includes also frequency meters, a synchroscope, a power factor meter, electric, magnetic, centrifugal and liquid tachometers, slip meters, a Tirrill voltage regulator, current and potential transformers, electrostatic voltmeters, and rotating standard test meters.

The modern equipment contained in the telephone laboratory has been made possible through the liberal coöperation of various telephone companies. It includes a Western Electric demonstration panel, containing all parts and circuits for connecting two subscribers through the A board and B board of the multi-office exchange; a Swedish-American magneto wall switchboard; a demonstration outfit of the Automatic Telephone Company type, including line switches, first and second selectors and connector switches; Kellogg Switchboard & Supply Company's switchboard panel, and two demonstrating panels of the Stromberg-Carlson type, one containing all the parts and circuits for the magneto switchboard and the other the same for common battery board. A complete line of bridging magneto and common battery wall telephone sets of all above-mentioned makes, including two of Leigh Cracraft type, are to be found in the laboratory. In addition there are series telephone sets, desk telephones, various individual telephone parts and potentiometer boards, for making transmission efficiency tests.

The machine, instrument, and general apparatus equipment of the department is unusually complete. More than forty generators and motors, both alternating and direct current, from one kilowatt to thirty kilowatts in size, and totaling 350 horsepower, are available for the use of students receiving instruction in the electrical laboratories. In addition, there are eight machines ranging from five to thirty-five kilowatts, complete except windings, available for instruction in armature and field winding.

The above machine equipment includes a 30-kilowatt, 2,300-volt, poly-phase alternating-current generator, a 15-kilowatt, 125-volt, alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase, or twelve-phase machine; a $7\frac{1}{2}$ -kilowatt synchronous converter, which may be used as a one-, two-, three-, or quarter-phase motor; a 10-kilowatt special synchronous converter, designed for use in single-, three-, or six-phase operation, equipped with amortisseur wind-

ing, speed limiting and oscillating devices, series winding and commutating poles. Three 5-kilowatt transformers are accessories of this machine. A pair of 6-kilowatt compound-wound generators is used as a balancer set on the Edison 3-wire system, supplying the laboratory with 110 volts, from the 220-volt power supply, and to illustrate commercial use of such systems. Two compound-wound generators on the same sub-base, direct-connected to a motor, are used to illustrate commercial use of generators in parallel operation, Edison 3-wire system, and "pump-back" factory efficiency tests.

A set of four machines, mounted on a common bed-plate, includes two 7½-kilowatt alternating-current generators, and two 15-horsepower direct-current motors, whose speed is variable from 600 to 1,800 revolutions. By means of flanged couplings, any combination of two, three, or four machines may be operated. The generator armature windings are brought out to twelve terminals, and each may be connected as a single-, two-, or three-phase Y or delta, six-phase or twelve-phase machine, and when running in synchronism, the armatures of the two machines may be turned with reference to each other through 180 degrees, so that any desired phase difference may be obtained. These alternators may be used in parallel, as synchronous motors, in meter testing to produce an artificial power factor, and many other combinations.

Accessory apparatus includes field and starting rheostats and controllers, load racks, and banks of lamps, inductive and capacity loads, 20,000- and 60,000-volt testing transformers, arc and spot welding equipment, a 3-element oscillograph with photographing attachments, with which simultaneous waves of three electric currents or voltages may be observed and photographed, a mercury arc rectifier, and a constant current transformer.

Through the generous assistance of the Westinghouse Electric and Manufacturing Company, the department has been able to install a very complete electric railway test set, consisting of two street-railway motors of a most recent design and a complete control equipment of the H L type. The motors are mounted on and geared to a shaft, on which are a flywheel and brake pulley. The flywheel requires as much energy to accelerate as does a 10-ton car, and the brake load may be adjusted to reproduce any desired load on car and condition of track. The H L control equipment includes the master controller, and electrically controlled, air-operated unit switches. It is the type used on many single cars and multiple-car trains on surface, elevated and subway roads, and also in many of the modern steam road electrifications.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

101. DIRECT-CURRENT MACHINES I RECITATION. Junior year, first semester. Recitations or lectures, three hours. Three semester credits. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Professor Reid.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The

class work is planned to coordinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines I Recitation. Assistant Professor Kloeffler.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. I.

110. DIRECT-CURRENT MACHINES II RECITATION. Junior year, second semester. Lectures or recitations, three hours. Three semester credits. Prerequisite: Direct-Current Machines I. Assistant Professor Kloeffler.

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. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

The latter part of the course is devoted to a study of the construction and testing of the various types of voltmeters, ammeters, wattmeters, and watt-hour meters. Text: Jansky's *Electrical Meters*.

115. DIRECT-CURRENT MACHINES II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines II Recitation. Assistant Professor Kloeffler.

Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. The latter part of the course is devoted to the calibration of electrical instruments. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. I.

121. ELECTRICAL MEASUREMENTS RECITATION. Junior year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisites: Calculus I (Math. 113) and Engineering Physics II (Physics 212). Assistant Professor Kloeffler.

This course is an extension of the work in electricity in Engineering Physics II. It treats of the various methods for the measurement of resistance, current, electromotive force, capacity, and inductance. Text: A. W. Smith's *Principles of Electrical Measurements*.

126. ELECTRICAL MEASUREMENTS LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Electrical Measurements Recitation. Assistant Professor Kloeffler.

The laboratory course follows the work of the classroom by giving applications of the fundamental principles studied.

130. ELECTRICAL ENGINEERING M-I RECITATION. Senior year, first semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus I (Math. 113). Assistant Professor Kloeffler.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text: Bailey's *Dynamo-Electric Machinery*.

135. ELECTRICAL ENGINEERING M-I LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Electrical Engineering M-I Recitation. Assistant Professor Fenton.

Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristics and efficiency tests are given. A written report on each test is required.

140. ELECTRICAL ENGINEERING M-II RECITATION. Senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Electrical Engineering M-I. Professor Reid.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text: Bailey's *Dynamo-Electric Machinery*.

145. ELECTRICAL ENGINEERING M-II LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Fenton.

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.

150. ELECTRICAL MACHINE DESIGN I. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Direct-Current Machines II. Assistant Professor Kloeffler.

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. Text: Gray's *Electrical Machine Design*.

155. ELECTRICAL MACHINE DESIGN II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Alternating-Current Machines II and Electrical Machine Design I. Assistant Professor Kloeffler.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine. Text: Gray's *Electrical Machine Design*.

160. ELECTRICAL ENGINEERING C RECITATION. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: College Physics. Assistant Professor Fenton.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machines and the use of electricity for lighting and power. Text: Morecroft's *Continuous and Alternating Machines*.

165. ELECTRICAL ENGINEERING C LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Fenton.

The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, six hours. Two semester

credits. Professor Reid, Assistant Professor Fenton, and Mr. Markle.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical-machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

195. THESIS. Senior year, continuing through both semesters. Professor Reid, Assistant Professor Kloeffler, Assistant Professor Fenton, and Mr. Markle.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the first semester of the senior year. The work is continued during the second semester. Every opportunity is given the student to work out original ideas as to design and operation of electrical apparatus and machinery.

FOR GRADUATES AND UNDERGRADUATES

201. ALTERNATING-CURRENT MACHINES I RECITATION. Junior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Direct-Current Machines I. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

205. ALTERNATING-CURRENT MACHINES I LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Alternating-Current Machines I Recitation. Professor Reid and Assistant Professor Kloeffler.

It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

210. ALTERNATING-CURRENT MACHINES II RECITATION. Senior year, first semester. Recitations or lectures, four hours. Four semester credits. Prerequisite: Alternating-Current Machines I. Professor Reid.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

215. ALTERNATING-CURRENT MACHINES II LABORATORY. Senior year, first semester. Laboratory work, six hours. Two semester credits. This course should accompany or follow Alternating-Current Machines II Recitation. Professor Reid.

A series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

220. TELEPHONY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Direct-Current Machines I and Alternating-Current Machines II. Assistant Professor Kloeffler.

This course consists of a consideration of the principles of acoustics and alternating-current phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text: McMeen and Miller's *Telephony*.

225. TELEPHONY LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Telephony Recitation. Assistant Professor Kloeffler.

This course includes the study and measurement of telephone parts, the actual wiring of telephone circuits on the magneto, common battery and automatic systems, location of line trouble, and transmission efficiency tests on various types of apparatus and circuits.

235, 236. ILLUMINATING ENGINEERING. Senior year, second semester. Lectures and recitation, two hours; laboratory, three hours. Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffler.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied. Text: Croft's *Practical Electric Illumination*

240. ELECTRIC RAILWAYS. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: Alternating-Current Machines II. Professor Reid.

A study is made of the development of electric traction; traffic conditions and train schedules; speed-time curves; power generation and distribution for electric railways signal systems; types of cars and locomotives in use; various control systems; and adaptability of electric traction to steam road. Text: Harding's *Electric Railway Engineering*.

Farm Engineering

Professor _____
Assistant Professor SANDERS

Instructor PARSONS
Assistant SMITH

This department gives instruction in such branches of engineering as are directly related to agriculture. It also correlates and gives general supervision to such courses presented in other engineering departments as are open to students in agriculture and agricultural engineering, in order that the agricultural application and uses of engineering principles, methods, and materials may be kept clearly before the student.

In all the courses given, the time is carefully apportioned between the classroom and the laboratory, in order to present the subject in the clearest and most forceful way. The practical application of theoretical principles is emphasized.

The various courses in rural architecture, farm machinery, and tractors are under the direct supervision of this department. The student is taught the requirements of farm buildings, is trained to plan their arrangement and to select and use the proper construction materials in the most advantageous way. The farm machinery laboratory equipment is unusually ample and complete; all kinds of the most modern implements, to the value of nearly \$10,000, are available, whereby their construction, adjustment, operation, and care may be fully covered, not only in laboratory study, but in field work and draft tests as well. The study of traction engines is arranged to cover thoroughly the construction, operation and repair of the numerous modern tractors which are part of the regular equipment; traction tests in conjunction with various types of farm power machinery are also made. The tractor laboratory is also equipped with four tractor power units mounted on bases, with various types of tractor ignition apparatus, and with complete apparatus for power and draft tests. All farm machinery and tractor equipment is kept up to date through a system of exchange with the manufacturers whereby old machines are replaced, when advisable, by new ones.

The comparatively recent development of this work, and its rapidly growing importance, renders investigational study very valuable, and special attention is given to the courses covering this phase of the subject.

COURSES IN FARM ENGINEERING

FOR UNDERGRADUATES

102. RURAL ARCHITECTURE. Elective, both semesters. Lectures, recitations, drafting-room practice, nine hours. Three semester credits. Professor _____.

This course includes lectures on the requirements, details of arrangement, and materials of construction for barns, storage, and work buildings for the farm. The preparation of specifications, bills of material, and estimates of costs is an essential part of the course. In the drafting-room, plans are prepared for typical farm buildings.

106. FIELD MACHINERY RECITATION. Sophomore year and elective, both semesters. Class work, one hour. One semester credit. Mr. Parsons.

The fundamentally important definitions and principles relating to farm machinery are first given, this being followed by material concerning the development, construction, operation, and use of soil preparation, seeding, cultivating, harvesting, and miscellaneous machinery. The importance of proper selection and care of farm machinery is emphasized.

107. FIELD MACHINERY LABORATORY. Sophomore year and elective, both semesters. Laboratory, three hours. One semester credit. Mr. Parsons.

A detailed study of the machines taken up in the classroom is conducted both in the laboratory and in the field.

111. POWER MACHINERY RECITATION. Junior year and elective, second semester. Class work, one hour. One semester credit. Prerequisite: Field Machinery. Mr. Parsons.

This course continues the study of field machinery with special reference to those machines requiring mechanical power for their operation, including engine plows, hay balers, feed mills, corn shellers, ensilage cutters, and threshing machines.

112. POWER MACHINERY LABORATORY. Junior year and elective, second semester. Laboratory, three hours. One semester credit. Mr. Parsons.

Laboratory and field instruction is given and tests are conducted upon the machines discussed in the classroom.

116. TRACTORS AND TRUCKS RECITATION. Junior year, both semesters. Lectures and recitations, two hours. Two semester credits. Prerequisite: None. Assistant Professor Sanders.

This course covers the study of the construction and operation of tractors and trucks, with special reference to machines using internal combustion engines as power units.

117. TRACTORS AND TRUCKS LABORATORY. Junior year, both semesters. Laboratory, three hours. One semester credit. Assistant Professor Sanders and assistants.

A study is made of the construction of steam and gas tractors and trucks and practice is given in the operation and testing of these machines under belt, road, and field conditions.

119. FARM SANITATION AND WATER SUPPLY. Elective, second semester. Class work, two hours. Two semester credits. No prerequisite. Professor ———.

A study of sources of water supply, installation of cisterns on the farm, and farm sanitation. No text is used, the instruction being given by lectures, bulletins, and library references.

120. FARM EQUIPMENT RECITATION. Elective, both semesters. Lectures and recitations, one hour. One semester credit. Professor ———.

A study of handy farm practices and important items of equipment for the farmstead is made in this course.

121. FARM EQUIPMENT LABORATORY. Elective, both semesters. Laboratory, three hours. One semester credit. Professor ———.

Practice is given in rope work, including knots, splices and halters; belt lacing and splicing; soldering; pipe fitting; and repairing of farm machinery.

125. FARM MOTORS RECITATION. Junior year, both semesters and summer school. Lectures and recitations, two hours. Two semester credits. Assistant Professor Sanders.

A descriptive study of steam engines, boilers, internal-combustion engines and automobiles, with special reference to their utilization on the farm.

126. FARM MOTORS LABORATORY. Junior year, both semesters and summer school. Laboratory, three hours. One semester credit. Assistant Professor Sanders and assistants.

130. ADVANCED FARM MACHINERY. Senior year and elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Field Machinery and Power Machinery. Professor ———.

Draft tests are made on various types of farm machines. A study is made also of the cost of operating these machines.

135. ADVANCED TRACTORS AND TRUCKS. Elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisite: Tractors and Trucks. Professor ——— and Assistant Professor Sanders.

Draft, power, and fuel economy tests are made upon standard types of tractors and trucks.

175. THESIS. Senior year, continuing through both semesters. Assistant Professor Sanders and Mr. Parsons.

Original problems relating to subjects taught in this department are assigned for investigation, after consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

205. FARM MACHINERY RESEARCH. Elective, both semesters. Six to fifteen hours laboratory or reading. Two to five semester credits. Assignment by permission. Prerequisites: Field Machinery and Power Machinery and such other preparation as may be necessary to conduct properly the investigation assigned. Professor ——— and Mr. Parsons.

Farm Machinery offers a broad field for original investigation along the lines of draft requirements, power consumption and cost of operating. Students admitted to this course are assigned to one project.

215. TRACTOR RESEARCH. Elective, both semesters. Six to fifteen hours laboratory, computation, or reading. Two to five semester credits. Prerequisites: Tractors and Trucks and such other preparation as may be necessary to conduct properly the problem assigned. Professor ——— and Assistant Professor Sanders.

Intensive studies are made of problems relating to tractor operation and construction.

General Engineering

Dean POTTER

101. ENGINEERING LECTURES. Freshman year, continuing through both semesters. Lectures, one hour a week. Dean Potter, other members of the engineering faculty, and visiting practicing engineers.

These lectures are designed to acquaint students who are beginning the study of engineering and architecture with the fundamental principles of their profession and to give them a general survey of the field of engineering.

105. SEMINAR. Sophomore, junior, and senior years. Required throughout each year. Lectures, papers, and discussions, one hour a week. Members of the engineering faculty.

This work differs for the various curricula, and as far as possible is conducted by the student branches of the professional engineering societies. In the case of electrical engineering students the work is conducted by the student branch of the American Institute of Electrical Engineers; the student branch of the American Society of Mechanical Engineers has charge of the work for students in mechanical engineering; the Kansas State Agricultural College Civil Engineering Society and the Architects' Club conduct the seminars for students in civil engineering and architecture, respectively. Students are required to present abstracts and reviews of articles appearing in the journals of their respective societies or in the technical press of their profession or to prepare original articles. Occasionally these individual groups unite in the general Engineering Society, under whose auspices lectures are given by practicing engineers and by members of the engineering and College Faculty on topics of general interest to engineering students.

Shop Practice

Professor CARLSON
 Instructor HOUSE
 Instructor LYNCH
 Instructor JONES
 Instructor GRANT
 Instructor SELLERS

Instructor BUNDY
 Instructor AIMAN
 Assistant GRANELL
 Assistant _____
 Assistant _____

The work in the shops is planned to meet the needs of three classes of students: (1) those in the special courses related to engineering and agriculture who expect to make use of the knowledge gained in their subsequent work in the shops and on the farm; (2) those who are training themselves for teaching and need to secure a general knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; and (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and of the workmen under different conditions.

The equipment of the shops is set forth to a certain extent below:

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for forty-eight students in each class. In this room are also installed an automatic band-saw filer and setter, and two grindstones driven by an individual motor.

PATTERN SHOP. This room is 45 by 81 feet and contains sixteen K. S. A. C. 12-in. by 32-in. safety wood-turning lathes; one 12-in. motor head-stock lathe; one 18-inch pattern-maker's lathe, with tools and chucks; eight pattern-makers' benches complete, with necessary small tools, core-box planes, electric glue-heating fixture, and other tools and apparatus for pattern work.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one 24-inch wood planer, one friezer, one 34-inch band saw, one jig saw, one 20-inch variety saw, one power mortiser, one sandpapering machine, one 8-inch jointer, one foot mortiser; a stock and tool room for holding the material, and small tools and gauges used in the wood shop.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendley-Norton lathe; two 14-inch Flather lathes; one 13-inch Lodge & Davis lathe; one 16-inch Lodge & Shipley combination engine and turret lathe; two 14-inch Reed lathes; five 14-inch K. S. A. C. lathes; one 28-in. by 20-ft. American lathe, equipped with blocks to raise it to 60-inch swing; one K. S. A. C. speed lathe; one Brown & Sharp No. 3-A Universal Milling Machine; one Brown & Sharp No. 2 universal milling machine; one No. 2 Brown & Sharpe universal grinder; one K. S. A. C. (Hendley-Norton pattern) shaper; one K. S. A. C. (Pratt & Whitney pattern) shaper; one Gray 26-in. by 6-ft. planer; one Niles 51-inch vertical turning and boring mill; one Baker Bros. Key seater; one Barnes 34-inch self-feed drill press; one Rogers 12-inch sensitive drill press; two K. S. A. C. 12-inch sensitive

drill presses; one K. S. A. C. (Bemis-Miles pattern) 20-inch double-traverse quick-return shaper; two Morse & Dexter valve reseating machines; one Walker universal grinder; one K. S. A. C. special drill grinder; one bolt and pipe machine, taking pipe up to two inches; one power hack saw; one Emerson direct-connected motor polishing machine; a complete set of sheet-metal worker's tools; benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (calculagraph) is installed near the machine shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet, which is used as a stock and storage room for the rough and finished parts of the 1½-hp. gas engine and 12-in. by 32-in. wood-turning lathes, which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with twelve K. S. A. C. downdraft forges and thirty-three Sturtevant downdraft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop there is also installed a 12-inch K. S. A. C. sensitive drill press, punch, and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, tire bender, tire shrinker, two Oxweld oxyacetylene welding outfits, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau Cupola; 4-ton, 25-foot-span K. S. A. C. traveling crane; core oven, 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas); one car, track and turntable; one 2-ft. by 3-ft. K. S. A. C. rumbler; one K. S. A. C. emery grinder; one K. S. A. C. molding machine; one Arcade squeezer-type molding machine; one air-driven sand riddler; one hammer core machine; an exceptionally large number of flasks, both wood and iron; ladles and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, one 11-in. by 20-in. brass furnace, crucibles, flasks, molding tubes, benches, cases, racks and necessary tools for bench and floor molding.

AMPHITHEATER. This room is 24 by 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil, forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER. This room is 36 by 40 feet. It is conveniently located and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE

FOR UNDERGRADUATES

101. WOODWORK. Freshman year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This is a course for engineering students, the first part of which consists of exercises to give familiarity with hand and bench tools. The latter part of the course is devoted to such work as will acquaint the student with the methods of operating the various woodworking machines used in commercial woodworking.

105. WOODWORK I. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. Aiman.

This beginning course is designed to give practice with the woodworking bench tools on the various common woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

110. WOODWORK II. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork I (Shop 105). Mr. Parker and Mr. Aiman.

This is a continuation of Woodwork I, with practice in the use of the rabbet, router, and matching planes, and with the plow dado and fillister on such work as will give the necessary practice. Considerable emphasis is laid upon the proper use and care of the tools and on the use of wood finishes.

115. WOODWORK III. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork II (Shop 110). Mr. Parker and Mr. Aiman.

In this course in mill work, practice is given on such articles as bring into use all of the woodworking machinery.

120. WOODWORKING FOR GRAMMAR GRADES. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: None. Mr. Parker and Mr. Aiman.

This course is designed for those who are preparing to teach manual training. It takes up the beginning work, and the exercises given are such as would be suitable for the grammar grades.

125. WOODWORKING I FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking for Grammar Grades (Shop 120.) Mr. Parker and Mr. Aiman.

In this continuation of Woodworking for Grammar Grades, problems suitable for students in the high schools are given. Special attention is given to the study of woods and methods of finishing them, as well as to the use and care of tools.

130. WOODWORKING II FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking I for High Schools (Shop 125). Mr. Parker and Mr. Aiman.

This is a continuation of Woodworking I for High Schools, with advanced work in cabinet construction by the use of woodworking machinery, and such bench work as necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper use may be made of time. Assignments are given which cover woodworking machinery, tools, and sharpening, and the drawing up of sketches for a completely equipped woodworking shop.

135. WOODTURNING. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking II for High Schools (Shop 130). Mr. Parker.

This work is such as will give the student a thorough training in handling a lathe and turning tools. Those taking this work are expected to arrange their assignments so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This training will be found valuable to those who have had no teaching experience.

140. ADVANCED WOODWORK. Elective, first semester. Laboratory, six hours, supplemented by lectures. Two semester credits. Prerequisite: Woodwork (Shop 101). Mr. Parker and Mr. Aiman.

Bench and machine work in making some of the most common building details, such as porch newels and rails, and plain and fancy molding cornices, is given. The lecture work consists of a detailed study of the wood finishes, tools, and machines used in building construction.

141. FARM SHOP PRACTICE. Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes act. The course consists of blacksmithing closely related to farm work, babbitting, soldering, belt lacing, thread cutting with band dies and taps, drilling, and drill grinding.

145. PATTERN MAKING. Junior and senior years, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Mr. Parker and Mr. Aiman.

A series of exercises is given embodying the principles governing the construction of plain and split patterns, including core prints and core boxes, after which practical patterns are made of machine parts.

146. FARM WOODWORK. Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar building operations on full-size construction work. Bills of material will be made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. FORGING I. Freshman year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Lynch and Mr. Granell.

This course in the forging of iron and steel is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching, and the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers, a center punch, and ball pein hammer weighing with handle about two pounds.

155. FORGING II. Sophomore year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Forging I (Shop 150). Mr. Lynch and Mr. Granell.

Advanced work in the forging of iron and in the manufacture of steel tools is given, including instruction in hardening, tempering, casehardening, and annealing, heat treating, and testing of tool steels. Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE.** Sophomore year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Grant. Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

165. **METALLURGY.** Sophomore year, both semesters. Lectures and recitations, two hours. Two semester credits. Professor Carlson and Mr. Sellers.

This course deals with the manufacture and use of iron, steel, copper, and their alloys, as well as their proper selection and use in the manufacturing industries.

170. **MACHINE TOOL WORK I.** Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Foundry Practice (Shop 160). Mr. Sellers, Mr. Jones, and Mr. Bundy.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Tools required: A four-inch scale, or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gauge.

180. **ADVANCED PATTERN MAKING.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Pattern Making (Shop 145). Professor Carlson and Mr. Parker.

This is a continuation of Pattern Making, with more advanced work, including match-board work, patterns for molding machines, and general pattern work.

183. **ADVANCED FOUNDRY PRACTICE.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Professor Carlson and Mr. Grant.

This is a continuation of Foundry Practice, including green and dry sand and loam molding. A study is also made of the different mixtures of iron, of handling the cupola and brass furnace, of difficult molding and core work, and of making steel castings.

186. **FORGING III.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging II (Shop 155). Mr. Lynch and Mr. Granell.

More advanced work is given in the working of iron and steel and in studying the effect of the different heat treatments upon steel. Opportunity will be given for work with the oxyacetylene and thermit processes of welding.

189. **FORGING IV.** Elective both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging III (Shop 215). Professor Carlson and Mr. Lynch.

Opportunity is offered for work in steel and iron, oxyacetylene welding, steam hammer work, drop forge work, and other lines, depending upon the object in view and the previous training of the student.

192. **MACHINE TOOL WORK II.** Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Machine Tool Work I (Shop 170). Mr. Sellers, Mr. Jones, and Mr. Bundy.

Progressive problems are given in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe with exercises in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges and tool adjustments best suited to the different metals, and of cutting speeds and feeds. Tools required: same as for Machine Tool Work I.

193. **MACHINE TOOL WORK III.** Senior year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequi-

site: Machine Tool Work II (Shop 225). Mr. Sellers, Mr. Jones, and Mr. Bundy.

This course takes up work on the turret lathe, boring mill and grinder. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, of belts, lacings, and other methods of belt connection, and of compound and differential indexing.

195. THESIS. Senior year, continuing through both semesters. Professor Carlson.

A thesis gives an opportunity for the student to work out problems of interest and value to himself under his own initiative, but subject to the supervision of the instructors. The shops have ample facilities for carrying on work of this character, of a constructive or investigative nature, and every possible aid is given those who select theses along this line.

FOR GRADUATES AND UNDERGRADUATES

235. MACHINE TOOL WORK IV. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 230). Mr. Sellers and Mr. Jones.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

240. MACHINE TOOL WORK V. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work IV (Shop 235). Mr. Sellers and Mr. Jones.

This course is devoted entirely to a systematic study to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops.

245, 250. FACTORY ENGINEERING. Senior year, first semester. Lectures and recitations, one hour; drafting-room, three hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Carlson.

This course deals with the problems of the factory executive, such as the selection, installation, and arrangement of direct and indirect equipment, the standardization of machines and tools, stock and store methods, production orders, routing and dispatching, time study and rate setting, instruction and operation cards, wage systems, cost systems, and the various factors that have to do with the design and control of factories.

255. FACTORY DESIGN. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisite: Factory Engineering (Shop 245, 250). Professor Carlson.

The knowledge gained in the shops and laboratories and in the course in factory engineering is used in the design of a complete factory.

260. ADVANCED SHOP PRACTICE. Elective, first semester. Laboratory, nine hours. Three semester credits. Professor Carlson and assistants.

Opportunity is offered those having the necessary preliminary training to specialize to a limited degree along certain lines of Shop Practice, such as the heat treatment of steel, oxyacetylene welding, jig and die work, cutting speeds and feeds, shop management, and systems.

265. SHOP-PRACTICE RESEARCH. Elective, both semesters. Laboratory, nine hours. Three semester credits. Professor Carlson and Mr. Sellers.

Those who wish to investigate some phase of shop-practice work in which they are greatly interested are given opportunity to do so. The wonderful improvements in the methods of present-day production amply justify investigative work along this line, and every possible aid will be accorded those wishing to take this work.

Steam and Gas Engineering

Professor POTTER
 Professor CALDERWOOD, in charge
 Instructor MACK

Instructor HOBBS
 Assistant _____

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting-room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for the boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, chain-gate, and side-feed stokers; three high-pressure water-tube boilers, one being equipped with a Roney stoker and the others with under-feed stokers. Besides the high-pressure boilers there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains fourteen steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves; also a uniflow engine. These engines range in power from 6 to 250 horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Three ammonia refrigerating machines are available for laboratory work only and a fourth refrigerating machine, which serves the College, is also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal-testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Foos gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas, and with light and heavy liquid fuels. Besides the Foos experimental engine, the gas engine laboratory includes many different sizes and makes of gas and oil engines.

A Westinghouse air-pump, a complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Junkers and a Sargeant gas calorimeter, apparatus for approximate analysis of fuels, oil-testing equipment, a bearing tester, several different types of pyrometers, a variety of gas-engine indicators, Venturi and Pitot tubes.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

101. STEAM AND GAS ENGINEERING I RECITATION. Junior and senior years, first semester. Lectures and recitations, four hours. Four semester credits. Prerequisites: Kinematics (Ap. Mech. 180) and Calculus II (Math 116). Professor Calderwood.

A study of heat power engineering, including steam engines and valve gears; the thermodynamics of gases and vapors; gas and vapor cycles. Texts: Furman's *Valve Gears*, Vol. I, and Hirshfeld and Barnard's *Heat Power Engineering*.

105. STEAM AND GAS ENGINEERING I LABORATORY. Junior and senior years, first semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering I Recitation. Professor Calderwood, Mr. Mack, and Mr. Hobbs.

The study and calibration of steam gauges, indicators, and planimeters; valve-setting and steam-engine operations; study of calorimeters, flow meters, and feed-water heaters; determination of the indicated and brake horsepower, mechanical efficiency, and the steam consumption of high-speed automatic cut-off, Corliss, simple and compound engines; tests of DeLaval, Kerr and Terry steam turbines are included in this course. Text: Carpenter and Diederichs' *Experimental Engineering* is used in this and subsequent laboratory courses.

110. STEAM AND GAS ENGINEERING II RECITATION. Junior and senior years, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering I. Professor Potter and Professor Calderwood.

This is a continuation of the study of heat-power engineering, including steam turbines; internal-combustion engines; fuels and combustion; boilers and boiler auxiliaries; gas producers; natural and artificial gas; condensers, evaporators; compressed-air and refrigerating machinery. Text: Hirshfeld and Barnard's *Heat-power Engineering*.

115. STEAM AND GAS ENGINEERING II LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering II Recitation. Professor Calderwood and Mr. Mack.

This course involves the approximate analysis of coal; determination of the calorific values of solid, liquid, and gaseous fuels; evaporative tests of steam boilers; testing of internal-combustion engines, including a study of the various auxiliaries for gas and oil engines; tests of compressed-air and refrigerating machinery.

120. STEAM AND GAS ENGINEERING C RECITATION. Junior and senior years, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Engineering Physics (Physics 212) and Calculus II (Math. 116). Mr. Mack.

A descriptive study is made of steam boilers, steam engines, steam turbines, gas and oil engines, including the various auxiliaries. Text: Allen and Bursley's *Heat Engines*.

125. STEAM AND GAS ENGINEERING C LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering C Recitation. Mr. Mack and Mr. Hobbs.

The study and calibration of steam gauges, indicators, and planimeters; calorimeters; evaporative tests of steam boilers; determination of the heating value of liquid and gaseous fuels; tests of steam engines; valve setting; tests of steam turbines; tests of internal-combustion engines; operation and testing of refrigerating machines are involved in this course.

130. ELEMENTS OF STEAM AND GAS POWER. Freshman year, both semesters. Lectures, recitations, and laboratory, six hours. Two semester credits. Professor Potter, Professor Calderwood, Mr. Mack, and Mr. Hobbs.

An elementary study is made of steam engines, steam turbines, steam boilers, steam power-plant auxiliaries, gas and oil engines, natural and manufactured gas, gas power-plant auxiliaries, and elements of automotive engineering. Text: Potter and Calderwood's *Elements of Heat-power Engineering*.

170. DAIRY REFRIGERATION RECITATION. Elective, first semester. Lectures and recitations, one hour. One semester credit. Mr. Hobbs.

The elementary theory and principles of operation of various refrigerating and ice-making machinery and of cold storage, with special reference to the dairy industry, are considered.

175. DAIRY REFRIGERATION LABORATORY. Elective, first semester. Laboratory work, three hours. One semester credit. Mr. Hobbs.

Study and operation of various types of refrigeration systems; steam-engine operation, and testing of refrigeration machines.

195. THESIS. Senior year, continuing through both semesters. Professor Potter and Professor Calderwood.

The laboratories of the department are well furnished with apparatus suitable for experimental and research work in the field of heat-power engineering. The subject of the investigation should be selected in consultation with the head of the department at the beginning of the first semester.

FOR GRADUATES AND UNDERGRADUATES

206. POWER-PLANT ENGINEERING. Senior year, first semester. Laboratory, nine hours. Three semester credits. Professor Potter, Professor Calderwood, and Mr. Mack.

One-half of the semester is devoted to complete power-plant testing; special investigations of steam-engine performance; operation of gas

producers, and advanced laboratory work on internal-combustion engines. The remainder of the time is spent in designing a complete power plant.

210. REFRIGERATION, HEATING, AND VENTILATION RECITATION. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Professor Calderwood.

This course is planned to acquaint the student with the fundamental principles of refrigerating systems, and the application of refrigeration to ice making, cold storage, and the cooling of air, liquids, and solids; also the fundamental principles of heating and ventilation, including the direct and indirect systems, hot-air, hot-water and steam systems of heating. Text: Hoffman's *Heating and Ventilation* and notes on refrigeration.

215. REFRIGERATION, HEATING, AND VENTILATION LABORATORY. Senior year, second semester. Laboratory, three hours. One semester credit. Taken with Refrigeration, Heating and Ventilation Recitation. Professor Calderwood and Mr. Mack.

The laboratory work will include tests of refrigerating machinery and of the thermal conductivity of insulating materials; tests on fans and blowers, radiators and house-heating boilers. The remainder of the time will be devoted to the design of heating and ventilating systems for buildings.

FOR GRADUATES

301. ADVANCED THERMODYNAMICS. Elective, first or second semester. Lectures and recitations, two hours. Two semester credits. Professor Calderwood.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations along thermodynamic lines.

305. ENGINEERING RESEARCH. Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Potter, Professor Calderwood, and Mr. Mack.

The laboratory work is correlated with the work of the Engineering Experiment Station. Investigations on lubricants, fuels, combustion, internal-combustion engines, steam engines, steam turbines, steam boilers, gas producers, refrigeration, heat insulating materials, heating and ventilation, compressed air and similar subjects are carried on.

Engineering in the Summer School

In order to encourage the introduction of manual training and industrial drawing in the common schools and high schools of the State, and to improve the quality of work now being given, the College offers summer courses in mechanical drawing, manual training and shop practice for high-school and grade teachers.

In addition various courses required in the several engineering curricula are offered in the Summer School. This enables teachers who wish to take an engineering curriculum to get a considerable start on the work during their summer vacations, and also enables College students who are irregular to make up their back courses.

For full information in regard to the courses offered, see the section of this catalogue devoted to the Summer School. A special circular giving details concerning the Summer School may be had upon application to the Vice President of the College.

Special Courses Related to Engineering

Special short courses dealing with automobile repair, tractor operation, carpentry, machine-shop work, foundry practice, blacksmithing, telegraphy, radio-telegraphy, and electrical repair work are grouped with other special courses in another part of this catalogue, and are there described in detail. Reference should be made to the general index in the back of this book. A special circular describing this work may be had on application to the Vice President of the College.

Division of Home Economics

HELEN BISHOP THOMPSON, *Dean*

Modern research in the sciences and present-day development of the industries, arts, and professions have brought a recognition of the value of technical training as a part of the preparation for life's work. An educational plan which combines industrial, technical, and scientific subjects with the older general studies results to the student in the power to express, in everyday activities, the knowledge acquired in the classroom. It increases the capacity for productive work and develops the desire to realize in practical form the theories and principles studied. The aim of a collegiate course in home economics is not merely to increase the student's stock of information, but to stimulate interest in continued study or research, to train in accuracy in detail, to teach discrimination with regard to criteria by which to interpret results of work, and to cultivate an attitude of economic and social responsibility.

The course as outlined below is arranged to meet the needs of the following groups of students: those who wish to teach, those who wish to enter graduate courses leading to technical or professional work, and those who wish to apply their knowledge to various problems of home life or in fields of industry and social service in which an understanding of home-economics subjects is essential to intelligent action. While emphasis is laid on the material and practical side of life, the training does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year curriculum, leading to the degree of bachelor of science.

A three-year curriculum, in the School of Agriculture.

A one-year curriculum in lunch-room management, for which a certificate is granted.

A housekeepers' course, about fifteen weeks in length, for which a certificate of proficiency is granted.

CURRICULUM IN HOME ECONOMICS

The training in the four-year curriculum is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, sociology, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and studies of general interest. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for students to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year curriculum is recommended for all who desire to teach home economics, or to undertake any phase of institutional work.

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 home economics, as dietitians, or as professional housekeepers.

Curriculum in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
Design or Design A	Household Physics
Ap. Art 101 or 106 3(1-6)	Physics 101 4(3-3)
Foods I	Clothing I
Food and Nut. 101 3(1-6) or	Clo. and Text. 101 2(1-3) or
Elem. Hygiene and Home Nursing*	House Furnishings*
Hshld. Econ. 103 3(3-0)	Ap. Art 108 2(1-3)
Library Methods	Costume Design
Lib. Ec. 101 1(1-0)	Clo. and Text. 106 2(0-6)
Current History	Physical Education W-II
Hist. 126 1(1-0)	Phys. Ed. 152A 1(0-3)
Physical Education W-I	
Phys. Ed. 151A 1(0-3)	

* The substitution of these courses for the courses in Foods I and Clothing I must first have the approval of the Dean of the Division.

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Organic Chemistry HE		Foods II	
Chem. 121	5(3-6)	Food and Nut. 106.....	5(3-6)
English Literature HE-I		English Literature HE-II	
Engl. 177	3(3-0)	Engl. 180	3(3-0)
General Zoölogy		Embryology and Physiology	
Zoöl. 105	5(3-6)	Zoöl. 108	5(3-6)
Clothing II		Gardening	
Clo. and Text. 111.....	3(1-6)	Hort. 122	3(3-0)
Physical Education W-III		Physical Education W-IV	
Phys. Ed. 153.....	1(0-3)	Phys. Ed. 154.....	1(0-3)

JUNIOR

FIRST SEMESTER		SECOND SEMESTER	
German I*		German II*	
Mod. Lang. 101.....	3(3-0) or	Mod. Lang. 102.....	3(3-0) or
French I*		French II*	
Mod. Lang. 151.....	3(3-0)	Mod. Lang. 152.....	3(3-0)
Human Nutrition		Household Management	
Food and Nut. 112.....	3(3-0)	Hshld. Econ. 106.....	2(2-0)
Household Microbiology		Textiles	
Bact. 121	5(3-6)	Clo. and Text. 116.....	3(2-3)
Economics		Psychology	
Econ. 101	3(3-0)	Educ. 101	3(3-0)
Elective	3(-)	Elective	6(-)

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
German Readings		American Government	
Mod. Lang. 111.....	3(3-0) or	Hist. 151	3(3-0)
French Readings		Sanitation and Public Health	
Mod. Lang. 161.....	3(3-0)	Hshld. Econ. 211.....	3(3-0)
American History		Elective	11(-)
Hist. 101	3(3-0)		
Dietetics			
Food and Nut. 201.....	5(3-6)		
Elective	6(-)		

Groups of Electives for Students in the Division of Home Economics

The groups given below are selected with a view to training students for the vocations in which home economics may be directly applied.

A sufficient number of hours may be chosen from any group to fill the elective requirement, or a smaller number of hours may be taken from a group and, for the remaining elective hours, advanced courses of related subject matter may be chosen.

Music may be added to any group.

* Students who have offered French or German for entrance should take advanced courses in modern language, the courses which they take depending upon their preparation. Students who under these circumstances take less than nine semester credits in modern language are required to take additional elective hours, so that their total requirement is the same as for other students.

Advertising, Buying, and Salesmanship

FIRST SEMESTER	SECOND SEMESTER
Design A	Principles of Advertising
App. Art 106..... 3(1-6)	Ind. Jour. 125..... 3(3-0)
Clothing Salesmanship	Advertising English
Clo. and Text. 130..... 2(2-0)	Engl. 125..... 3(3-0)
Business English	Applied Psychology
Engl. 122..... 3(3-0)	Educ. 215..... 2(2-0)
Oral English I	Accounting Practice
Engl. 128..... 3(3-0)	Math. 134..... 3(3-0)
Industrial Feature Writing	Business Management
Ind. Jour. 123..... 2(2-0)	Econ. 126..... 2(2-0)
Technical Writing	
Engl. 207..... 2(2-0)	

Certificate Requirements for Vocational Home Economics Teaching

Educ. Administration I	Educ. Psychology
Educ. 105..... 3(3-0)	Educ. 109..... 3(3-0) or
Educ. Electives..... 3(3-0)	Educ. Sociology I
Electives in Home Economics or	Educ. 118..... 3(3-0)
Modern Language..... 3(3-0)	Special Methods in Teaching of
	Home Economics
	Educ. 132..... 3(3-0)
	Practice Course in Household
	Management
	Hshld. Econ. 116..... 3(0-9)
	Supervised Observation and
	Teaching in Home Economics
	Educ. 160..... 3()
	Problems in Child Welfare
	Hshld. Econ. 201..... 3(3-0)
	Electives in Home Economics, 2(2-0)

Clothing and Textile Work

Household Entomology	Principles of Art and their
Ent. 106..... 2(2-0)	Application
Modern Problems of the	Ap. Art 124..... 3(3-0)
Household	Labor Problems
Hshld. Econ. 236..... 2(2-0)	Econ. 111..... 2(2-0)
Clothing Salesmanship	European Industrial History
Clo. and Text. 130..... 2(2-0)	Hist. 224..... 3(3-0)
Problems in Hygiene of	Clothing Economics
Clothing I	Clo. and Text. 236..... 2 to 4
Clo. and Text. 240..... 2 to 4	Problems in Hygiene of
American Industrial History	Clothing II
Hist. 105..... 3(3-0)	Clo. and Text. 244..... 2 to 4
	Social Problems
	Econ. 257..... 2(2-0)

Designing and Decorating

Freehand Drawing I	Freehand Drawing II
Arch. 111..... 2(0-6)	Arch. 114..... 2(0-6)
Woodwork I	Woodwork II
Shop 105..... 1(0-3)	Shop 110..... 1(0-3)
Photography	Principles of Art and their
Physics 120..... 2(1-3)	Application
Landscape Gardening I	Ap. Art 124..... 3(3-0)
Hort. 125..... 2(0-6)	Landscape Gardening II
Principles of Topography I	Hort. 301..... 3(0-9)
Ind. Jour. 101..... 3(2-3)	Principles of Topography II
	Ind. Jour. 104..... 3(2-3)
	Handicraft
	Ap. Art 112..... 2(0-6)
	Interior Decoration and
	Furnishing
	Ap. Art 114..... 3(1-6)
	The Arts and Crafts Movement
	Engl. 295..... 3(3-0)

Food and Nutrition.

(Research; Hospital Dietetics; Public Health Work; Specialized Teaching)

Physical Chemistry Chem. 206 5(3-6)	Physiological Chemistry Chem. 231 5(3-6)
Microchemical Methods of Analysis Chem. 245 1(0-3)	Biochemical Preparation Chem. 234 5(0-15)
Anatomy and Physiology Anat. 131 3(2-3)	Quantitative Analysis Chem. 241 5(1-12)
Hygienic Bacteriology Bact. 206 4(2-6)	Food Analysis Chem. 257 3(0-9)
Investigations in Food Economics and Nutrition I Food and Nut. 246 2 to 4	Household Chemistry Chem. 265 3(1-6)
Food Economics and Nutrition Seminar I Food and Nut. 251 2(2-0)	Histology I Path. 101 3(1-6)

Homemaking

Problems in Child Welfare Hshld. Econ. 201 3(3-0)	Interior Decoration and Furnishing Ap. Art 114 3(1-6)
Hygiene and Home Nursing Hshld. Econ. 209 3(3-0)	Principles of Art and their Application Ap. Art 124 3(3-0)
Modern Problems of the Household Hshld. Econ. 236 2(2-0)	History of the Home Hist. 225 3(3-0)
Household Entomology Ent. 106 2(2-0)	Household Chemistry Chem. 265 3(1-6)
Sociology Econ. 151 3(3-0)	Pathology of Vegetable Food Products Bot. 121 3(1-6)
	Rural Sociology Econ. 156 3(3-0)
	Community Problems Econ. 260 1(1-0)
	Clothing III Clo. and Text. 124 3(1-6)

Homemaking

(Special Rural Problems)

Poultry Bacteriology Bact. 216 3(1-6)	Plant Propagation Hort. 101 3(2-3)
Rural Sociology Econ. 156 3(3-0)	Orcharding Hort. 107 2(1-3)
Hygiene and Home Nursing Hshld. Econ. 209 3(3-0)	Small Fruits Hort. 110 2(2-0)
Rural Organization Educ. 222 2(2-0)	Market Gardening Hort. 210 3(2-3)
Rural Leadership Educ. 224 1(1-0)	Home Dairying Dairy Husb. 112 1½(2-3)
	Home Poultrying Poult. Husb. 102 1½(3-0)
	Dairy Bacteriology Bact. 211 3(1-6)
	Apiculture Ent. 111 3(2-3)
	Farm Sanitation and Water Supply Farm Eng. 119 2(2-0)

Institutional Management

Institutional Management I Hshld. Econ. 221..... 3(1-6)	Institutional Management II Hshld. Econ. 226..... 4(3-3)
Business English Engl. 122 3(3-0)	Special Problems in Institutional Administration Hshld. Econ. 246..... 2 to 5
Oral English I Engl. 128 3(3-0)	Institutional Furnishings Ap. Art 203..... 3(1-6)
Business Management Econ. 126 2(2-0)	Institutional Accounting Math. 131 3(3-0)
Technical Writing Engl. 207 2(2-0)	Advertising English Engl. 125 3(3-0)
	Applied Psychology Educ. 215 2(2-0)
	Labor Problems Econ. 111 2(2-0)

Lecturing and Demonstrating

Oral English I Engl. 128 3(3-0)	Oral English II Engl. 131 3(3-0)
Public Speaking I Pub. Spk. 101..... 2(2-0)	Public Speaking II Pub. Spk. 102..... 2(2-0)
Extempore Speech I Pub. Spk. 106..... 2(2-0)	Extempore Speech II Pub. Spk. 108..... 2(2-0)
Sociology Econ. 151 3(3-0)	Applied Psychology Educ. 215 2(2-0)
Technical Writing Engl. 207 2(2-0)	Rural Sociology Econ. 156 3(3-0)
	Community Problems Econ. 260 1(1-0)

Sanitary Science; Food and Market Inspection

Hygienic Bacteriology Bact. 206 4(2-6)	Dairy Chemistry Chem. 254 3(1-6)
Quantitative Analysis I Chem. 150 2(0-6)	Chemistry of Meats Chem. 255 3(1-6)
	Food Analysis Chem. 257 3(0-9)
	Pathogenic Bacteriology I Bact. 111 4(2-6)
	Water Purification and Sewage Disposal Bact. 221 3(1-6)
	Pathology of Vegetable Food Products Bot. 121 3(1-4, 2)
	Meat Inspection Path. 216 2(2-0)

Social Welfare Work

Problems in Child Welfare Hshld. Econ. 201..... 3(3-0)	Labor Problems Econ. 111 2(2-0)
Hygiene and Home Nursing Hshld. Econ. 209..... 3(3-0)	Current Economic Problems Econ. 225 2(2-0)
Modern Problems of the Household Hshld. Econ. 236..... 2(2-0)	Rural Sociology Econ. 156 3(3-0)
Investigation in Household Economics Hshld. Econ. 241..... 2 to 5	Social Problems Econ. 257 2(2-0)
Sociology Econ. 151 3(3-0)	Community Problems Econ. 260 1(1-0)
Pan-America Hist. 207 2(2-0)	Modern Europe Hist. 223 3(3-0)
Rural Organization Educ. 222 2(2-0)	Immigration and International Relations Hist. 228 2(2-0)
Rural Leadership Educ. 224 1(1-0)	Investigation in Household Economics Hshld. Econ. 241..... 2 to 5
	Investigation in Child Welfare Hshld. Econ. 251..... 2 to 5

State Certificate Requirements for General Teaching

Educational Administration I Educ. 105	3(3-0)	Educational Psychology Educ. 109	3(3-0)
		Educational Sociology Educ. 118	3(3-0)
Additional Educational Courses.....		9(9-0)	

(NOTE.—Home Economics Education (2 hrs.) and Special Methods in the Teaching of Home Economics (3 hrs.) should be included by students who wish to teach home economics. Modern Europe or Advanced English should be added by those expecting to teach these subjects. Additional courses may be chosen in the line of the student's interests.)

Applied Art

Professor HOLMAN
Instructor AVERILL¹

Instructor SHELL²
Assistant EVERHARDY

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound, because we have not trained our eyes as we have our ears. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace. Each course consists of lectures, studio laboratory work, field observation work, and reading.

COURSES IN APPLIED ART

FOR UNDERGRADUATES

101. DESIGN. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. Professor Holman and Miss Averill.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function and form.

106. DESIGN A. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. To be taken as a substitute for Design by students who have had color and design work in high school. Professor Holman and Miss Averill.

A further study is made of harmonies, adaptation of natural motifs, and design as applied to fabrics and other materials. Art masterpieces and articles of common use are studied according to the principles of design and color.

108. HOUSE FURNISHINGS Freshman year, second semester. Class work, one hour; studio, three hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Design is the selection and arrangement of materials for the making of useful and beautiful things. The decorative phase of design is studied in the solving of problems which occur in the furnishings of the house.

1. Absent on leave, November 1, 1919, to May 31, 1920.
2. Temporary appointment, November 1, 1919, to May 31, 1920.

112. **HANDICRAFT.** Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Miss Averill.

Both constructive and decorative designs are studied in handicraft work. Original designs are carried out in the following mediums: leather, clay, metal, reeds, and other materials.

114. **INTERIOR DECORATION AND FURNISHING.** Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

116. **INSTITUTIONAL FURNISHINGS.** Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A study is made of the fundamental principles of design, including color, form, and arrangement. These principles are applied to problems involving the selection and use of the following: wall, floors, furniture, finishes, coverings, linen, china, and silver.

120. **SKETCHING.** Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design or Design A. Professor Holman.

Objects are sketched singly and in groups in the studio and out of doors. The media employed are pencil, charcoal, and brush. The aim is to train the student to see forms in perspective and to represent them with sufficient accuracy to apply in illustrating the more practical problems in the other courses in the department.

124. **PRINCIPLES OF ART AND THEIR APPLICATION.** Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A general survey is made of art periods as an index to what the art quality is. An examination is made of the religious, political, and social aspects of art expression. Architecture, furniture, textiles, sculpture, pictures, and the lesser art objects are compared as to their art quality. The modern fields of landscape, architecture, furnishings, clothing, advertising, etc., are surveyed. The principles controlling art expression are applied to these modern fields of life.

Clothing and Textiles

Professor BIRDSALL
Associate Professor COWLES
Instructor FECHT
Instructor McDONALD

Instructor HARRISON
Instructor HUNT
Assistant WORCESTER

The object of the instruction in clothing and textiles is to give young women a practical knowledge of the selection of materials, of the growing of textile fibers, and of the processes used in their manufacture into fabrics. The course also includes problems in garment construction, the history of typical forms in dress, costume design and individualization, the selection, care, and renovation of factory-made garments, clothing budgets, the economic and sociological phases of the clothing industries.

COURSES IN CLOTHING AND TEXTILES

FOR UNDERGRADUATES

101. CLOTHING I. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Associate Professor Cowles, Miss McDonald, Miss Harrison, and Miss Worcester.

It is the purpose of this course to train the student in the handling of sewing equipment and in efficient methods of work. Attention is given to the taking of measurements, development of patterns, and the adaptation of commercial patterns to individual characteristics in form. The kinds, qualities, and quantities of material suitable for making different garments are discussed.

Laboratory.—Construction of unlined garments; millinery; remodeling and repairing of worn clothing. Labor-saving methods and rapid construction are emphasized. Time studies and speed tests are required.

106. COSTUME DESIGN. Freshman year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Design (Ap. Art 101) or Design A (Ap. Art 106). Miss Hunt.

This course treats of art in dress and comprises the application of the principles of color, harmony and design; individual requirements in color and line; comparative design of ancient and modern costumes; original problems in designs for embroidering; sketching of costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments.

111. CLOTHING II. Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Cowles, Miss Harrison, Miss McDonald, and Miss Worcester.

This course considers the manufacture and selection of clothing; clothing industries and clothing standards in their relation to the economic and social life of the community; comparison of home- and factory-made garments; hygienic factors involved in clothing; standardization of dress, its advantages and disadvantages; clothing budgets for individuals and family groups.

Laboratory.—The laboratory consists of group work in making entire outfits of clothing for individuals of different ages or the planning and making of the garments required in the wardrobe of a family.

116. TEXTILES. Junior year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the historical and economic development of the textile industry, from primitive ages to the present time. The combination of art, science, and mechanics that makes possible the elaborateness of modern textiles is given careful attention.

Laboratory.—The behavior of textile fibers toward various chemical reagents is studied. Physical and microscopic tests are made for the identification of fibers. Bleaching and dyeing; laundry processes as they affect color, shrinkage, strength, etc.; and analysis of mixed goods are likewise considered in the laboratory work.

120. CLOTHING LABORATORY TECHNIQUE. Elective, both semesters. Laboratory, three hours. One semester credit. To accompany Educ. 132. Professor Birdsall.

This course is offered to all students preparing to teach clothing and textiles in grade and high school. The course has as its aim the development of technique and the making of illustrative material for use in the teaching of these courses.

124. CLOTHING III. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Clothing I and Costume Design. Miss Harrison and Miss McDonald.

The development of costume, including a survey of the ancient Egyptian, Grecian, Roman, and early modern French costumes and present-day modes, is treated historically.

Laboratory.—The laboratory deals with the adaptation of materials to the individual and aims to teach self expression through dress. Students are expected to execute original designs in materials approved by the instructor. Those who so desire may devote one laboratory period each week, or both, to the design and construction of millinery.

130. CLOTHING SALESMANSHIP. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Clothing II. Miss Hunt.

This course provides instruction to those who wish to prepare themselves for positions as educational or departmental directors in large stores, service managers in factories, or teachers of salesmanship. Actual practice in department stores followed by reports and conferences; study of department systems and policy, based on observation, together with a certain amount of practical experience, is required of all students.

FOR GRADUATES AND UNDERGRADUATES

236. CLOTHING ECONOMICS. Elective, both semesters. From two to four semester credits, depending upon the work done. Prerequisites: Textiles and General Economics. Associate Professor Cowles.

This course includes a study of the organization of the clothing trades and industries; of wholesale and retail clothing markets; of wages and standards of efficiency in workmanship; conditions of work in the textile and clothing industries; standardization of fabrics; study of the budget for clothing and household textiles. Topics are assigned for reading and investigation and written reports are required.

240. PROBLEMS IN HYGIENE OF CLOTHING I. Elective, first semester. From two to four semester credits. Prerequisites: Clothing II, Embryology and Physiology, and Microbiology. Associate Professor Cowles.

Students are assigned special problems for investigation of clothing in relation to health and its effect upon anatomical form, muscular development, and physiological functions.

244. PROBLEMS IN HYGIENE OF CLOTHING II. Elective, second semester. From two to four semester credits. Prerequisite: Problems in Hygiene of Clothing I or its equivalent.

This course may be taken as a continuation of Course 240, or may be elected independently by students in Sanitation and Public Health or General Physiology.

Food Economics and Nutrition

Professor BOGERT
Associate Professor ROTHERMEL
Assistant Professor PITTMAN
Instructor SKINNER¹
Instructor GREEN²
Instructor PERRY

Instructor ROUSE³
Instructor OTTO³
Assistant TRAIL
Assistant WILLIAMS
Fellow THOMAS

Food is one of the determining factors in the health of the individual and of the family. The selection of wholesome and economical food requires the constant application of chemistry and of sanitary science. The preparation and preservation of food involve processes dependent upon physics, chemistry, and bacteriology. In the modern science of nutrition and dietetics, the student learns the chemical and physiological principles involved in the nutritive processes of the body and the quanti-

1. Absent on leave, first semester, 1919-'20.
2. Absent on leave, 1919-'20.
3. Temporary appointment.

tative application of these principles in planning food for the individual and the group. Science, applied science, and practice are presented in their proper relations in order to train the student in fundamental principles and to enable her to gain by experience methods of translating these principles into her everyday household practices. Advanced courses in this department provide for vocational and professional positions.

COURSES IN FOOD ECONOMICS AND NUTRITION

FOR UNDERGRADUATES

101. FOODS I. Freshman year, both semesters. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: entrance credit in Physics; parallel, Chemistry I. Miss Skinner, Miss Otto, and Miss Thomas.

The application of heat to various food principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized, as is also the study of commercially prepared food products.

Laboratory—Experimental and practical cookery, illustrating this course, forms the basis of the laboratory work.

106. FOODS II. Sophomore year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Organic Chemistry, Foods I or its equivalent. Assistant Professor Pittman, Miss Williams, and Miss Trail.

This course emphasizes the classification, composition, occurrence, and general properties of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Recipes are compiled. Practice is given in judging food preparations.

112. HUMAN NUTRITION. Junior year, both semesters. Lectures and recitations, three hours. Three semester credits. Prerequisites: Organic Chemistry, Embryology and Physiology, and Foods II.* Dean Thompson and Professor Bogert.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

FOR GRADUATES AND UNDERGRADUATES

201. DIETETICS. Senior year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Human Nutrition. Associate Professor Rothermel and Miss Perry.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: daily food requirements in health and in disease throughout infancy, childhood, adolescence, adult life, and old age; typical dietaries for each period of life; milk formulæ; the problem of satisfying the diverse requirements in families and other groups.

* Students from other divisions desiring to elect Human Nutrition may substitute an equivalent number of hours in other sciences for Embryology and Physiology, and Foods II.

Laboratory.—Studies in weight measures and cost of some of the common food materials; calculations and quantitative preparation of standard portions and combinations of foods; analyses of recipes; computation and scoring of dietaries with special regard to nutritive requirements for varying physiologic, economic, and social conditions; practice in marketing and serving, comprise the work in the laboratory. (Graduate students are required to do an assigned problem in place of the practice in marketing and serving included in the laboratory for undergraduates.)

241. SPECIAL INVESTIGATIONS IN FOODS I. Elective, first semester. From one to three semester credits. Hours to be arranged. Prerequisite: Human Nutrition. Assistant Professor Pittman.

Special problems are assigned to students for individual consideration.

242. SPECIAL INVESTIGATIONS IN FOODS II. Elective, second semester. From one to three semester credits. Hours to be arranged. Prerequisite: Human Nutrition. Assistant Professor Pittman.

This course may be taken as a continuation of Course 241 or may be elected independently.

246. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION I. Elective, first semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment; dietary studies; or practice in the methods commonly used in the simpler experiments in nutrition.

247. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION II. Elective, second semester. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson and Professor Bogert.

This course may be taken as a continuation of course 246 or may be elected independently.

251. FOOD ECONOMICS AND NUTRITION SEMINAR I. Elective, first semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Dean Thompson and Professor Bogert.

This is a course of assigned reading and discussion of topics in the fields of food economics and nutrition. Special attention is given to recent literature, which bears upon problems in dietetics, in both normal and pathological conditions; upon growth and upon normal and subnormal nutrition in infancy and childhood. Feeding experiments are compared and discussed. A reading knowledge of modern languages, while not a fixed requirement, is urged as of especial advantage in this course.

252. FOOD ECONOMICS AND NUTRITION SEMINAR II. Elective, second semester. Class work, two hours. One or two semester credits. Prerequisite: Human Nutrition. Dean Thompson and Professor Bogert.

This course may be taken as a continuation of course 251 or may be elected independently.

Household Economics

Professor KNEELAND
Associate Professor REYNOLDS*
Instructor MCCOY
Instructor WARD

Instructor FORD†
Assistant BALDWIN
Fellow ANDERSON

The successful administration of the home, whether it be for the family or for the larger institutional group, depends upon the wise expenditure of time, money, and effort, the maintenance of healthful and comfortable home conditions, and appreciation of the importance and relation of the home to the rest of society. The courses in this department, therefore, apply the principles of economics, sociology and sanitary science to the problems of household and institutional management, child welfare, and home nursing and sanitation.

Throughout the work, effort is made to develop the student's ability to carry into practice the principles of home making. Interest in community service and in industrial and social problems is stimulated. Students who plan to do executive work as directors of residence, institutional or lunch-room managers, visiting housekeepers, or hospital dietitians will find suitable electives in this department.

COURSES IN HOUSEHOLD ECONOMICS

FOR UNDERGRADUATES

103. ELEMENTARY HYGIENE AND HOME NURSING.‡ Freshman year, first semester. Class work, three hours. Three semester credits. Associate Professor Reynolds.

Emphasis is placed upon personal hygiene as a means of maintaining and improving health in the home. Practical methods of preventing disease and of dealing with accidents are investigated and demonstrated. Standards of health are studied and demonstrations are given in the home care of the sick and convalescent.

106. HOUSEHOLD MANAGEMENT. Junior year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Foods II. Recommended to precede or parallel: Economics. Professor Kneeland.

This course includes a study of the evolution of the home and its present functions and problems; the organization and simplification of housework through efficient methods of housekeeping and arrangement of equipment and through the use of labor-saving devices; problems of household service; experiments in coöperative laundering, cooking, cleaning, etc.; the expenditures of the household, and household budgets and accounts; the use of time freed from housework.

116. PRACTICE COURSE IN HOUSEHOLD MANAGEMENT. Elective, both semesters. Three semester credits. Prerequisite: Foods II. Recommended to precede or parallel: Household Management. Miss McCoy.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget, and keeping the accounts. Students who wish to qualify as teachers under the Smith-Hughes requirements for vocational high schools are required to take this course.

* Resigned, February 13, 1920.

† In charge of correspondence work in Household Economics, Home Study Service, Division of College Extension.

‡ This course may be taken in place of Foods I, with the approval of the Dean of the Division.

FOR GRADUATES AND UNDERGRADUATES

201. PROBLEMS IN CHILD WELFARE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisites: Physiology and Psychology. Professor Kneeland.

A study is made of the needs of the child and of the methods of meeting these needs through the care of the child in the home and through community child-welfare activities. The topics considered include the health problems of mother and child, child mentality and training, play and recreation, child labor, juvenile delinquency, and the special needs of defective and dependent children.

209. HYGIENE AND HOME NURSING. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisites: Human Physiology and Household Microbiology. Associate Professor Reynolds.

This course puts special emphasis on the prevention of disease and on the building up of the highest degree of health as the principal functions of the home nurse. The topics studied include the prevention and treatment of functional disturbances, the methods of controlling and nursing communicable diseases, the application of dietetic and serum therapy, the treatment of injuries and wounds, and the practical care of the sick. There are lectures, discussions, and demonstrations, and reference work and special reports are required.

211. SANITATION AND PUBLIC HEALTH. Senior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Household Microbiology. Associate Professor Reynolds.

This course deals with the household as a factor in health conservation, emphasis being placed upon the interrelation of home and community health. It includes a study of the influence upon health of the location, ventilation, heating, lighting, and water supply of the house; the sanitary disposal of sewage and other wastes; the sanitary care of the house; housing conditions and their control and improvement; public health activities and the methods and importance of public health administration in relation to the home. Reference work and special reports are required.

221. INSTITUTIONAL MANAGEMENT I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Human Nutrition.

This course deals with the food problem of institutions and includes the study of marketing, preparation of food, arrangement of menus, and cost of service for different types of institutions.

Laboratory.—Practical experience in the cafeteria of the department and investigations of the food problems of other institutions are included in the laboratory work.

226. INSTITUTIONAL MANAGEMENT II. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Institutional Management I.

This course includes a study of the various types of institutions; the qualifications and duties of the manager; the planning, equipping, and general care of buildings and rooms; the organization of work; the management of employees; institutional accounting; and office management.

Laboratory.—Experience is given in the cafeteria of the department, and special problems of other institutions are investigated.

236. MODERN PROBLEMS OF THE HOUSEHOLD. Elective, both semesters. Class work and conferences, two hours. Two semester credits. Prerequisite: Household Management. Prerequisite or parallel: Economics. Professor Kneeland.

A brief survey is made of the economic, social, and administrative problems of the modern household, in order to give the student a fuller

understanding of present home conditions and to show the significance of the special problems chosen for investigation. During the rest of the course each student investigates a special topic, reporting on her work to the class or the instructor. The investigation may consist of library work, field work, or experimentation on a problem of family expenditures, housing, household equipment, housekeeping methods and schedules, community conditions and activities related to the home, the use of time freed from housework, or family relationships.

241. INVESTIGATION IN HOUSEHOLD ECONOMICS. Elective, both semesters. From two to five semester credits, depending on the nature of the problem. Prerequisites: Modern Problems of the Household, and Economics. Consult Instructor. Professor Kneeland and Associate Professor Reynolds.

The work of this course may be a continuation of the investigation started in the preceding course, or the investigation of a new economic, social, or administrative problem of the household. Conferences are held and reports are made at hours arranged by appointment.

246. SPECIAL PROBLEMS IN INSTITUTIONAL ADMINISTRATION. Elective, second semester. From two to five semester credits, depending on the nature of the problem. Prerequisite or parallel: Institutional Management II, Dietetics, and Economics. Consult Instructor.

Special problems in the organization and management of institutions are assigned for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

251. INVESTIGATION IN CHILD WELFARE. Elective, second semester. From two to five semester credits, depending on the nature of the problem. Prerequisite: Problems in Child Welfare. Consult Instructor. Professor Kneeland.

A special problem in some phase of child welfare is assigned for individual investigation. Conferences are held and reports are made at hours arranged by appointment.

Home Economics in the Summer School

In addition to instruction in various branches of home economics available to teachers during the regular College year, the College offers several courses in this subject in the Summer School. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the Vice President of the College. See, also, the article on Summer School in this catalogue.

Special Courses in Home Economics

The Housekeepers' Course, which is completed in fifteen weeks or less and is given each semester, and the one-year curriculum in Lunch-room Management are to be found grouped and described with other special courses in another part of this catalogue. They may be found by reference to the general index in the back of this book.

Division of General Science

JULIUS TERRASS WILLARD, *Dean*

In the class of colleges to which this institution belongs the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the state and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among persons and activities, peoples and events with breadth of view and tolerance of attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic, scientific, cultural and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the more readily visible, and evidently important parts. These departments thus give unity to all of the four-year curricula, although presenting but few curricula that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

CURRICULUM IN GENERAL SCIENCE

The curriculum in general science includes fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some, instead of taking the technical subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual 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, agriculture, home economics, history, economics, English, journalism, music, professional educational subjects, and several other lines. (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 curriculum are to a considerable extent made up of studies required in one or more of the specialized curricula. They provide also, however, advanced work not included in other curricula. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the curriculum in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other curricula. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, approved by the Faculty or by the Dean of the Division of General Science, and in such manner as to give logical coherence to the curriculum as a whole. The elective portion of the curriculum, as thus made up, consists for the most part of several groups of two or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other curricula to that in general science receive credit for work done in the other curricula in so far as it can be fitted into the general plan of this one.

The curriculum in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented here the required subjects of the curriculum in their specified order by years and semesters, together with a considerable number of groups of electives.

CURRICULUM IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be widely read in this day it must stand out from the great mass of other matter and gain the attention and hold the interest of the reader. To do this its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The curriculum in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the

modern newspaper and the general magazine are giving constantly more attention, while there are also 500 agricultural publications and a greater number of class and trade publications which are largely or exclusively concerned with matters relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the curriculum is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The curriculum consequently offers, in the first place, fundamental studies of literary, social, and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect German or French. In the second place, the student is required to elect subjects in agriculture, mechanic arts, applied science, or home economics, depending on the portion of the field of industrial journalism which he desires to enter, it being expected that every student graduated from the curriculum shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism are presented in a series of courses extending throughout the sophomore, junior, and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery and much of application are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

CURRICULA IN APPLIED CHEMISTRY

The facilities for instruction in chemistry are ample, and the demand of students for curricula planned especially to give chemical training is such that formulations have been made to meet the needs of those desiring to specialize in agricultural chemistry, biochemistry, or industrial chemistry. By suitable modifications of the curriculum in industrial chemistry the needs of students interested in chemical engineering are met. The instructional facilities of the Department of Chemistry reinforced by opportunities for practical work in connection with the researches of the experiment stations are such as to provide amply for this specialized training.

Curriculum in General Science

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Plane Trigonometry* Math. 101 3(3-0)	College Algebra* Math. 104 3(3-0)
General Botany I Bot. 101 3(1-4, 2)	General Botany II Bot. 105 3(1-4, 2)
Current History Hist. 126 1(1-0)	Current History Hist. 126 1(1-0)
Library Methods Lib. Ec. 101 1(1-0)	Elective † 2(-)
Military Science I (Men) Mil. Tr. 101 1(0-4)	Military Science II (Men) Mil. Tr. 102 1(0-4)
Physical Education M-I Phys. Ed. 103 R(0-2) or	Physical Education M-II Phys. Ed. 104 R(0-2) or
Physical Education W-I Phys. Ed. 151A 1(0-3)	Physical Education W-II Phys. Ed. 152A 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I Engl. 171 4(4-0)	English Literature II Engl. 174 4(4-0)
English History Hist. 121 3(3-0)	Modern Europe Hist. 223 3(3-0)
General Physics I Physics 135 4(3-3)	General Physics II Physics 140 4(3-3)
General Zoölogy I Zoöl. 101 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Elective † 3(-)	Elective † 3(-)
Military Science III (Men) Mil. Tr. 103 1(0-4)	Military Science IV (Men) Mil. Tr. 104 1(0-4)
Physical Education M-III (Men) Phys. Ed. 105 R(0-2) or	Physical Education M-IV (Men) Phys. Ed. 106 R(0-2) or
Physical Education W-III (Women) Phys. Ed. 153 1(0-3)	Physical Education W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
American Government Hist. 151 3(3-0)	American History I Hist. 101 3(3-0)
Psychology Educ. 101 3(3-0)	Economics Econ. 101 3(3-0)
Extempore Speech I Pub. Spk. 106 2(2-0)	General Microbiology Bact. 101 3(1-6)
Elective † 3(-)	Elective † 6(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Elective † 16(-)	Elective † 16(-)

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107, the first semester, postponing trigonometry until the second semester. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the Dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

Groups of Electives and Options for Students in the Division of General Science

In addition to the courses included in the following groups, others will be found described in the exposition of the work of the respective departments. From any group elected a sufficient number of courses to constitute an effective block of knowledge must be taken. At least eight semester credits in any new field are usually required, but a smaller number will be honored if in a field already entered upon.

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FIRST SEMESTER	SECOND SEMESTER
Advanced Composition I Engl. 113 2(2-0)	Advanced Composition II Engl. 116 2(2-0)
Business English Engl. 122 3(3-0)	Advertising English Engl. 125 3(3-0)
Oral English I Engl. 128 3(3-0)	Oral English II Engl. 131 3(3-0)
Argumentation and Debate Engl. 119 3(3-0)	Methods of Teaching English Engl. 134 3(3-0)
The Short Story Engl. 251 3(3-0)	Community English Engl. 254 2(2-0)

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The English Bible I Engl. 271 3(3-0)	The Shakspearean Drama Engl. 274 3(3-0)
Nineteenth Century Literature Engl. 277 3(3-0)	American Literature Engl. 280 3(3-0)
Current Literature Engl. 282 2(2-0)	The Novel Engl. 285 2(2-0)
English Survey I Engl. 288 2(2-0)	English Survey II Engl. 290 2(2-0)
Browning Engl. 293A 3(3-0)	The Arts and Crafts Movement Engl. 295 2(2-0)

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German I Mod. Lang. 101 3(3-0)	German II Mod. Lang. 102 3(3-0)
Beginning German I Mod. Lang. 103 5(5-0)	Beginning German II Mod. Lang. 104 2(2-0)
German Readings Mod. Lang. 111 3(3-0)	German Short Stories Mod. Lang. 201 3(3-0)
Scientific German I Mod. Lang. 236 3(3-0)	Scientific German II Mod. Lang. 241 3(3-0)

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French I Mod. Lang. 151 3(3-0)	French II Mod. Lang. 152 3(3-0)
Beginning French I Mod. Lang. 153 5(5-0)	Beginning French II Mod. Lang. 154 5(5-0)
French Readings Mod. Lang. 161 3(3-0)	French Short Stories Mod. Lang. 251 3(3-0)
Spanish I Mod. Lang. 176 3(3-0)	Spanish II Mod. Lang. 177 3(3-0)
Spanish Readings Mod. Lang. 180 3(3-0)	Commercial Spanish Mod. Lang. 183 3(3-0)

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Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Calculus I Math. 113 5(5-0)	Calculus II Math. 116 3(3-0)
Analysis of Statistics Math. 125 3(3-0)	Institutional Accounting Math. 131 3(3-0)
Differential Equations Math. 201 3(3-0)	Special Methods in the Teaching of Mathematics Math. 122 3(3-0)

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FIRST SEMESTER	SECOND SEMESTER
Advanced Inorganic Chemistry Chem. 207 3(3-0)	Industrial Electrochemistry Chem. 205 2(2-0)
Inorganic Preparations Chem. 202 .. 2(0-6) to 4(0-12)	Physical Chemistry Chem. 206 5(3-6)
Industrial Chemistry I Chem. 203 5(3-6)	Industrial Chemistry II Chem. 204 5(3-6)

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Organic Chemistry Chem. 120 3(2-3)	Organic Chemistry HE Chem. 121 5(3-6)
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Organic Preparations Chem. 223 5(0-15)	Stereoisomeric and Tautomeric Compounds Chem. 224 2(2-0)
Qualitative Org. Analysis Chem. 225 2(0-6)	Carbocyclic and Heterocyclic Compounds Chem. 226 2(2-0)
Physiological Chemistry I Chem. 232 5(3-6)	Physiological Chemistry II Chem. 233 5(3-6)
Pathological Chemistry Chem. 235 2(2-0)	Physiological Chemistry Chem. 231 5(3-6)

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Quantitative Analysis I Chem. 150 2(0-6)	Quantitative Analysis I Chem. 150 2(0-6)
Quantitative Analysis II Chem. 250 3(1-6)	Quantitative Analysis III Chem. 251 3(1-6)
Advanced Qualitative Analysis Chem. 240 3(1-6)	Household Chemistry Chem. 265 3(1-6)

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Household Physics Physics 101 4(3-3)	Agricultural Physics Physics 111 3(3-0)
Photography Physics 120 2(1-3)	Harmonics Physics 222 2(2-0)
Molecular Physics Physics 221 4(3-3)	Physical Measurements Physics 223 3(2-3)
Wireless Telegraphy Physics 130 2(1-3)	Special Methods in the Teaching of Physics Physics 224 3(2-3)
Spectroscopy Physics 230 3(1-6)	Radioactivity and Electron Theory Physics 233 3(3-0)

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Agricultural Microbiology Bact. 106 3(1-6)	Soil Microbiology Bact. 201 3(1-6)
Hygienic Bacteriology Bact. 206 4(2-6)	Pathogenic Bacteriology I Bact. 111 4(2-6)
Pathogenic Bacteriology II Bact. 116 4(2-6)	Dairy Bacteriology Bact. 211 3(1-6)
Poultry Bacteriology Bact. 216 3(1-6)	Water Purification and Sewage Disposal Bact. 221 3(1-6)

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Plant Pathology I Bot. 116 3(1-4, 2)	Plant Histology Bot. 215 2(0-6)
Plant Pathology II Bot. 201 3(1-4, 2)	Ecology Bot. 228 2(2-0)
Plant Physiology I Bot. 208 3(3-0)	Taxonomic Botany of the Flowering Plants Bot. 225 3(1-4, 2)
Economic Botany Bot. 219 3(1-4, 2)	Field Crops and Vegetable Diseases Bot. 203 2(1-2, 1)
Evolution of Plants Bot. 222 3(3-0)	Fruit Crop Diseases Bot. 202 2(1-2, 1)

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FIRST SEMESTER	SECOND SEMESTER
Advanced Invertebrate Zoölogy Zoöl. 201 4(2-6)	Advanced Vertebrate Zoölogy Zoöl. 202 4(2-6)
Taxonomy of Invertebrates Zoöl. 205 3(0-9)	Taxonomy of Vertebrates Zoöl. 208 3(0-9)
Cytology Zoöl. 214 4(2-6)	Animal Ecology Zoöl. 211 3(1-6)
Parasitology Zoöl. 123 2(1-3)	Economic Zoölogy Zoöl. 126 3(1-6)
Embryology Zoöl. 117 3(2-3)	Advanced Mammalian Embryology Zoöl. 220 4(2-6)

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Dynamic and Structural Geology Geol. 101 2(2-0)	Historical Geology Geol. 201 2(2-0)
	Engineering Geology Geol. 102 4(2-6)

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General Entomology Ent. 101 3(2-3)	General Economic Entomology Ent. 206 3(2-3)
Insect Morphology I Ent. 211 3(1-6)	Apiculture Ent. 111 3(2-3)
Advanced General Entomology Ent. 221 3(3-0)	Principles of Taxonomy Ent. 216 1(1-0)
Advanced Apiculture Ent. 228 3(2-3)	Taxonomy of Insects I Ent. 217 2(0-6)

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American History II Hist. 202 3(3-0)	American History III Hist. 203 3(3-0)
American Industrial History Hist. 105 3(3-0)	Immigration and International Relations Hist. 228 2(2-0)
Pan-America Hist. 207 2(2-0)	Comparative Government Hist. 252 2(2-0)
Modern England and the British Empire Hist. 226 3(3-0)	History of the Home Hist. 225 3(3-0)
American Political History Hist. 206 2(2-0)	

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Business Law I Hist. 153 1(1-0)	Business Law II Hist. 154 1(1-0)
	Farm Law Hist. 155 2(2-0)

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Economics Econ. 101 3(3-0)	Agricultural Economics Ag. Ec. 101 3(3-0)
Sociology Econ. 151 3(3-0)	Marketing and Coöperation Ag. Ec. 201 2(2-0)
Business Organization Econ. 106 1(1-0)	Money and Banking Econ. 116 2(2-0)
Labor Problems Econ. 111 2(2-0)	Public Finance Econ. 213 2(2-0)

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Educational Administration I Educ. 105 3(3-0)	Educational Psychology Educ. 109 3(3-0)
History of Education I Educ. 113 3(3-0)	Educational Sociology I Educ. 118 3(3-0)
Rural Education Educ. 201 3(3-0)	Educational Measurements Educ. 211 3(3-0)

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FIRST SEMESTER	SECOND SEMESTER
Agricultural Education Educ. 125 2(2-0)	Special Methods in the Teaching of Agriculture Educ. 136 3(3-0)
Home Economics Education Educ. 121 2(2-0)	Supervised Observation and Teaching in Agriculture Educ. 161 3(0-9)
Industrial Education Educ. 129 2(2-0)	Special Methods in the Teaching of Home Economics Educ. 132 3(3-0)
	Supervised Observation and Teaching in Home Economics Educ. 160 3(0-9)
	Special Methods in the Teaching of Industrial Arts Subjects Educ. 140 3(3-0)
	Supervised Observation and Teaching in Industrial Arts Educ. 162 3(0-9)

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Elementary Journalism Ind. Jour. 107 2(2-0)	Industrial Writing Ind. Jour. 113 2(2-0)
Journalism Practice I Ind. Jour. 110 2(0-6)	Journalism Practice II Ind. Jour. 116 2(0-6)
Industrial Feature Writing Ind. Jour. 123 2(2-0)	Technical Journalism Ind. Jour. 130 2(2-0)
Journalism Practice III Ind. Jour. 127 2(0-6)	Journalism Practice IV Ind. Jour. 133 2(0-6)

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Materials of Journalism Ind. Jour. 218 2(2-0)	Magazine Features Ind. Jour. 216 2(-)
History of Journalism Ind. Jour. 219 2(2-0)	Journalism Surveys Ind. Jour. 222 2(0-6)

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	Voice (Music 130) Two private lessons a week. Two semester credits.
	Piano (Music 140) Two private lessons a week. Two semester credits.
	Violin (Music 135) Two private lessons a week. Two semester credits.
	Wind Instruments (Music 145) Two private lessons a week. Two semester credits.
Harmony I Music 101 2(2-0)	Harmony II Music 102 2(2-0)
Harmony III Music 103 2(2-0)	Harmony IV Music 104 2(2-0)
Counterpoint Music 107 2(2-0)	Musical Form and Musical Analysis Music 109 2(2-0)
History of Music I Music 110 2(2-0)	History of Music II Music 111 2(2-0)
School Music Methods I Music 120 2(-)	School Music Methods II Music 121 2(-)
School Music Methods III Music 122 2(-)	School Music Methods IV Music 123 2(-)
Choral Society Music 150 1(1-0)	Choral Society Music 150 1(1-0)
Orchestra Music 151 1(1-0)	Orchestra Music 151 1(1-0)
College Band Music 152 1(1-0)	College Band Music 152 1(1-0)

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FIRST SEMESTER	SECOND SEMESTER
American History I Hist. 101 3(3-0)	American History II or III Hist. 202 or 203 3(3-0)
American Government Hist. 151 3(3-0)	
Pan-America Hist. 207 2(2-0)	
English History Hist. 121 3(3-0)	Modern Europe Hist. 223 3(3-0)
Economics Econ. 101 3(3-0)	Agricultural Economics Ag. Ec. 101 3(3-0)
Business Organization Econ. 106 1(1-0)	Money and Banking Econ. 116 2(2-0)
Labor Problems Econ. 111 2(2-0)	Public Finance Econ. 213 2(2-0)
Sociology Econ. 151 3(3-0)	Marketing and Coöperation Ag. Ec. 201 2(2-0)
	Agricultural Land Problems Ag. Ec. 216 1(1-0)

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General Botany I Bot. 101 3(1-4, 2)	General Botany II Bot. 105 3(1-4, 2)
Plant Pathology I Bot. 116 3(1-4, 2)	
Economic Botany Bot. 219 3(1-4, 2)	Seed Identification and Weed Control Agron. 105 2(1-3)
Farm Forestry Hort. 113 4(3-3)	Plant Propagation Hort. 101 3(2-2, 1)
	Gardening Hort. 122 3(3-0)
	Landscape Gardening I Hort. 125 4(2-6)
General Zoölogy I Zoöl. 101 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Parasitology Zoöl. 123 2(1-3)	Economic Zoölogy Zoöl. 126 3(1-6)
Embryology and Physiology Zoöl. 108 5(3-6)	General Microbiology Bact. 101 3(1-6)
Hygienic Bacteriology Bact. 206 4(2-6)	Water Purification and Sewage Disposal Bact. 221 3(1-6)
General Entomology Ent. 101 3(2-3)	General Economic Entomology Ent. 206 3(2-3)
Horticultural Entomology Ent. 201 2(2-0)	Apiculture Ent. 111 3(2-3)
Organic Chemistry Chem. 120 3(2-3)	
Quantitative Analysis I Chem. 150 2(0-6)	Dairy Chemistry Chem. 254 3(1-6)
Chemistry of Soils and Fertilizers Chem. 252 3(1-6)	Chemistry of Meats Chem. 255 3(1-6)
Chemistry of Crops Chem. 253 3(1-6)	Household Chemistry Chem. 265 3(1-6)
Human Nutrition Food and Nut. 112 3(3-0)	Agricultural Physics Physics 111 3(3-0)
Household Physics Physics 101 4(3-3)	Wireless Telegraphy Physics 130 2(1-3)
Photography Physics 120 2(1-3)	
Household Physics Physics 101 4(2-3)	Foods I Food and Nut. 101 3(1-6)
Organic Chemistry HE Chem. 121 5(3-6)	Household Microbiology Bact. 121 5(3-6)
Foods II Food and Nut. 106 5(3-6)	Dietetics Food and Nut. 201 5(3-6)
Human Nutrition Food and Nut. 112 3(3-0)	

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FIRST SEMESTER	SECOND SEMESTER
Design	Clothing I
Ap. Art 101..... 3(1-6)	Clo. and Text. 101..... 2(1-3)
Clothing II	Costume Design
Clo. and Text. 111..... 3(1-6)	Clo. and Text. 106..... 2(0-6)
Interior Decoration and Furnishing	Textiles
Ap. Art 114..... 3(1-6)	Clo. and Text. 116..... 3(2-3)
	Principles of Art and Their Application
	Ap. Art 124..... 3(3-0)

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General Botany I	General Botany II
Bot. 101 3(1-4, 2)	Bot. 105 3(1-4, 2)
Market Grades and Classes of Live Stock	Plant Propagation
An. Husb. 131..... 3(1-6)	Hort. 101 3(2-2, 1)
Grain Crop Production	Forage Crop Production
Agron. 101 3(2-2, 1)	Agron. 102 3(2-2, 1)
Elements of Dairying	Dairy Judging
Dairy Husb. 101..... 3(2-3)	Dairy Husb. 104..... 1(0-3)
Organic Chemistry	Farm Poultry Production
Chem. 120 3(2-3)	Poult. Husb. 101..... 2(1-2, 1)
Plant Pathology I	Principles of Feeding
Bot. 116 3(1-4, 2)	An. Husb. 152..... 3(3-0)
Soils	Orcharding
Agron. 131 4(3-3)	Hort. 107 2(1-2, 1)
Quantitative Analysis I	Soil Fertility
Chem. 150 2(0-6)	Agron. 132 3(2-2, 1)

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Engineering Drawing	Descriptive Geometry
Ap. Mech. 155..... 2(0-6)	Ap. Mech. 158..... 2(0-6)
Architectural Drawing I	Architectural Drawing II
Arch. 108 2(0-6)	Arch. 109 2(0-6)
Working Drawings and Specifications I	Working Drawings and Specifications II
Arch. 168 2(0-6)	Arch. 169 2(0-6)
Freehand Drawing I	Shades and Shadows
Arch. 111 2(0-6)	Arch. 130 2(0-6)
Design I	Freehand Drawing II
Arch. 142 3(0-9)	Arch. 114 2(0-6)
Domestic Architecture	Design II
Arch. 172 2(0-6)	Arch. 144 3(0-9)
Perspective	
Arch. 127 2(0-6)	

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Wood Working for Grammar Grades	Wood Working I for High Schools
Shop 120 2(0-6)	Shop 125 2(0-6)
Wood Working II for High Schools	Wood Turning
Shop 130 2(0-6)	Shop 135 2(0-6)
Forging I	Forging II
Shop 150 1(0-3)	Shop 155 1(0-3)
Forging III	Forging IV
Shop 186 1(0-3)	Shop 189 1(0-3)
Foundry Practice	Pattern Making
Shop 160 1(0-3)	Shop 145 1(0-3)
Machine Tool Work I	Machine Tool Work II
Shop 170 2(0-6)	Shop 192 2(0-6)
Machine Tool Work III	Metallurgy
Shop 193 1(0-3)	Shop 165 2(2-0)
Farm Motors	Rural Architecture
Farm Engr. 125, 126... 3(2-3)	Farm Engr. 102..... 3(0-9)
Concrete Construction	Surveying I
Ap. Mech. 140, 145... 2(1-3)	Civ. Engr. 102..... 2(0-6)
Mechanical Drawing I	
Ap. Mech. 161..... 2(0-6)	

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FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry Chem. 120 3(2-3)	Quantitative Analysis III Chem. 251 3(1-6)
Quantitative Analysis II Chem. 250 3(1-6)	Principles of Milling Mill. Ind. 101 1(0-3)
Grain Crop Production Agron. 101 3(2-2, 1)	Milling Practice I Mill. Ind. 109 3(1-6)
Grain Marketing Mill. Ind. 102 3(3-0)	Grain Products Mill. Ind. 103 2(2-0)
Wheat and Flour Testing Mill. Ind. 203 4(1-9)	Experimental Baking A Mill. Ind. 204 2(0-6)
	Milling Practice II Mill. Ind. 110 2(0-6)

Curriculum in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Principles of Typography I Ind. Jour. 101 3(2-3)	Principles of Typography II Ind. Jour. 104 3(2-3)
Library Methods Lib. Ec. 101 1(1-0)	Current History Hist. 126 1(1-0)
Current History Hist. 126 1(1-0)	Options* 5(-)
Options* 3(-)	Industrial Journalism Lecture R
Industrial Journalism Lecture R	Military Science II (Men) Mil. Tr. 102 1(0-4)
Military Science I (Men) Mil. Tr. 101 1(0-4)	Physical Education M-II Phys. Ed. 104 R(0-2) or
Physical Education M-I Phys. Ed. 103 R(0-2) or	Physical Education W-II Phys. Ed. 152A 1(0-3)
Physical Education W-I Phys. Ed. 151A 1(0-3)	

* The options and electives are chosen with the advice and approval of the Dean. The options are in two general groups, of eighteen semester credits each: (1) social science, and (2) courses related to an industry or applied science. In the tabulated presentation of electives for students in the Division of General Science, on preceding pages, groups may be found that will be accepted as the required option and electives. Group 31 (applied science), group 32 (domestic science), group 33 (domestic art), group 35 (agriculture), group 36 (architecture), or group 37 (manual training), may be chosen in satisfaction of the eighteen hours required related to an industry or applied science. From group 30, eighteen hours are to be chosen in satisfaction of the social science option. The options taken in the freshman year, and a large part of those in the sophomore year, must be those related to an industry or applied science.

The electives are to be chosen in groups of usually not fewer than eight semester credits, unless they are courses which extend fields already entered through the required subjects or the options.

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I Engl. 171 4(4-0)	English Literature II Engl. 174 4(4-0)
General Zoölogy I Zoöl. 101 3(2-3)or	General Zoölogy II Zoöl. 102 3(2-3)if <i>General Zoölogy I is chosen the first semester.</i>
General Botany I Bot. 101 3(1-4, 2)	General Botany II Bot. 105 3(1-4, 2)or
General Microbiology Bact. 101 3(1-6)if <i>General Botany I is chosen the first semester.</i>	
Elementary Journalism Ind. Jour. 107 2(2-0)	Industrial Writing Ind. Jour. 113 2(2-0)
Journalism Practice I Ind. Jour. 110 2(0-6)	Journalism Practice II Ind. Jour. 116 2(0-6)
Options* 6(-)	Options* 6(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R
Military Science III (Men) Mil. Tr. 103 1(0-4)	Mil. Science IV (Men) Mil. Tr. 104 1(0-4)
Physical Education M-III (Men) Phys. Ed. 105 R(0-2)or	Physical Education M-IV (Men) Phys. Ed. 106 R(0-2)or
Physical Training W-III (Women) Phys. Ed. 153 1(0-3)	Physical Training W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Industrial Feature Writing Ind. Jour. 123 2(2-0)	Technical Journalism Ind. Jour. 130 2(2-0)
Journalism Practice III Ind. Jour. 127 2(0-6)	Journalism Practice IV Ind. Jour. 133 2(0-6)
Extempore Speech I Pub. Spk. 106 2(2-0)	Principles of Advertising Ind. Jour. 125 3(3-0)
Options and Electives* 10(-)	Options and Electives* 9(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Circulation and Advertising Promotion Ind. Jour. 201 3(3-0)	Editorial Practice Ind. Jour. 207 2(2-0)
Copy Reading Ind. Jour. 204 2(0-6)	Ethics of Journalism Ind. Jour. 210 2(2-0)
Electives and Options* 11(-)	Electives and Options* 11(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R

* See footnote on the previous page.

Curriculum in Agricultural Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
General Zoölogy I Zoöl. 101 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Engineering Drawing Ap, Mech. 155 2(0-6)	General Botany I Bot. 101 3(1-4, 2)
Library Methods Lib. Ec. 101 1(1-0)	
Military Science I (Men) Mil. Tr. 101 1(0-4)	Military Science II (Men) Mil. Tr. 102 1(0-4)
Physical Education M-I Phys. Ed. 103 R(0-2) or	Physical Education M-II Phys. Ed. 104 R(0-2) or
Physical Education W-I Phys. Ed. 151A 1(0-3)	Physical Education W-II Phys. Ed. 152A 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Phys. 150 5(4-3)
General Botany II Bot. 105 3(1-4, 2)	Quantitative Analysis Chem. 241 5(1-12)
Business Law I Hist. 153 1(1-0)	
Military Science III (Men) Mil. Tr. 103 1(0-4)	Military Science IV (Men) Mil. Tr. 104 1(0-4)
Physical Education M-III (Men) Phys. Ed. 105 R(0-2) or	Physical Education M-IV (Men) Phys. Ed. 106 R(0-2) or
Physical Education W-III (Women) Phys. Ed. 153 1(0-3)	Physical Education W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I Mod. Lang. 103 5(5-0)	Beginning German II Mod. Lang. 104 2(2-0)
Physical Chemistry Chem. 206 5(3-6)	Scientific German I Mod. Lang. 236 3(3-0)
Agricultural Microbiology Bact. 106 3(1-6)	Inorganic Preparations Chem. 202 2(0-6)
Soils Agron. 131 4(3-3)	History of Chemistry Chem. 208 1(1-0)
	Food Analysis Chem. 257 3(0-9)
	Soil Fertility Agron. 132 3(2-3)
	American Government Hist. 151 3(3-0)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Comparative Physiology I	Economics
Anat. 121 5(4-3)	Econ. 101 3(3-0)
Chem. of Soils and Fertilizers	Chemistry of Crops
Chem. 252 3(1-6)	Chem. 253 3(1-6)
Electives 7(-)	Electives 10(-)
Thesis R	Thesis R

Curriculum in Biochemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
Plane Trigonometry	College Algebra
Math. 101 3(3-0)	Math. 104 3(3-0)
General Zoölogy I	General Zoölogy II
Zoöl. 101 3(2-3)	Zoöl. 102 3(2-3)
Engineering Drawing	General Botany I
Ap. Mech. 155 2(0-6)	Bot. 101 3(1-4, 2)
Library Methods	
Lib. Ec. 101 1(1-0)	
Military Science I (Men)	Military Science II (Men)
Mil. Tr. 101 1(0-4)	Mil. Tr. 102 1(0-4)
Physical Education M-I	Physical Education M-II
Phys. Ed. 103 R(0-2) or	Phys. Ed. 104 R(0-2) or
Physical Education W-I	Physical Education W-II
Phys. Ed. 151A 1(0-3)	Phys. Ed. 152A 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry I	Organic Chemistry II
Chem. 218 4(2-6)	Chem. 219 4(2-6)
Plane Analytical Geometry	Calculus
Math. 110 4(4-0)	Math. 119 3(3-0)
Engineering Physics I	Engineering Physics II
Physics 145 5(4-3)	Physics 150 5(4-3)
General Botany II	Quantitative Analysis
Bot. 105 3(1-4, 2)	Chem. 241 5(1-12)
Business Law I	
Hist. 153 1(1-0)	
Military Science III (Men)	Military Science IV (Men)
Mil. Tr. 103 1(0-4)	Mil. Tr. 104 1(0-4)
Physical Education M-III (Men)	Physical Education M-IV (Men)
Phys. Ed. 105 R(0-2) or	Phys. Ed. 106 R(0-2) or
Physical Education W-III (Women)	Physical Education W-IV (Women)
Phys. Ed. 153 1(0-3)	Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I Mod. Lang. 103..... 5(5-0)	Beginning German II Mod. Lang. 104..... 2(2-0)
Physical Chemistry Chem. 206 5(3-6)	Scientific German I Mod. Lang. 236..... 3(3-0)
Histology I Path. 101 3(1-6)	Inorganic Preparations Chem. 202 2(0-6)
Comparative Physiology I Anat. 121 5(4-3)	History of Chemistry Chem. 208 1(1-0)
	General Microbiology Bact. 101 3(1-6)
	American Government Hist. 151 3(3-0)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Physiological Chemistry I Chem. 232 5(3-6)	Physiological Chemistry II Chem. 233 5(3-6)
Organic Preparations Chem. 223 5(0-15)	Biochemical Preparations Chem. 234 5(0-15)
Economics Econ. 101 3(3-0)	Pathogenic Bacteriology I Bact. 111 4(2-6)
Elective 3(-)	Elective 3(-)
Thesis R	Thesis R

Curriculum in Industrial Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Library Methods Lib. Ec. 101..... 1(1-0)	Mechanical Drawing I Ap. Mech. 161..... 2(0-6)
Woodwork Shop 101 1(0-3)	Business Law I Hist. 153 1(1-0)
Forging I Shop 150 1(0-3)	
Military Science I (Men) Mil. Tr. 101..... 1(0-4)	Military Science II (Men) Mil. Tr. 102..... 1(0-4)
Physical Education M-I Phys. Ed. 103..... R(0-2) or	Physical Education M-II Phys. Ed. 104..... R(0-2) or
Physical Education W-I Phys. Ed. 151A..... 1(0-3)	Physical Education W-II Phys. Ed. 152A..... 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Engineering Physics I Physics 145 5(4-3)	Engineering Physics II Physics 150 5(4-3)
Adv. Inorg. Chemistry Chem. 207 3(3-0)	Quantitative Analysis Chem. 241 5(1-12)
Military Science III (Men) Mil. Tr. 103 1(0-4)	Military Science IV (Men) Mil. Tr. 104 1(0-4)
Physical Education M-III (Men) Phys. Ed. 105 R(0-2) or	Physical Education M-IV (Men) Phys. Ed. 106 R(0-2) or
Physical Education W-III (Women) Phys. Ed. 153 1(0-3)	Physical Education W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I Mod. Lang. 103 5(5-0)	Beginning German II Mod. Lang. 104 2(2-0)
Physical Chemistry Chem. 206 5(3-6)	Scientific German I Mod. Lang. 236 3(3-0)
Fire Assaying Chem. 242 2(0-6)	Inorganic Preparations Chem. 202 2(0-6)
Gas Analysis Chem. 243 1(0-3)	History of Chemistry Chem. 208 1(1-0)
Elective 3(-)	Industrial Electrochemistry Chem. 205 2(2-0)
	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
	Elective 3(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
American Government Hist. 151 3(3-0)	Economics Econ. 101 3(3-0)
Industrial Chemistry I Chem. 203 5(3-6)	Industrial Chemistry II Chem. 204 5(3-6)
Electives 8(-)	Electives 8(-)
Thesis R	Thesis R

Bacteriology

Professor BUSHNELL
Associate Professor HUNTER
Associate Professor GAINNEY

Instructor WITHAM
Instructor BEAUDETTE

The Department of Bacteriology occupies parts of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, a large general laboratory, incubator or temperature room, washroom, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of lectures and printed laboratory directions are furnished the students in some of the courses; in others textbooks are required. The Department library contains textbooks on

bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work the Department offers excellent facilities.

Bacteriology is presented to the students as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. It is now possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitation.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

101. GENERAL MICROBIOLOGY. Sophomore or junior year, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Professor Bushnell and Miss Witham.

This general introductory course consists of lectures, recitations and demonstrations covering the morphological and biological characters, the classification and the distribution of bacteria, factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technic. During the last half of the semester, organisms representing the different families and genera are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

106. AGRICULTURAL MICROBIOLOGY. Junior year, both semesters. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Professor Bushnell and Miss Witham.

This is a general course consisting of lectures, recitations and demonstrations. The relation of microorganisms to agriculture is particularly emphasized. First, information is given concerning the nature of microorganisms; their biological characteristics, classification and distribution in nature; their influence upon the plant food in the soil; their relation to certain fermentations, etc. Later some emphasis is placed upon the relation of microorganisms to disease; sources and modes of infection; use of germicidal agents and general hygienic measures.

Laboratory.—In the laboratory, the student becomes familiar with methods of cultivating and studying bacteria, yeasts and molds. Various known forms are studied; methods for the quantitative and qualitative analysis of water, milk, etc., are given some attention. Some time is given to methods of sterilization and the use of germicidal agents. The aim of this course is to give the student a general working knowledge of the subject and to point out its relation to agriculture and the problems of everyday life.

111. PATHOGENIC BACTERIOLOGY I. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Professor Bushnell and Doctor Beaudette.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microorganisms; factors necessary for

the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technic, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microorganisms are studied morphologically, culturally and biochemically. A quantitative and qualitative examination of milk and water is made in the latter part of the semester.

116. PATHOGENIC BACTERIOLOGY II. Junior year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Pathogenic Bacteriology I. Professor Bushnell and Doctor Beaudette.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection, and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; epizootic and epidemic diseases of unknown etiology are further treated. A detailed study is made of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention, and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; prevention and treatment of specific infectious diseases. Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolsins; experiments showing the constitutions and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprise the laboratory work.

121. HOUSEHOLD MICROBIOLOGY. Junior year, both semesters. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Miss Witham.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution and the relative importance of bacteria. The morphological and biochemical characters of microorganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics. It is designed to give the student a more thorough knowledge of those microorganisms which are of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances, are studied in detail. Some time is given to the principles of sanitation as applied to public-health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—General laboratory technique is first taken up, consisting of preparation of media, methods and principles of sterilization, incubation, plating, isolating and staining of microorganisms. Studies consisting of the morphological, cultural, and biochemical characteristics of different organisms are made. A study of microorganisms and their activities, both beneficial and harmful, in their relation to household

economy; bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are topics taken up in the laboratory work.

FOR GRADUATES AND UNDERGRADUATES

201. SOIL MICROBIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Course 101 or 106. Associate Professor Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria.

206. HYGIENIC BACTERIOLOGY. Elective, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Professor Bushnell.

Pathogenic bacteria, especially those related to disease 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 are studied. Various books are recommended as textbooks.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anaerobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

211. DAIRY BACTERIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Associate Professor Hunter.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms 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; examina-

tion of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

216. POULTRY BACTERIOLOGY. Elective, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General or Agricultural Microbiology. Professor Bushnell.

Consideration is given to the various microbial diseases of poultry; etiology, sources, and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis, and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work.

221. WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Microbiology, or Household Microbiology. Professor Bushnell.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory.—The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of samples of water and sewage; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

FOR GRADUATES

301. RESEARCH BACTERIOLOGY. Elective, both semesters. Credit to be arranged. Prerequisite: At least two of the outlined courses offered by the department. Professor Bushnell, Associate Professor Hunter, Associate Professor Gainey.

Advanced students showing sufficient training, ability and interest in original research are admitted to this course, upon approval of the head of the department. The student is under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation is chosen and outlined.

Students showing the proper interest and ability are given an opportunity to do experiment-station and advanced research work, during vacation periods, under the direct supervision of a faculty member of the department.

Students desiring to take work leading to an advanced degree are given individual research problems. After the proper completion of such an investigation, the results are presented to the graduate faculty in the form of a thesis. Such a thesis, when accepted by the faculty, fulfills part of the requirements for a master of science degree.

Botany and Plant Pathology

Professor MELCHERS
 Professor MILLER
 Assistant Professor DAVIS
 Assistant Professor GATES

Instructor HAYMAKER
 Instructor DALBEY
 Assistant CASHEN
 Fellow DALE

The instruction given in the Department of Botany and Plant Pathology has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, opportunities are offered to secure a broad and thorough training in the courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany and Plant Pathology lies in the investigation of those problems in plant life which affect agriculture. Three distinct general lines of work in botany are being conducted in the Experiment Station: Experimental investigations in the cause, prevention, and control of plant diseases; physiological investigations in drouth resistance in forage plants, and investigations and a survey of the Kansas flora.

The equipment for elementary instruction comprises eighty compound and sixty-four simple microscopes; a series of Jung, Peter, Kony, and Frank botanical charts; a lantern-slide projection apparatus; and a very complete collection of preserved material for studies in general morphology and plant pathology. For advanced work, Zeiss, Spencer, and Bausch and Lomb microscopes, with apochromatic lenses; a filar micrometer; Bausch and Lomb and Spencer camera lucidas; two Zeiss binocular microscopes; and Bausch and 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, two Spencer microtomes, electric and gas embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological studies.

For instruction in physiology a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available.

For investigations in plant pathology and plant physiology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungus and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: three compound microscopes, a Bausch and Lomb binocular monobjective compound microscope, a Spencer binocular microscope, analytical balances, drying ovens, hot-air sterilizers, steam auto-

clave, steam still, a Freas electric incubator, transfer chambers for isolating organisms, a Thelco low-temperature incubator, five Chicago electric incubators, pathological tables, research desks, a large supply of glassware for culturing fungi, two soil and air thermographs, a very complete herbarium, containing the various genera and species of fungi, and a large and representative collection of preserved specimens, illustrating the economic plant diseases.

For general botanical reference there is an excellent herbarium, especially complete for the State of Kansas. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

FOR UNDERGRADUATES

101. GENERAL BOTANY I. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Professor Miller, Assistant Professor Davis, Assistant Professor Gates, Mr. Haymaker, Miss Dalbey, and Miss Cashen.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, response of plants, such as photosynthesis, digestion, respiration, transpiration, and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, is studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint as working organisms. Text, *A Textbook of Botany for Colleges*, by Ganong.

Laboratory—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany I. Professor Melchers, Professor Miller, Assistant Professor Davis, Assistant Professor Gates, Mr. Haymaker, Miss Dalbey, and Miss Cashen.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text, *A Textbook of Botany for Colleges*, by Ganong.

111. BOTANY. Elective, second semester. Class work, one hour; laboratory, six hours.** Three semester credits. Miss Dalbey.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period

This is a condensed course in general botany offered especially for students in the Division of Home Economics. In so far as the time allows, a study is made of the morphology of a few of the chief great groups of plants, of their elementary physiology and their anatomical structures, particularly with reference to the functioning of plant life. The latter portion of the course is devoted to a systematic study of the most important plant families, in which their floral structures are considered. Time is devoted to the tracing out of unknown wild flowers by means of a key, so that a student will be able to familiarize herself with the flora of any community where she may be. This course is designed to afford a sufficient foundation for teaching botany in a high school.

116. PLANT PATHOLOGY I. Sophomore year, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Professor Melchers and Mr. Haymaker.

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 considered. The student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, in the nursery, and in market-garden work. Non-parasitic and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case. An extensive collection of preserved pathological material is available.

Laboratory.—Practical work in the recognition of all the more common plant diseases of the farm, orchard, and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungous pathogenes which cause them. Complete laboratory outlines, which likewise serve as a text in this course, are furnished by the department.

121. PATHOLOGY OF VEGETABLE FOOD PRODUCTS. Elective, first semester. Class work, one hour; laboratory, six hours.** Three semester credits. Prerequisite: High-school Botany, or its equivalent. Miss Dalbey.

This course is designed primarily for students in the Divisions of Home Economics and General Science. It deals with fungous and bacterial diseases and other maladies commonly recognized as the cause of decay or other deterioration in plant products, particularly in fruits and vegetables. The course offers opportunity to acquire the ability to recognize at sight the presence of fungi in fruits and vegetables as they occur on the market. The course aims to place emphasis on the presence of such infection and the results that can be expected when such products are bought on the market and stored under ordinary conditions.

Laboratory—The laboratory work comprises a study of the organisms causing decay in plant food products. Attention is given to conditions affecting the growth and dissemination of the organism, especially temperature and light conditions, and points out the precautions which must be taken to prevent loss of food products through decay. Exercises are devoted to the proper way to select, buy, and store vegetables and fruit as they occur on the market. A study of these is made in the laboratory, since much of the laboratory material is obtained from the local market. In addition to this, an extensive collection of preserved material is available. Laboratory outlines are furnished by the department.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

** Two of the required laboratory hours are used for report writing outside of the regular laboratory period.

126. MEDICAL BOTANY. Sophomore year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: High-school Botany or its equivalent. Assistant Professor Gates.

This is a lecture, laboratory, and reading course dealing with poisonous plants. The lecture includes a study of the principal stock-poisoning plants of the range; losses due to native poisonous plants, methods of identification, habitat, poisonous properties and methods of control and elimination.

Laboratory.—The laboratory work follows the work presented in the lectures, and consists chiefly of a study of the native poisonous plants of the West, the identification of these plants by means of a descriptive key.

FOR GRADUATES AND UNDERGRADUATES

201. PLANT PATHOLOGY II. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi and their morphology; it is essential for those who wish to follow plant pathological work professionally.

Laboratory.—The laboratory work consists of a detailed study of the genera of fungi. A large supply of plant-disease material in the department collections furnishes a basis for these studies.

202. FRUIT CROP DISEASES. Elective, first semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Mr. Haymaker.

The class work consists of a series of lectures dealing with diseases affecting fruit crops of all kinds. Special emphasis is laid on measures and methods for controlling these diseases by means of spraying, sanitation, and varietal resistance. The preparation and practical application of the standard sprays is considered. Text: *Manual of Fruit Diseases*, by Hesler and Whetzel.

Laboratory.—This consists of a detailed study of each disease affecting the major fruit crops, together with a detailed microscopic study of the organisms causing the disease. The course is especially valuable for those studying horticulture or those expecting to specialize in plant pathology.

203. FIELD CROP AND VEGETABLE DISEASES. Elective, second semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Professor Melchers.

This class work consists of a series of lectures dealing with the historical development of phytopathology, with special emphasis on literature pertaining to field-crop and vegetable diseases. The field symptoms are discussed, varietal susceptibility and resistance are considered, and control measures are advised.

Laboratory.—This consists of a detailed microscopic study of the plant diseases attacking field crops and vegetables, and is of value to those who wish to pursue agronomic or horticultural work, and is especially designed for those students who expect to specialize in plant pathology.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† One of the required laboratory hours is employed in lecture and laboratory quizzes and reviews.

208. PLANT PHYSIOLOGY I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Professor Miller.

This course consists of a series of lectures on the more important phases of plant physiology. Such subjects as the root systems of plants, absorption, wilting coefficient, resistance to drought, transpiration, water requirement, photosynthesis, respiration, digestion, and growth are discussed in detail. The subject matter of plant physiology that pertains to agriculture is especially emphasized. The course is designed to give students a broad knowledge of the functions of plants and the more important factors which influence them. The work is supplemented by discussions, reference readings, and special reports.

215. PLANT HISTOLOGY. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: General Botany II. Miss Dalbey.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing, and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *Plant Histology*.

219. ECONOMIC BOTANY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Botany II and Plant Pathology I.

This course consists of a series of carefully planned lectures by the various members of the department. It treats of the more important phases of botany, such as plant pathology, plant physiology, plant ecology, taxonomy, psychology, morphology, and genetics.

222. EVOLUTION OF PLANTS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Mr. Haymaker.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phylla, and to the probable derivation of the chief groups of plants. Instruction is imparted by means of lectures and reference readings. Text: *Evolution of Plants*, by Campbell.

225. TAXONOMIC BOTANY OF THE FLOWERING PLANTS. Elective, first or second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the terms employed, the development of the more important systems of classification, and a consideration of families of plants.

Laboratory.—Selected flower types representing the principal orders and families of plants are studied and plants are identified in the field and in the laboratory.

228. ECOLOGY. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: General Botany II. Assistant Professor Gates.

The class work consists of a series of lectures dealing with the structure and dynamics of vegetation.

Laboratory.—With the opening of vegetation in the spring, field trips are taken to selected places.

*Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

230. PHYSIOLOGICAL PHENOMENA IN THE GERMINATION OF SEEDS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: General Botany II. Assistant Professor Davis.

This is a course in plant physiology in which the seed is used as the basis of the work in the laboratory. A study is made of the different factors in germination, as to water requirement, temperature, oxygen supply, light, permeability of seed coats by water, solutes, and gases; dormancy, agencies in so-called after-ripening, enzymes, etc. This course is of special interest to students in agronomy, or those who expect to take up work in connection with grain mills, seedhouses, etc.

FOR GRADUATES

301. PLANT PATHOLOGY III. Elective, second semester. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology II. Professor Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course includes a somewhat detailed study of the cryptogamic herbarium. Considerable attention is devoted to the growing of pure cultures of pathogenic fungi, the making of inoculations, isolations of fungi, etc. The preparation of media of various kinds for the growing of fungi receives considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

302. PLANT PATHOLOGY IV. Elective, first and second semesters. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology III. Professor Melchers.

This course involves original research. Problems are chosen by the student along some lines in which he is interested. A carefully worked-out report which summarizes the investigation undertaken, is required at the end of the semester.

308. INVESTIGATIONS IN TAXONOMY AND ECOLOGY. Elective, first and second semesters. Laboratory work, including conferences and field work, from six to twenty-four hours. From two to eight semester credits. Assistant Professor Gates.

Open to graduate students and especially qualified undergraduates upon approval of application. This course involves original research in a problem, chosen by or assigned to the student. The results are embodied in a written report presented at the end of the course.

*Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

Chemistry

Professor KING	Instructor HARRISS
Associate Professor SWANSON	Instructor KEITH
Associate Professor NEWMAN	Instructor DOW
Associate Professor HUGHES	Instructor McDONALD
Associate Professor BRUBAKER	Instructor SPICER
Assistant Professor COLVER	Instructor SKOURUP
Instructor WEST	

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observation by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 936 students each semester in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 324 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry. In all of the laboratory work the student is required to give the designated amount of time, and at least a certain amount of work must be satisfactorily performed in order to obtain credit.

COURSES IN CHEMISTRY

FOR UNDERGRADUATES

101. CHEMISTRY I. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: High-school physics. Professor King, Associate Professor Newman, Mr. West, Miss Harriß, Mr. Keith, Miss Dow, Mr. McDonald, and Mr. Skourup.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. Mc-

Pherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry.

105. CHEMISTRY AV-I. Freshman year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Mr. McDonald.

This course deals with the fundamental laws and theories of chemistry, the elements and their inorganic compounds, and lays emphasis on the application of chemistry to the arts and industries. Both the metals and nonmetals are studied, but the treatment is less detailed than in Chemistry I and II.

Laboratory.—The laboratory work is intended to give the student training in manipulation and first-hand knowledge of the important laws of chemistry and the properties of substances studied, by use of appropriate experiments which the student himself performs.

106. CHEMISTRY V-II. Freshman year, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry AV-I. Mr. West.

This course follows Chemistry AV-I and has the same general object, but deals with the organic compounds.

Laboratory.—The laboratory work consists in the preparation of certain organic compounds and qualitative study of their properties.

107 and 108. CHEMISTRY E-I and E-II. Freshman year, both semesters. Lectures and recitations, three hours; laboratory, three hours. Four semester credits each. Prerequisites and teachers same as for Chemistry I and II.

These courses cover the work of general chemistry and qualitative analysis. The relative amount of time spent upon these subjects is the

same as in Chemistry I and II with the exception of the laboratory. Instead of spending six hours a week in laboratory, students in these courses spend three hours. Throughout all the work in these courses emphasis is placed upon those phases of chemistry which have a special bearing upon engineering materials. Texts: Same as for Chemistry I and II.

120. ORGANIC CHEMISTRY. Sophomore year, both semesters and summer school. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Prerequisite: A college course in general chemistry. Associate Professor Brubaker, Assistant Professor Colver, and Mr. West.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Sophomore year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisites and teachers same as for Organic Chemistry.

The lectures and recitations in this course are the same as in Organic Chemistry, with additional emphasis placed on the organic compounds most intimately related to daily life in the home. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory—The laboratory work includes preparations, and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide: *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

150. QUANTITATIVE ANALYSIS I. Sophomore year, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

FOR GRADUATES AND UNDERGRADUATES.

202. INORGANIC PREPARATIONS. Junior year and elective, both semesters. One semester credit for each three hours of laboratory work. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

Students of Advanced Inorganic Chemistry are advised to take this course. It consists in the preparation and purification of some typical inorganic compound, together with those of more complex composition and compounds of the rarer elements.

203 and 204. INDUSTRIAL CHEMISTRY I AND II. Senior year and elective, first and second semesters, respectively. Given in 1919-'20 and alternate years thereafter. Class work, three hours; laboratory, six hours. Five semester credits each semester. Prerequisite: Organic Chemistry. Professor King and Associate Professor Brubaker.

This course treats the more important technical processes. Considerable attention is given to general operations and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalis, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch and the products of fermentation and the destructive distillation of wood and coal. Textbook: *Manual of Industrial Chemistry*, by Rogers and Aubert.

205. INDUSTRIAL ELECTROCHEMISTRY. Junior year and elective, second semester. Offered in 1920-'21 and alternate years thereafter. Class work, two hours. Two semester credits. Prerequisite: College courses in general chemistry and physics. Associate Professor Brubaker.

In this course are treated briefly the principles of voltameters, electrochemical methods of analysis, electroplating, electrotyping, and the production of metallic objects by electroplating methods. This is followed by fuller treatment of electrolytic refining of metals, the manufacture of various industrial products by electrolytic methods, primary cells, the lead storage battery, the Edison storage battery, the electrometallurgy of iron and steel, and the fixation of atmospheric nitrogen. Textbook: Thompson's *Applied Electrochemistry*.

206. PHYSICAL CHEMISTRY. Junior year, first semester. Given in 1920-'21 and alternate years thereafter. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

207. ADVANCED INORGANIC CHEMISTRY. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Given in 1920-'21 and alternate years thereafter. Prerequisite: Chemistry II or Chemistry HE-II. Associate Professor Newman.

The course consists of a thorough study of the facts of chemistry and their theoretical interpretations according to the views of the present day. Special stress is placed upon the properties of the elements as a basis for methods of classification, and upon the rarer elements and compounds. Text: *Modern Inorganic Chemistry*, by J. W. Mellor.

208. HISTORY OF CHEMISTRY. Junior year, second semester. Lecture work, one hour. One semester credit. Prerequisite: Physical Chemistry. Dean Willard.

These lectures deal with the history concerning the development of the principal laws and theories of chemistry, special emphasis being placed upon the failures and triumphs of the founders of chemical science.

209. SURFACE TENSION AND RELATED PHENOMENA. Elective and graduate, second semester. Lectures, two hours. Two semester credits. Prerequisite: Physical Chemistry (Chem. 206). Professor King.

This course of lectures deals with surface tension phenomena. Attention is devoted to methods of measuring surface tension, to surface energetics, and particularly to the relation of surface tension to absorption, and colloidal formation.

210. CHEMICAL STATICS AND DYNAMICS. Elective and graduate, second semester. Lectures and assigned reading, two hours. Two semester credits. Prerequisite: An approved course in Physical Chemistry. Professor King.

This course of lectures deals with the general topics of chemical equilibria, velocity of chemical reactions, hydrolysis, catalysis, etc.

211. PAINT, OILS AND PIGMENTS. Elective and graduate, first semester. Lectures and assigned readings, two hours. Two semester credits. Prerequisite: Satisfactory courses in Organic Chemistry and Quantitative Analysis. Professor King.

This course consists of a series of lectures and assigned readings on the extraction, purification, and properties of the oils commonly used in paints, on the manufacture and properties of paint pigments, and on a general survey of the products employed as protective coverings for both wood and metal.

218 and 219. ORGANIC CHEMISTRY I AND II. Sophomore year, first and second semesters, respectively. Lectures and recitations, two hours; laboratory, six hours. Four semester credits each. Prerequisite: Chemistry II. Assistant Professor Colver and Mr. West.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide: Jones's *A Laboratory Outline of Organic Chemistry*.

223. ORGANIC PREPARATIONS. Senior year, first semester. Laboratory work, fifteen hours. Five semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

224. QUALITATIVE ORGANIC ANALYSIS. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

This is primarily a laboratory course designed to impress upon the student's mind the characteristic reactions of the various classes of organic compounds. The first few weeks are spent in carrying out class reactions, using known compounds; the remainder of the semester is devoted to the classification and identification of pure, unknown substances and mixtures. Manual: *Class Reactions and Identification of Organic Substances*, by Noyes and Mulliken; reference book, *A Handbook of Organic Analysis*, by H. T. Clarke.

225. STEREOISOMERIC AND TAUTOMERIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon such special topics of organic chemistry as optical isomerism, particularly the older and more recent methods of determining the configuration of the asymmetric carbon atoms of sugars; geometrical isomerism; and keto-enol tautomerism.

226. CARBOCYCLIC AND HETEROCYCLIC COMPOUNDS. For graduate and advanced students in chemistry, second semester. Lectures, two hours. Two semester credits. Prerequisite: Organic Chemistry II. Assistant Professor Colver.

The course consists of lectures and assigned readings upon carbocyclic and heterocyclic compounds. In the study of the carbocyclic compounds the structure, orientation, methods of synthesis, and reactions of benzene, naphthalene, anthracene, and derivatives are considered in much greater detail than is possible in an elementary course. The heterocyclic compounds studied include furane, pyrrol, thiophene, pyridine, quinoline, isoquinoline, purine, pyrimidine, hydantoin, and some structurally related substances, such as certain classes of dyes, the alkaloids, and uric acid.

230. PRINCIPLES OF ANIMAL NUTRITION. Elective and graduate, second semester. Class work, three hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course gives a thorough study of the relations of animals to matter and energy, and the physiological principles involved. Study of the researches which have established the principles of nutrition constitutes the ground work of the course.

231. PHYSIOLOGICAL CHEMISTRY. Elective and graduate, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: An acceptable course in organic chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or in one of the biological sciences. It is a systematic 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 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. Text: Mathews' *Physiological Chemistry*.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the lectures and recitations. Laboratory guide: Mathews' *Physiological Chemistry*.

232. PHYSIOLOGICAL CHEMISTRY I. Senior year, first semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or one of the biological sciences. It treats of the chemistry of carbohydrates, lipins and proteins, and the chemical changes which these undergo during the processes of digestion and metabolism.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the class work.

233. PHYSIOLOGICAL CHEMISTRY II. Senior year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Physiological Chemistry I. Associate Professor Hughes.

This is a continuation of Physiological Chemistry I. It includes the chemistry of the body tissues and excretions.

Laboratory.—The laboratory work includes a qualitative and quantitative study of the tissues and excretions discussed in the class work.

234. **BIOCHEMICAL PREPARATIONS** Senior year, second semester. Laboratory work, fifteen hours. Five semester credits. Prerequisites: Organic Chemistry II, and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

235. **PATHOLOGICAL CHEMISTRY.** Elective and graduate. Class work, two hours. Two semester credits. Prerequisite: An approved course in physiological chemistry. Associate Professor Hughes.

This course presents the chemical facts pertaining to abnormal nutritional processes. The chemical factors involved in the causation, progress and results of disease are discussed under the following heads: inflammation, degeneration, infection, anemia, tuberculosis, dyspepsia, typhoid fever; jaundice, nephritis, diabetes, gout, rheumatism, intoxication, etc.

240. **ADVANCED QUALITATIVE ANALYSIS** Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Newman.

This course is designed to broaden the student's knowledge of chemistry by a systematic study of the properties of the acid and basic elements and their compounds as shown in a detailed study of systematic analysis. Many of the rarer elements are included. A study of the application of chemical theory to analytical reactions is taken up in considerable detail with the aim of familiarizing the student with the important theories as applied to analytical procedure. Reports are made on assigned reference work.

241. **QUANTITATIVE ANALYSIS.** Sophomore year, second semester. Class work, one hour; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251.

242. **FIRE ASSAYING.** Junior year, first semester. Laboratory work, six hours. Two semester credits. Prerequisite: Quantitative Analysis. Associate Professor Newman.

In this course the student becomes familiar with the ordinary methods of fire assaying. Some attention is also paid to wet assaying. Fire assays of ores containing metals such as copper, zinc, lead, bismuth, tin, silver and gold are made.

243. **GAS ANALYSIS.** Junior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Quantitative Analysis. Associate Professor Brubaker.

The work in this course acquaints the student with the use of standard apparatus in the analysis of gases. Analyses of air, flue and furnace, and illuminating gases are made.

245. **MICROCHEMICAL METHODS OF ANALYSIS.** Elective and graduate. Laboratory, three hours. One semester credit. Prerequisites: Elementary Organic Chemistry, and Quantitative Analysis I. Associate Professor Brubaker.

The microscope is a very useful instrument in chemical analyses. The technical chemist finds it indispensable, and its applications are steadily increasing. The object of this course is to teach the student the various methods of using the microscope in chemical analysis, both qualitative and quantitative, applied to both inorganic substances and to vegetable or animal products.

250. **QUANTITATIVE ANALYSIS II.** Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Brubaker.

This course covers the general procedure of gravimetric analysis and volumetric analysis, together with a discussion of chemical theory as applied to quantitative reactions. Particular attention is paid to the commercial significance of the procedures studied. The work for the first part of the semester consists of a selected series of gravimetric determinations designed to develop accuracy in a number of fundamental operations. During the second part of the semester, solutions of acids, bases and oxidizing agents are standardized and used in analysis. Reports are made on assigned reference work for the study of methods of analysis not taken up in class. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

251. QUANTITATIVE ANALYSIS III. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis II. Associate Professor Brubaker.

This is a continuation of Quantitative Analysis II, and applies the fundamental principles of quantitative work to the analysis of important industrial products and raw materials, including paints, soaps, oils, bituminous materials, coal, gas, water, iron and steel, and other substances, the choice of the work being determined by the instructor in consultation with the student. The chemical theories underlying the methods used are also considered in some detail. Textbook: *Quantitative Analysis*, by Edgar G. Mahin. Other standard works on quantitative analysis are used as references.

252. CHEMISTRY OF SOILS AND FERTILIZERS. Senior year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

The class work takes up the chemical composition of soils and fertilizers, and those chemical changes in the soil which are most important in affecting plant growth. Attention is also given to colloids and soluble salts in relation to optimum soil conditions. The course is adapted especially to the needs of students of soils.

Laboratory—The laboratory work is planned to give the student a knowledge of the most important chemical methods used in the analysis and investigation of soils and fertilizers.

253. CHEMISTRY OF CROPS. Senior year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

In the class work a detailed study is made of the chemical composition of substances present in plants and plant products; the most important chemical transformations which take place in plant growth; and enzymes and colloids in relation to plant substances and plant growth.

Laboratory.—The laboratory exercises are planned to give the student a working knowledge of the most important methods used in the analysis and investigation of substances present in plants and plant products.

254. DAIRY CHEMISTRY. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work is centered chiefly upon the following: A detailed study of the chemical compounds present in milk, butter, cheese, and other dairy products; chemical changes affected by conditions of handling dairy products; a review of literature relating to recent investigational work in dairy chemistry.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of dairy products.

255. CHEMISTRY OF MEATS. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work includes the following: A detailed study of the chemical compounds present in the edible portions of meat animals; chemical changes effected by different methods of preparing and storing meat products; a review of recent literature relating to investigational work in the chemistry of meat and meat products.

Laboratory—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of meats and meat products.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Associate Professor Swanson.

Applied Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry.

Biochemistry. Associate Professor Hughes and Assistant Professor Hogan.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Junior year, second semester. Laboratory work, nine hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Food Analyst De Rose.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

260. ADVANCED QUANTITATIVE ANALYSIS. Junior year and elective, first semester. One credit for each three hours of laboratory work. Prerequisites: Quantitative Analysis I, or Quantitative Analysis II and III. Associate Professor Brubaker.

Under this heading provision is made for the election of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories afford a large opportunity for advanced work.

265. HOUSEHOLD CHEMISTRY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Brubaker.

The lectures cover the chemistry of numerous problems of air, water, soap, laundering, dry cleaning, food and cookery, and textiles. A portion of the lecture time is given to reciting on the subject matter of previous lectures and of the laboratory work. References are given for study.

Laboratory.—The laboratory work consists largely of quantitative exercises dealing with air, water, soap, foods, food accessories, and textiles.

275. CHEMISTRY SEMINAR. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

Economics and Sociology

Professor KAMMEYER
Associate Professor MERRITT

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology and statistics is at the disposal of the students, and is used for collateral readings, book reviews and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

101. ECONOMICS. Junior and senior years, both semesters. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a course in the fundamentals of economic science, including a study of man's wealth-getting and wealth-using activities as they manifest themselves in the consumption, production, exchange, and distribution of commodities and services. Budgets, factories and expenses of production, money, banking, wage systems, labor organizations, rent, interest and profits are some of the leading topics for study and class discussion. These phenomena are here studied in conjunction with the laws or social conventions which control or influence them, such as the federal-reserve systems, the farm-loan act, legal restrictions concerning commerce, strikes, child labor, trusts, monopolies, and the like. The application of economic principles to such subjects as taxation, socialism, insurance, etc., is also considered. Supplementary reading of current literature, reference books, the keeping of notes, and periodical written reports are required. A combination of the textbook and lecture methods is followed. Text: Ely's *Outlines of Economics*.

106. BUSINESS ORGANIZATION. Senior year and elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Economics. Associate Professor Merritt.

Individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions are studied in this course. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, to cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Jones's *Administration of Industrial Enterprises*.

111. LABOR PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Merritt.

The history, organization, functions, and legal status of labor unions in the United States and in the principal countries in Europe are discussed. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed

and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction is by lectures, assigned readings, and reports. Text: Groat's *Organized Labor in America*.

116. MONEY AND BANKING. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

The first half of this course is devoted to a study of the nature, history and functions of money; its place as a factor in man's economic progress, and its importance as such in his business activities as organized to-day; money standards and systems, monometallism, bimetalism, limping standard, paper standard, gold-exchange standard; coinage and coinage laws; instruments of credit, bills of exchange, drafts; clearing houses. The second half of the course takes up the subject of banking. Banking in its historic forms is briefly considered as a preparation for a more detailed study of the federal-reserve system, the federal farm-loan system, and state banks, particularly Kansas state banks. To this is added a study of savings banks, trust companies, building and loan associations and other institutionalized forms of credit. Instruction is by lectures and reports. Any acceptable text, such as White's *Money and Banking*, may be used as a manual.

121. ECONOMIC GEOGRAPHY. Elective, first semester. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a discussion of the important facts of the economic world and a study of production and trade as they are influenced by geographical conditions. The geography of the more important commercial products of farm, range, forest, mine, factory, and sea; transportation and manufactures; great commercial and manufacturing centers, and types of commercial nations are considered. Stress is given to the natural resources of the United States as factors in the national development. This includes the current movement to conserve natural resources; the improvement and extension of waterways; the control of water power and water supply. Instruction is imparted by lectures, library work, and study of a text. (Not offered in 1919-'20.)

126. BUSINESS MANAGEMENT. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Associate Professor Merritt.

Plant location and structure; the organization and management of industrial forces; distribution of manufactured goods, with especial attention given to the problems involved in relations of manufacturers, middlemen and consumers; the organization of the sales department; sales management and the art of selling; typical advertising campaigns of different classes of producers; costing and its spread to the different elements of production, are subjects studied in this course. Instruction is given by lectures, library work, and study of the text.

131. COST ACCOUNTING. Elective, both semesters. Class work, two hours. Two semester credits. Mr. ———.

Following a review of the principles of accounting, a general survey of the more important principles of cost accounting is made. This course is concerned particularly with the subject of production costs. The student is expected to keep the principles of costing in mind throughout the whole course, to the end that he may be able to adapt these working principles to concrete problems. Attention is given to the calculation and the distribution of overhead costs, and to the organization of cost systems. Practical problems are given for solution and as means of illustrating and applying the principles. Lectures, laboratory work, and study of the text are the methods of instruction. (Not offered in 1919-'20.)

FOR GRADUATES AND UNDERGRADUATES

213. PUBLIC FINANCE. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems; proposed reforms; public indebtedness; budgets; and other phenomena of financial administration. Instruction is by assigned readings, lectures, and reports.

225. CURRENT ECONOMIC PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer and Associate Professor Merritt.

This course is intended to supplement Economics, course 201, and to give an opportunity to those who elect it to make a more intensive study of selected economic problems than was possible in that course. The subject matter varies, of course, to harmonize with changing economic conditions. At present the problems of economic insecurity, of population, of railway regulation or ownership, of international trade, of trade-unionism and of taxation are of dominant interest and importance. These, or as many of them as time permits, are made the subject of careful study, classroom discussion and written reports. Materials are gathered from reference books, government publications, magazines and newspapers, and especial effort is made to encourage the student to think independently and to formulate his own judgments.

COURSES IN SOCIOLOGY.

FOR UNDERGRADUATES

151. SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organizations. Such social institutions as the family, the state, the church and the school are studied as to origin, development, organization and aims. The processes of socialization, social forces, and social control, particularly as they manifest themselves in rural life, receive special emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student to get his social bearings and to find himself as a fact and a factor in the complex interrelations of human society. Assigned library readings and special written reports are required. Instruction is by recitation, class discussion and lectures. Text: Hayes's *Introduction to Sociology*.

156. RURAL SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with the problem of the rural family, the rural school, the rural church, rural societies and associations, the economic and social activities of the community, and the relation of the state to the general welfare. Reasons for the increased interest in rural sociology and problems; the effect of environment and occupation on community life; advantages and disadvantages of rural life; marketing and transportation as factors of community development; the various social institutions of the community, boys' and girls' clubs, men's clubs, the grange, and their possible economic and social activities; the country-life movement, and the reorganization of rural and social forces are then taken up. The interdependence of town, city and rural life are studied, with special emphasis on conditions as they exist in this State. Instruction is by assigned readings, lectures, and recitations. Text: Voght's *An Introduction to Rural Sociology*.

FOR GRADUATES AND UNDERGRADUATES

257. SOCIAL PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Merritt.

A study of social conditions and social legislation, with constructive methods of dealing with present social conditions. Stress is given in the early part of the course to the practical handling of statistical material for the purpose of acquainting students with the most important work done in the field of social inquiry. A study is made of unemployment, old age, invalidity pensions and sickness insurance, workmen's compensation, minimum-wage laws, mothers' pensions, assistance to school children, charity organizations, and employment bureaus. State-aided schemes of social reform and publicity as a means of social reform and control are discussed. Instruction is given by lectures, text, and library work.

260. COMMUNITY PROBLEMS. Elective, both semesters. Class work, one hour. One semester credit. Associate Professor Merritt.

A study is made of the larger problems of urban and rural community life, considered from the sociological standpoint. Agencies and movements for organization, development and improvement; surveys; community centers; schools and churches; granges; agencies of public health, safety, recreation, and charity—all these are investigated. Attention is given to the methods for studying a community so that it may find and organize itself for improvement. Field work, lectures, and library work are the methods of instruction. Arrangements may be made for extended credit by doing more extended field work than is required by the course. (Not offered in 1919-'20.)

263. THEORIES OF SOCIAL PROGRESS. Elective, both semesters. Class conference, two hours. Two semester credits. Prerequisites: Sociology and Economics. Associate Professor Merritt.

A historical survey of social philosophy is made, and this is followed by a detailed study of current theories as they are being applied by theorists to the social problems of the day. Especial attention is given to the interdependence of economic and social theory. Instruction is by assigned readings, lectures, and recitations. Text: *Theories of Social Progress*, by Todd.

266. SOCIAL PSYCHOLOGY. Elective, both semesters. Class conference, two hours. Two semester credits. Prerequisite: Sociology. Associate Professor Merritt.

The social self and the process of its development are studied, together with applications to a variety of social problems, in order to establish a viewpoint, a method for all social sciences. Instruction is by assigned readings, lectures, and recitations. Text: *An Introduction to Social Psychology*, by Ellwood.

Education

Professor HOLTON
 Professor KENT*
 Associate Professor ANDREWS
 Associate Professor PETERSON

Assistant Professor DAVIDSON
 Assistant Professor LLOYD-JONES*
 Assistant Professor CAVE†
 Doctor HOLTZ

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter

* Resigned.

† Second semester, 1919-'20.

of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

The State Board of Education has set up the following standards for the certification of teachers:

1. Three-year Certificates Renewable for Life.
 - a. Complete four years of College work.
 - b. At least eighteen hours of the four years' work must be taken in the Department of Education as follows: (1) Three semester hours in Psychology, three in Educational Administration and three in Educational Psychology or Educational Sociology. (2) Nine semester hours elected from the Department of Education.
 - c. Credit obtained in college courses in the teaching of special subjects will be accepted to the extent of three semester hours to apply on the required credits in Education, provided that these courses are conducted with the approval of the College Department of Education and are offered in the junior or senior year, with preliminary preparation as follows:

English.—Not less than fifteen semester hours of college credit, following at least three high-school units.

Foreign Language.—Not less than fifteen semester hours of college credit in the language in which the teachers' course is taken, following at least three high-school units or equivalent in some foreign language or languages.

Mathematics.—Not less than fifteen semester hours of college credit, following at least two high-school units.

Physical Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in physical science.

Biological Science.—Not less than ten semester hours of college credit in the science in which the teachers' course is taken, following at least two high-school units or equivalent in biological science.

History.—Not less than ten semester hours of college credit, following at least two high-school units or equivalent.

In any of the above, six hours of college credit will be regarded as the equivalent of one high-school unit.
 - d. Valid in any elementary school or high school in Kansas.
2. Three-year Certificates Renewable for Three-year Periods.
 - a. Complete at least two years of College work, including three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching or equivalent courses in the Department of Education which may be acceptable to the State Board of Education.
 - b. Valid in any elementary school, junior high school or high school offering not more than a two-year course of study.
3. Certificates for Teachers and Supervisors of Public-school Music.
 - a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in technical courses in Music.

- (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - (3) Not less than eight semester hours in Methods of Teaching Public-school Music.
 - b. Valid for three years and may be renewed for three-year periods.
4. Certificates for Teachers and Supervisors of Physical Education.
- a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Physical Education.
 - (2) Three semester hours in Psychology, three in Educational Administration and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
5. Certificates for Teachers and Supervisors of Manual Training.
- a. Complete at least two years of College work, including the following:
 - (1) Not less than twenty-eight semester hours in the Department of Shop Practice.
 - (2) Three semester hours in Psychology, three in Educational Administration, and three in Methods of Teaching.
 - b. Valid for three years and may be renewed for three-year periods.
6. Certificates for Teachers of Vocational Agriculture.
- a. Complete four years of College work, including the following:
 - (1) Not less than forty-two semester hours in technical agriculture.
 - (2) Eighteen semester hours in the Department of Education; viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Agricultural Education, three in Special Methods in Agriculture, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.
7. Certificates for Teachers of Vocational Home-making.
- a. Complete four years of College work, including the following:
 - (1) Not less than thirty-six semester hours in technical home economics.
 - (2) Eighteen hours in the Department of Education; viz., three in Psychology, three in Educational Administration, three in Educational Sociology, three in Home Economics Education, three in Special Methods in Home Economics, and three in Supervised Observation and Teaching.
 - b. Valid for three years and may be renewed for life.

COURSES IN EDUCATION

FOR UNDERGRADUATES

101. PSYCHOLOGY I. Freshman or sophomore year, second semester. Class work, three hours. Three semester credits. Required for three-year State certificate. Associate Professor Peterson.

This is an introductory course in psychology for teachers. It consists primarily in a study of the nature of the learning process and of the conditions and methods of study which favor the most rapid and effective progress in learning. The distribution and significance of individual differences and other related topics will also receive attention.

102. PSYCHOLOGY II. Freshman year, first semester. Class work, three hours. Three semester credits. Required for State teachers' certificate in music. Associate Professor Peterson.

This is an adaptation of course 101 to the special needs of music teachers. Less time is devoted to the study of learning and some attention is given to the analysis of musical ability into its elemental capacities. A study is made of the methods of measurement of some of these capacities.

103. PSYCHOLOGY III. Junior year and elective, first or second semester. Class work, three hours. Three semester credits. Required for State life certificate. Associate Professor Peterson.

The aim of this course is to give a fair acquaintance with the more fundamental facts and problems of the entire field of psychology and with the methods by which new facts are ascertained and evaluated. Special attention is given to the psychological factors which directly influence personal efficiency.

104. PSYCHOLOGY IV. Junior or senior elective, both semesters. Associate Professor Peterson.

This course is essentially similar to Course 103, but more attention is given to those phases of individual and applied psychology which bear directly on the practical problems of daily life. Students in agriculture, engineering, and industrial journalism who desire some work in psychology should enroll in this section.

105. EDUCATIONAL ADMINISTRATION I. Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificate. Associate Professor Andrews.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. Study of the school law of Kansas is an important part of the course.

106. EDUCATIONAL ADMINISTRATION II. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Kent.

This course is similar to 105 in the general principles of educational administration in a democracy, but differs from it in that it gives special emphasis to the administration and supervision of vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 105.

109. EDUCATIONAL PSYCHOLOGY. Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificate. Prerequisite: Psychology. Associate Professor Peterson.

The course deals with those aspects of psychology that have a direct bearing upon educational practices. Attention is paid to the results of experimental investigations in the field. Instruction is by lectures and library work.

113. HISTORY OF EDUCATION I. Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY I. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

119. EDUCATIONAL SOCIOLOGY II. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course is similar to 118 in general principles of education in a democracy, but differs from it in that it deals with the concrete objectives in vocational agriculture, homemaking, and trades and industry. Students preparing to teach these subjects should take this course rather than 118.

121. HOME ECONOMICS EDUCATION. Elective, first or second semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisite: Foods I and II, Clothing I and II. Assistant Professor Lloyd-Jones.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

125. AGRICULTURAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Professor Kent or Assistant Professor Davidson.

A comparative study is made of the provisions for agricultural education in Kansas and other states and countries and of the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Prerequisite: Educational Administration. Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Elective, first or second semester. Class work, three hours. Three semes-

ter credits. Expected of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisites: Foods I and II, Clothing I and II, and Psychology. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany course 141.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Elective, second semester. Class work, three hours. Three semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Psychology. Professor Kent or Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work includes observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to the selection of laboratory materials, the supervision of laboratory exercises, and the adaptation of class and laboratory work to each other.

140. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL ARTS SUBJECTS. Elective, second semester. Class work, three hours. Three semester credits. Expected of all candidates for the State teachers' certificate who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Professor Kent or _____.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outlines and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken up. The work includes recitations, class discussions, assigned readings and written reports.

141. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective. Class work, two hours; laboratory, three hours. Three semester credits. Assistant Professor Raburn.

(See Department of Physics, course 224.)

142. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective. Class work, three hours. Three semester credits. Assistant Professor Stratton.

(See Department of Mathematics, course 122.)

143. SPECIAL METHODS IN THE TEACHING OF HISTORY. Elective, first or second semester. Class work, two hours. Two semester credits. Associate Professor Iles.

(See Department of History, course 127.)

144. SPECIAL METHODS IN THE TEACHING OF ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Professors Searson and Davis.

(See Department of English, course 134.)

160. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Elective, first or second semester. Three semester credits. Prerequisites: Foods I and II, Clothing I and II, and Special Methods in the Teaching of Home Economics. Assistant Professor Lloyd-Jones.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the junior high school of Manhattan.

161. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Professor Kent or Assistant Professor Davidson.

Students expecting to teach take this work as a part of the regular class in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticize lesson plans and presentation.

162. SUPERVISED OBSERVATION AND TEACHING IN INDUSTRIAL ARTS. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Professor Kent or _____.

Industrial classes conducted by experienced teachers are visited and careful observations are made in regard to sequence of courses, methods of presentation, interest, class order, and other phases of class work. Reports are presented on this work for discussion. Students are assigned teaching work under careful supervision, results are noted and suggestions are made for individual improvement.

FOR GRADUATES AND UNDERGRADUATES

201. RURAL EDUCATION. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Educational Administration. Professor Holton or Professor Kent.

This course deals with extension education, boys' and girls' club work, the problems of the rural high school, one-room schools, consolidation, social centers, farmers' organization, and all forms of organized community life in the open country, in so far as they bear on the problems of public education. A certain amount of field work is required in connection with the course.

211. MENTAL AND EDUCATIONAL MEASUREMENTS. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Associate Professor Peterson.

This course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

215. APPLIED PSYCHOLOGY. Elective, first or second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Associate Professor Peterson.

A study is made of the psychological conditions of personal, industrial and business efficiency as determined by observation and experiment in such special fields as advertising, salesmanship, employment, scientific management, etc. Special attention is given to the use of psychological tests in employment, vocational guidance, etc.

220. THE AMERICAN HIGH SCHOOL. Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

The course considers the history of secondary education in America with reference to its historic background. The history of the secondary

curriculum, the social function of the high school, its administration and the place and importance of each subject in the course of study will receive consideration.

221. **EXTENSION METHODS AND PROBLEMS.** Elective, second semester. Class work, two hours. Two semester credits. Professor Kent and members of the Extension Division.

The origin and development of extension work, its aim and purposes and relation to other general educational activities are briefly reviewed. The organization and administration of extension work under the Smith-Lever law and the part taken by colleges and the Department of Agriculture; types of extension work conducted by bankers, railroads, manufacturers, and other agencies; and future problems of extension work, are studied.

222. **RURAL ORGANIZATION.** Elective, second semester. Class work, two hours. Two semester credits. Professor Holton and Director Burr.

In this course a study is made of the principles and projects of rural organized activities; the history and development of organizations for rural improvement and progress; the function of such organizations in promoting rural progress and welfare; and the organization, aims and accomplishment of typical rural organizations.

224. **RURAL LEADERSHIP.** Elective, second semester. Class work, one hour. One semester credit. Professor Holton and Director Burr.

This course is a study of the place and function of rural leadership in community development; of how leaders are developed and how they may be used by extra-community agencies in cooperating with the community in movements for community improvement.

FOR GRADUATES

301 and 302. **EDUCATIONAL SEMINAR I AND II.** Open to candidates for the master's degree. First and second semester, respectively. Class work, two hours. Four semester credits on completion of both courses. Prerequisites: Psychology and Educational Administration. Professor Holton and other members of the graduate faculty.

The work consists of lectures, reports, and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a carefully prepared report.

303. **EDUCATIONAL SOCIOLOGY III.** Open to candidates for the master's degree. Both semesters and summer session. Class work, three hours. Three semester credits. Professor Holton.

This course has for its purpose the discovery of the fundamental social objectives for the curricula in high schools and colleges.

306. **EDUCATIONAL ADMINISTRATION III.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The subjects considered are: The financial basis of public education, formation of budgets, structure and administration of the curriculum, administration of vocational training, essentials of the elementary curriculum, use of standard tests and interpretation of data. The problems of supervision as they relate to promotion, retardation and failure will be considered.

307. **HISTORY OF EDUCATION II.** Class work, three hours. Three semester credits. Associate Professor Andrews.

The purpose of the course is to show the intellectual background of history, to sketch rapidly the ethical and educational ideas of the ancient world, the Hellenization of the orient, the rise of Christianity and the development of the Renaissance. Political and social history is considered

only to interpret the educational plan and purpose of the period. Finally, we consider the modern scientific spirit and the modern educational theories, purposes and ideals.

325. **THESIS.** Required of all candidates for the degree of master of science whose major work is in the Department of Education. First and second semesters. Hours of work and credit arranged in conference with the head of the department.

The problem selected for research and investigation must be approved by the graduate faculty of the department.

COURSES IN RELIGIOUS EDUCATION

FOR UNDERGRADUATES

180. **RELIGIOUS EDUCATION I.** Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The controlling purpose of the courses in religious education is the preparation of teachers for Sunday schools. The need for better prepared teachers and for better teaching is recognized by everyone who is familiar with the work of the Sunday schools.

This course comprises a study of the origin of the Bible; the Bible as a social inheritance; the Old Testament history with special emphasis upon the social message of the prophets; the New Testament with attention given to the social teachings of Christ.

182. **RELIGIOUS EDUCATION II.** Elective, first semester. Class work, three hours. Three semester credits. Doctor Holtz.

The fundamental instincts, the physiological and psychological characteristics of the various stages of development, and the best methods of moral and religious instruction suited to these stages are studied in this course.

184. **RELIGIOUS EDUCATION III.** Junior or senior, elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Psychology. Doctor Holtz.

A study is made of the recognized principles underlying modern religious education; the organization of Sunday schools, the subject matter best adapted to each department of the organization; and the application of modern methods of teaching.

English

Professor SEARSON
 Professor MACARTHUR
 Professor DAVIS
 Associate Professor CONOVER
 Associate Professor BURNS
 Assistant Professor RICE
 Assistant Professor HEIZER

Assistant Professor ALDER*
 Instructor LEONARD
 Instructor RUSSEL
 Instructor CHRISTOPH
 Instructor FULLER
 Instructor BOWER

Ability to think well and to speak well, and capacity to appreciate the world's best literature, are recognized essentials of a liberal education. The work of the Department of English is to acquaint the student with the best standards of English practice and appreciation, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English lan-

* In charge of correspondence work in English in Home Study Service, Division of Extension.

guage and literature is thus made the means of increasing the power and efficiency of the individual. It is therefore the aim of the department, in coöperation with the technical departments of the College, to increase the knowledge and effectiveness of the students.

COURSES IN ENGLISH LANGUAGE

FOR UNDERGRADUATES

101. COLLEGE RHETORIC I. Freshman year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Three units of high-school English. Professor Searson, Professor Macarthur, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, and Miss Bower.

After a series of tests to determine the fitness of the student to pursue the work of the course, a rapid, thorough review of the essentials of English is given, special attention being paid to sentence and to paragraph structure. This is followed by themes designed to develop the student's ability to tell accurately what he knows, to describe interestingly what he sees, and, above all, to enable him to relate the subject of English to the work which he expects to do in after life. Texts: Greever and Jones, *Century Handbook of Writing*; Cunliffe and Lomer, *Writing of To-day*, first half.

104. COLLEGE RHETORIC II. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Searson, Professor Macarthur, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, Miss Bower.

This course is a continuation of the work in College Rhetoric I. Special emphasis is laid on outlining and on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course. Texts: Canby and others, *English Composition in Theory and Practice*; Cunliffe and Lomer, *Writing of To-day*, second half.

107. SPECIAL ENGLISH. Freshman year, both semesters. Class work, three hours. No credit. Professor Davis and Assistant Professor Rice.

This course is a review of the essentials of English composition, accompanied by drills in sentence structure and in idiomatic expression, by special exercises and by consultations. It is required of any student assigned to College Rhetoric I who within the first few weeks of the work of that course shows that he is unable to express his ideas clearly and accurately. Textbook: Greever and Jones, *Century Handbook of Writing*.

110. ENGINEERING ENGLISH. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Macarthur and Professor Davis.

This is an advanced course in English particularly adapted to the needs of engineers. The general problems of engineering writing are discussed. Specific assignments are made in the writing of business letters relating to engineering, and in the preparation of technical manuscripts and reports. Essays of especial value to the engineer are read and analyzed. Texts: Watt, *The Composition of Technical Papers*; Aydelotte, *English and Engineering*.

113. ADVANCED COMPOSITION I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Associate Professor Conover.

In this course special emphasis is given to the subject of exposition. The subjects of the themes required are taken as far as possible from the student's particular field of work. Models of reports, explanations and general expository work are carefully studied. Text: Jelliffe, *Handbook of Exposition*.

116. ADVANCED COMPOSITION II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Advanced Composition I. Associate Professor Conover.

Narrative writing is studied in this course, both in its relation to the other forms of composition and as an independent form. The practical forms of narrative are studied in detail, and attention is given to the short story. Text: Buck and Morris, *Narrative Writing*.

119. ARGUMENTATION AND DEBATE. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Burns.

This course includes a systematic study of the theory of debate; brief making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material; and effective methods of refuting arguments. Consultations, library investigations and special group conferences form helpful laboratory features of the course. Text: Stone and Garrison, *Essentials of Argument*.

122. BUSINESS ENGLISH. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course comprises a thorough review of business forms and general business writing, with special attention to business correspondence and special sales letters. A close study is made of the principles of effective writing as they are found applied in the best writing in the commercial world. Text: Gardner, *Effective Business Letters*.

125. ADVERTISING ENGLISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

This course offers a study of the principles of effective English as they are applied in present-day advertising writing. A preliminary survey of the principles of advertising is made in the early part of the course. Later actual practice is given in the writing and printing of the fundamental types of advertisements. Text: Hall, *Writing an Advertisement*.

128. ORAL ENGLISH I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Assistant Professor Heizer.

In this course a study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music. Text: Brewer, *Oral Composition*.

131. ORAL ENGLISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Assistant Professor Heizer.

This course is a continuation of Oral English I, but does not require it as a prerequisite. Attention is directed especially to the forms of oral English more commonly employed, such as conversation, the toast or after-dinner speech, introductions, nominations, announcements, pres-

entations, and the like. For reading the students are directed to current magazines so as to be able to discuss current events of all kinds. Text: Brewer, *Oral Composition*.

134. METHODS OF TEACHING ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course is planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the application of English instruction to life needs and definite methods of motivating English instruction are specially considered. Text: Carpenter, Baker, and Scott, *The Teaching of English*.

137. AGRICULTURAL ENGLISH. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis and Associate Professor Conover.

This course consists of a rapid review of the essentials of English composition as applied in the business writing of the modern farmer. Business correspondence, bulletin writing, the organization of short business talks, and the basic principles of farm advertising are considered. The problems of writing that confront the county agent, the high-school teacher of agriculture, and the farm manager are made the subject of discussion and practice.

FOR GRADUATES AND UNDERGRADUATES

201. FARM ADVERTISING. Elective, first semester. Class work and practice, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads," "story ads," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary. Text: Starch, *Advertising*.

204. FARM BULLETINS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins are made the basis for the work. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write farm bulletins.

207. TECHNICAL WRITING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: One of the following courses: 113, 116, 122, 125, 201, 204. Professors Searson and Macarthur.

This course is planned to help students properly to record and to report technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness. Text: Watt, *The Composition of Technical Papers*.

251. THE SHORT STORY. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Assistant Professor Rice.

Practice in writing short stories, based upon thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action, and character analysis—are especially emphasized. Text: Eisenwein, *Writing the Short Story*; Ashmun, *Modern Short Stories*.

254. COMMUNITY ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Professor Searson and Assistant Professor Heizer.

This course comprises the study and practice of the English work most needed in the activities and recreations of community life. A detailed study is made of the pageant. The class is organized as a special group and its members are trained in the various forms of procedure that may be required in the rural community. Text: Bates and Orr, *Pageants and Pageantry*.

FOR GRADUATES

301. HISTORY OF LANGUAGE I. Elective, first semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Macarthur.

This course offers a study of the origin and development of the English language. Special emphasis is placed on Old English. Texts: Wyld's *Historical Study of the Mother Tongue* and Bright's *Anglo-Saxon Reader*.

302. HISTORY OF LANGUAGE II. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Macarthur.

This course is a continuation of History of Language I. Special emphasis is placed on Middle English and Modern English. Texts: Wyld's *Historical Study of the Mother Tongue* and Emerson's *Middle English Reader*.

304. SPECIAL STUDIES IN APPLIED ENGLISH. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: History of Language II. Professor Searson and Associate Professor Conover.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

COURSES IN ENGLISH LITERATURE

FOR UNDERGRADUATES

171. ENGLISH LITERATURE I. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: College Rhetoric II. Professor Searson, Professor Davis, Associate Professors Conover and Burns, Assistant Professors Rice and Heizer, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller, and Miss Bower.

In this course the students are made familiar with the principles of literary appreciation and are taught to apply them to selected texts in narrative, lyric and dramatic poetry, as well as in fiction, the essay, and the oration. The work of the course is intensive, notebooks are kept, and frequent tests are given. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

174. ENGLISH LITERATURE II. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: English Literature I. Professors Searson and Davis, Associate Professors Conover and Burns, Miss Leonard, Miss Russel, Mr. Christoph, Miss Fuller and Miss Bower.

This course presents history of English literature by means of lectures and of discussions of the text. Extensive assignments in reading are made, and reports are given in class. Weekly tests are required. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis, Assistant Professors Rice and Heizer, Miss Russel, and Miss Bower.

This course offers in slightly condensed form the work given in course 171. Texts: Heydrick, *How to Study Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

180. ENGLISH LITERATURE HE-II. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: English Literature HE-I. Professor Davis, Associate Professor Conover, Assistant Professors Rice and Heizer, Miss Russel, and Miss Bower.

This course presents a history of English literature in much the same way as course 174. The amount of reading required is slightly less. Texts: Long, *English Literature*, and Cunliffe, Pyre, and Young, *Century Readings in English Literature*.

FOR GRADUATES AND UNDERGRADUATES

271. THE ENGLISH BIBLE I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Macarthur.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power. Text: Moulton, *Short Introduction to the Literature of the Bible*.

272. THE ENGLISH BIBLE II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Macarthur.

This course, while being a continuation of The English Bible I, is in itself an independent unit and does not require The English Bible I as a prerequisite. Text: Moulton, *Modern Reader's Bible*.

274. THE SHAKSPEREAN DRAMA. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Searson and Professor Macarthur.

This course includes a study of Shakspeare's life and times and the reading of ten of his greatest plays. Text: Boas, *Shakspeare and His Predecessors*.

277. NINETEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Macarthur and Associate Professor Conover.

In this course there is discussion of the literary movements found throughout the century, especially in the Victorian period. Significant works are read and are made the subjects of class reports and discussions. Text: Saintsbury, *Nineteenth Century Literature*.

280. AMERICAN LITERATURE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professor Davis and Assistant Professor Heizer.

The course consists of lectures on the history of American literature and of class reports on assigned readings. A special study is made of the standard works of the chief American authors. Text: Curtis Hidden Page, *Chief American Poets*.

282. CURRENT LITERATURE. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I. Associate Professor Conover.

It is the aim of this course to establish a definite basis or standard of literary criticism and appreciation by an inductive study of contemporary literature. The course includes a consideration of the best works of such literary figures as Tagore, Henry James, Maeterlinck, Galsworthy, Anatole France, Thomas Hardy, Tchekov, Bernard Shaw, Selma Lagerlof, Emile Verhaeren, Arnold Bennett, Stephen Phillips, Wm. Butler Yeats, J. M. Synge, Alfred Noyes, and the younger group.

285. THE NOVEL. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature II. Associate Professor Conover and Miss Russel.

A study of the English novel, including the discussion of its historical development, its relation to other forms of fiction, and its place in contemporary literature. Especial attention is given to representative works of modern writers, both English and American. Text: Cross, *The Development of the English Novel*.

288. ENGLISH SURVEY I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Searson, Professor Macarthur.

This course offers an advanced study in the history of English literature. Beginning with Anglo-Saxon times, the course continues through the Middle English period down to the close of the Elizabethan period. Text: Garnett and Goss, *History of English Literature*, Vols. I and II.

290. ENGLISH SURVEY II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Survey I. Professors Searson and Macarthur.

This course is a continuation of English Survey I. It traces the rise of Puritanism and its influences on English literature. Emphasis is placed upon the classical movement. A brief survey is made of romanticism and its development. Text: Garnett and Goss, *History of English Literature*, Vols. III and IV.

292. BROWNING. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Macarthur.

This course offers a study in the interpretation of the most important poetic and dramatic works of Robert Browning. Texts: Browning's *Complete Poetical Works* and Phelps' *Browning, How to Know Him*.

294. TENNYSON. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I. Professors Searson and Macarthur.

This course offers a study in the interpretation of the most important poetic works of Alfred Tennyson. Texts: Tennyson's *Complete Poetical Works* and Van Dyke's *The Poetry of Tennyson*.

295. THE ARTS AND CRAFTS MOVEMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Macarthur.

This course takes as its basis the life of William Morris, and treats of the arts and crafts movement in its relation to literature. Works of Morris, Rossetti, Ruskin, and other writers of the same group are read and discussed. Text: Mackail's *Life of William Morris*.

FOR GRADUATES

310. THE ROMANTIC MOVEMENT I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course offers advanced work in the study of eighteenth century romanticism. Text: Beers, *A History of English Romanticism in the Eighteenth Century*.

313. THE ROMANTIC MOVEMENT II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course continues throughout the Victorian period the work done in the preceding course. Text: Beers, *A History of English Romanticism in the Nineteenth Century*.

Entomology

Professor DEAN
Assistant Professor MERRILL
Assistant Professor SMITH

Associate Entomologist McCOLLOCH
Assistant HAYES

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedded ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air-conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station with all the necessary equipment provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

101. GENERAL ENTOMOLOGY. Junior year and elective, both semesters and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: General Zoölogy I and II. Professor Dean, Assistant Professor Smith.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history

and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

106. HOUSEHOLD ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Zoology I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects, complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

111. APICULTURE. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping, the best methods used among beekeepers being discussed. A study is made of bee diseases and of the standard methods to be used in their eradication and control. A study is also made of the relation of bees to agriculture and horticulture.

116. MILLING ENTOMOLOGY. Junior year, second semester. Class work, one hour. One semester credit. Professor Dean.

This is a study of the insect pests of flour mills, elevators, granaries, warehouses, and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips are made to flour mills and warehouses.

FOR GRADUATES AND UNDERGRADUATES

201. HORTICULTURAL ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This is a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

206. GENERAL ECONOMIC ENTOMOLOGY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Professor Dean.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

211. INSECT MORPHOLOGY I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals exclusively with the external anatomy of representative insects belonging to a number of orders. The types studied are selected so as to present the essentials of the structure of the exoskeleton and to afford a basis for the courses in taxonomy and for professional studies in hexapod morphology.

212. INSECT MORPHOLOGY II. Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisite: Insect Morphology I. Assistant Professor Smith.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

216. PRINCIPLES OF TAXONOMY. Elective, second semester. Lectures, one hour. One semester credit. Prerequisites: (1) For students taking Taxonomy of Insects I: General Entomology and Insect Morphology I. (2) For students taking Taxonomy of Vertebrates: General Zoölogy I and II. All students registering in either of the above-mentioned courses must also register for this course. Courses cannot be taken separately. Assistant Professor Smith.

This course of lectures deals with the fundamental principles of modern taxonomy. The following subjects are considered in detail: Systems of classification; terminology of taxonomic groups; criteria of species and genera, binomial nomenclature, pre-Linnæan and modern nomenclature; international code of zoölogical nomenclature, and other codes; law of priority; and modern tendencies in taxonomy.

217. TAXONOMY OF INSECTS I. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: General Entomology and Insect Morphology I. Students registering for this course must also register for the course in Principles of Taxonomy. Assistant Professor Smith.

This is a study of the general principles of the classification of representative insects. The purpose of the course is so to familiarize the student with the literature, methods and ideals of classification that he will be able to identify unknown forms and to pursue advanced taxonomic studies.

218. TAXONOMY OF INSECTS II. Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisite: Taxonomy I and Insect Morphology II. Assistant Professor Smith.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected groups.

221. ADVANCED GENERAL ENTOMOLOGY. Elective, first semester. Class work, three hours. Three semester credits. The class work consists of lectures, assigned readings, and written reports. Prerequisite: General Entomology. Assistant Professor Smith.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology are correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course includes, in part, a detailed consideration of the following: Phylogeny of insects and their relatives; metamerism; reproduction; gynandromorphism; parthenogenesis; pædogensis; polyem-

brony; respiration; temperature; embryology; internal and external metamorphosis; metabolism; aquatic insects, their evolution, adaptations, and activities; regeneration; experimental work with insects; insect parasitism; color and coloration; insects in relation to other organisms; insect behavior; and geological and geographical distribution.

226. MEDICAL ENTOMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Assistant Professor Smith.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

Laboratory.—The laboratory work consists of a careful study of insects and other arthropods which may affect the health of man directly, and of those which may be instrumental in the dissemination of disease; also a study of the causative organisms of certain insect-borne diseases and the methods by which these organisms are transmitted.

228. ADVANCED APICULTURE. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: The regular course in apiculture, Entomology 111 or its equivalent. Assistant Professor Merrill.

This course is a continuation of the regular course in apiculture. The primary object of this course is to make a detailed study of the principles of bee behavior, and how these are related to practices of good beekeeping, special attention being given to the different forms of the behavior exhibited by the bees throughout the different seasons of the year, and the beekeeping practices which should be adopted to conform to this behavior. Since it begins in the first semester, problems that apply particularly to that time of the year are taken up, such as preparation for wintering, feeding for winter, and winter protection. Observations are made on the merits and demerits of different systems of wintering. Extracting honey, preparing it for market, marketing, and other advanced subjects are studied.

230. INSECT HISTOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: General Entomology and General Cytology. Assistant Professor Smith.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects; practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining and mounting the various groups of insects and insect tissues afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

231. ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, first semester. Lectures, one hour. One semester credit. Prerequisite: General Entomology. Assistant Professor Smith.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the

needs of advanced undergraduates and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to take this course.

236. ZOÖLOGY AND ENTOMOLOGY SEMINAR. Elective, both semesters. One two-hour session each week. One semester credit. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussion of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

316. RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems. Prerequisites: (1) For research in taxonomy and morphology: General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. (2) For research in economic entomology: General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I. Professor Dean, Assistant Professors Merrill and Smith, and Associate Entomologist McColloch.

Geology

Professor NABOURS*
Associate Professor NEWMAN

By use of abundant illustrative material, an effort is made to have the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. 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 series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, limestone, glacial drift and sand dunes, are available for illustrative purposes.

* Absent on leave, 1919-'20.

COURSES IN GEOLOGY

FOR UNDERGRADUATES

101. DYNAMIC AND STRUCTURAL GEOLOGY. Elective, first semester. Class work, two hours; two field trips during the semester. Two semester credits. Professor Nabours.

This course consists of a brief study of the structure of the earth, and of the agencies by which rocks are formed or destroyed and the topographic features of the earth produced. Text: *Introductory Geology*, by Chamberlain and Salisbury.

102. ENGINEERING GEOLOGY. Junior year and elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Professor Nabours and Associate Professor Newman.

The class work consists of a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks and their mineral constituents.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORICAL GEOLOGY. Elective, second semester. Class work, two hours; two field trips during the semester. Two semester credits. Prerequisites: Geology 101, Elementary Zoölogy, and General Botany, or equivalent. Professor Nabours.

This course takes up a brief study of the history of the earth as shown by the record in the rocks. Special emphasis is placed on the history of life as indicated by the fossils.

 History and Civics

Professor PRICE
Associate Professor ILES
Associate Professor JAMES

Assistant Professor PEINE
Instructor OREM

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment and general culture are constant and specific aims of each course offered by the Department of History and Civics. As a result of the training received in these courses the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast. In our modern age and self-governing nation, and in an institution supported by the State and Nation, it would seem to be the imperative duty of every student to secure specific training for wise and effective leadership in the governmental affairs of the State and Nation that are thus preparing him for life and its duties.

COURSES IN HISTORY

FOR UNDERGRADUATES

101. AMERICAN HISTORY I (*or* BEGINNINGS OF THE AMERICAN NATION). Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the

end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations, based on *An American History Notebook*, by R. R. Price.

103. AMERICAN HISTORY LECTURES. Elective, both semesters and summer school. Two one-hour lectures a week. No credit. No prerequisite. Professor Price.

This series of lectures follows the outline given in *An American History Notebook*, which is used as the basis for the work in American History I, American History II, and American History III. Therefore this course is directly helpful to students taking any one of the three courses named above. To students taking only one of the above-named courses, these lectures give some insight as to the content of the other two courses. Since *An American History Notebook* has been adopted by the State Textbook Commission for use in the schools of the State, these lectures are also directly helpful for any student who expects to teach American history either in the grades or in high school. Only those who are regularly assigned to this course are permitted to attend the lectures; and when the student is assigned, regular attendance is required. There are no recitations and no examinations connected with this course. Students are permitted to ask questions at the close of each lecture. The course is based on Price's *An American History Notebook*.

105. AMERICAN INDUSTRIAL HISTORY. Sophomore and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Peine.

This course traces the history of American agriculture, manufactures, and commerce with related activities from their colonial beginnings to the present. It includes a survey of the physical basis for American history, the growth of population and its expansion across the continent, and the reflection of these things on our industrial, social and political life. European developments, especially the industrial revolution and the expansion of commerce, are studied for the light they throw on American history. Finally, throughout the course an attempt is made to trace the growth of our national industrial organization and its present-day aspects. This course is based on *Outlines of American Industrial History*, prepared by the department. A text, such as Coman's *Industrial History of the United States* or Bogart's *Economic History of the United States*, is required, and the student is held responsible (a) for the contents of his text and (b) for assigned library work and lectures.

121. ENGLISH HISTORY. Sophomore year, both semesters and summer school. Class work, three hours. Three semester credits. Not open for credit to students who offer English history for entrance; such students should take History 226 or some other three-hour College course in history. Associate Professor James.

This is a general survey of the whole field of English history with some emphasis on the modern period. It includes the outlines of political history and the essentials of English constitutional development. Special attention is given to the development of the empire, to the English background of American history, and to the industrial and social development of the English people. The work is based on Cheyney's *Short History of England*, with lectures and assigned readings.

123. HISTORY OF WESTERN EUROPE. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Peine.

This is a general course in the history of Europe from the fall of Rome to the end of the Napoleonic era. It includes a study of medieval institutions, the rise of towns and commerce, the development of western nations, the Renaissance and the Reformation, the commercial and industrial revolution, and the expansion of Europe, and closes with a survey of France in the eighteenth century, the French Revolution, and the age of Napoleon. The work is based on a standard text with lectures and assigned readings.

126. CURRENT HISTORY. Freshman year, both semesters and summer school. Class work, one hour. One credit each semester. Open as elective for not to exceed a total of four semester credits. Associate Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly magazine, such as *The Independent* or *The Outlook*; but this is supplemented by such monthly periodicals as *The Review of Reviews*, *Current History*, and *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Elective, summer school. Class work, four hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussion based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on methods in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. The course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

FOR GRADUATES AND UNDERGRADUATES

202. AMERICAN HISTORY II (or WESTWARD EXPANSION AND SECTIONALISM). Elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruc-

tion is by means of lectures, recitations, and readings, based on *An American History Notebook*, by R. R. Price.

203. AMERICAN HISTORY III (*or* THE NEW INDUSTRIAL AGE). Elective, second semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course opens with a review of the industrial conditions in America just before the Civil War; next a careful examination is made of the industrial effects of that war; finally a study of the political and constitutional history of the last half-century is made in the light of the industrial conditions and developments of the same period. Manufactures, commerce, and especially agriculture, are carefully examined, particularly with reference to the South and West. The new developments in political parties and the new devices in self-government are carefully studied as to developments, cause, and present conditions. The new America, with its spirit of nationality, its emphatic self-government, and its new world power and responsibility, are studied especially in the light of the new industrial developments. Instruction is imparted by lectures, recitations, assigned readings, and special reports.

204. AMERICAN AGRICULTURAL HISTORY. Elective, first semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course is intended primarily for students in the Division of Agriculture. It devotes itself chiefly to the history of American agriculture. The course starts with a study of European background and Indian beginnings. It traces and compares the agricultural development of New England, the South and the central colonies during the colonial period; then follows the westward movement into the prairie regions of the Mississippi valley, with the distinctive American developments in methods, live stock, and especially farm machinery. The course gives special consideration to the South with its cotton, to the Northwest with its wheat, to the Southwest with its live stock, and to the corn belt with its varied industries. A special study is made of the last quarter-century, when varied industries, more intensive farming and the high cost of living are replacing extensive mining of the soil, with its remarkable era of low cost of living, its sudden accumulation of wealth, and its rapid development of civilization. The relation of all this to our own State is constantly kept in view. This course should be supplemented by the course in American Political History. Instruction is given by lectures and recitations, readings and reports.

206. AMERICAN POLITICAL HISTORY. Elective, first semester. Class work, two hours. Two semester credits. This course is especially intended to supplement course 204 or course 105; it is not open for credit to students who have credit in course 202. Associate Professor Iles.

This course gives the story of the origin, development, leaders and function of political parties in America, and studies the issues and results of the more important presidential elections. It traces the growth of nationality and the development of self-government through American history, but with special reference to present tendencies. This is a very desirable course for any one who would understand and appreciate present political and governmental conditions and tendencies.

207. PAN-AMERICA. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor James.

The history, government, and industrial conditions of Canada, Mexico, and the South American nations, and the interrelations of each of these and the United States are studied in this course.

223. MODERN EUROPE (SINCE 1814). Sophomore and junior years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of the modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. Recitations, lectures, and assigned readings. Text: Hayes's *A Political and Social History of Modern Europe*, Vol. II., with special studies on the World War.

225. HISTORY OF THE HOME. Elective, second semester. Class work, three hours. Three semester credits. Miss Orem.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history of the home and family during the Middle Ages, including the influence of the Christian church. Next the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home is studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family*, supplemented by lectures and special studies.

226. MODERN ENGLAND AND THE BRITISH EMPIRE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Entrance credit in English history or three hours College credit in history, preferably History 121. Associate Professor James.

This course begins approximately with the accession of the Tudors in 1485. Special emphasis is placed on the beginnings and growth of world empire, England's part in international affairs, the economic and social history of the British Islands, and the changes by which England's government has become a practical democracy. The work closes with a survey of England and her empire as they exist to-day with their part in the World War. The course is based on Cross's *History of England and Greater Britain*, with lectures, assigned readings, and reports.

228. IMMIGRATION AND INTERNATIONAL RELATIONS. Elective, second semester. Class work, two hours. Two semester credits. Professor Price.

The title of the course suggests its content. It includes a study of the causes and the effects—economic, social, and political—of the coming of the foreigner to our shores, including the colonial period, the middle period, and the period since our Civil War, with special reference to the recent changes both as to character of the immigrants and the conditions in America. The text for this part of the course is Fairchild's *Immigration—A World Movement and Its American Significance*. The second part of the course is covered by lectures and assigned readings and reports. The text for the second part of the course is Latane's *From Isolation to Leadership*.

COURSES IN CIVICS

FOR UNDERGRADUATES

151. AMERICAN GOVERNMENT. Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the

function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

152. COMMUNITY CIVICS. Elective, summer school. Class work, four hours. Two semester credits. Another hour of credit may be obtained by a limited number of students who have time to devote to special problems. Associate Professor Iles.

This course deals chiefly with the functions of government as manifested in community life. It is designed to afford a basis both in subject matter and in method for those teachers who desire to present civics in direct relation to individual welfare. The use of local material in teaching civics is illustrated and the structural side of government is reviewed as far as is necessary to show the means through which the functions are performed.

153. BUSINESS LAW I. All years, both semesters. Class work, one hour. One semester credit. Assistant Professor Peine.

This course includes a careful study of the essential principles in the law of contracts, of sales, and of negotiable instruments. It should be followed by Business Law II. Text: Huffcut's *Elements of Business Law*.

154. BUSINESS LAW II. Elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Business Law I. Assistant Professor Peine.

This course includes a careful study of the more fundamental principles of the law of agency, of insurance, of guarantee and damages; of partnership and corporations; of bailments, including common carriers; of torts, especially the law of negligence; and of patent rights. Text: Huffcut's *Elements of Business Law*, and the *Kansas Statutes*.

155. FARM LAW. Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor Peine.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Bay's *Business Law*, supplemented by Green's *Law for the American Farmer*, and by the *Kansas Statutes*.

FOR GRADUATES AND UNDERGRADUATES

252. COMPARATIVE GOVERNMENT. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor Iles.

This course comprises a study of the leading features, especially with regard to administration, of certain European governments such as England, France, and Germany, and a comparison of essential features with government in the United States. It is planned to supplement and round out the course in American Government. Text: Macy and Gannaway's *Comparative Free Government* or Holt's *Introduction to the Study of Government*.

Industrial Journalism and Printing

Professor CRAWFORD
Associate Professor ROGERS

Assistant Professor KEITH
Instructor POLSON

The work in industrial journalism and printing is designed to accomplish two purposes: the preparation of students who expect to be leaders in industrial, economic, and social life to do occasional writing for newspapers and other periodicals on subjects of special interest; and the training of students fundamentally interested in journalism for positions on farm journals, newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist*, the official paper of the College, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing. In it is published acceptable matter prepared by students. The office of *The Kansas State Collegian*, the student semi-weekly newspaper, is in the department practice room. Students write also for general newspapers, farm journals, and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two semesters of which are required of all students taking the curriculum in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which the instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of agricultural publications, newspapers, and trade journals.

The printing plant contains a linotype, a two-revolution cylinder press, a drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, a folding machine, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN INDUSTRIAL JOURNALISM AND PRINTING

FOR UNDERGRADUATES

101. PRINCIPLES OF TYPOGRAPHY I. Freshman year, first semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Assistant Professor Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. The history of printing is presented

and a study is made of the development of the various typographical styles. Practice is given in setting straight matter. Emphasis is laid on accuracy.

104. PRINCIPLES OF TYPOGRAPHY II. Freshman year, second semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Assistant Professor Keith.

The work of the preceding course is continued, a study being made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated. The use of cost systems in printing offices receives attention.

107. ELEMENTARY JOURNALISM. Sophomore year, both semesters. Class work, two hours. Two semester credits. Miss Polson.

The course is intended to give the student practical experience in the fundamentals of news writing. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered.

113. INDUSTRIAL WRITING. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Elementary Journalism. Miss Polson.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The work of the College and the Experiment Stations affords the basis for the study and practice.

121. AGRICULTURAL JOURNALISM. Junior year, both semesters. Class work, one hour. One semester credit. Associate Professor Rogers.

The course is intended to supply students in the course in agriculture with sufficient knowledge of the principles of news writing, as applied to agriculture, to enable them to become occasional contributors to newspapers and farm journals. Much practice in agricultural writing is given in the course.

123. INDUSTRIAL FEATURE WRITING. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Writing. Associate Professor Rogers.

This course takes up the feature story, with careful attention to both the informative and the entertaining type. The principles underlying the feature story are applied to writing on agricultural and other industrial subjects. The demands of newspapers, farm journals, and general magazines for writing of this character are analyzed.

125. PRINCIPLES OF ADVERTISING. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing. Professor Davis of the Department of English.

This course considers the fundamentals of advertising as a part of modern business. The study of the goods to be advertised, the analysis of the market, the psychology of advertising, the preparation of advertising copy, and other important matters are taken up. The student is required to make application of the principles brought out in the course.

130. TECHNICAL JOURNALISM. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Feature Writing. Associate Professor Rogers.

The course deals specifically with agricultural journals, trade journals, and other publications of highly specialized character. The writing which is done in the course is done for publications of these types, and the students are required to submit their material to editors. A beginning is made in the study of the desk work required on a technical journal, including the handling of copy, the use of illustrations, and the principles of make-up from the editorial standpoint.

110, 116, 127, 133. JOURNALISM PRACTICE I, II, III, IV. These courses comprise laboratory practice accompanying courses 107, 113, 123, 130. Sophomore and junior years. Six hours. Two semester credits for each course. Prerequisite for each semester is the work of all preceding semesters in Journalism Practice. Professor Crawford, Associate Professor Rogers and Miss Polson.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department workroom. The College campus is divided into "runs," which the students must cover at regular intervals, and assignments are given at specific times. The work given is suited to the advancement of the student. As he progresses in his work he is required not only to obtain news and feature stories, but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

201. CIRCULATION AND ADVERTISING PROMOTION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Technical Journalism. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The advertising agency, the circulation analysis, and the fixing of advertising rates are treated.

204. COPY READING. Senior year, first semester. Laboratory practice, six hours. Two semester credits. Prerequisite: Technical Journalism. Associate Professor Rogers.

The course continues the work begun in Technical Journalism, and gives practice in the work required of the copy reader, whether on a newspaper, an agricultural journal or some other publication. A study is made of newspaper style and of magazine and book style, the distinction between the two being clearly pointed out. The writing of heads and titles and proof reading receive detailed attention. A large amount of copy is actually handled in class, and papers of various types are made up as practice assignments.

207. EDITORIAL PRACTICE. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, and exchange matter. The acceptance and rejection of contributions receive consideration. Editorial policies and their influence form the subject of careful discussion.

210. ETHICS OF JOURNALISM. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Circulation and Advertising Promotion. Professor Crawford.

The course treats ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter or staff writer, in the editorial conduct of the paper, and in the handling of circulation and advertising. The federal and state laws relating to periodical publications,

to advertising, to libel, and to authors' rights, including the federal law of copyright, are treated. The attitude of periodical publications on matters of ethics and law is observed at first hand by the students.

212. PRINTING COST ACCOUNTING. Elective, second semester, on permission of the instructor. Class work, two hours. Two semester credits. Assistant Professor Keith.

Cost-finding systems adapted to various sizes and kinds of printing plants are studied in detail in this course. The figuring of costs, the economical routing of work through the plant, the purchase of stock and other supplies, and other problems of management are treated. All books and records commonly kept in printing offices are studied.

213. MATERIALS OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Miss Polson.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

216. MAGAZINE FEATURES. Elective, second semester, on permission of the instructor. Two semester credits. Miss Polson.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

219. HISTORY OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course deals with the history of journalism from its beginning and with the history of printing so far as this is concerned with periodical publications. Most of the time of this course is given to journalism in England, Canada and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century, and the several types which arose because of this are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

222. JOURNALISM SURVEYS. Elective, second semester. Laboratory work, six hours. Two semester credits. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated, and studies are made of the relation of the reading matter to the industrial, economic, social, and moral life of the communities.

225. CURRENT PERIODICALS. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course comprises a study of current periodicals of various types. Special emphasis is laid on the material that they contain and the nature of its appeal to the reader. It is a nontechnical course, intended to give general students some knowledge of the field of current periodical literature.

227. JOURNALISM FOR VOCATIONAL TEACHERS. Elective, summer school. Class work, four hours. Two semester credits. Associate Professor Rogers.

This course is offered to meet the demand of teachers who feel the need of special training in news gathering and editing to enable them to use

effective publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical news material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper is required of each student taking the work.

FOR GRADUATES

Special courses will be arranged to meet the specific needs and desires of individual graduate students. These courses will in general embody creative literary work or detailed research in specialized journalism.

Library Economy

Librarian SMITH
Associate Librarian DERBY

Reference Assistant HEDRICK
Reference Assistant SANKEE

The Library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the Library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSE IN LIBRARY ECONOMY

FOR UNDERGRADUATES

101. LIBRARY METHODS. Freshman year, both semesters. Class work, one hour. One semester credit. Associate Librarian Derby, Miss Hedrick, and Miss Sankee.

The course consists of lectures on classification and arrangement of books in the Library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals, etc. Instruction is given, also, in methods of indexing current reading for purposes of future reference.

Mathematics

Professor REMICK
 Professor WHITE
 Associate Professor STRATTON

Assistant Professor FEHN
 Instructor HOLROYD
 Instructor MCKITTRICK

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

101. PLANE TRIGONOMETRY Freshman year, first and second semesters: Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*

104. COLLEGE ALGEBRA Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Rietz and Crathorne's *College Algebra*.

107. COLLEGE ALGEBRA A. Freshman year, second semester. Class work, five hours. Five semester credits. Prerequisites: Plane geometry and one year of high-school algebra. Professor Remick, Professor White, Associate Professor Stratton, Assistant Professor Fehn, Miss Holroyd, and Miss McKittrick.

After a brief review of elementary subjects, a thorough treatment of quadratics, ratio, proportion, progressions, and the binomial theorem for positive exponents is given. The remainder of the course follows closely the chief content of course 104. Text: Rietz and Crathorne's *College Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Sophomore year, first semester. Class work, four hours. Four semester credits. Prerequisites: Plane Trigonometry and College Algebra. Professor White, Associate Professor Stratton, and Assistant Professor Fehn.

This course treats of coördinate systems, projections, loci, straight line, conics, parametric and empirical equations, with a discussion of the general equation of the second degree. Text: Tanner and Allen's *Brief Course in Analytical Geometry*.

113. CALCULUS I. Sophomore year, second semester. Class work, five hours. Five semester credits. Prerequisite: Plane Analytical Geometry. Professors Remick and White and Associate Professor Stratton.

The usual topics of differential calculus are considered together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus I. Professors Remick and White and Associate Professor Stratton.

In this division of the subject emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

119. CALCULUS. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professors Remick and White.

This course is designed especially for students intending to teach secondary mathematics and for those interested in the natural sciences. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and mechanics. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

122. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry; a study of the report of prominent mathematical organizations, especially those of the international commission; a comparison of the curricula of different schools—these are some of the matters which receive attention. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

125. ANALYSIS OF STATISTICS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick and Associate Professor Stratton.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, readings, and recitations.

128. MATHEMATICS OF BIOLOGY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. The course is designed to meet the needs of students in biology and is taught largely by the lecture method.

131. INSTITUTIONAL ACCOUNTING. Elective, second semester. Class work, three hours. Three semester credits. Associate Professor Stratton.

This course treats of accounting for institutions such as colleges, schools, clubs, societies, industrial and social organizations. The practice work includes preparation for publication of statements of income and expenditure, balance sheets, treasurer's reports, financial data and statistics, and of the annual returns of net income required under the federal income-tax law. A study is made of the mathematics of investments, the handling of endowment and trust funds, and the preparation of budgets. The work proceeds by lectures, discussions, written reports, and exercises.

134. ACCOUNTING PRACTICE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary Bookkeeping. Associate Professor Stratton.

This course includes an analysis of the development and structure of bookkeeping methods, the accounts of single proprietors, partnerships and corporations, the construction of manufacturing and trading profit-and-loss accounts and balance sheets, the analysis of railroad reports and bank statements, including bankruptcy and receivership conditions. The course is designed to give the students power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

201. DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered, together with the usual applications. Text: Murray's *Differential Equations*.

204. METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Calculus II. Professors Remick and White.

This course includes a study of the law of error based on the theory of probability and the probability curve; adjustments of observations by the method of least squares; development of precision measures; distribution of errors; and Gauss's method of substitution in the solution of normal equations. The solution of a number of problems is required.

207. SOLID ANALYTICAL GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Plane Analytical Geometry and Calculus II. Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of lines and planes. The standard types of quadratic surfaces are considered together with their classification and principal properties. Text: Snyder and Sisam's *Analytical Geometry of Space*.

210. ADVANCED CALCULUS I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor White.

This course considers primarily special topics in integral calculus, including various methods of integrating elementary forms, a discussion of definite integrals with attention to the gamma and beta functions, and applications to lengths and areas. Text: Byerly's *Integral Calculus*.

213. ADVANCED CALCULUS II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Advanced Calculus I. Professor White.

This is a continuation of course 210, including further applications to geometry and mechanics, a treatment of line, surface, and space integrals, and a discussion of elliptic integrals. Text: Byerly's *Integral Calculus*.

216. THEORY OF EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick.

The course presupposes familiarity with the elements of the classical theory of the subject and treats particularly the modern development based upon the ideas connected with substitution groups and leading to the discussion of the solution of the general algebraic equation from the standpoint of the Galois theory. Text: Cajori's *Modern Theory of Equations*.

FOR GRADUATES

301. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Advanced Calculus II and Differential Equations. Professor Remick.

The usual line of topics is treated through lectures, discussions, and reports.

306. THEORETICAL MECHANICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Associate Professor Stratton.

It is assumed that the student entering upon this course is familiar with certain preliminary ideas found in textbooks on general physics, and the subject of mechanics is treated in its relation to mathematical analysis.

311. PROJECTIVE GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Professor White.

This course includes a treatment of the fundamental forms, projective relations, point rows, and pencils of the second order, poles and polars, properties of conics, and involution.

Military Training

FREDERICK B. TERRELL (Captain Inf., U. S. A.), Professor of Military Science and Tactics, Commandant of Cadets
 LEWIS C. DAVIDSON (Captain Inf., U. S. A.), Associate Professor of Military Science and Tactics
 EDWARD L. CLAEREN (Formerly Major, U. S. A.), Secretary
 FRANK CUMISKEY (First Sergeant Inf., U. S. A.), Instructor
 ARTHUR H. LENZ* (First Sergeant Inf., U. S. A.), Instructor
 F. L. STEINER† (First Sergeant Inf., U. S. A.), Instructor

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curricula. All young men of age, not physically disqualified, are required to take military training four full hours a week for two years. A student entering as a junior or above is held for military science for the time necessary to complete the remainder of his College course unless this period is reduced by credits accepted from another institution.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests

* Resigned, March 14, 1920.

† Beginning March 22, 1920.

are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from military science on account of physical disability are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused, but must make it up later.

The act of Congress of June 3, 1916, known as the national defense act, provides for the establishment in civil institutions of a Reserve Officers' Training Corps (R. O. T. C.).

The object of this provision is stated as follows:

"The primary object of establishing units of the Reserve Officers' Training Corps is to qualify, by systematic and standard methods of training, students at civil institutions for reserve officers. The system of instruction, herein prescribed presents to these students a standard measure of that military training which is necessary in order to prepare them to perform intelligently the duties of commissioned officers in the military forces of the United States, and it enables them to be thus trained with the least practicable interference with their civil careers.

"Units of the senior division may be organized at civil institutions which require four years of collegiate study for a degree, including State universities and those State institutions that are required to provide instruction in military tactics under the provisions of the act of Congress approved July 2, 1862, donating lands for the establishment of colleges where the leading object shall be practical instruction in agriculture and the mechanic arts, including military tactics.

"Units of the junior division may be organized at any other public or private educational institution."

An infantry unit of the Reserve Officers' Training Corps has been established in this College, the senior division consisting of men in the four years' College curricula and the School of Agriculture.

Members of the R. O. T. C. will receive the benefits mentioned below:

1. SENIOR DIVISION, BASIC COURSE (Freshman, Sophomores, and School of Agriculture). Each student of these classes will be furnished with complete uniform, and equipment for his use during the course. The articles remain the property of the United States and must be accounted for and turned in by each student at the close of each college year.

2. SENIOR DIVISION, ADVANCED COURSE (students who have a credit for two years Basic Course). The student who continues in the R. O. T. C. after completing the Basic Course will receive the following benefits:

He will receive the uniform referred to above, on the same terms.

He will receive commutation of subsistence at the rate of 40 cents per day, provided he executes an agreement to complete the Advanced Course, or continue in the course during the remainder of his time in College, and to take the course in camp training during such period, prescribed by the Secretary of War. The camps referred to involve no expense on the part of the student. In addition, a complete summer uniform will be issued.

After graduation he will be eligible for appointment by the President of the United States as a reserve officer of the Army, and if so appointed he may, under certain conditions, be appointed and commissioned as a temporary second lieutenant in the regular army for a period of six months, with pay at the rate of \$100 per month, with the usual allowances.

In order to elect the Advanced Course, R. O. T. C., a student must have the recommendation of the President of the College and the Professor of Military Science and Tactics.

The corps of cadets at present is organized as two battalions of infantry, four companies. A military band is also provided for, the members of which must be thoroughly trained in military tactics. Assignments to the military band are made upon recommendation of the bandmaster, who has charge of the technical instruction.

Officers and noncommissioned officers are selected from the students taking the Advanced Course, R. O. T. C., by the commandant of cadets, with the approval of the President of the College. This selection is made from among those cadets who have been most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state and the adjutant-general of the Kansas National Guard, while warrants signed by the President of the College and the Commandant of Cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

Students who are regularly enrolled in the advanced course of the senior division receive three semester credits of elective work toward graduation for each semester of military training taken beyond the basic course.

COURSES IN MILITARY TRAINING

Senior Division, R. O. T. C.

BASIC COURSES

101. MILITARY SCIENCE I. Freshman year, first semester. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: None.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the soldier, squad and company in close and extended order; preliminary instruction, sighting, position and aiming drills, gallery practice, nomenclature and care of rifle and equipment.

(b) *Theoretical.* Theory of target practice (individual and collective), military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Freshman year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

103. MILITARY SCIENCE III. Sophomore year, first semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science II.

The work of this course is divided as follows:

(a) *Practical*. Same as 102 (a); combat firing.

(b) *Theoretical*. Infantry Drill Regulations, to include the school of the battalion and combat; Small Arms Firing Regulations; lectures as in 102 (b); map reading; camp sanitation and camping expedients.

104. MILITARY SCIENCE IV. Sophomore year, second semester. Lectures, recitations and military drill, four hours a week. One semester credit. Prerequisite: Military Science III.

The work of this course is divided as follows:

(a) *Practical*. The same as 102 (a); signaling; semaphore and first-aid; sand-table work; range practice.

(b) *Theoretical*. Lectures on recent military history; service of information and security; marches and camping.

ADVANCED COURSES

109. MILITARY SCIENCE V. Junior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisites: Military Science IV.

This course is divided into—

(a) *Practical*. Duties consistent with rank of cadet officers or non-commissioned officers in connection with courses 101, 102, 103, and 104; military sketching; discipline and handling of men.

(b) *Theoretical*. Minor tactics; field orders; map maneuvers. Liaison, topography, military engineering.

110. MILITARY SCIENCE VI. Junior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science V.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Minor tactics; map maneuvers continued; elements of international law; military law; sanitation.

111. MILITARY SCIENCE VII. Senior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VI.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; proceedings of court-martial; gradual growth of principles of international law embodied in American diplomacy, legislation and treaties; psychology of war and kindred subjects; general principles of strategy to show relations between the statesman and the soldier; military engineering; company administration.

112. MILITARY SCIENCE VIII. Senior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VII.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; rifle in war; lectures on military history and policy; orders and messages; tactical walks; military history.

Modern Languages

Professor CORTELYOU
Assistant Professor LIMPER
Assistant HESSE

The study of modern foreign languages serves a number of purposes. It gives the student general training and culture; it throws helpful side lights upon English, his mother tongue; and it gives him important aid in scientific research. It is desired that the instruction in modern languages here given be as practical as possible, without, however, failing to encourage an appreciation of modern foreign literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A realization of the growing importance of our relations to Spanish-speaking peoples has led to the introduction of Spanish courses, which may be taken as electives.

A number of literary and scientific periodicals published in French, Spanish, and German are received by the College Library, and afford the student excellent opportunity to amplify his reading knowledge of these languages.

Students who have had French, Spanish, or German in high school are required, as a rule, to take more advanced courses as their elective or required work in that language.

COURSES IN GERMAN

FOR UNDERGRADUATES

101. GERMAN I. Elective, first semester. Class work, three hours. Three semester credits. No prerequisite. Professor Cortelyou.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually with the reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this course there are included the study of articles, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text: Vos's *Essentials of German* (first eighteen lessons).

102. GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: German I, or its equivalent. Professor Cortelyou.

Students are repeatedly drilled on the grammatical constructions already emphasized in German I, of which this course is a continuation. The remaining important grammar points are studied. The general plan of the work is the same as in course 101. Essential facts of grammar are insisted upon, but German is taught as a living language. Written translations from English into German are frequent. Text: Vos's *Essentials of German* (completed).

103. BEGINNING GERMAN I. Junior year and elective, first semester. Class work, five hours. Five semester credits. Professor Cortelyou.

The greater part of the grammar is taken up in this course. The work includes a study of articles, pronouns, nouns, numerals, sentence order, conjugation of verbs throughout the active voice, and adjective declen-

sions and comparison. Translations of English into German as well as German into English are frequent. Text: Vos's *Essentials of German* (first twenty-seven lessons).

104. BEGINNING GERMAN II. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Beginning German I, or one year of high-school German. Professor Cortelyou.

The study of grammar is finished, special stress being put upon forms and uses of the subjunctive, forms of the passive voice, substitutions for the passive, mixed verbs, and modal auxiliaries. Grammar points of course 103 are constantly reviewed. Some sight reading and composition work is done. Text: Vos's *Essentials of German* (Lesson twenty-eight to the end).

111. GERMAN READINGS. Junior year and elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Beginning German I, or one year of high-school German. Professor Cortelyou.

This course embraces readings of easy, idiomatic selections from modern authors. Grammatical drill is continued. German conversations based on the texts read are frequent. Text: *Aehrenlese*, by Bierwirth and Herrick.

FOR GRADUATES AND UNDERGRADUATES

201. GERMAN SHORT STORIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

The material read in this course comprises a number of short stories of considerable interest, by such modern authors as Auerbach, Niese, Goldhammer, La Roche, Leander, Scheffel, and Polenz. Text: Baker's *German Stories*.

206. GERMAN COMEDIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin*. Exercises in conversation and sight reading are occasionally introduced. Text: Manley and Allen's *Four German Comedies*.

216. GERMAN HISTORICAL PROSE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Not given in the year 1919-'20. Professor Cortelyou.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text: Rogge's *Der grosse Preussenkoenig*, edited by Adams.

221. GERMAN PROSE I. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society; occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; con-

versational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text: Kron's *German Daily Life*.

226. GERMAN CLASSICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 216, 221, or 231. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

231. GERMAN PROSE II. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text: Allen and Batt's *Easy German Stories*, Vols. I and II.

236. SCIENTIFIC GERMAN I. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 102 or 103. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles, especially those dealing with chemistry and physics. Text: Dippold's *Scientific German Reader*.

241. SCIENTIFIC GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 236. Professor Cortelyou.

This is a continuation of the preceding course. The material studied is of a more general nature than in course 236. Text: Greenfield's *Technical and Scientific German*.

COURSES IN FRENCH

FOR UNDERGRADUATES

151. FRENCH I. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this course and reading matter in the grammar is supplemented by a reader. Texts: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: French I, or one year of high-school French. Assistant Professor Limper and Miss Hesse.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have

had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

153. BEGINNING FRENCH I. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Assistant Professor Limper and Miss Hesse.

From the start great care is taken in acquiring correct pronunciation. The larger part of the grammar is covered in this course. Considerable time is devoted to oral and written work and to conversation. Easy readings are taken up. Texts: Olmsted's *Elementary French Grammar* (first thirty-seven lessons) and Allen and Schoell's *French Life*.

154. BEGINNING FRENCH II. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Prerequisite: Beginning French I, or one year of high-school French. Assistant Professor Limper and Miss Hesse.

This course is a continuation of Beginning French I. The grammar is completed, especial attention being given to irregular verbs. The grammar points of the preceding course are reviewed and considerable time is devoted to conversation. Much reading is done, the purpose being to enlarge the student's vocabulary. Texts: Olmsted's *Elementary French Grammar* (Lesson XXXVIII to the end); Fontaine's *En France* and one other short reading text.

161. FRENCH READINGS. Elective, first semester and summer school. Class work, three hours. Three semester credits. Not to be taken by students who have had course 154. Prerequisite: French II. Assistant Professor Limper and Miss Hesse.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

FOR GRADUATES AND UNDERGRADUATES

251. FRENCH SHORT STORIES. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 154 or 161. Assistant Professor Limper and Miss Hesse.

The purpose of this course is to introduce the student to modern French literature. The modern short story, since it covers so large a range of subjects, also offers excellent material for the enlargement of the vocabulary. Stories by such writers as Daudet, Maupassant, and Zola are read. Text: Buffum's *French Short Stories*.

270. TEACHERS' COURSE IN FRENCH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: Consult the instructor. Assistant Professor Limper.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading, the anatomical basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the State. Under the fourth heading, methods of conducting a *Cercle français* and material to be used in it are treated.

COURSES IN SPANISH

FOR UNDERGRADUATES

176. SPANISH I. Elective, first semester and summer school. Class work, three hours. Three semester credits. Assistant Professor Limper and Miss Hesse.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hill and Ford's *First Spanish Course* (first thirty-one lessons).

177. SPANISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish I, or one year of high-school Spanish. Miss Hesse.

In addition to study of grammar, which is here completed, considerable reading is done. Stress is laid upon training the ear to understand spoken Spanish. Texts: Hills and Ford's *First Spanish Course* (completed), and Bergé-Soler and Hatheway's *Elementary Spanish-American Reader*.

180. SPANISH READINGS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

A thorough study is made of one or two of the best works in Spanish literature from the more modern writers. One hour a week is devoted entirely to conversation and composition, the subjects being taken from current topics of the day.

183. COMMERCIAL SPANISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

This course is intended to equip the student with a commercial vocabulary and with the elements indispensable to success, especially necessary if he should pursue his business in Latin-American countries. Text: McHale's *Commercial Spanish*.

Music

Professor WESTBROOK
 Instructor SMITH
 Instructor KIMMEL
 Instructor BUGBEY
 Instructor CURRY
 Instructor LEFFLER

Instructor LOVEJOY
 Instructor WHEELER
 Instructor HANNEN
 Instructor BRAZLETON
 Instructor LING
 Miss HUGHES

The aim of the Department of Music is, to be of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is given in private lessons. No two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, cannot be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils.

All theoretical work is taught in classes. These and other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the Dean, may be made in the Division of Engineering, as follows: For Voice or some instrument, two hours each semester; for Musical History, two hours each semester; for Harmony, two hours each semester; for Counterpoint, Musical Form and Musical Analysis, two hours each semester; for Chorus, Orchestra or Band, one hour each semester; for Public School Music Methods, two hours each semester. Any student having a full assignment may, upon recommendation of the Director of Music together with the approval of the student's Dean, take music without credit.

Students coming from other schools to enter our courses in music may be sufficiently advanced as players or singers to enter the second or third year of the regular music curricula but prohibited therefrom owing to their lack of knowledge of theory. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM LEADING TO THE DEGREE OF BACHELOR OF MUSIC

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a degree.

For entrance to the vocal course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one and two of the high-school vocal course and grades one and two of the high-school piano course, or their equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the piano or organ course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to six, inclusive, of the high-school piano course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

For entrance to the violin course leading to a degree, the candidate for admission shall furnish proof that he has completed grades one to

six, inclusive, of the high-school violin course, or its equivalent, as outlined by the Kansas State Music Teachers' Association.

The Director of the Department of Music, together with the instructor with whom the candidate chooses to study voice or his chosen instrument, shall decide whether or not the candidate for admission can musically qualify for admission as a freshman in this course. Those who cannot qualify musically may enter upon their theoretical and collegiate subjects, but will be considered preparatory students in their chosen instrument until, in the judgment of the instructor and the Director of the Department of Music, the student may be classified in this course. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument.

Outline of Curriculum of Music Leading to the Degree of Bachelor of Music

FIRST YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony I. Two one-hour recitations a week. Two credits.
 Ear Training and Sight Singing I. Two one-hour recitations a week.
 Musical Appreciation I. One one-hour recitation a week. One credit.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 College Rhetoric I. Three one-hour recitations a week. Three credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony II. Two one-hour recitations a week. Two credits.
 Ear Training and Sight Singing II. Two one-hour recitations a week.
 Two credits.
 Musical Appreciation II. One one-hour recitation a week. One credit.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 College Rhetoric II. Three one-hour recitations a week. Three credits.
 Harmonics. Two one-hour recitations a week. Two credits.
 Physical Education.

SECOND YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony III. Two one-hour recitations a week. Two credits.
 Musical History I. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 German I. Three one-hour recitations a week. Three credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Harmony IV. Two one-hour recitations a week. Two credits.
 Musical History II. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 German II. Three one-hour recitations a week. Three credits.
 Physical Education.

THIRD YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Counterpoint. Two one-hour recitations a week. Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 Practice Teaching I.
 Psychology. Three one-hour recitations a week. Three credits.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two credits.
 Musical Form and Musical Analysis. Two one-hour recitations a week.
 Two credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying.
 One credit.
 Recital.
 Practice Teaching II.
 Educational Psychology. Three one-hour recitations a week. Three credits.

FOURTH YEAR

FIRST SEMESTER:

Voice or some instrument. Two private lessons a week.
 Musical Theory I. (Composition, orchestration, and conducting.) Two
 one-hour recitations a week.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying.
 One credit.
 Recital.
 French I. Three one-hour recitations a week. Three credits.
 English Literature I. Four one-hour recitations a week. Four credits.

SECOND SEMESTER:

Voice or some instrument. Two private lessons a week.
 Musical Theory II. (Composition, orchestration, and conducting). Two
 one-hour recitations a week.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying.
 French II. Three one-hour recitations a week. Three credits.
 Recital.

Vocal students must offer, in addition to the course as outlined above, eight credits in piano.

Students of piano, violin, organ, etc., must offer four credits in either voice or some instrument other than their major subject.

Upon the approval of the Dean of the Division of General Science and the Director of the Department of Music, substitutes in collegiate subjects such as German, English, etc., as outlined above, may be made, these substitutes to be made in literary lines.

The degree of bachelor of music is conferred upon students who complete the curriculum in music as outlined in the foregoing statement.

In addition to the course as outlined, students should elect a sufficient number of hours in the Department of Education, so that in addition to receiving the degree of bachelor of music they may also receive from the State Board of Education a teachers' certificate which will allow them to teach in the high schools of the State.

CURRICULUM IN APPLIED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ or some band instrument in private, individual lessons, together with the study of theoretical subjects in classes. This curriculum is designed to fit students not only to be soloists but also to be efficient teachers of music.

The curriculum in applied music is the same as the first three years of the preceding curriculum (the curriculum leading to a degree in music) as outlined above.

A certificate is awarded to students who complete the curriculum in applied music. A high school education or its equivalent is a prerequisite to the awarding of the certificate. Those not qualified to take up the curriculum in applied music are considered as preparatory students until, in the judgment of the Director of the Department of Music, their work justifies a change in classification. Each candidate for a certificate must give a public recital some time during the second semester of his third year.

CURRICULUM IN PUBLIC-SCHOOL MUSIC

For those wishing to prepare themselves to teach music in the public schools a curriculum in public-school music, as outlined below, has been prepared. The completion of a four-year high-school course or its equivalent is required before entering on the work here outlined. To those satisfactorily completing this curriculum a State teachers' certificate in music is granted.

Outline of Curriculum in Public-school Music**FIRST YEAR****FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods I. Two semester credits.
 Harmony I. Two semester credits.
 Ear Training and Sight Singing I. Two semester credits.
 Psychology. Three semester credits.
 Chorus. One semester credit.
 Musical Appreciation I. One semester credit.
 College Rhetoric I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods II. Two semester credits.
 Harmony II. Two semester credits.
 Ear Training and Sight Singing II. Two semester credits.
 Chorus. One semester credit.
 Musical Appreciation II. One semester credit.
 Methods in Teaching. Three semester credits.
 College Rhetoric II. Three semester credits.
 Physical Education.

SECOND YEAR

FIRST SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods III. Two semester credits.
 Harmony III. Two semester credits.
 Chorus. One semester credit.
 Musical History I. Two semester credits.
 Educational Administration. Three semester credits.
 French I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods IV. Two semester credits.
 Harmony IV. Two semester credits.
 Chorus. One semester credit.
 Musical History II. Two semester credits.
 French II. Three semester credits.
 American Literature. Three semester credits.
 Physical Education.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

101, 102. HARMONY I AND II. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Miss Bugbey.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

103, 104. HARMONY III AND IV. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Prerequisite: Harmony II. Miss Bugbey.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

105, 106. EAR-TRAINING AND SIGHT SINGING I AND II. Elective for all students; required with Harmony I and II for music students. Class work, two hours. No College credit, but required in the music curricula. Miss Bugbey.

This course is a study in reading and hearing intervals and chords.

107. COUNTERPOINT Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Harmony IV. Miss Bugbey.

The course in counterpoint consists of the study of simple counterpoint in two parts; first, second, third, fourth and fifth species, and florid counterpoint.

109. MUSICAL FORM AND MUSICAL ANALYSIS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Harmony IV and Counterpoint. Miss Bugbey.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms are the substance of this course.

110, 111. HISTORY OF MUSIC I AND II. Elective, beginning first semester and continuing throughout the year. Students may enter at the beginning of either semester, however. Class work, two hours. Two semester credits for each course. Miss Bugbey.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

115, 116. MUSICAL APPRECIATION I AND II. Elective. Class work, one hour. Students may enroll at the beginning of either semester. One semester credit for each course. Miss Bugbey.

Music is a language, and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way, in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work, so that many students may be accommodated at periods which will suit their convenience.

120, 121. SCHOOL MUSIC METHODS I AND II. First semester and continuing throughout the year. Lectures and research, three hours. Two semester credits for each course. Miss Hughes.

These courses deal with the place of music and the teacher in the school and in the community.

122, 123. SCHOOL MUSIC METHODS III AND IV. First and second semesters, respectively. Lectures, research, and practice teaching, three hours. Two semester credits for each course. Miss Hughes.

These courses are a continuation of School Music Methods I and II.

PRACTICAL COURSES IN MUSIC

130. VOICE. Two private lessons a week. Two semester credits. Elective in College curricula. Professor Westbrook, Miss Kimmell, and Mr. Lovejoy.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied, and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

135. VIOLIN. Two private lessons a week. Two semester credits. Elective in College curricula. Miss Hannen.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work, as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influence progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing, and also to the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon, and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violoncello, viola and contrabass receive the same attention in this department as does the violin.

140. PIANO. Two private lessons a week. Two semester credits. Elective in College curricula. Misses Smith, Leffler, Ling, and Brazelton.

The methods of instruction in this department are direct and simple. Pupils are taught not only to play, but also to think logically according to the scientific principles of the art. Thus is developed definite and intelligent teaching ability as well as sound artistic performance. A technical foundation is the first requisite in modern piano playing. This is accomplished by a carefully selected and graded set of exercises and studies, designed to bring about that mental control of muscles without which artistic results cannot be obtained. Clearness of conception, distinctness of phrasing, variety of tone, good rhythm and technical accuracy are insisted upon. As the student advances, difficult compositions of both the classic and modern writers are studied. Interpretation becomes a special study, and all the emotional, intellectual and physical faculties are brought into that harmony and control which alone results in artistic performance. Opportunity is offered for study of accompaniments and piano ensemble.

145. WIND INSTRUMENTS. Two private lessons a week. Two semester credits. Elective in College curricula. Mr. Wheeler.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression, and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

150. THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit each semester.

This organization, which is conducted by Professor Westbrook, numbers about two hundred, and is one of the best student singing organizations in the West. The rehearsals are held Monday evening, weekly, and

part songs, madrigals, glees, cantatas, and the great oratorios are studied, and presented publicly with the assistance of the orchestra and visiting artist soloists.

151. THE ORCHESTRA. Regular rehearsals, all special rehearsals and public performances. One credit each semester.

The orchestra is conducted by Mr. Wheeler, teacher of stringed instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational, and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

152. THE COLLEGE BAND. Regular rehearsals, special rehearsals and public performances. One credit each semester.

Practice in the band may be accredited through the Department of Military Science in lieu of drill and theoretical instruction. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the institution. The try-out for this singing body is held in the first semester of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by the dropping out of a member is immediately filled by one of this list.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the State. Mr. Lovejoy.

THE ST. CECILIA CLUB. This is a singing organization of young women, and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range, blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo clubs are combined for special choir singing. Mr. Lovejoy.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this institution. In addition to numerous choral, orchestra, band and glee-club concerts given, in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College in the Artist Series Course and during Spring Festival Week. There are also numerous recitals by the members of the conservatory faculty and by students.

FEEES

For a semester of eighteen weeks:

Voice, two lessons a week with the Director.....	\$38.00
Voice, one lesson a week with the Director.....	20.00
Organ, band or orchestral instruments, two lessons a week with Mr. Wheeler,	28.00
One lesson a week in same with Mr. Wheeler.....	15.00
Voice, violin or piano, two lessons a week, according to the teacher	
chosen	\$28.00, \$25.00, or 22.00
One lesson a week in same, according to teacher chosen, 15.00, 13.50, or	12.00
Piano rent, one hour daily.....	4.00

Physical Education and Athletics

Professor CLEVENGER
Assistant Professor SCHULZ*
Assistant Professor LORENZ

Instructor BOND
Assistant BARTHOLF
Assistant BLAIN

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable physical preparation for life. It is an urgent necessity that each student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

PHYSICAL EDUCATION FOR MEN

Physical education is required of all freshmen and sophomores unless excused for disability by the College physician. After completing the requirement, advanced work may be elected for a total of four hours of credit.

PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student when he enters upon the work of the department. A second examination is given at the close of his first year. All students, whether taking work in the department or not, are entitled to receive a physical examination and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs, tastes, and capabilities. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams should enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more sports during the school year must undergo a physical examination preliminary to participation in each sport. This is required in order that no student may engage in athletics to his own permanent physical injury. Each student may secure a copy of his physical measurements, and an anthropometric chart, showing in graphic form his development as compared with that of the average man.

* Resigned, June 30, 1920.

Members of the teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course at least two semesters' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application, but practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

Various grades of gymnastic and athletic exercises are offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

COURSES IN PHYSICAL EDUCATION

103. PHYSICAL EDUCATION M-I. Freshman year, first semester. Two hours a week. Assistant Professor Lorenz.

Hygiene and social problems are discussed as an essential part of this course. This instruction gives an insight into the practical problems of daily healthy living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in College, as well as for gaining the highest development of vital power and health for future duties.

During the winter the practical work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism. During the fall a man may select Rugby football or soccer football. Beginning about December first the work consists of the following:

a. *Free Calisthenics*. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercise. Both the Swedish and the German systems are used.

b. *Light Apparatus*. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

c. *Heavy Apparatus*. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

d. *Indoor Athletics*. Instruction is given in all indoor track events preparatory to indoor track meets.

e. *Games*. There are included basket ball, indoor baseball, volley ball; also other games of more recreative nature.

104. PHYSICAL EDUCATION M-II. Freshman year, second semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Training M-I. Baseball, track and field athletics are given in the spring as soon as weather conditions permit outdoor work. A part of the regular instruction for the spring semester is in swimming. A passing grade must be made in this phase of the work also.

105. PHYSICAL EDUCATION M-III. Sophomore year, first semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Education M-II. It is required of all young men of the sophomore class.

106. PHYSICAL EDUCATION M-IV. Sophomore year, second semester. Two hours a week. Assistant Professor Lorenz.

This course is a continuation of Physical Education M-III. It is required of all young men of the sophomore class.

110. ADVANCED APPARATUS I. Elective, first semester. Three hours a week. One semester credit. Assistant Professor Lorenz.

This course is open only to those men who show ability as gymnasts. From this class men are picked for the gymnastic team. Tumbling and work on the various pieces of apparatus are given.

111. ADVANCED APPARATUS II. Elective, second semester. Three hours a week. One semester credit. Assistant Professor Lorenz.

This is a continuation of Advanced Apparatus I.

120. PHYSICAL TRAINING SPECIALTIES. Under this head come fencing, boxing, wrestling, offered as advanced work to those who have had not less than two semesters of work in the gymnasium. Hours are arranged with the instructor.

126. FOOTBALL. Elective, summer school. Lectures and recitations, four hours. Two semester credits. Professor Clevenger.

This course covers the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarter-back pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The work covers a discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASE BALL. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The course includes discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Elective, summer school. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

This course covers discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and in the spring the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basket ball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basket ball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it cannot be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the department to furnish an opportunity for all students to participate in some form of healthful athletic competition. To carry out the above aim, class football is maintained during the fall among the different classes of the College, also among the different classes of the School of Agriculture. Basket ball also is promoted during the fall and early part of the winter among the different fraternities, different classes, and different cadet companies, as well as among the students of the different departments of the College.

The work of the spring is largely given over to competition in baseball among the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the department, too, to revive an interest in track athletics among the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the department.

By action of the Student Council, approved by the Faculty, the following rules govern class athletics contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to each other at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon College life and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical-education system and a healthful system of sport. Intercollegiate contests are scheduled for football, basket ball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the Faculty appointed by the Board of Administration, and one member from each College class, elected by his class.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.
3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).

4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.

5. No student shall participate in intercollegiate sport for more than three years.

6. No graduate student shall participate in any intercollegiate contest.

7. No student shall participate in intercollegiate contests who has not been in attendance one full year prior to the date of contests, who has not passed in his entrance requirements, who has not passed in at least 30 semester hours' work during the year previous to the contest, and who is not maintaining passing grades in 12 credit hours during the current semester.

8. No person who, having participated in any intercollegiate contest, fails to remain in College the remainder of that semester, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL EDUCATION FOR WOMEN

All young women in the College are required to take two years of physical education unless excused by the Dean of Women.

After the two years' required physical education have been completed, women have the privilege of electing physical education for a total of four credit hours; such elective work must be approved by their Dean. Athletic Association points are awarded for elective work.

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes a system of body measurements, strength tests, and examination of the condition of the heart and lungs. Physical defects, abnormalities and weaknesses are noted, and special exercises are provided for the student needing the individual corrective work.

A suit has been adopted which consists of an all-white middie blouse, black tie, and black plaited bloomers. White tennis shoes with white rubber soles are used. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert, according to a pattern approved by the Department of Physical Education, or a one-piece gray knit suit. Girls should not buy their swimming suits before arriving in Manhattan. For further information address Women's Department of Physical Education, K. S. A. C., Manhattan, Kan.

COURSES IN PHYSICAL EDUCATION

151A. PHYSICAL EDUCATION W-I. Freshman year, first semester. Lectures and gymnasium, three hours. One semester credit. Dean Van Zile, Miss Bond and Miss Bartholf.

Instruction in hygiene and social problems is an essential part of this course. In these lectures, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented. This part of the course is given by the Dean of Women.

The physical training part of this course is divided into two hours a week of regular gymnasium work and one hour of interpretative dancing, folk dancing, games, tennis, hockey, basket ball, or swimming. Classes are in part held out of doors when the weather permits.

152A. PHYSICAL EDUCATION W-II. Freshman year, second semester. Gymnasium, three hours. One semester credit. Prerequisite: Physical Education W-I. Miss Bond and Miss Bartholf.

In this course the marching tactics, floor work, etc., are continued for two hours a week, and basket ball, games, interpretative dancing, folk dancing, tennis, and swimming are carried on for one hour a week.

153, 154. PHYSICAL EDUCATION W-III AND W-IV. Sophomore year, first and second semesters, respectively. Gymnasium, three hours. One semester credit. Miss Bond and Miss Bartholf.

The work in these two courses is a continuation of that of courses 151A and 152A. More advanced work in marching tactics and apparatus is here given.

175. GYMNASTICS. Elective, summer school. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Miss Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work.—The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the physiological benefit derived from the dances, in costuming, and in the use of the dances in festivals and fetes. A notebook is required.

Practical Work.—This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Elective, summer school. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work.—This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

182. PLAYGROUND MANAGEMENT. Elective, summer school. Lectures and recitations, one hour; practical work, to be arranged. One semester credit. Miss Bond.

This course includes discussions of the organization and administration of playground activities and equipment, and practical experience in conducting such activities.

184. ESTHETIC DANCING. Elective, summer school. Practical work, three hours. One-half semester credit. Miss Bond.

This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise, and good carriage than does esthetic dancing.

187. TECHNIQUE OF BASKET BALL, BASE BALL, AND HOCKEY. Elective, summer school. Lectures and recitations, three hours. One semester credit. Miss Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING W. Open to all women students of the College. Both semesters. No credit. Miss Bartholf.

This is a course in swimming in which individual instruction is given in several styles of swimming and diving.

Physics

Professor HAMILTON
Associate Professor FLOYD*
Associate Professor RABURN
Assistant Professor STEWART

Assistant Professor CONVERSE
Assistant Professor BRACKETT
Instructor MILLER
Instructor TAYLOR

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS

FOR UNDERGRADUATES

101. HOUSEHOLD PHYSICS. Freshman year, both semesters. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: One year of high-school physics or its equivalent. Professor Hamilton and Associate Professor Floyd.

This course consists of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting, and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, three hours. Three semester credits. Associate Professor Raburn and Assistant Professor Stewart.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access is 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

* Absent on leave, year 1919-'20.

gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinney's *A Textbook of Physics*.

120. PHOTOGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: Things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Elementary Physics. Professor Hamilton and Assistant Professor Stewart.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages, and as he learns the code he is instructed in field work.

135. GENERAL PHYSICS I. Sophomore year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: Elementary Physics and Plane Trigonometry. Associate Professors Raburn and Floyd and Assistant Professor Stewart.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics, sound, and heat. Text: Reed and Guthe's *College Physics*.

Laboratory—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

140. GENERAL PHYSICS II. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: General Physics I. Associate Professors Raburn and Floyd and Assistant Professor Stewart.

This course includes a study of the theory of electricity and light. The class follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

145. ENGINEERING PHYSICS I. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Elementary Physics and Trigonometry. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Brackett.

This course in mechanics, sound and heat is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text: Kimball's *College Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics and heat. Accurate measurements and carefully recorded data are required.

150. ENGINEERING PHYSICS II. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisite: Engineering Physics I. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Brackett.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimball's *College Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

FOR GRADUATES AND UNDERGRADUATES

213. ACOUSTICS. Elective, first semester. Class work, one hour. One semester credit. Prerequisite: Engineering Physics II. Associate Professor Floyd or Assistant Professor Brackett.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

221. MOLECULAR PHYSICS. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Floyd and Assistant Professor Stewart.

This course includes a study of molecular kinetics of gases, liquids and solids; liquid-gas systems; crystal-gas systems; crystal-liquid systems; Brownian movement; solutions, osmosis, and electrolytic conduction.

Laboratory.—The laboratory work is based on the theory as given in the class work, and includes the determination of capillary constants, molecular conductivities, percentage ionization, and specific heats of gases.

222. HARMONICS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: One year each of music and elementary physics. Professor Hamilton and Associate Professor Floyd.

This course is given to students of music so that they may learn the fundamental principles of sound that are associated with harmony. It is a lecture and demonstration course that deals with many facts of interest relating to the construction of scales and chords. A clearer understanding of composition and of tone quality may be had if the physical laws of sound are understood.

223. PHYSICAL MEASUREMENTS. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Hamilton and Associate Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. For credit towards the State teachers' certificate this must be taken in the student's senior year. Prerequisites: Educational Psychology and College Physics. Associate Professor Floyd and Assistant Professor Converse.

This course is intended for those who are either teaching or expecting to teach physics in secondary schools. The class work includes an analysis of the present status of physics and of physics instruction in our high schools, and is based upon a critical study of the State text as well as other modern texts that may be used as reference. Special effort is made to vitalize the work and to make it apply to everyday life. Lectures, library work, demonstrations and practice teaching are used as methods of directing the course.

Laboratory.—The laboratory work includes the formation and adaptation of courses suitable for either rural or city high schools.

230. SPECTROSCOPY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Raburn or Floyd.

This is an advanced course in light, intended to cover the theory and use of the spectroscope and spectrometer as instruments for identifying elements or their compounds, when rendered incandescent, by means of their characteristic spectra or definite wave lengths.

Laboratory.—The laboratory work consists of calibration of prisms and gratings for ready use in chemical laboratories and also gives ample training in measuring wave lengths and in identifying the spectra of many substances.

233. RADIO-ACTIVITY AND ELECTRON THEORY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Raburn.

The nature of the electron and its behavior in electric and magnetic fields, are studied. Temperature effects and behavior of the electron in cathode tubes using a hot cathode are discussed and studied in detail. The methods of determining the mass and velocity of electrons is developed from the historical standpoint. A study is made of the nature and effects of the various rays, including x-rays and ultra-violet rays and the emanations from the known radioactive substances.

Public Speaking

Professor EMERSON
Instructor BOWMAN

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the College, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addi-

tion to its regular courses it aims to make itself available as far as possible for individual rehearsals; for the training of the orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

101. PUBLIC SPEAKING I. Elective, both semesters. Class work, two hours. Two semester credits. Mrs. Bowman.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

102. PUBLIC SPEAKING II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Mrs. Bowman.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

106. EXTEMPORE SPEECH I. Freshman and junior years and elective, both semesters. Class work, two hours. Two semester credits. Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

108. EXTEMPORE SPEECH II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Extempore Speech I, or its equivalent. Professor Emerson.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

110. ADVANCED PUBLIC SPEAKING. Elective, second semester. One semester credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the department. Professor Emerson.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the semester. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or addresses suitable for extension work.

Zoology

Professor NABOURS†
 Professor ACKERT*
 Associate Professor HARMAN
 Assistant Professor HISAW
 Instructor BROWN

Instructor MARTIN
 Assistant WILLMANN
 Assistant HURD
 Assistant RUDE

The courses have been planned to give a fundamental knowledge of the structures, functions and relations of animals; information concerning the manner in which animals respond to the conditions of the environment; an appreciation of their human values; and a consideration of the problem of heredity and evolution.

The courses in General Zoölogy (101 and 102, and 105) constitute a general survey, and form an excellent introduction to all lines in agriculture, general science, and home economics. Embryology (117), Cytology (214), Advanced Mammalian Embryology (220), Parasitology (123), Evolution and Heredity (217), and Paleontology (Geology 201) are preliminary to advanced work in animal breeding, animal husbandry, dairy husbandry and veterinary medicine. Selections may be made among these courses and Advanced Zoölogy (201, 202), Invertebrate and Vertebrate Taxonomy (205, 208), Economic Zoölogy (126), Ecology (211), Embryology and Physiology (108), Zoölogical Problems (129), Research in Zoölogy (301), and the Seminar (236), by those who expect to do advanced work in zoölogy or entomology, or become teachers of biology.

The classrooms and laboratories are equipped with charts, models, microscopic binoculars, microtomes, paraffin baths and other apparatus both for elementary and advanced work, and a good natural-history museum is available.

COURSES IN ZOÖLOGY

FOR UNDERGRADUATES

101 and 102. GENERAL ZOÖLOGY I AND II. Sophomore year and elective, first and second semesters, respectively. Class work, two hours; laboratory, three hours. Three semester credits for each course. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Martin, Miss Willmann, and Miss Hurd.

In General Zoölogy I an elementary study is made of the structures and functions of types selected to illustrate the invertebrates; in course 102 an elementary study is made of the structures and functions of types selected to illustrate the development of the phylum chordata.

Laboratory.—The form and activities of animals are observed both in the field and in the vivaria, and important systems of those animals selected as types are dissected and sketched.

105. GENERAL ZOÖLOGY. Sophomore year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Men and women in separate classes. Professor Nabours, Professor Ackert, Associate Professor Harman, Assistant Professor Hisaw, Miss Brown, Mr. Martin, Miss Willmann, and Miss Hurd.

The structures and functions of types of both invertebrates and vertebrates are studied.

* In charge, 1919-'20.

† Absent on leave, 1919-'20.

Laboratory.—Studies of the form and function of types of living animals, and dissection and reconstruction of the important systems of selected types.

108. EMBRYOLOGY AND PHYSIOLOGY. Sophomore year and elective, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Zoöl. 105 or equivalent, and Chem. 121. Professor Nabours, Professor Ackert, Associate Professor Harman, Miss Brown, and Miss Willmann.

The first three-fifths of the semester is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human species; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations; and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

111. GENERAL ZOÖLOGY VET. Freshman year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Given concurrently with Anat. 101. Professor Ackert, Assistant Professor Hisaw, and Mr. Martin.

A general study is made of the forms in the animal kingdom, with attention given to classification, distribution, habitats, and relation to each other and to man.

Laboratory.—The form and activities of animals are observed in the field, vivaria and the museum, and a comparative study of the systems of organs in a few selected types is made.

114. EMBRYOLOGY VET. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Given concurrently with Anat. 106. Prerequisites: Zoöl. 111 and Anat. 101. Professor Ackert, Assistant Professor Hisaw, and Mr. Martin.

The origin of the germ cells, fertilization, the establishment of relations between the uterus and embryo, the development of membranes, and the nutrition of the foetus in mammals are considered briefly.

Laboratory.—Exercises in the reconstruction of organs and systems from sections and dissections in the chick and pig embryos, and of foetal relations in mammals.

117. EMBRYOLOGY. Junior and elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105. Professor Nabours, Professor Ackert, and Assistant Professor Hisaw.

The development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth in mammals are studied in this course.

Laboratory.—Studies of the male and female germ cells, stages in the processes of fertilization, the segmenting ovum, and whole mounts, serial sections, and reconstruction of the chick and pig embryos in several stages of growth, with demonstrations of types of mammalian foetal relations form the subject matter of the laboratory investigation.

123. PARASITOLOGY. Senior year and elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Courses 101 and 102, or 105. Professor Ackert.

A study is made of the biology, life histories, and economic importance of the external and internal parasites of the domestic animals and man.

Laboratory.—The structural and functional adaptations of selected types of parasites are studied in the laboratory.

126. ECONOMIC ZOÖLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ackert.

The bird and mammal groups are studied comprehensively. Specimens in the museum are used extensively.

Laboratory.—The laboratory work comprises largely three-hour field trips to a number of selected areas: woods, streams, meadows, College campus, and farm. This work includes identification of birds and mammals, with special studies of their migration, adaptation, and economic importance.

129. ZOÖLOGICAL PROBLEMS. Elective, both semesters. One or two semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual problems in heredity, parasitology, cytology, embryology, and animal behavior are assigned by the instructors in charge.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED INVERTEBRATE ZOÖLOGY. Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

A comprehensive study is made of representatives of the invertebrates, from the standpoints of behavior, comparative anatomy, development, and phylogeny. Representatives of the invertebrate groups are studied from the morphological aspect.

202. ADVANCED VERTEBRATE ZOÖLOGY. Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 101 and 102, or 105. Professor Ackert.

The behavior, comparative anatomy, development, and phylogeny are studied, giving a comprehensive view of the chordates. A study is made of the anatomy and morphology of certain representative vertebrates.

205. TAXONOMY OF INVERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Courses 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

Practice is had in the use of the keys for the identification of species, and emphasis is placed on familiarity with the literature of invertebrate taxonomy, except insects, and on the identification of species in the local fauna.

208. TAXONOMY OF VERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105; and Ent. 216, concurrently. Assistant Professor Hisaw.

This course is similar to course 205, with the difference that vertebrates instead of invertebrates are studied.

211. ANIMAL ECOLOGY. Elective, second semester. Lectures, one hour; laboratory and field work, six hours. Three semester credits. Prerequisites: Zoöl. 101 and 102, or 105, and Ent. 101. Assistant Professor Hisaw.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is con-

sidered from the descriptive, comparative and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures.

214. **CYTOLOGY** Elective, first semester. Lecture, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoöl. 108, 117, or equivalent. Associate Professor Harman.

Methods of preparing material for microscopical study; killing, fixing, staining, and sectioning; the development of the germ cells; and theories of structure and functions of the different parts of the cell are matters considered in this course. The work forms a basis for studies of heredity and related subjects.

217. **EVOLUTION AND HEREDITY** Elective, second semester. Lecture, two hours; library reference reading and reports, three or six hours. Three or four semester credits. Prerequisites: Consult instructor. Professor Nabours.

A lecture and reading course dealing with the development of the idea of evolution; the evidence and the principal theories of the causes; problems of variation, heredity, and experimental evolution.

220. **ADVANCED MAMMALIAN EMBRYOLOGY**. Elective, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisites: Zoöl. 108, 114 or 117, or the equivalent. Professor Nabours and Associate Professor Harman.

The course consists of further study of the main facts of embryology, with special reference to their bearing upon biological theories, the consideration of embryological problems, and a comparative study of the physiology of reproduction in mammals, including man.

225. **ZOÖLOGY AND ENTOMOLOGY SEMINAR** Elective, both semesters. One two-hour session a week. One credit. Subject matter changes each semester. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussions of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. **RESEARCH IN ZOÖLOGY**. Elective, both semesters and during the summer. One to five semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Assistant Professor Hisaw.

Individual research problems in heredity and experimental evolution, parasitology, cytology, embryology, and animal behavior are assigned.

Special Courses for Teachers

At the present time teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 31, 32, 33, 35, 36 and 37, on pages 210 and 211, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the semester in which a subject is regularly given.

The conditions and requirements for the different classes of state certificates are stated in the introductory paragraphs for the Department of Education, page 240.

The course for persons who wish to prepare for teaching vocational agriculture under the Smith-Hughes law is outlined under the Division of Agriculture, page 91, and the course for those wishing to qualify as teachers of vocational home economics, under the same law, is given on page 190, under the Division of Home Economics.

Kansas State Agricultural College

Summer School

May 28 to July 30, 1920

EDWIN LEE HOLTON, *Dean.*

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences, and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public schools, viz.: Preparing boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized, and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 1,137 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewerage system.

The library is open during the summer and its valuable collection of books, periodicals, bulletins, and reports is placed at the service of the Summer School students.

EXPENSES

Tuition is free. An incidental fee of \$5 is charged all students whose homes are in Kansas; for nonresidents of the State an incidental fee of \$10 is charged. No matriculation or entrance fee is charged for the Summer School of 1920. Each student pays also a sick-benefit fee of \$1. Receipts for these fees must be presented before enrollment in the Summer School classes. Table board varies from \$5 to \$7 a week. Three meals a day, except on Sunday, are served at the College cafeteria in Kedzie Hall. Room rent ranges from \$10 to \$15 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of men students at prices ranging from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

The College reserves the right to change its schedule of fees at any time without previous notice.

REGISTRATION AND LATE REGISTRATION

Registration will take place in Nichols Gymnasium from eight until five o'clock on the opening day, Friday, May 28. No one will be allowed to register for full-time work after Friday, June 11. All class and laboratory work begins with the first period, Saturday, May 29.

COLLEGE CREDITS AND VISITING PRIVILEGES

Full College credit will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of courses. Students desiring College credit will not be allowed to carry more than nine semester credit hours of work, except upon written approval of the Dean of the Summer School and of the Dean particularly concerned. In exceptional cases and when approved as above, undergraduate students may carry not to exceed ten semester credit hours. Graduates of colleges may carry for graduate credit nine semester hours; in exceptional cases, and not for graduate credit, they may carry twelve semester hours, subject to the approval of the Dean of the Summer Session and of the Dean particularly concerned.

Those interested primarily in freshening their acquaintance with subject matter, in enlarging their outlook, or in improving their methods of teaching, and not caring for credit toward a degree, may, upon showing a receipt for Summer School fees, be given a visitor's card, which will admit them to any courses offered. They should, however, make out class cards for any courses which they wish seriously to pursue. A limited visiting privilege may be granted to candidates for College credit by the Dean in case such privilege be not likely to interfere with the quality of the College-credit work.

CONVOCATION AND COLLEGE LECTURES

From time to time, as announced, classes will be displaced for an hour for special lectures, musical or literary exercises. During the Summer Session lecturers of note, specialists in their particular fields, will lecture before the Summer School.

At other times the program will be musical or literary in nature. These numbers are furnished by the Summer School music staff, by visiting artists, and by members of the Summer School chorus and orchestra. Every student with musical ability is urged to join one of the musical organizations.

RECREATION AND AMUSEMENT

A part of the attraction of the Summer School session is the opportunity for recreation and social environment. The vicinity of Manhattan is rich in features of interest for "hikes." Usually lunch is carried and supper eaten on these trips. The agronomy or experimental farm is visited on one of these trips; the serum plant and live-stock barns are visited on another. Other hikes are made to places of natural interest. Camp Funston is only forty minutes distant by trolley, and a trip to the camp makes an enjoyable and instructive outing.

There are picture shows on the campus; parties, "community" sings, and folk games are held. There is a play time when all members of the Summer School may spend an hour in real play. Baseball, hockey, tennis, swimming, and other sports are carried on.

For those who appreciate opportunities for literary and forensic improvement, combined with social good times, the Summer School Literary Society meets Saturday evening of each week and is open to all students.

Courses in the Summer School

Division of Agriculture

F. D. FARRELL, Dean

AGRICULTURAL ECONOMICS

Associate Professor GRIMES
Specialist ERIC ENGLUND

101. AGRICULTURAL ECONOMICS. Elective. Class work, six hours. Three semester credits. Associate Professor Grimes and Mr. Englund.

The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth.

106. FARM MANAGEMENT. Elective. Class work, four hours; laboratory, six hours. Three semester credits. Associate Professor Grimes and Mr. Englund.

Farming is studied as a business, taking up the factors which affect its success and methods of improving it to obtain the most efficient organization. Methods of leasing are also studied.

AGRONOMY

Professor THROCKMORTON
Assistant Professor ZAHNLEY

21. ELEMENTARY AGRICULTURE. Class work, four hours; laboratory, six hours. Three semester credits in School of Agriculture. Assistant Professor Davidson.

This is a general course planned for teachers of public schools who teach one year of agriculture. It covers the entire field of general agriculture, together with suggested outlines for a year's work in the laboratory. Texts, Waters' *Essentials of Agriculture*, and Call and Schafer's *Manual of Agriculture*.

101. GRAIN CROP PRODUCTION. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisites: Botany 101. Assistant Professor Zahnley.

This course is a study of the distribution, relative importance, value, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

120. TEACHERS' COURSE IN SOILS AND CROPS. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Zahnley.

This course is designed primarily for young women preparing to teach the one-year course in agriculture offered in many Kansas high schools. The course deals with the origin and formation, texture and composition of soils; the management of soils to maintain fertility; and the adaptation of soils to crops. It also deals with the distribution, relative impor-

tance, and production of such grain crops as wheat, corn, kafir, oats, barley, and rye; and such forage crops as sorghum, alfalfa, clover and grasses.

131. SOILS. Class work, six hours; laboratory, six hours. Four semester credits. Professor Throckmorton. Assistant Professor Zahnley.

This course comprises a study of the management of farm soils and deals with the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; conservation of moisture, and physical conditions of the soils. Prerequisite: General Chemistry. Text, Lyon, Fippen, and Buchman's *Principles of Soil Management*.

ANIMAL HUSBANDRY

Professor McCAMPBELL
Associate Professor FERRIN
Associate Professor PATERSON
Assistant Professor IBSEN

104. PRINCIPLES OF FEEDING. Class work, six hours. Three semester credits. Prerequisite: Elementary Organic Chemistry. Associate Professor Ferrin.

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

106. GENETICS. Class work, six hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105. Assistant Professor Ibsen.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility, and sterility.

170. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell and Associate Professor Paterson.

This course is planned especially to meet the needs of teachers who desire a general rather than a special course in animal husbandry. The work in the classroom embraces the following:

a. Feeding principles and practices, three weeks. Text: Henry and Morrison's *Feeds and Feeding*.

b. History of breeds and pedigrees, two weeks. Text: Plumb's *Types and Breeds of Live Stock*.

c. Breeding principles and practices, two weeks. Text: Munford's *Breeding Farm Animals*.

d. Housing, barns, sanitation, herd and flock management, fitting for shows, sale management, etc., two weeks. Lectures.

Laboratory.—The first seven weeks are devoted to judging; the last two weeks are given over to meat demonstrations.

DAIRY HUSBANDRY

Assistant Professor OLSON
Instructor ATKESON

101. ELEMENTS OF DAIRYING. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Olson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming, construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and buttermaking on the farm. Lectures are supplemented by textbook work.

Laboratory.—Practice in operating the Babcock test and lactometer; separation of milk; and farm buttermaking.

104. DAIRY JUDGING. Laboratory, six hours. One semester credit. Instructor Atkeson.

Dairy stock is judged 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.

HORTICULTURE

Professor AHEARN
Instructor PICKETT
Instructor DOERNER

210. PLANT PROPAGATION. Class work, four hours; laboratory, six hours. Three semester credits. Mr. Pickett.

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

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

107. ORCHARDING. Class work, four hours. Two semester credits. Professor Ahearn.

This is a discussion of the conditions necessary for success with orchards. Location, improvement of soil, application of fertilizers, pruning, prevention of loss from frost, marketing and storage. Prerequisites: Plant Propagation, and Pomology II.

210. MARKET GARDENING. Class work, four hours; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a systematic study is made of both commercial and amateur gardening; soil improvement, the value of fertilizer, marketing and storage conditions are given special attention.

Laboratory.—The laboratory work consists of the preparation of the plans for gardens; seed testing; the construction of the hotbed; the use of tools and machinery; and practical work in the garden.

125a. LANDSCAPE GARDENING RECITATION. Class work, four hours. Two semester credits. Mr. Doerner.

Lectures are given on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and public parks. Opportunity is given the student to become acquainted with plant materials that are best adapted to Kansas conditions.

POULTRY HUSBANDRY

Assistant Professor Fox

101. FARM POULTRY PRODUCTION. Class work, two hours; laboratory, six hours. Two semester credits. Assistant Professor Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

120. TEACHERS' COURSE IN POULTRY HUSBANDRY. Class work, two hours. One semester credit. Assistant Professor Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied.

Division of Veterinary Medicine

R. R. DYKSTRA, Dean

ANATOMY AND PHYSIOLOGY

Professor BURT

213. PHYSIOLOGY. Class work, six hours. Three semester credits. Professor Burt.

The work in this subject consists of the study of the skeletal tissues, the circulatory, digestive, respiratory and other systems, in much the same manner as is done during the regular college course. The lectures are supplemented with demonstrations and experiments. Dissected specimens are used as often as possible instead of papier-mâché models. The laboratory is well equipped with physiological apparatus. This apparatus is freely employed and its application explained. The demonstrations and experiments are especially helpful to those engaged in teaching and those intending to teach this subject. Credit in this course is the same as the credit in Human Physiology. It may be substituted for Animal Physiology. Text, Martin's *Human Body*. References are also made to Howell's *Text Book on Human Physiology* and others. Teachers are recommended to use the text by Howell.

SURGERY AND MEDICINE

Instructor FRICK

167. FARM ANIMALS IN HEALTH AND DISEASE. Class work, six hours. Three semester credits. Doctor Frick.

In this course the common diseases of domesticated animals are discussed, and particular attention is devoted to first-aid treatment, preventive measures against the spread of contagious and infectious diseases, methods of taking temperatures, counting the pulse and respirations, modes of administering drugs, bandaging, etc. Various aids to correct diagnoses, particularly tuberculin testing of dairy and beef animals, are taken up. A few lectures on the more commonly used medicines are included. When clinical cases are available, they are used to visualize the instruction given in the classroom. This is a course for teachers and students preparing to teach vocational agriculture.

Division of Engineering

A. A. POTTER, Dean

APPLIED MECHANICS AND MECHANICAL DRAWING

Professor SEATON
Assistant Professor PEARCE

98, 99. MECHANICAL DRAWING FOR HIGH SCHOOLS. Lectures and recitations, two hours; drafting, eight hours. Three semester credits in the School of Agriculture. Assistant Professor Pearce.

A course intended for high-school teachers of mechanical drawing and for those desiring to make College entrance credits. The work of the course will be varied to suit the previous training of those who register for it. A study is made of drawing instruments and materials, drawing-room practice and conventions, lettering, orthographic projection, and

simple working drawings. Practice is also given in tracing and blue-printing. Text, French and Svensen's *Mechanical Drawing*.

101. APPLIED MECHANICS I RECITATION. Class work, six hours. Three semester credits. Prerequisites: Calculus I, and Engineering Physics II. Professor Seaton.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motion; work energy and power; graphical solutions of problems in statics. Text, Poorman's *Applied Mechanics*.

105. APPLIED MECHANICS I LABORATORY. Laboratory work, six hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Professor Seaton.

Exercises are given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Standard tests are also made on cement. Text: Carpenter and Diedrichs' *Experimental Engineering* (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Class work, ten hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton.

This course discusses the behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Class work, six hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton.

Behavior of materials subjected to tension, compression and shear riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple beams; design of beams of wood, steel and reinforced concrete; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Text, Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

120. APPLIED MECHANICS II OR E-II LABORATORY. Laboratory work, six hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Professor Seaton.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on fine and coarse aggregates for concrete, and on brick.

130. HYDRAULICS RECITATION. Class work, six hours. Three semester credits. Must accompany or follow Applied Mechanics I. Assistant Professor Pearce.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its

measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. HYDRAULICS LABORATORY. Laboratory work, six hours. One semester credit. Must accompany or follow Hydraulics Recitation. Professor Seaton.

Tests to determine the coefficients of weirs and orifices; use and calibration of water meters; tests to determine loss of head in pipes due to various causes; and tests on water wheels, water turbines, rams and pumps.

155. ENGINEERING DRAWING. Drafting, supplemented by lectures and recitations, twelve hours. Two semester credits. Assistant Professor Pearce.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Drafting practice with lectures and recitations, twelve hours. Two semester credits. Prerequisite: Engineering Drawing. Assistant Professor Pearce.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, double-curved and warped surfaces, with their sections, tangents and tangent planes; as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle.

161. MECHANICAL DRAWING I. Drafting, with lectures and recitations, twelve hours. Two semester credits. Prerequisite: Engineering Drawing. Assistant Professor Pearce.

A study is made of conventional representations, working drawings, modern drafting room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170.—MECHANICAL DRAWING II. Drafting, eighteen hours. Three semester credits. Prerequisites: Mechanical Drawing I. Kinematics (Ap. Mech. 180) must accompany or precede this course. Assistant Professor Pearce.

About one-half of the time is occupied in making free-hand sketches of simple machine parts and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, 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. Displacement and velocity diagrams are drawn for linkages and cams.

180. KINEMATICS. Lectures and recitations, six hours. Three semester credits. Prerequisites, if taken for credit: Plane Trigonometry, Descriptive Geometry. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the Department. Assistant Professor Pearce.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism*.

ELECTRICAL ENGINEERING

Professor REID
Assistant Professor FENTON

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, twelve hours. Two semester credits. Professor Reid and Assistant Professor Fenton.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

FARM ENGINEERING

Assistant Professor SANDERS
Assistant SMITH

116, 117. TRACTORS AND TRUCKS. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

A study is made of the selection, care, and repair of traction engines.

125, 126. FARM MOTORS. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

This course is designed to teach the operation, care, and repair of stationary gas engines, oil engines, and steam engines. Some time is also devoted to automobile details, including automobile motors, carburetors, transmission systems, differentials, clutches, and starting systems.

MANUAL TRAINING AND SHOP PRACTICE

Instructor LYNCH	Assistant GRANELL
Instructor JONES	Assistant STROM
Instructor GRANT	Assistant WINTER
Instructor PARKER	
Instructor BUNDY	
Instructor AIMAN	

105. WOODWORK I. Laboratory, six hours. One semester credit. Mr. Parker, Mr. Aiman.

This is a beginning course designed to give practice with the wood-working bench tools on the various woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

119. MANUAL TRAINING FOR PRIMARY GRADES. Laboratory, twelve hours. Two semester credits. Mr. Parker.

The work of this course is planned to meet the need of teachers of primary work. Exercises suitable for the pupils of the various grades are made by the class and a brief study is made of suitable materials and equipment. The work includes paper folding and cutting, cardboard construction, raffia, cord work, weaving, reed work, and elementary tool work in woodworking.

120. WOODWORKING FOR GRAMMAR GRADES. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in elementary woodworking planned primarily for the teacher of the upper grades. The work consists of simple, useful problems which brings into use the common woodworking tools. Various woods are used so as to acquaint the student with different kinds of lumber. The finishing consists of staining, filling, and waxing. Considerable emphasis is laid upon the use and care of tools.

125. WOODWORKING I FOR HIGH SCHOOLS. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a continuation of grade woodwork, the work being of such a nature as to require previous experience with tools. The early part of the course consists of useful problems in elementary furniture construction, a brief study of common woods and methods of finishing them, including staining, filling, waxing, varnishing and rubbing. During the latter part of the course the various woodworking machines are discussed, demonstrated, and instructions given in using them, after which enough work is given to enable the student to operate the woodworking machines.

130. WOODWORKING II FOR HIGH SCHOOLS. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course in advanced cabinet construction, with the use of woodworking machinery and such bench work as is necessary for the assembling and finishing of the problems being constructed. A study is made of the progressive steps or operations in order that a proper use may be made of time. Instruction is given in the use and care of woodworking machinery and in staining, filling, varnishing, rubbing and finishing the problems constructed.

135. WOODTURNING. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. Aiman.

This course is designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave surfaces, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the students make some object of value from his own design, both as a project in turning and as a practical lesson in designing.

141. FARM SHOP PRACTICE. Laboratory, eighteen hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes Act. The course consists of blacksmithing closely related to farm work, babbiting, soldering, belt lacing, thread cutting with hand dies and taps, drilling and drill grinding.

146. FARM WOODWORK. Laboratory, eighteen hours. Three semester credits. Mr. Parker and Mr. Aiman.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar operations on full-size construction work. Bills of material are made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. FORGING I. Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

In this course the field of hand-forging as related to high-school work is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable the worker to forge, harden and temper many of the tools which are needed in this and other branches of manual training.

Tools required: One pair five-inch outside calipers, one two-foot rule, one ball-peen hammer, weight about two pounds, including handle.

155. FORGING II. Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Advance work is given in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel and in the casehardening of mild steel.

Tools required: Same as in Forging I.

160. FOUNDRY PRACTICE. Laboratory, six hours. One semester credit. Mr. Grant.

Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

170. MACHINE TOOL WORK I. Laboratory, twelve hours. Two semester credits. Mr. Jones and Mr. Bundy.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Practically all of the work is upon parts of machines that are being built in the shops.

Tools required: A four-inch scale, or B. & S. slide caliper rule, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one B. & S. center gauge.

186. FORGING III. Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice is given in the making of ornamental iron work. Tools required: Same as for course 150.

192. MACHINE TOOL WORK II. Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course consists of progressive problems in turning and caliper-ing, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine.

Tools required: Same as in Machine Tool Work I.

193. MACHINE TOOL WORK III. Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course takes up work on the turret lathe and boring mill; lacings and methods of belt connections, compound and differential indexing, and the cutting of spiral gears on the milling machine.

Tools required: Same as in Machine Tool Work I.

SPECIAL COURSES

IN AUTOMOBILES, TRACTION ENGINES, CARPENTRY, FOUNDRY, BLACKSMITHING, AND MACHINE SHOP WORK.

To meet the need of those who wish to gain practical knowledge of the trades related to engineering, the courses described below will be offered beginning June 7 and continuing to the end of the Summer Session. A student pursuing one of these courses will have to devote about 40 hours a week to actual work in the shop and laboratory, and will be expected to pay the following laboratory fees: Automobile mechanics, \$18 a month; tractor operators, \$18 a month; blacksmiths, \$18 a month; machinists, \$18 a month; carpenters, \$9 a month; and foundrymen, \$9 a month. Besides these laboratory fees, an incidental fee of \$5 will be charged for entrance, as will be a sick benefit fee of \$1, which entitles the student to free medical attention from the College physician.

The College reserves the right to change the schedule of fees at any time without previous notice.

AUTOMOBILES. The course in automobiles includes a thorough study of the construction and assembly of four-, six-, and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting and lighting systems; the automobile chassis, including transmission systems and differentials; tire repairs; general repairing, overhauling and operation of automobiles; and sufficient shopwork to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire-repair equipment, and electrical equipment. All grades of work will be given; the garage mechanic may supplement his knowledge with advanced and specialized work; or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTION ENGINES. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is suited to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the manipulation of lathes, planers, drill presses, boring mills, shapers, and screw machines.

In order to enable the students to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making; setting of cores, gates and risers; different methods of venting; also general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, punching, care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, hammers; hardening, tempering, annealing, case and pack hardening, tool forging, oxyacetylene and thermit processes of welding.

A student entering any branch will devote his entire attention to the work in which he is most interested or for which he is best prepared. He will be given practical instruction by efficient teachers, completely mastering each step before proceeding to the next. He will work with the machines themselves, studying the construction, operation and adjustment of every part until he thoroughly understands it. The courses are so arranged that the student will have much individual attention from the instructor, though the development of initiative will not be neglected.

Division of Home Economics

HELEN B. THOMPSON, *Dean*

APPLIED ART

Assistant EVERHARDY

101. **DESIGN.** Class work, three hours; studio work, nine hours. Three semester credits. Assistant ———.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function, and form.

102. **PUBLIC SCHOOL DRAWING I.** Class work, two hours; studio work, six hours. Two semester credits. Assistant ———.

This course presents representation, color, design, construction work, and picture study for rural and grade schools.

104. **PUBLIC SCHOOL DRAWING II.** Class work, two hours; studio work, six hours. Two semester credits. Prerequisite: Course 102. Assistant Everhardy.

An advance course is given in representation and design.

114. **INTERIOR DECORATION AND FURNISHING.** Class work, two hours; studio work, twelve hours. Three semester credits. Prerequisite: Design. Assistant Everhardy.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

CLOTHING AND TEXTILES

Instructor FECHT
Assistant ———

101. **CLOTHING I.** Class work, two hours; laboratory, six hours. Two semester credits. Miss ———.

The aim of this course is to study the historical development of dress and discuss sewing equipment, appropriate materials of cotton and linen for undergarments, the care and repair of clothing, and the elementary principles of dress design.

Laboratory.—In the laboratory problems dealing with garment construction are dealt with, the nature of the problem being dependent upon the preparation of the student.

106. COSTUME DESIGN. Laboratory, twelve hours. Two semester credits. Prerequisite: Design. Miss _____.

A study of art in dress, comprising the application of the principles of color, harmony and design, individual requirements in color and line, comparative design of ancient and modern costumes, original problems in designs for embroidering, sketching of costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments.

124. CLOTHING III. Laboratory, twelve hours. Two semester credits. Prerequisite: Clothing I, or its equivalent. Miss _____.

This course emphasizes the artistic in lines and decoration, deals with the design and adaptation of materials for individual and occasion, and lays stress on self-expression through dress. Commercial patterns are used. Practice in cutting, fitting, and different finishes is represented. Students are, also, requested to bring garments for remodeling. In this way materials which are usually discarded may be utilized, thus promoting economy and thrift.

211. MILLINERY. Class work, two hours; laboratory, six hours. Two semester credits. Miss _____.

This course includes a discussion of practical and artistic principles of millinery. Attention is given to taste and economy in the selection of hats. Renovation and the use of old materials is considered.

FOOD ECONOMICS AND NUTRITION

Dean THOMPSON
Assistant Professor PITTMAN
Instructor SKINNER

102. SCHOOL LUNCH PROBLEMS IN THE RURAL SCHOOL. Class work, two hours; laboratory, six hours. Two semester credits. Miss Skinner.

This course includes the selection and arrangement of equipment suitable for preparing hot lunches in rural schools; the principles of hygiene to be observed in preparation and serving of the lunches; menu planning and the nutritive requirements of growing children which should be kept in mind to insure proper selection of food.

Laboratory—The preparation and serving of simple hot lunches together with the examination and use of equipment adapted for preparing rural school lunches form the basis of the laboratory work.

106. FOODS II. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisites: Organic Chemistry, Foods I or its equivalent. Assistant Professor Pittman.

This course emphasizes the classification, composition, occurrence and general properties of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Compilation of recipes. Practice in judging food preparations.

112. HUMAN NUTRITION. Lectures and recitations, six hours. Three semester credits. Prerequisites: Organic Chemistry, Embryology and Physiology, and Foods II. Dean Thompson.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

241. SPECIAL INVESTIGATIONS IN FOODS, I. One to three semester credits. Hours to be arranged. Open to senior and graduate students. Assistant Professor Pittman.

Special problems are assigned to students for individual consideration.

246. INVESTIGATIONS IN FOOD ECONOMICS AND NUTRITION, I. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students. Dean Thompson.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment, dietary studies or practice in the methods commonly used in the simpler experiments in nutrition.

HOUSEHOLD ECONOMICS

Professor KNEELAND
Instructor SKINNER

106. HOUSEHOLD MANAGEMENT. Class work, four hours. Two semester credits. Prerequisite: Foods II or equivalent. Professor Kneeland.

This course includes a study of the evolution of the home and its present functions and problems; the organization and simplification of housework through efficient methods of housekeeping and arrangement of equipment and through the use of labor-saving devices; problems of household service; experiments in coöperative laundering, cooking, cleaning, etc.; the expenditures of the household and household budgets and accounts; the use of time freed from housework.

116. PRACTICE COURSE IN HOUSEHOLD MANAGEMENT. Three semester credits. Prerequisite: Foods II or equivalent. Prerequisite or parallel: Household Management. Professor Kneeland.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, planning, cooking and serving meals, caring for the rooms, planning the household budget and keeping the accounts.

Students who wish to qualify as teachers under the Smith-Hughes requirements for vocational high schools are required to take this course.

221. INSTITUTIONAL MANAGEMENT I. Class work, two hours; laboratory, twelve hours. Three semester credits. Prerequisite: Foods II or equivalent. Miss Skinner.

This course deals with the food problems of institutions and includes the study of marketing, preparation of food, arrangement of menus and methods and cost of service, for different types of institutions.

Laboratory.—Practical experience in the cafeteria of the department and investigation of the food problems of other institutions are included in the laboratory work.

Division of General Science

J. T. WILLARD, Dean

BACTERIOLOGY

Professor BUSHNELL

101. GENERAL MICROBIOLOGY. Class work, two hours; laboratory, twelve hours. Three semester credits. The course is designed primarily for teachers, but students in General Science and in Agriculture may obtain credit in this course by special arrangement with the head of the department.

This course consists of a general survey of the subject of bacteriology as related to agriculture, sanitation, the preparation and care of food, etc. Some attention is also given to the method of isolation, cultivation and study of microorganisms. The student becomes somewhat familiar with methods used in the bacteriological analysis of water, milk, etc.; sterilization, sources and modes of infection by pathogenic bacteria, and means of controlling their distribution.

121. HOUSEHOLD MICROBIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits.

This course is especially arranged for students taking domestic science. The credit received in this course is equivalent to that given for the regular college course. Students wishing to take this course should consult the head of the department before entering. See general catalogue for description of work offered, course 121.

301. RESEARCH BACTERIOLOGY. Elective. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the department.

Advanced students showing sufficient training, ability, and interest in original research may be admitted to this course, upon approval of the head of the department. The student will be under the direct supervision of a faculty member of the department, and in consultation with him the subject for investigation will be chosen and outlined.

BOTANY

Instructor HAYMAKER
Instructor DALBEY
Assistant CASHEN

101. GENERAL BOTANY I. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: High School Botany.

This is a course of lectures, combined with special study of a required text, with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, will be studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text, *A Text Book of Botany for Colleges*.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department.

105. GENERAL BOTANY II. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: General Botany I.

A careful study is made of the morphology of the chief great groups of plants, of their physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory.—The aim of the laboratory in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the department. Text, *A Text Book of Botany for Colleges*.

116. ECONOMIC PLANT DISEASES (PLANT PATHOLOGY I). Class work, two hours; field, laboratory and library work, twelve hours. Three semester credits. Prerequisite: General Botany II. Mr. Haymaker.

The diseases affecting the chief economic crops of the field, orchard and garden are studied. Among these are the smuts of cereal and forage crops; the common rusts attacking wheat, oats, rye and barley; the apple blotch, apple scab, Illinois blister canker, brown rot of fruits; potato, tomato and bean diseases, together with many others. Methods for preventing losses brought about by plant diseases will receive considerable attention. This course is intended to make high-school teachers familiar with the common plant diseases which are causing a great annual loss in Kansas. Time will be devoted to collecting and identifying these diseases in the field. Methods of collecting, preserving and preparing plant diseases for exhibit purposes, especially for high-school work, will receive attention. Text, *Diseases of Economic Plants*, by Stevens and Hall.

152. FRUIT, VEGETABLE AND CEREAL DISEASES. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Prerequisite: Plant Pathology I. Mr. Haymaker.

This course consists of a series of lectures dealing with diseases attacking fruits, vegetables and cereals. Special attention is given to control measures. The laboratory work considers various economic diseases which have not been considered in Plant Pathology I. This course is of special interest to horticultural and agronomy students.

155. FIELD BOTANY. Class work, two hours; field, laboratory, and library work, twelve hours. Three semester credits.

The purpose of the course is to offer teachers an opportunity to become acquainted with plants in the field, their natural history, habits, distribution and relation to their environment. Excursions will be made to different localities near Manhattan, to study plants of the prairies, woods, swamps, streams, etc. Especial attention will be given to methods of collecting and preserving plants for use in high-school teaching. Part of the laboratory work will consist of determining the names of plants by means of manuals. Text, *Gray's New Manual of Botany*.

160. BOTANY FOR HIGH-SCHOOL TEACHERS. Class work, two hours; laboratory and library work, twelve hours. Three semester credits.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural history standpoint. Most of the larger and more important groups of plants are studied from this point of view.

CHEMISTRY

Professor KING
Associate Professor SWANSON
Associate Professor HUGHES
Associate Professor BRUBAKER
Instructor KEITH
Instructor WEST
Instructor HARRISS

101. CHEMISTRY I. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: High-school physics. Professor King, Mr. West, Miss Harriss, Mr. Keith.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the students' ideas of general chemistry.

120. ORGANIC CHEMISTRY. Lectures and recitations, four hours; laboratory, six hours. Three semester credits. Prerequisite: A college course in general chemistry. Associate Professors Hughes and Brubaker, and Mr. West.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and

other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: A college course in general chemistry. Associate Professor Hughes.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. Text: Norris's *Organic Chemistry*

Laboratory.—The laboratory work includes preparations and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide, *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

150. QUANTITATIVE ANALYSIS I. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

206. PHYSICAL CHEMISTRY. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students in other divisions who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

218. ORGANIC CHEMISTRY I. Lectures and recitations, four hours; laboratory, twelve hours. Four semester credits. Prerequisite: College course in organic chemistry. Associate Professor Hughes and Mr. West.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide: Jones's *A Laboratory Outline of Organic Chemistry*.

223. ORGANIC PREPARATIONS. Laboratory work, thirty hours. Five semester credits. Prerequisite: Organic Chemistry II. Associate Professor Hughes.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

234. BIOCHEMICAL PREPARATIONS. Laboratory work, thirty hours. Five semester credits. Prerequisite: Organic Chemistry II and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

241. QUANTITATIVE ANALYSIS. Class work, one hour; laboratory, twenty-four hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Associate Professor Swanson.

Applied Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry.

Biochemistry. Associate Professor Hughes and Assistant Professor Hogan.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Laboratory work, eighteen hours. Three semester credits. Prerequisites: Organic Chemistry and Quantitative Analysis I. Associate Food Analyst Campbell.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

ECONOMICS AND SOCIOLOGY

Associate Professor MERRITT

101. ECONOMICS. Class work, six hours. Three semester credits. Associate Professor Merritt.

The fundamental principles of the science are studied and discussed in their relation to current economic problems, not as mere questions of the day but as phases of still larger problems in the evolutionary progress of economic society. The course deals with the several stages of economic development through which man has passed down to and including the ideals underlying the New Industrialism. The theory and progress of

social control; price fixing by authority; business cycles; the railway problem; capitalistic monopoly; economic insecurity due to unemployment, industrial accidents, sickness and old age; trade unionism; money and the mechanism of exchange; rent; interest; profits, and wages are some of the topics for study and class discussion. Instruction is by lectures in combination with assigned readings, class discussions, and reports. Text, Ely's *Outlines of Economics*.

204. BUSINESS ORGANIZATION Class work, four hours. Two semester credits. Associate Professor Merritt.

This is a study of the entrepreneurial, partnership, and corporate forms of business organization and management; the advantages and disadvantages of each form, and legislative restrictions governing the same. The selling plans, advertising methods and systems used by typical manufacturing and commercial firms, credits and collections, are made the basis of study and reports. Attention is also given to the organization and operation of markets and exchanges, cost accounting, and special systems of wage payments. Instruction by recitation and class discussions based on Briscoe's *Economics of Business*

251. SOCIOLOGY. Class work, six hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organization. Such social institutions as the family, the church, the school, and the state are studied as to origin, development, organization, and aims. The processes of socialization, social forces and social control receive emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student get his social bearings, and to find himself as a fact and factor in the complex interrelations of human society. Assigned library readings and special written reports are required. Instruction by lectures and class discussions. Text, Hayes's *Introduction to Sociology*.

260. COMMUNITY PROBLEMS. Class work, two hours. One semester credit. Associate Professor Merritt.

A study is made of the larger problems of urban and rural community life, considered from the sociological standpoint. Agencies and movements for organization, development and improvement; surveys; community centers; schools and churches; granges; agencies of public health, safety, recreation, and charity—all these are investigated. Attention is given to the methods for studying a community so that it may find and organize itself for improvement. Field work, lectures, and library work are the methods of instruction. Arrangements may be made for extended credit by doing more extended field work than is required by the course. This course is especially arranged for teachers, ministers, and others interested in community work.

EDUCATION

Professor HOLTON
 Professor KENT
 State Club Leader HALL
 Associate Professor ANDREWS
 Associate Professor PETERSON
 Assistant Professor _____
 Assistant Professor DAVIDSON

101. PSYCHOLOGY I. Class work, six hours. Three semester credits. Associate Professor Peterson.

A general introduction is here given to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The work of the course includes the study of a text, outside readings, lectures and class experiments.

105. EDUCATIONAL ADMINISTRATION I. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is a study of the organization of state, city and county schools; the interrelation of boards of education, superintendents, principals, teachers. The school law of Kansas is also studied.

109. EDUCATIONAL PSYCHOLOGY Class work, six hours. Three semester credits. Prerequisite: Psychology. Associate Professor Peterson.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Attention will be paid to the results of experimental investigations in the field. Lectures and library work.

111. METHODS OF TEACHING. Class work, six hours. Three semester credits. Prerequisite: Psychology. Associate Professor Andrews.

The aim of this course is the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work includes lectures, library, assignments, and observation of classes. A feature of the course is individual reports and discussions.

113. HISTORY OF EDUCATION I. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices and the changing political, economic, scientific, cultural, and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY I. Class work, six hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

121. HOME ECONOMICS EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Assistant Professor _____.

This course offers problems dealing with the place of Home Economics in modern secondary education; the aims and phases of work in various types of schools; the organization, maintenance, equipment and supervision of such departments.

125. AGRICULTURAL EDUCATION. Class work, six hours. Three semester credits. Professor Kent.

A comparative study is made of the provisions for agricultural education in this and other states and countries and the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Professor Kent.

This course is a study of typical secondary schools of industrial education and departments on industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in in-

dustrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Class work, six hours. Three semester credits. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany supervised observation and teaching.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Class work, six hours. Three semester credits. Assistant Professor Davidson.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work will include observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to selecting laboratory materials, conducting laboratory exercises, and adapting class and laboratory work to each other.

139. SPECIAL METHODS FOR CLUB WORKERS. Class work, two hours. One semester credit. State Club Leader Hall.

This is a course in organizing and conducting garden, corn, pig, canning, bread, garment-making and other clubs for boys and girls. Methods of organizing, financing and directing these clubs will be studied. The purpose and function of club work in the social, economic and vocational development of the child is emphasized.

201. RURAL EDUCATION. Class work, six hours. Three semester credits. Prerequisite: Educational Administration. Professor Kent.

This course deals with extension education, boys' and girls' club work, the problems of the rural school, consolidation, social centers, farmers' organizations, and all forms of organized community life in the open country. A certain amount of field work is done in connection with the course.

211. MENTAL AND EDUCATIONAL MEASUREMENTS. Class work, four hours. Two semester credits. Prerequisite: Educational Psychology. Associate Professor Peterson.

The course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

222. RURAL ORGANIZATION Elective. Class work, four hours. Two semester credits. Director Burr.

Principles and projects of rural organized activities. The history and development of organizations for rural improvement and progress. The function of such organizations in promoting rural progress and welfare. A study of the organization, aims and accomplishment of typical rural or farmers' organizations.

224. RURAL LEADERSHIP. Elective. Class work, two hours. One semester credit. Director Burr.

The place and function of rural leadership in community development; how leaders are developed and how they may be used by extra-community agencies in cooperating with the community in movements for community improvement.

301. EDUCATIONAL SEMINAR I. Open to candidates for the master's degree and teachers. Class work, four hours. Two semester credits. Prerequisites: Educational Psychology, and Educational Administration. Professor Holton.

The work consists of lectures, reports and class discussions. Each member of the semina chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a paper.

ENGLISH

Professor MACARTHUR
Professor DAVIS
Associate Professor CONOVER
Associate Professor BURNS
Instructor _____

101. COLLEGE RHETORIC I. Class work, six hours. Three semester credits. Associate Professor Burns.

This course consists of a rapid review of the principles of sentence structure, outlining, and paragraphing, followed by a study of the elements of effective writing in prose. In connection with the course systematic training is given in the writing of expository themes.

104. COLLEGE RHETORIC II. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Conover.

College Rhetoric II continues the work of College Rhetoric I. Special emphasis is laid on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course.

122. BUSINESS ENGLISH. Class work, six hours. Three semester credits. Professor Davis.

This course comprises a thorough review of business letter writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements, and a practical study of other forms commonly used in connection with business.

128. ORAL ENGLISH I. Elective, first semester. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Burns.

This course of study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music.

134. METHODS OF TEACHING ENGLISH. Class work, six hours. Three semester credits. Professor Macarthur.

The teacher of English in the high school often feels the need of new methods of presenting the subject. This course considers particularly the needs of the teacher who has had special training in home economics, agriculture, manual training, or general science, but who has not had such training in English. The class work consists not only of lectures by the instructor, the interpretation of the works assigned for study, and in writing of critical essays, but of the systematic discussion of methods for presenting the classics to the pupils in the high school and of awakening in them a warm vital appreciation of the best literature and of the best conduct of composition work under the conditions met in the rural and smaller high schools. A definite program of work for the high-school year is constructed and discussed. The Department of English will accept the work of this course as a substitute for English Literature I.

140. LITERATURE FROM THE READERS. Class work, six hours. Three semester credits. Professor Davis.

This course is planned to meet the needs of teachers of rural and grade schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress, and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping stone to the appreciation of the world's best literature. Special emphasis is placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric II. Associate Professor Conover.

This course consists of special studies of narrative, lyric, and dramatic poetry, the novel, and the essay. The students are made familiar with the principles of literary appreciation and are taught to apply them in intensive reading and study of standard selections.

180. ENGLISH LITERATURE HE-II. Class work, six hours. Three semester credits. Professor Davis and Associate Professor Conover.

A general survey of English literature from the earliest times are offered on the history of English literature from the earliest times to the present day. In addition, works of representative authors of each period are assigned for reading outside of the classroom. These are discussed in class and passages from them interpreted.

271. THE ENGLISH BIBLE I. Class work, six hours. Three semester credits. Professor Macarthur.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power.

HIGH SCHOOL DEBATE AND ORATORY. Class work, three hours. Associate Professor Burns.

This course comprises a thorough drill in coaching high school debates and in teaching debating in the high school. Special assistance will be given to teachers who desire to collect and to prepare material for high-school debates. The debating files of the College will be available for students taking this work.

SHORTHAND. Class and laboratory drills, six hours. Miss West.

Special instruction in shorthand and practical drills in application will be given to students and teachers desiring to prepare themselves as stenographers or to acquire rapid facilities for note taking. Stenographers desiring to increase their accuracy and speed in note-taking, as well as students desiring to enter upon this study and drill for the first time, will be admitted to the course by special arrangement with the instructor in charge.

TYPEWRITING. Class and laboratory drills, six hours. Miss West.

Special laboratory instruction and drill will be given in typewriting. Typewriting from stenographic notes, from rapid dictation and from the dictaphone, as well as expert drill in multiple copying, stencil cutting and duplication, will comprise leading features of the course.

NOTE: If ten or more teachers desire a thorough course in grammar, the course will be offered.

ENTOMOLOGY

Assistant Professor MERRILL

101. GENERAL ENTOMOLOGY. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisites: General Zoölogy I and II, or equivalent. Associate Professor Tanquary.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species, and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they become fitted to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. Field work forms a limited part of the course.

111. APICULTURE. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honey-bee. Special attention is given to practical beekeeping, dealing with the best methods practical among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

228. ADVANCED APICULTURE. One to three semester credits, depending upon the amount of work done. Assistant Professor Merrill.

This course is open to those who have had Entomology III, Apiculture, or its equivalent. The work is largely individual and is outlined to suit the need of persons registering for the course. Advanced and special work only is given.

HISTORY AND CIVICS.

Professor PRICE
Associate Professor ILES
Associate Professor JAMES
Instructor OREM

56. MODERN HISTORY II. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the last half unit of Modern History for College entrance. Miss Orem.

This course is designed to set forth the history of Europe since the Thirty Years' War. The rise of Prussia and of Russia, the decline of Spain, the ascendancy of France, the great Revolution, the Napoleonic empire, are the chief subjects for study during the early part of the course. The latter part is given over to a study of the growth of nationalities in the nineteenth century, special attention being directed toward the social, political and economic developments of the period, as well as to the international relations, all with the object of making clear in some degree the causes operating to bring about the recent World War. The larger part of this course is devoted to the last hundred years. The results and effects of the World War, including territorial changes, and the League of Nations, are carefully studied. The text used will be Robinson and Beard's *Outlines of European History*, Part II, together with Harding's *New Medieval and Modern History*, and assigned readings.

59. AMERICAN NATION I. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the first half-unit of American History for College entrance. Miss Orem.

This course comprises a survey of American history from the discovery of America to the overthrow of the Federalist party in 1800. It

deals with the establishment of the English colonies in America, the growth of social and political institutions in these colonies, the development of an American nationality, the struggle among European nations for possession of North America, the divergent English and American political theories, the causes and meaning of the American revolution, the schemes for financing the Revolutionary war, the European diplomatic entanglements, the relations of the Continental Congress and the state, the efforts to solve the problem of imperial organization, the Constitutional Convention, and the Federalist organization of the new government. Along with the political history of this period goes a study of America's economic development. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

60. AMERICAN NATION II. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the second half-unit of American History for College entrance. Miss Orem.

This is essentially the course that is usually designated as American History II in the high-school curricula. It will cover the period from the election of Jefferson, in 1800, to the present time. Westward expansion, sectional differences, Kansas History, the Civil War, and especially the new industrial age, will be the points of emphasis. This course may be taken by any students whether or not they have had the first half of a high school American History course. The texts will be the same as in American Nation I.

63. CIVICS. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or one-half unit for College entrance. Associate Professor James.

This course, while designed primarily to meet the needs of teachers of civics in grammar schools and in high schools and of those preparing for college, is intended generally as a preparation for the duties of citizenship. Therefore, the emphasis is laid upon the actual workings of American Government, with the due attention to recent changes and tendencies in state and nation. The text used is Guiteau's *Government and Policies in the United States*, Kansas edition, supplemented by assigned readings.

101. AMERICAN HISTORY I (BEGINNINGS OF THE AMERICAN NATION). Class work, six hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations.

121. ENGLISH HISTORY. Class work, six hours. Three semester credits. Associate Professor James.

A survey is made of the whole field of English history, with special emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional and political advance and New World history, the growth and organization of the empire, the commercial and industrial revolutions, and more recent political, social and industrial developments, will be studied in as much detail as the time allows. Throughout, some notice will be taken of contemporary world history are studied in this course.

and of England's position in international affairs leading up to her part in the Great War. The course is based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

126. CURRENT HISTORY. Class work, two hours. One semester credit. Associate Professor James.

The subject matter of this course varies each semester from that of any other semester. The student is guided in the study of this course by such weekly magazines as *The Independent* and *The Outlook*, supplemented by such monthly periodicals as *The Review of Reviews*, *World's Work*, *Current History*, etc. The course is designed to give the student as wide an outlook on contemporary world movements and as good an understanding of the conditions and institutions in the midst of which he lives as can be crowded into two recitation periods per week. At the same time it directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Class work, four hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussions based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the *Report of the Committee of Seven*, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on method in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. This course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civic courses.

151. AMERICAN GOVERNMENT. Class work, six hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

152. COMMUNITY CIVICS. Class work, four hours. Two semester credits. Another hour of credit may be obtained by a limited number of students who have time to devote to special problems. Associate Professor Iles.

This course deals chiefly with the functions of government as manifested in community life. It is designed to afford a basis both in subject matter and in method for those teachers who desire to present Civics in direct relation to individual welfare. The use of local material in teaching civics is illustrated, and the structural side of government is reviewed as far as is necessary to show the means through which the functions are performed.

202. AMERICAN HISTORY II (WESTWARD EXPANSION AND SECTIONALISM). Class work, six hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruction is by means of lectures, recitations, and readings.

This course is based on Price's *American History Notebook*, printed by the state for use in the Kansas schools, and includes a careful study of the state texts in American History for both the grades and the high schools, as well as our state text on Kansas History.

223. MODERN EUROPE (SINCE 1814). Class work, six hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. World readjustments, new governments and their boundaries, the League of Nations, political problems and social and economic adjustments due to the Great War are included. A desirable course for all who wish a large view and clear understanding of the Europe of to-day. Recitations, lectures, and assigned readings. Text, Hayes' *A Political and Social History of the Modern Europe*, vol. II.

AMERICAN HISTORY LECTURES. Two lectures each week. No credit. Professor Price.

These lectures cover the whole period of American History, with special consideration of our international relations, our agricultural history, the history of Kansas, and the very recent period. They are based upon the *American History Notebook*, printed by the state for use in the schools of Kansas. Advice is given as to the best reading references on certain phases of our history; but there are no recitations and no examinations. These lectures are helpful to those who are taking any of the courses in American History, and should prove especially helpful to all teachers of this subject, whether in the grades or in the high school. These lectures are open to any one who is properly assigned to them, but regular attendance is required, as in any course.

INDUSTRIAL GEOGRAPHY. A three-hour course in geography for teachers will be offered, provided ten or more enroll for it.

INDUSTRIAL JOURNALISM AND PRINTING

Associate Professor ROGERS
Assistant Professor KEITH

102. PRINTING PRACTICE. Laboratory practice, twelve hours. Two semester credits. Assistant Professor Keith.

A study of general printing-shop practice, including cost finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition. More advanced work will be given to students prepared for it.

107. **ELEMENTARY JOURNALISM.** Class work, four hours. Two semester credits. This course should be accompanied by Journalism Practice I to give four semester credits. Associate Professor Rogers.

This course is designed to give the students practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for effective use of the written articles in farm bureau, educational, and other vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism.

110. **JOURNALISM PRACTICE I.** Laboratory practice, twelve hours. Two semester credits. Professor Crawford.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

227. **JOURNALISM FOR VOCATIONAL TEACHERS.** Class work, four hours. Two semester credits. Associate Professor Rogers.

This course is offered for the purpose of meeting the demands for teachers who feel the need of special training in news writing and editing to enable them to use effective publicity in connection with the work of their schools. How to write, edit, and publish a school paper, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications are available for use by students in the course. Actual practice on a model school paper will be required of each student taking the work.

MATHEMATICS

Professor WHITE
Associate Professor STRATTON
Instructor MCKITTRICK

53. **BOOKKEEPING.** Class work, four hours. Two semester credits in the School of Agriculture. Associate Professor Stratton.

The object of this course is to teach the fundamental principles of bookkeeping and accounting and their practical applications. Business papers will be used as a basis for the study of all business transactions. Text: Lyons and Carnahan's *Bookkeeping*.

62. **ALGEBRA II.** Class work, seven and a half hours. Four semester credits in the School of Agriculture. Miss McKittrick.

This course takes up ratio and proportion, graphical representation, simultaneous equations, involution, evolution, theory of exponents, radicals, quadratic equations, and applications to practical problems. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

66. **PLANE GEOMETRY I.** Class work, seven and a half hours. Four semester credits in the School of Agriculture. Associate Professor Stratton.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry*

67. PLANE GEOMETRY II. Class work, seven and a half hours. Four semester credits in the School of Agriculture. Miss McKittrick.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

This course comprises the usual theorems and constructions, including the relation of planes and lines in space, the properties and measurements of prisms, cylinders, pyramids, and cones; the sphere and spherical triangle. The solution of many numerical and original exercises is required and mensuration of surfaces and solids is treated. Text: Wentworth and Smith's *Plane and Solid Geometry*.

80. TEACHERS' COURSE IN ARITHMETIC. Class work, four hours. Two semester credits in the School of Agriculture. Associate Professor Stratton.

This course is for rural and grade teachers and those interested in a normal course in arithmetic. The real problems of the class room are taken up and discussed with a view to giving the teachers something definite to be used in their own school work. Modern movements and methods, and also a brief history of arithmetic will be given some consideration. Text: Stratton and Remick's *Agricultural Arithmetic*.

101. PLANE TRIGONOMETRY. Class work, six hours. Three semester credits. Associate Professor Stratton.

Measurement of angles, functions of any angle, functions of multiple and submultiple angles, sum and difference formulæ are included in this course. Triangle and trigonometric equations are solved. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Class work, six hours. Three semester credits. Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Hawkes' *Higher Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

Coördinate systems and applications; loci; the straight line, circle, parabola, ellipse, and hyperbola are studied in this course. The subject matter is that of the usual first course. Text: *Brief Course in Analytic Geometry*, by Tanner and Allen.

113. CALCULUS I. Class work, ten hours. Five semester credits. Professor White.

The usual topics of differential calculus are considered, together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to work of engineering students. Text, Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Class work, six hours. Three semester credits. Associate Professor Stratton.

The subject matter of this course belongs in the main to integral calculus. Emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by methods of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

123. TEACHERS' COURSE IN HIGH-SCHOOL MATHEMATICS. Class work, two hours. One semester credit. Professor White.

This course undertakes an examination of the subject matter and methodology of high-school mathematics. It includes a study of high-school needs and of high-school courses in algebra, geometry and trigonometry, with bibliographies and other sources of assistance in teaching high-school mathematics. The course includes also a study of the mathematical situation of the past decade as regards the high-school, with present outlook problems and purposes. The work proceeds by readings, lectures, and reports. The student should have as a basis of his work Young's *The Teaching of Mathematics*.

MODERN LANGUAGES

FRENCH

Assistant Professor LIMPER

151. FRENCH I. Class work, six hours. Three semester credits.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this semester and reading matter in the grammar is supplemented by a reader. Text: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Class work, six hours. Three semester credits.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

161. FRENCH READINGS. Class work, six hours. Three semester credits.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

270. TEACHERS' COURSE IN FRENCH. Class work, six hours. Three semester credits.

The subject matter of this course falls under four heads, namely: pronunciation, grammar, reading material, and work outside of the regular curriculum. Under the first heading the physiological basis for the production of the sounds peculiar to the French language are treated. Under the second heading not only are methods of presenting grammar dealt with, but a thorough and systematic review of the subject is included. The third division consists of a careful examination of the various reading texts used in the state. Under the fourth heading methods of conducting a *Cercle francais* and material to be used in it are treated.

SPANISH

Assistant Professor LIMPER

176. SPANISH I. Class work, six hours. Three semester credits.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hills and Ford's *First Spanish Course* (first thirty-one lessons).

MUSIC*

Professor WESTBROOK	Instructor LEFFLER
Instructor SMITH	Instructor HANNEN
Instructor BUGBEY	Instructor CURRY
Instructor KIMMELL	Instructor LOVEJOY

101. HARMONY I. Class work, four hours. Two semester credits. The course in harmony includes the study of scales and intervals, primary and secondary chords and their inversions, harmonizing given bases and melodies, ear training, the chord of the dominant seventh, and keyboard harmony. Students contemplating teaching music in public schools will find this work invaluable to them, as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

110. HISTORY OF MUSIC I. Class work, two hours. One semester credit. Miss Bugbey.

A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

120. SCHOOL MUSIC METHODS I. Class work, four hours. Two semester credits. Professor Westbrook.

This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work are studied. Suggestions for community music work are also given.

130. VOICE. Private instruction. Professor Westbrook and Mr. Lovejoy.

Hours to suit the convenience of students are arranged for those wishing private vocal instruction. For two half-hour private lessons a week one credit is given.

135. VIOLIN. Private instruction. Miss Hannen.

This work is organized after the same plan as vocal instruction. Credit of one hour is given for private instruction.

140. PIANO. Private instruction. Miss Smith.

This work is organized the same as Voice and Violin and a special piano teacher is in charge.

150. CHORUS. Two hours. Twice a week, one-hour periods. One semester credit. Professor Westbrook.

Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

151. ORCHESTRA. Two hours. One semester credit.

Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music is studied and is presented in public performances.

* The following fees are charged for private instruction in music:

Two half-hour voice lessons per week throughout the term, with Director Westbrook, \$16.50.

Voice, piano, violin fees, \$14, \$12.50, and \$11 for two lessons per week according to teacher of classes.

The fees are just one-half the regular College semester fees.

PHYSICAL EDUCATION

Professor CLEVENGER
Instructor BOND

COURSES FOR MEN

Courses for men are designed primarily to instruct men who desire expert practical knowledge of the best methods of coaching football, base ball, basket ball, and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as men already engaged in coaching in high schools and colleges.

These courses will be conducted by lectures and by practical demonstrations.

Throughout all the courses, lectures and demonstrations will be given on the care and prevention of injuries, how to guard against injuries, how to care for them, and the best methods of bandaging sprains and weak joints.

126. FOOTBALL. Lectures and recitations, four hours. Two semester credits. Professor Clevenger.

This course will cover the following phases: Spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarter-back pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The work will cover the discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASE BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The course will cover the discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

This course will cover the discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

COURSES FOR WOMEN

175. GYMNASTICS. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Miss Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work. The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the physiological benefit derived from the dances, in costuming, and in the use of the dances in festivals and fetes. A notebook is required.

Practical Work. This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work. This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

182. PLAYGROUND MANAGEMENT. Lectures and recitations, one hour; practical work, to be arranged. One semester credit. Miss Bond.

This course includes discussions of the organization and administration of playground activities, equipment, and practical experience in conducting playground activities.

184. ESTHETIC DANCING. Practical work, three hours. One-half semester credit. Miss Bond.

Practical Work. This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise, and good carriage than does esthetic dancing.

187. TECHNIQUE OF BASKET BALL, BASE BALL, AND HOCKEY. Lectures and recitations, three hours. One semester credit. Miss Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING W. Five hours. No credit. Miss Bond.

PHYSICS

Associate Professor RABURN
Assistant Professor CONVERSE
Assistant Professor BRACKETT

31. GENERAL SCIENCE. Class work, six hours. Several excursions. One-half unit for admission; no College credit. Assistant Professor Converse.

This course is intended for those teachers who are required to offer courses in general science in public-school work. The course includes class, laboratory and field work. It is based on such everyday problems as: Water supply, air supply, weather predictions, light supply, prime motors, transportation, crops, and similar problems, with a study of what science in general has done and can do to solve them. Text to be selected.

41. INTRODUCTORY PHYSICS. Class work, four hours; laboratory, six hours. No College credit. Assistant Professor Converse.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject is covered and some time given to working problems. Simple experiments and demonstrations are given. The course is a good review for those who have had high-school physics. Students who expect to take county examinations for certificates to teach are advised to take this course. Text, Black and Davis's *Physics*.

51, 61. ELEMENTARY PHYSICS I (A-I, H-I). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Algebra III. Assistant Professor Brackett.

This course is intended to give a general view of mechanics, sound and heat. Special emphasis is placed upon principles which will be met again

in later work in the same or other sciences. Text, Black and Davis's *Physics*.

52, 62. ELEMENTARY PHYSICS II (A-II, H-II). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Course 51 or 61. Associate Professor Raburn.

This is a continuation of Elementary Physics I and includes a study of light, magnetism and electricity. The fundamental laws are studied and illustrated and the working principles of many electrical appliances in daily use are made the subject of class discussion.

101. HOUSEHOLD PHYSICS. Class work, six hours. Three semester credits. Associate Professor Raburn.

This is a course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, six hours. Three semester credits. Associate Professor Raburn.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinny's *Physics*.

201, 211. COLLEGE PHYSICS I (GENERAL PHYSICS I, OR ENGINEERING PHYSICS I). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Assistant Professor Brackett.

This is a course in mechanics, heat, and sound. It or its equivalent is required of general science and engineering students. The course is intended to give the student a thorough working knowledge of the fundamental units and laws involved in force, work, power, and energy, with a discussion of the fundamental laws of gases and liquids, as they occur in the transformation and transmission of force and energy. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

Laboratory.—The laboratory work consists in the use of apparatus devised for testing the laws of inertia, moments of force, moments of torsion, and elasticity, together with measurements in thermometry and calorimetry.

202, 212. COLLEGE PHYSICS II (GENERAL PHYSICS II, OR ENGINEERING PHYSICS II). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Associate Professor Raburn.

This is a course in electricity and light. It or its equivalent is required of general science and engineering students. The work in electricity is of such a nature as to give a working knowledge of the units employed and of the fundamental laws; and to acquaint the student with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Class work, four hours; laboratory and library, six hours. Three semester credits. Assistant Professor Converse.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel-plating, etc. The laboratory includes the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted to the presentation of those topics which present special difficulty, to advise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our high schools of Kansas. This course is intended for those who are either teaching or expecting to teach physics in secondary schools.

PUBLIC SPEAKING

Professor EMERSON

201. EXTEMPORE SPEECH I. Class work, four hours. Two semester credits. Professor Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticisms and points of theory, given by the instructor, supplement the practice work. Conviction, not entertainment, is the dominant purpose in the course.

204. DRAMATICS Class work, four hours. Two semester credits. Professor Emerson.

This is not an elaborate study of the drama, but aims to give instruction in dramatic presentation. Practice work predominates. Special attention is paid to "home talent" or amateur theatricals, and methods of coaching are suggested. The "Little Country Theater" idea is developed.

205. PUBLIC SPEAKING FOR TEACHERS. Class work, four hours. Two semester credits. Professor Emerson.

This course is designed, first, to give the teacher training in the art of reading and speaking from the public platform; second, to give the teacher a knowledge of the principles of public speaking as they apply to pedagogy. Practice work predominates. The situation in the grades and high schools is covered. Special emphasis is placed upon the teaching of reading in the schools.

220. SUMMER SCHOOL PLAY. Professor Emerson.

The department prepares and presents during the session one amateur play. The Summer School plays are of a standard type, good royalties being paid to secure them. Any student enrolled in the Summer School is eligible to try out for the cast.

ZOOLOGY

Associate Professor HARMAN
Instructor BROWN

105. GENERAL ZOOLOGY. Class work, six hours; laboratory and field work, twelve hours. Five semester credits. Required in the curricula in agriculture and home economics; with an extra credit hour will satisfy the requirement in general science. Miss Brown.

The structures and functions of types of both invertebrates and vertebrates, and animal relations, are studied in the class and on field trips.

Laboratory.—Studies are made of the form and function of types of living animals; and dissections and reconstructions made of the important systems of selected types. A considerable part of the laboratory time is spent in the field identifying and studying animals in their natural relations.

108. EMBRYOLOGY AND PHYSIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: General Zoölogy or its equivalent. Associate Professor Harman.

The first three-fifths of the term is devoted to (*a*) embryology and the remaining two-fifths to (*b*) human physiology. The course thus falls into two closely related parts: (*a*) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human; and (*b*) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (*a*) Studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations, and (*b*) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory, and other systems.

Division of College Extension

HARRY UMBERGER, *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the State at large. They know that the number who complete a College course in agriculture, engineering, or home economics is small in comparison with the great majority of the people who cannot go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition not only to give its resident students the best possible training for leadership in life's work but to be of direct service to every community of the State.

As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the Faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the State should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the State."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when \$2,000 per year was appropriated for this purpose by the State legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated \$4,000 for the work, to which the College added \$800. Up to this time a regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers Institutes was formally organized.

The interest in extension work throughout the State now developed rapidly. In 1907 the legislature appropriated \$10,500 for the two years, to which the College added \$1,000. In 1909 the belief in the value of agricultural extension was so great that \$52,500 was appropriated by the legislature for the biennium, and this amount has been increased by each succeeding legislature, \$35,000 being appropriated for 1912, \$40,000 for the year 1913, \$45,000 for 1914, and \$50,000 for the year ending June 30, 1915.

This rapid development of extension work was made possible not only because the people of the State wished to have such work done, but because much new light has been thrown on the essentials in agriculture by

the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the Federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, by the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to everyone; and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of \$480,000, of which \$10,000 is paid each year to each state which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each state in the proportion which the rural population of such state bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such state, or has otherwise been provided from within the state, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the State and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and \$10,000, therefore, was secured from the Federal government for extension work for the year ending July 30, 1915. The additional sums coming from the Federal funds under this act to the State for the year ending June 30, 1916, and 1917, respectively, were \$14,555.45 and \$26,685, for the years 1918 and 1919, \$38,816 and \$50,946, respectively; and for the years 1920 and 1921, \$63,073.65 and \$75,203.20, respectively. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, \$34,000 was set aside for extension work for the year ending June 30, 1920. During the war Congress made an emergency appropriation to extension work, in order that special attention might be given to maximum production of food, conservation and economic utilization of farm products. This appropriation terminated June 30, 1919. There was such great demand for continuation of much of the work started under this appropriation with a view to carrying it on on a more constructive and permanent basis, that Congress appropriated funds for this purpose, effective July 1, 1919. This is known as the supplementary Federal Smith-Lever appropriation. The total sum for extension work under the Smith-Lever act and from State funds for the year ending June 30, 1920, therefore, is as follows: From the Federal government, through the Smith-Lever act, \$73,073.65; from the Federal government through the supplementary Smith-Lever appropriation, \$36,388.65; from the State through the Agri-

cultural College, \$34,000; from the State direct, appropriation to offset the Smith-Lever appropriation, \$63,073.65; from county appropriations as offset to the supplementary Federal Smith-Lever appropriation, \$36,388.65; total, \$242,924.60.

Another act of the legislature, of very great importance to the extension activities of the Agricultural College and to the State, went into effect July 1, 1916. This is known as the county farm-bureau law, or "An act providing for State and county appropriations for the support of county farm bureaus." It provides "that whenever there shall be organized in any county in the State of Kansas a county farm bureau having a membership of 25 per cent of the *bona fide* farmers of the county, or as many as 250 farmers, and having for its purpose the giving of instructions in agriculture and home economics to the people of said county through practical demonstrations and otherwise, and the employment of a county agricultural agent or agents to prosecute this work, the Kansas State Agricultural College shall contribute, from Federal and State funds granted for demonstrations in agriculture and home economics, not less than \$800 nor more than \$1,600 per annum, as far as such funds are available, towards the salary of such county agricultural agent; . . . provided, that before such appropriation is made the county farm bureau shall present to the county commissioners of its county a copy of the constitution and by-laws adopted by the farm bureau and approved by the Kansas State Agricultural College, and a certified statement of deposit in a local bank of the county of not less than \$800, which shall be used, subject to the order of the county farm bureau, for providing the necessary equipment for said bureau." It is provided further that when these conditions have been fulfilled the "board of county commissioners shall appropriate from the public funds of the county a sum of money not less than \$800 per annum, and not to exceed \$1,600 per annum, to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau."

The legislature of 1919 amended this law to read "the Kansas State Agricultural College shall contribute, from Federal and State funds granted for demonstrations in agriculture and home economics, not less than \$1,200, as far as such funds are available, towards the salary of such county agricultural agent, or agents"; and further, "that the said board of county commissioners shall appropriate a sum of money not less than \$1,200 per annum to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau. The executive committee of the farm bureau shall be required to prepare and present to the board of county commissioners, on or before the first Monday in August, a budget or budgets showing clearly the amounts needed from year to year, which budgets shall be used as the basis for the appropriation by the county commissioners, and the county commissioners shall be empowered to make a tax levy against the property of the county, real and personal, sufficient to raise the funds needed for the farm-bureau work, which levy shall be in addition to all other levies authorized by law. Before and until the income from such tax levy is available, the county commissioners may make appropriations necessary for farm-

bureau work from the general funds of the county, and shall have power to replace such appropriations from the general fund by transferring an equal amount from the farm-bureau fund when available."

The administration of this law was placed in the hands of the Kansas State Agricultural College by a general clause providing that the work of the agricultural agent shall be "under the general direction and supervision of the Kansas State Agricultural College," and "the constitution and by-laws of each bureau and all accounts and expenditures of funds provided for by this act shall be subject to the approval of the director of extension of the Kansas State Agricultural College."

Since the original act became effective, July 1, 1915, seven of the original ten county farm bureaus have availed themselves of its provisions. Forty additional counties have organized farm bureaus that are at work, and others are organizing.

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the President of the College and the Board of Regents it became necessary to create, in December, 1912, a Division of College Extension coördinate with the other divisions of the College. This at first was subdivided into four distinct sections or departments, but the increase in work and personnel of the division has made necessary a reorganization into eight departments, namely: institutes and extension schools, county-agent work, boys' and girls' club work, home economics, emergency home demonstration-agent work, drainage and irrigation engineering, rural service, and home-study service, each with its own head and staff. The heads of the departments are responsible to the director, who is Dean of the Division of College Extension. Through this organization it is possible to administer the extension work effectively and economically, to reach directly more than 500,000 people in the State each year, and to conduct some activity in every county.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the departments in the other divisions of the College. The regular publications of the Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the State, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Institutes and Extension Schools

T. J. TALBERT, Superintendent
 MABLE CALDWELL, Assistant to the Superintendent
 H. J. BOWER, Soils
 RALPH KENNEY, Crops
 E. G. KELLY, Entomology
 R. W. KISER, Animal Husbandry
 C. G. ELLING,* Sheep Production
 W. E. PETERSON,* Dairy Husbandry
 H. E. DODGE, Dairy Husbandry
 HAROLD SIMONDS, Horticulture (resigned, Jan. 1, 1920)
 T. A. CASE, Veterinary Medicine

The Department of Institutes and Extension Schools has direct supervision over approximately three hundred and fifty farm and home institute organizations, all two-day and three-day extension schools in agriculture and home economics, and the work of the extension specialists.

Each farm and home institute of the State is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. While some organizations hold six or more monthly meetings, practically all of them have no fewer than three monthly meetings, because no institute organization can obtain State aid unless it has at least three meetings in addition to the annual meeting at which some representative of the College is present. The College plans to send two specialists, one in agriculture and one in home economics, to present at the annual meeting certain well-defined lessons. The specialists and their subjects are chosen because of a known need or interest in a particular community or a plan to start or encourage certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by this department. These are completed and returned by the local officers. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union or other organization.

The monthly meetings which are held by many of the local organizations in this State are an important feature of the institute work. These meetings are usually held on the second Saturday afternoon of each month from September to May. The Department of Institutes and Extension Schools suggests the subject for discussion, and the same subject may be discussed in every institute in the State. In this way certain important, timely subjects are being discussed by thousands of farmers and their wives at seasonable times, thus promoting a general uniformity of action.

Each year some special topics, such as farm management, the management of live stock, gardening, some phase of dairying, etc., are made especially important in institute programs, either for the whole State or for certain specified districts. During 1918 the monthly meetings were largely concerned with the consideration of topics of value to farmers and their wives interested in increased production and in establishing their agricultural program upon a peace-time basis.

Every institute has a membership paying a membership fee. The membership lists constitute the mailing list for the publications issued

* The U. S. Department of Agriculture coöperates in furnishing directly all or a part of the salaries and the franking privilege.

by this department. In addition to receiving these pamphlets each member who fills out and returns a membership blank receives from the College, from the government or from some State experiment station such other obtainable literature as his interests demand.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institutes they are able to meet this demand only in part, and for that reason extension schools or short courses in agriculture and home economics have been organized in communities which desire more complete courses in these subjects than can be given at the institutes.

The College now conducts extension schools in agriculture and home economics of three days' duration sending to each school three or four instructors. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics, so that some of the essentials of these subjects may be learned. The local committees are required to organize the classes and pay the local expenses for each school. The Agricultural College supplies the teachers and pays their railroad fares from funds appropriated to it for this purpose.

In addition to these general schools, special schools in breeding, animal diseases, dairying, poultry, orcharding, road making, and cement construction are held in communities desiring them and willing to defray the local expenses. Five-day schools in home economics may be had on request.

Extension schools are popular where the communities are brought to understand the work given. Almost every community which has had one school has petitioned for another. Increased interest is being manifested in the extension schools, and it is believed that more requests will be received in 1920 for schools than the College will be able to schedule with its present force of extension workers.

EXTENSION SPECIALISTS

The specialists of this department work in extension schools and institutes during the winter months only. During the spring, summer and fall they conduct special campaigns, such as silo building, wheat improvement, grasshopper control, cow testing, hog-cholera control, and other campaigns, and coöperative demonstration work. The latter phase of the work of the extension specialists is being especially met by the organization of coöperative demonstration work in each branch of agriculture in a certain number of counties each year. In much of the coöperative work each specialist has from two to six coöperators in each county. These men and women work under the direction of the specialists and the supervision of the county agents, keep records of the work, and call demonstration meetings at their farms on each trip of the specialist. The number of visits which each specialist makes to each point varies from two in the case of the specialist in soils to six in the case of the specialists in horticulture and entomology. The aim in all of this coöperative demonstration work is to show as well as to explain.

This line of work is especially appreciated, and the representatives of the department have been able to meet only a fraction of the demands upon them.

Educational work in hog cholera is conducted in counties where the Agricultural College is requested to put it on. One veterinarian devotes all of his time to this work, holding educational meetings in every community, until every farmer has had opportunity to attend a meeting near his home.

The calls for the extension specialists in all lines of work are so many that it is impossible to meet more than two-thirds of the calls for assistance from county agricultural agents and from farmers' organizations. While the number of specialists is being increased rapidly, yet the work is growing far more rapidly, thus indicating a healthy condition.

Agricultural Agent Work*

H. UMBERGER, Dean of Division of Extension and County Agent Leader
 KARL KNAUS, Assistant County Agent Leader (in charge, Jan. 1, 1920)
 A. F. TURNER, Assistant County Agent Leader
 F. A. DAWLEY, Assistant County Agent Leader (temporary appointment)
 E. L. RHOADES, Farm Management Demonstrator

DISTRICT AGRICULTURAL AGENT
 L. E. WILLOUGHBY, Hays

COUNTY AGRICULTURAL AGENTS

F. S. TURNER, Anderson County	T. R. PHARR, Jewell County
H. F. TAGGE, Atchison County	H. L. HILDWEIN, Kingman County
THEO. W. THORDARSON, Barton County	GEO. W. SALISBURY, Labette County
HOMER B. WILLIS, Barber County	I. N. CHAPMAN, Leavenworth County
A. C. MALONEY, Bourbon County	GAYLORD HANCOCK, Lyon County
J. A. HENDRIKS, Chase County	R. F. OLINGER, Marion County
A. I. GILKISON, Cheyenne County	O. T. BONNETT, Marshall County
ROBT. E. CURTIS, Clay County	C. V. MALONEY, Meade County
A. B. KIMBALL, Clark County	HAYES M. COE, Montgomery County
CHAS. J. BOYLE, Cloud County	W. L. TAYLOR, Morris County
J. H. McADAMS, Coffey County	V. M. EMMERT, McPherson County
E. L. GARRETT, Comanche County	E. L. McINTOSH, Nemaha County
F. H. DILLENBACK, Doniphan County	C. D. THOMPSON, Neosho County
R. O. SMITH, Douglas County	R. P. SCHNACKE, Pawnee County
F. JOE ROBBINS, Franklin County	E. I. MARIS, Rawlins County
CHAS. E. CASSEL, Finney County	E. J. MACY, Sedgwick County
H. J. ADAMS, Gray County	FRANK O. BLECHA, Shawnee County
W. W. WRIGHT, Greenwood County	W. A. BOYS, Sumner County
E. H. LEEKER, Jackson County	R. W. SHAFER, Washington County
HARRY S. WILSON, Johnson County	A. D. FOLKER, Wyandotte County
JOE M. GOODWIN, Jefferson County	F. A. BILLHIMER, Wichita-Greeley Counties

Agricultural agent work in this State is provided for by the Federal Smith-Lever Act and the State farm-bureau law. The Federal Smith-Lever Act provides an appropriation which increases each year until 1922, which is distributed among the states according to their agricultural population. In addition to this it is supported from July 1, 1919, to July 1, 1920, by supplementary Federal agricultural appropriation, this being made necessary by the fact that this work increased more rapidly during the war period than could be financed by regular Smith-Lever funds. Before the Federal funds are available they must be duplicated within the State.

* The U. S. Department of Agriculture coöperates in furnishing all or a part of the salary of every member of this department. In the case of the county agricultural agents, counties, through farm bureaus, furnish a part of the salary and all expenses.

The State legislature appropriates at each session an amount equal to that available to this State from the Federal Smith-Lever appropriation. In addition to this, the State farm-bureau law, effective June 17, 1919, provides that when one-fourth, or as many as two hundred and fifty of the *bona fide* farmers of a county, shall form a farm-bureau organization, adopt a constitution and by-laws and elect officers, and when an equipment fund of at least \$800 has been provided and deposited in a local bank, the county commissioners shall appropriate at least \$1,200 per year (which sum may be raised by a special tax levy), and the Agricultural College shall appropriate at least \$1,200 from the State or Federal funds above mentioned for the purpose of hiring a county agricultural agent and paying his expenses.

Previous to 1914, county agents were financed by membership dues and private subscriptions. At that time a membership of at least one hundred, paying dues of \$5 each, was required. In 1914 Congress passed the Smith-Lever Act, and in 1915 the Kansas legislature passed a farm-bureau law, which has since been the basis for the extension of the county-agent work. January 1, 1916, there were ten counties with organized farm bureaus. This number has increased gradually, until at the present time we have fifty-seven organized farm bureaus in the State.

COUNTY AGENTS. At the present time, January 1, 1920, the following forty-seven counties have farm bureaus with county agents actively at work or the position temporarily vacant: Anderson, Atchison, Barton, Barber, Bourbon, Chase, Cherokee, Cheyenne, Clay, Clark, Coffey, Comanche, Doniphan, Douglas, Franklin, Finney, Ford, Gray, Greenwood, Harvey, Hodgeman, Jackson, Johnson, Jefferson, Jewell, Kingman, Labette, Leavenworth, Lyon, Marion, Marshall, Meade, Miami, Montgomery, Morris, McPherson, Nemaha, Neosho, Pawnee, Pratt, Rawlins, Sedgwick, Shawnee, Sumner, Washington, Wilson, and Wyandotte. The Wichita-Wilson Farm Bureau also has a county agent, as the farm-bureau law provides that west of the line which forms the boundary of Phillips and Norton counties two counties may unite in forming a farm bureau.

The following nine counties will hire county agricultural agents previous to July 1, 1920: Allen, Cloud, Crawford, Osage, Pottawatomie, Rooks, Rush, Woodson, and Ness.

DISTRICT AGENTS. A district agent is maintained at Hays, who coöperates with the Fort Hays Experiment Station in extension work in the adjoining counties.

The agricultural agents are active in conducting demonstrations in the best methods of production, in assisting farmers with suggestions and plans relative to farm management and the farm business, and in organizing rural activities. The field demonstrations are conducted for the purpose of introducing new crops, and of testing relative values of varieties already grown, and methods of cultivation and harvesting. Demonstrations in proper methods of feeding, and care and management of live stock are conducted. Methods of controlling insects and diseases of farm crops, orchards and gardens, and diseases of live stock are

demonstrated. Surveys of the farm business are made, in order to study the conditions prevailing in typical areas and possible improvements in farm-management methods that should be employed. Improved methods of marketing and community welfare, in which better social relations are fostered, also are important features of this work. The agent interests himself in practically every farm activity, especially where there is need of improvement.

FARM MANAGEMENT DEMONSTRATIONS. Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the agricultural agents. In these demonstrations such records are taken as are essential to the determination of the net profits of the individual farms. These records are classified according to different types of farming, the profits of each type are determined, and individual farm records are compared with the average of all the farm records taken. The results of the study are made known to each farmer interested, in order that he may use the suggestions received in any need or reorganization of his own business. For those who desire it, farm account books are opened and instruction is briefly given in keeping simple records. This work was begun in September, 1914. The demand for this work was greatly increased by the enactment of the income-tax law and the resulting need of business records by which the income might be determined, and by the demand for accurate cost-of-production figures by price-fixing commissions.

Home Economics

MRS. MARY WHITING MCFARLANE, Director
MISS RENA FAUBION, Specialist in Dairying
MISS MINNIE SEQUIST, Specialist in Clothing and Textiles
MISS GERTRUDE LYNN, Specialist in Dietetics
MISS W. PEARL MARTIN, Specialist in Home Nursing
MRS. HARRIET W. ALLARD, Specialist in Household Management and Assistant in Institutes
MISS SUSANNA SCHNEMAYER, Specialist in School Lunches and Assistant in Institutes

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the State who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls of the State to whom these courses are not available. To give as much assistance as possible to this vast majority of women is the aim of the Department of Home Economics in Extension, and with this in view, seven women are regularly employed, and two others have been employed part time as special assistants during the year. The extension work in home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, home-makers' clubs, by judging at fairs, through lectures at chautauquas, and by means of personal correspondence. During the institute season, from October to March, four women spend full time in giving lectures and demonstrations before farm and home institutes and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same

specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at chautauquas, and in special extension schools. From May to September, inclusive, two women give their time to community assembly work. For the entire year the remaining four women spend their time in extension schools, and special demonstration meetings.

EXTENSION SCHOOLS IN HOME ECONOMICS

The extension schools in home economics, covering a period of a week in each place and giving definite courses of instruction, enable the women of the State to avail themselves of the opportunities offered by the Agricultural College at their very doors. The sessions of the school are conducted both forenoons and afternoons, each half day being divided into a lecture period of one hour and a demonstration period of one and one-half hours. For any one school two courses from the following list may be selected: Food preparation, home management, home nursing, sewing, canning, dietetics, and home art. The minimum required membership for a school of this kind is twenty, but as many more may become members as the room in which the school is to be held can accommodate. A tuition fee, usually of \$1 per member, is collected by the local committee, to be used in defraying the local expenses. Schools in home economics alone are held from March until October, and in connection with extension schools in agriculture, from November until March. During the year 1919 one hundred twenty-three schools were held, with an average attendance of fifty-six.

Special schools in dressmaking are held on request. These are two weeks in length, lasting from Monday afternoon until the second Friday evening. The dressmaking schools are designed primarily to give general instruction in sewing and special suggestions to members desiring to make their own dresses.

The prevalence of influenza necessitated the holding of special schools in home nursing, which proved one of the most popular forms of extension work.

Home Demonstration Work

MISS FRANCES L. BROWN, State Home Demonstration Agent Leader
MISS ELSIE BAIRD, Demonstration Agent, Anderson County
MISS ELLEN BATCHELOR, Demonstration Agent, Atchison County
MISS SARA JANE PATTON, Demonstration Agent, Cherokee County
MISS ETHEL McDONALD, Demonstration Agent, Meade County
MISS MAUDE COE, Demonstration Agent, McPherson County
MISS IRENE TAYLOR, Demonstration Agent, Shawnee County
MISS MOLLIE LINDSEY, Demonstration Agent, Washington County

Home demonstration work was made possible in August, 1917, through the passage of the emergency extension bill by Congress. This bill provided funds for the employment of county and city home demonstration agents. It carried an appropriation providing for the salaries of these agents, but it stipulated that the expenses and office room and equipment should be provided by the county or city in which the home demonstration agent was placed. These expenses were met in this State in each case by a fund of \$400 guaranteed by the city or county at the time the

services of a home demonstration agent were requested. These agents were called emergency home demonstration agents.

In taking up the work in cities it was considered a public utility, and the expense fund and equipment were provided either by the city commission, the chamber of commerce, or the public schools, separately or together. Representatives of these organizations, and other leading organizations in the city, were selected to act as an advisory committee. This committee acted in conjunction with the Division of Extension of the Agricultural College in supervising the work of the agent. Wherever it was possible for the agent to use an organization already existing, this was done, but where this was not possible, the agent, with the aid of her advisory committee, built an organization.

In the counties the work of the home demonstration agent has been started in two different ways. In the beginning several agents were asked for and placed in counties having no farm bureaus but other organizations, such as the council of defense, willing to guarantee the \$400 for expenses and office equipment. The work was taken up by the council of defense in Ness, Cowley, Stevens, and Seward counties. Cowley county discontinued the work July 1, 1918; Stevens, March 1, 1919; Ness, May 10, 1919; and Seward, July 1, 1919.

In farm-bureau counties, in addition to the conditions already mentioned, it also was necessary to organize the county for the work of the woman agent. A woman was selected in each township as a vice president, and these vice presidents formed a farm-bureau auxiliary with the usual officers. This organization was completed before the home demonstration agent began her work in the county. However, after following this plan for a time, it was found that it would be advantageous to defer the organization until the agent had reached the county, and this change was made.

Since the State conference of home demonstration agents, which was held in August, 1918, such farm-bureau counties requesting women agents as have been able to reorganize, have reorganized on the basis of an ideal farm bureau. That is, the women are taken into the farm bureau as members, having all the rights and privileges accorded to any member, and they become a part of the working organization. In such counties the work of the home demonstration agent is taken up as a part of the regular farm-bureau program.

January 1, 1918, three home demonstration agents had been placed in cities, and twelve county home demonstration agents were at work.

During the spring and summer months of 1918 the program for the work of the home demonstration agents was furnished largely by the Federal Food Administration, and the greater part of the agent's time was used in giving public talks and demonstrations concerning the use of various substitutes. Since the signing of the armistice the use of substitutes has become less imperative, and the home demonstration agents have directed their efforts toward bringing their work to a permanent and constructive basis. To this end the women of the counties and cities having these agents have gathered in groups to discuss the needs of their localities, and the agents, with the help of the women of the counties or

cities, have been building up a program of work intended to fill these needs. The home demonstration agent develops the projects included in the program, by means of talks and demonstrations in schools and clubs, exhibits at fairs, and by personal visits. In cities and counties where home demonstration agents have been located for a year the results are encouraging.

The following cities in the State have had home demonstration agents: Kansas City, Independence, Fort Scott, Wichita, Pittsburg, and Hutchinson. County home demonstration agents were at work in Anderson, Atchison, Chase, Cherokee, Lyon, Marshall, McPherson, Morris, Nemaha, Ness, Seward, Shawnee, Stevens, Washington, and Wyandotte counties. The Riley county agent acted also as agent for the city of Manhattan.

On June 30, 1919, the emergency fund, under which all this work had been carried on, was discontinued, and beginning with July 1 the work ceased to be known as emergency home demonstration work, and became home demonstration work, being placed upon an entirely different basis. Thenceforth those counties enjoying the services of a home demonstration agent must pay dollar for dollar for the use of government funds expended in the county for this purpose, because the appropriation set aside for this work was much less than that set aside from the emergency funds.

There were funds enough to continue the work in eight counties only; accordingly the opportunity was given to those counties that had had a home demonstration agent working in connection with a regularly organized farm bureau. In every instance where such an opportunity was given the farm bureau met the necessary conditions and petitioned for the work. The following counties were thus able to continue the work with the home demonstration agent: Anderson, Atchison, Morris, Lyon, McPherson, Meade, Cherokee, Shawnee, Washington. Nemaha county also continued the work, paying the entire expense of the home demonstration agent, since there were not enough Federal funds to go around. Because of lack of local funds, Lyon county suspended the work August 7, and Nemaha county, September 15.

Since July 1, 1919, a farm bureau desiring the services of a home demonstration agent must meet the following conditions:

1. Supply an office properly equipped for the work.
2. Provide adequate stenographic help.
3. Must set aside a fund, part of which shall be used to defray the salary of the home demonstration agent, and \$500 of which is to be used as an expense fund. From this expense fund the home demonstration agent is reimbursed for the official use of her car, and equipment and supplies are provided.

The work in the counties established since July 1 is on a permanent basis and bids fair to meet with the same measure of success as has been accorded the county agent work.

Boys' and Girls' Club Work*

OTIS E. HALL, State Club Leader**
LOTTIE MILAM, Assistant
L. C. WILLIAMS, Assistant
P. R. IMEL, Assistant†
J. L. PREHN, Assistant†

Boys' and girls' club work has become one of the very important phases of Agricultural College extension service. The club work is divided into club projects, and each project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, sewing, bread baking, etc.

Most of the clubs are conducted in coöperation with farm bureaus, farm and home institute organizations, county boards of education, and business men's organizations. Almost any community, however, can have a club by interesting five or more boys and girls in one of the club projects and by getting pledges from them to carry on the work as outlined by county and State leaders. Through these clubs the College is able to reach and serve a class of young people which it could neither reach nor serve in any other way. A large number of boys and girls get their first acquaintance with the College through the club work. Very few club groups fail to have a representative direct from the College visit them some time during the year. County agents give frequent and valuable help to these young workers. From College specialists, from county agents, and through special letters and lessons sent out from the State leader's office, the boys and girls learn definitely regarding the results of many of the more important experiments conducted by the Experiment Station, and regarding farm practices recommended by the College. In fact, some of the most valuable methods and practices which the College has to offer are put into actual practice by these young people.

Complete records showing expenses and receipts are kept by the boys and girls, and they meet now and then with their local and county leaders to consider various matters pertaining to their different projects. The president of the club in most cases is one of the club's own members. In this way valuable experience in leadership is had by hundreds of boys and girls who have no other source for such experience. At the close of the club season the different club members send in their records and stories, and many of them exhibit at local, county and State contests. In short, the club boys and girls shoulder responsibilities, meet with failure as well as with success, and do on a small scale what they will be obliged to do on a larger scale when, in later years, they become real farmers and home-makers.

* The U. S. Department of Agriculture coöperates in furnishing a part of the salary of each one in this department.

** Resigned, March 31, 1920.

† Resigned, January 1, 1920.

Drainage, Irrigation and Farm Engineering

H. B. WALKER, Drainage and Irrigation Engineer
IRA E. TAYLOR, Assistant Engineer (resigned, January 1, 1920)
 , Farm Engineer

Reclamation by drainage and irrigation is an important factor in the development of the agricultural resources of Kansas. Eastern Kansas has its problems of flood control and land drainage, while in Western Kansas irrigation by pumping is each year more extensively practiced with uniform success. The Agricultural College maintains a Drainage and Irrigation Department to assist in the development of reclamation work. Competent engineers are employed to give practical help to persons or communities interested in field irrigation or land drainage. It is the duty of the department to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm-drainage projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications, for drainage and irrigation projects; and to carry on a general campaign of education for the best methods of land reclamation.

The improvement of the farmstead involves many technical questions of an engineering nature. The modern farm is equipped with a water-supply system, a lighting plant, a sewerage system, up-to-date farm buildings, farm motors, and a farm workshop. The installation of this modern equipment is often simplified if proper technical advice is available. The Drainage and Irrigation Department has been enlarged to include farm engineering. It is the duty of the farm engineer to render engineering assistance to farmers in all matters relating to the development and modernization of the farmstead; to furnish plans and specifications for farm improvements; and to carry on a campaign of education for the best methods of farm engineering.

The services of the engineers of this department are free, except for the usual charge for traveling and local expenses.

Rural Service

WALTER BURR, Director

The work of the Rural Service Department is now on the project basis, approved by the States Relations Service of the United States Department of Agriculture, under the title "Rural Organization."

The object of this department is to advise with and assist county agents and farm bureaus in coordinating the activities of groups of farmers, community leaders and farmers' organizations for more effective work in the development of the agriculture and home economics of the rural community.

Conferences of leaders are held in local communities for discussion and consultation in regard to the work undertaken by organized groups, and to ways in which the efforts of these groups may be coordinated. Sug-

gestions are given by letter and personal visit to individuals and groups contemplating organization, as to what type of organization is best suited to local needs. Where communities lack unity, because of a multitude of unrelated and overlapping organizations, efforts are made through personal visits and correspondence to interest the organizations in co-ordinating their activities through the farm bureau.

Programs for all-round community development in harmony with county farm-bureau plans are worked out on the request of community leaders in coöperation with other specialists on the extension staff. One State-wide rural organization conference is conducted each year. At this conference methods of rural organization and community programs are given consideration.

Home-Study Service

(Correspondence)

V. L. STRICKLAND, Director
GEORGE GEMMELL, Agronomy
F. G. WELCH, Animal Husbandry
HELEN W. FORD, Home Economics
FLOYD PATTISON, Industrial Subjects
JULIA B. ALDER, English and History
P. P. BRAINARD, Education

NOTE.—The Faculty members employed in the Home-study Service devote their entire time to the work of teaching by correspondence. They keep in close touch with the various departments of the College, and all credit courses which are offered by correspondence must first meet the requirements of the regular College department handling the courses in residence.

There are many people in Kansas who, for many reasons, cannot attend classes on the campus, although they have interest in and need for the work offered by the Kansas State Agricultural College. Moreover, it has quite generally come to be recognized that even the completion of a college course does not end the necessity for education. It is in recognition of these manifold demands, far greater in number than the resident attendance at the College, that the institution offers to citizens of the State an opportunity to study at home various lines of agriculture, home economics, mechanic arts, farm engineering, and numerous high-school subjects.

The Home-study Service attempts to meet the widely varying needs and conditions of the people of Kansas by offering the following types of service:

1. *Free Reading or Unit Courses*, each of which is a one-lesson treatment in a simple, brief, and nontechnical way, of a single problem or unit of subject matter for which there is a demand in some phase of practical everyday life. The courses in this list are so numerous and varied that few interests are not touched by them. That they may be readily available and freely used by all to whom they would be helpful, they are made free to residents of the State. For full information concerning Free Reading Courses, send for Part I of the Home-study Service Announcement.

2. *Extension or Vocational Courses*, which are complete, comprehensive courses adapted to the needs of those who are ambitious for thorough, scientific training to meet in an effective way the various practical and technical problems found in the various vocational activities. These afford the nearest possible home equivalent of a college education, and offer the particular advantage of utilizing the practical situations of life as their laboratory and shop exercises. For full information concerning the Vocational Courses, send for Part II of the Home-study Service Announcement.

3. *Credit Courses*, which are offered for those who for any reason are unable to attend school and wish to do work of a type that can be used for college or high-school credit. These courses are also of value to those who wish to use their time to advantage when school is not in session. For further information concerning Credit Courses, send for Part III of the Home-study Service Announcement.

4. *Special Courses for Teachers*, which are a series designed as helps for teachers of industrial, agricultural and home-economics subjects. A particular effort is made in these courses to make available to the teachers of the State all the materials and aids which the Kansas State Agricultural College can offer them.

5. *Emergency Courses*. During the war a number of these courses were offered to help meet the new difficulties and duties imposed. It is the purpose of the department to continue a service of this kind. Whenever new situations arise calling for such courses, requests for them will be appreciated.

6. *Study Centers*. Under regulations established for this purpose, study centers may be arranged where college subjects may be studied under the personal direction of members of the College Faculty.

7. *Information Service*, the purpose of which is to afford a definite source to which technical or informational questions may be referred. All such questions which are referred to the Home-study Service will be promptly answered if possible, or referred to a specialist in the College or elsewhere, who will supply the information desired.

8. *Lantern-slide Service*. A number of sets of lantern slides on agricultural, industrial and home economics subjects have been prepared by specialists in the College with particular reference to Kansas conditions. These will be loaned, free of cost (except transportation charges), to any responsible resident of Kansas. For further information concerning these, inquiries should be addressed to the Home-study Service of the College.

FREE READING COURSES

The following Free Reading Courses are now in circulation. Others will be added as need arises and materials become available. These courses, including the bulletins and other publications containing the subject matter, are free to residents of Kansas, not because it costs nothing to offer them, but because it is felt that the service is due without direct charge to those who can use it to advantage, just as are many other services from state-supported institutions.

Soils and Fertility

(Including related subjects)

- RA 1. Soil Fertility
- RA 2. Land Drainage
- RA 3. Humus
- RA 5. Green Manuring
- RA 6. Commercial Fertilizers

Farm Crops

(Including related subjects)

- RA 101. Growing Corn in Kansas
- RA 102. Seed Selection for Crop Improvement
- RA 103. Wheat and Its Culture
- RA 104. Wheat in Western Kansas
- RA 105. Preparing the Land for Wheat
- RA 108. Grain Smuts
- RA 109. Growing Sorghum in Kansas
- RA 110. Pteridites and Its Culture
- RA 111. Milo and Its Culture
- RA 113. Sorghum Sirup Manufacture
- RA 114. Sudan Grass and Its Culture
- RA 115. Broom Corn and Its Culture
- RA 116. Corn Growing Under Droughty Conditions
- RA 117. Meadow and Pasture Grasses
- RA 118. Rape and Its Culture
- RA 120. Cowpeas and Their Culture
- RA 123. Red Clover and Its Culture
- RA 124. Sweet Clover and Its Culture

Garden Crops

(Including related subjects)

- RA 201. The Home Vegetable Garden
- RA 204. Sweet Potatoes and Their Culture
- RA 207. Diseases of Cabbage and Cauliflower
- RA 209. Cucumbers and Their Culture
- RA 214. Increasing the Potato Yield by Spraying

Orchard Crops

(Including related subjects)

- RA 304. Insect and Fungous Enemies of the Apple
- RA 305. The Peach and Its Culture
- RA 306. Spraying Peaches
- RA 307. The Pear and Its Culture

Small Fruits

(Including related subjects)

- RA 401. The Home Fruit Garden
- RA 402. Plant Propagation
- RA 403. Strawberries and Their Culture
- RA 405. Grapes and Their Culture
- RA 406. Grape Diseases and Pests
- RA 407. Orchard Spraying
- RA 409. Blackberry Culture

Ornamental Plants

(Including related subjects)

- RA 504. Tree Culture
- RA 505. Trees for Western Kansas
- RA 506. Black Walnuts
- RA 507. The Hardy Catalpa

Farm Animals

(Including related subjects)

- RA 601. Breeds of Draft Horses
- RA 602. Breeds of Light Horses
- RA 603. Feeding Work Horses
- RA 604. Unsoundness in Horses
- RA 605. Horse Breeding Suggestions
- RA 606. Growing Draft Colts
- RA 608. Blind Staggers
- RA 611. Breeds of Beef Cattle
- RA 612. Feeding Cattle
- RA 613. Production of Baby Beef
- RA 614. Cottonseed Meal for Feeding Beef Cattle
- RA 622. Dairy Farming
- RA 623. How to Raise Calves on Skim Milk
- RA 624. Production of Clean Milk
- RA 631. Breeds of Sheep
- RA 632. Sheep Raising
- RA 641. Breeds of Swine
- RA 643. Self-feeders for Swine
- RA 645. Hog Cholera
- RA 646. Hogging down Crops
- RA 648. Tuberculosis of Hogs
- RA 651. Breeds of Poultry
- RA 652. Poultry Management
- RA 653. Incubation of Eggs
- RA 654. Brooding of Chickens
- RA 655. Mites and Lice on Poultry
- RA 656. Important Poultry Diseases
- RA 657. Backyard Poultry Keeping

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| RA 659. Turkey Raising | RA 709. Treatment of Bee Diseases |
| RA 660. Duck Raising | RA 710. Outdoor Wintering of Bees |
| RA 661. Goose Raising | RA 711. Transferring Bees to Modern Hives |
| RA 662. The Guinea Fowl | RA 712. White Ants |
| RA 663. Squab Raising | RA 713. Important Insecticides |
| RA 671. Meat on the Farm | RA 714. How to Detect Insect Outbreaks |
| RA 672. Killing Hogs and Curing Pork | RA 715. Methods of Controlling Grasshoppers |
| RA 681. Making and Feeding Silage | RA 716. Collection and Preservation of Insects |
| RA 682. Feeding Grain Sorghums to Live Stock | <i>Agricultural Economics and Sociology</i> |
| RA 683. Utilizing Farm Wastes in Feeding Live Stock | RA 801. How to Use Farm Credit |
| RA 691. Some Common Disinfectants | RA 802. The Farmer's Living |
| RA 694. Tuberculosis. | RA 803. Community Welfare |
| | RA 804. Coöperative Live Stock Shipping Associations |
| | <i>Miscellaneous Agricultural Subjects</i> |
| | RA 901. Bindweed |
| | RA 902. Canada Thistles |
| | RA 903. Some Useful Birds |
| | RA 904. The Pocket Gopher |
| | RA 906. Weeds: How to Control Them |
- Insects*
(Including related subjects)
- | | |
|--|--|
| RA 702. The Hessian Fly | RA 705. Insects Injurious to Stored Grains |
| RA 703. Insect Pests of Alfalfa | RA 706. The White Grub |
| RA 704. The Spring Cankerworm | RA 707. The Honey Bee |
| RA 705. Insects Injurious to Stored Grains | RA 708. Comb Honey Production |

INDUSTRIAL READING COURSES

- | | | |
|---|---|--|
| | <i>Farm Machinery</i> | RI 505. Grain Fields |
| RI 2. Corn Cultivators | | RI 506. Sugar Beets |
| RI 3. Corn Harvesting Machinery | | RI 507. Alfalfa |
| RI 4. Care and Repair of Plows and Harrows | | RI 508. Drainage of Irrigated Lands |
| RI 5. Care and Repair of Mowers, Reapers, and Binders | | RI 512. Farm Reservoirs |
| RI 6. Operation of Threshing Machines | | RI 513. Pumping for Irrigation |
| RI 7. Farm Tractor | | <i>Farm Buildings</i> |
| | <i>Farm Shop</i> | RI 601. Dairy House Construction |
| RI 102. The Use of Paint | | RI 604. Ice Houses |
| RI 104. Rope Work | | RI 606. Hog Houses |
| | <i>Storage of Perishable Farm Produce</i> | RI 607. Ventilation of Stables |
| RI 201. Sweet Potato Storage | | <i>Miscellaneous Industrial Subjects</i> |
| | <i>Farm Concrete Work</i> | RI 701. Farm Wood Lot |
| RI 303. Concrete Silo Construction | | RI 703. Farm Sewage Disposal |
| RI 304. Concrete Fence Posts | | RI 705. Fire Prevention |
| | <i>Roads in the Country</i> | RI 706. Farm Lighting |
| RI 401. Benefits of Improved Roads | | RI 707. Preservative Treatment of Farm Timbers |
| RI 402. Sand, Clay and Burnt Clay Roads | | RI 708. Home Conveniences |
| RI 403. The Road Drag and How to Use It | | RI 710. Lightning and Lightning Conductors |
| RI 404. Macadam Roads | | RI 713. Fly-trap Construction |
| RI 405. Highway Improvement | | RI 715. Bird-house Construction |
| | <i>Drainage and Irrigation</i> | <i>Foods and Nutrition</i> |
| RI 501. Information for Beginners | | RHE 1. Nutrition |
| RI 502. The Construction of Small Irrigation Ditches | | RHE 2. What the Body Needs |
| RI 504. Orchards | | RHE 4. Foods Rich in Protein |
| | | RHE 5. Milk, the Indispensable Food for Babies |

<i>Preparation of Foods</i>		
RHE 102. Cheese	RHE 507. Grape Juice	
RHE 104. Vegetables	RHE 508. Preserving Apples by Evaporation	
RHE 105. Food for Young Children	RHE 510. Home Uses for Muscadine Grapes	
RHE 106. School Lunches	RHE 511. Canning Instructions	
<i>Proteins</i>		
RHE 210. How to Make Cottage Cheese on the Farm	RHE 512. Drying Fruits and Vegetables in the Home	
<i>Carbohydrates, or Starches and Sugars</i>		
RHE 301. Sugar as Food	RHE 513. Preservation of Vegetables by Fermentation and Salting	
RHE 302. Maple Sugar	RHE 514. Home-made Fruit Butters	
RHE 303. Sorghum Sirup	<i>Household Pests</i>	
RHE 304. Use of Honey	RHE 602. Fleas and Their Control	
RHE 306. The Native Persimmon	RHE 603. Carpet Beetle	
RHE 308. Okra	RHE 604. House Centipede	
RHE 310. Sugar Beet Sirup	RHE 608. House Flies	
RHE 311. Common Edible Mushrooms	RHE 609. House Ants	
<i>Cereals</i>		
RHE 401. Food Value of Corn, Kafir, and Cowpeas	RHE 610. Silverfish	
RHE 402. Ways of Using Cornmeal	RHE 611. Harvest Mites, or Chiggers	
RHE 403. Popcorn	RHE 612. The Bedbug	
RHE 404. Corn as Food	<i>Fats and Oils</i>	
<i>Preservation of Foods</i>		
RHE 501. Home Care of Foods	RHE 701. Economical Uses of Fat	
RHE 502. Milk	RHE 702. Peanut Oil	
	RHE 703. Making Butter on the Farm	
	<i>Household Management</i>	
	RHE 801. The Farm Kitchen as Workshop	

VOCATIONAL COURSES

SUBJECTS COVERED. Vocational courses treat subjects covered in the three general fields, *Agriculture, Industry* and *Home Economics*. The list which follows is being revised from time to time according to demands.

BY WHOM CONDUCTED. The courses are prepared and taught by specialists in correspondence study, who keep in close touch with the College Faculty in their respective fields.

METHODS OF WORK. Each course is based upon a recognized standard text treating the subject, and is covered in a number of definite lessons, ranging from ten to twenty. A written report is required of the student on each lesson, according to instructions sent upon enrollment.

EXAMINATIONS. Examinations in courses completed may be taken at the College or locally under the direction of some suitable person with which arrangements can be made, such as a county superintendent or city superintendent.

FEES. The enrollment fee for a single vocational course is \$3, or for a complete group of eight courses, \$15 (\$6 and \$30 to nonresidents of Kansas). The payment of five single enrollments entitles the student to the three additional courses free of charge.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing instruments, stationery and other materials required in their courses, and to pay postage on the lessons sent in.

AGRICULTURE

Agronomy

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 4. Grain Crops
5. EA 5. Forage Crops
(Select three additional subjects from list of electives.)

Horticulture

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 6. Gardening
5. EA 7. Orchardring
(Select three additional subjects from list of electives.)

Animal Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry

3. EA 8. Feeds and Feeding

4. EA 9. Animal Breeding
5. EA 10. Types and Breeds

(Select three additional subjects from list of electives.)

Dairying

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 11. Farm Dairying
5. EA 9. Animal Breeding
(Select three additional subjects from list of electives.)

Poultry Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture.
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 9. Animal Breeding
5. EA 12. Poultry Production
(Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE AGRICULTURAL COURSES

- | | |
|---------------------------|------------------------------|
| EA 3. Soils | EA 16. Greenhouse Management |
| EA 4. Grain Crops | EA 17. Floriculture |
| EA 5. Forage Crops | EA 18. Landscape Gardening |
| EA 6. Gardening | EA 19. Farm Forestry |
| EA 7. Orchardring | EA 22. Diseases of Animals |
| EA 8. Feeds and Feeding | EA 24. Horse Production |
| EA 9. Animal Breeding | EA 25. Dry-land Farming |
| EA 10. Types and Breeds | EA 26. Beef Production |
| EA 11. Farm Dairying | EA 27. Pork Production |
| EA 12. Poultry Production | EA 31. Farm Management |

By special arrangement with this department, students may choose from other lists of electives described hereafter.

INDUSTRIAL

Carpentry and Building

Required Subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 3. Architectural Drawing
4. EI 4. Constructive Carpentry and Inside Finishing
5. EI 5. Heating and Ventilating
(Select three additional subjects from list of electives.)

Stationary Engineering

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 11. Steam Boilers and Engines

4. EI 12. Gasoline Engines

5. EI 13. Blacksmithing

(Select three additional subjects from list of electives.)

Highway Improvement I

Required subjects:

1. EI 8. Concrete Construction
2. EI 15. Highway Construction
3. EI 16. Roads and Pavements
4. EI 19. Bridge and Culvert Construction
5. EI 28. Strength of Materials
(Select three additional subjects from list of electives.)

Farm Engineering

Required subjects:

1. EI 6. Farm Drainage
 2. EI 7. Farm Buildings
 3. EI 8. Concrete Construction
 4. EI 9. Farm Blacksmithing
 5. EI 10. Farm Machinery
- (Select three additional subjects from list of electives.)

Highway Improvement II

Required subjects:

1. EI 14. Plane Surveying
2. EI 2. Mechanical Drawing, Applied
3. EI 16. Roads and Pavements

4. EI 28. Strength of Materials
 5. EI 30. Structural Engineering
- (Select three additional subjects from list of electives.)

Machine Shop and General Repairing

Required subjects:

1. EI 1. Shop Mathematics
 2. EI 2. Mechanical Drawing, Applied
 3. EI 13. Blacksmithing
 4. EI 17. Automobiles
 5. EI 18. Machine Shop Work
- (Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE INDUSTRIAL COURSES

- | | |
|---|---|
| EI 1. Shop Mathematics | EI 15. Highway Construction |
| EI 2. Mechanical Drawing, Applied | EI 16. Roads and Pavements |
| EI 3. Architectural Drawing | EI 17. Automobiles |
| EI 4. Constructive Carpentry and Inside Finishing | EI 18. Machine Shop Work |
| EI 5. Heating and Ventilating | EI 19. Bridge and Culvert Construction |
| EI 6. Farm Drainage | EI 20. Elementary Woodworking |
| EI 7. Farm Buildings | EI 21. Farm Woodworking |
| EI 8. Concrete Construction | EI 23. Gasoline and Oil Tractor Engines |
| EI 9. Farm Blacksmithing | EI 24. Pattern Making |
| EI 10. Farm Machinery | EI 25. Plumbing |
| EI 11. Steam Boilers and Engines | EI 26. Practical Electricity |
| EI 12. Gasoline Engines | EI 27. Sheet Metal Drafting |
| EI 13. Blacksmithing | EI 28. Strength of Materials |
| EI 14. Plane Surveying | EI 29. Steam Traction Engines |
| | EI 30. Structural Engineering |

By special arrangement with this department students may choose from other lists of electives set forth in this pamphlet.

HOME ECONOMICS

Domestic Science

Required subjects:

1. EH 1. Household Management
 2. EH 2. Foods and Cookery I
 3. EH 3. Foods and Cookery II
 4. EH 9. Home Nursing
- (Select three additional subjects from list of electives.)

Domestic Art

Required subjects:

1. EH 1. Household Management
 2. EH 5. Sewing I
 3. EH 6. Sewing II
 4. EH 8. Educative Millinery
 5. EH 11. Home Decoration
- (Select three additional subjects from list of electives.)

General Course in Home Economics

Required subjects:

1. EH 1. Household Management
 2. EH 2. Foods and Cookery I
 3. EH 5. Sewing I
 4. EH 9. Home Nursing
 5. EH 11. Home Decoration
- (Select three additional subjects from list of electives.)

ELECTIVE SUBJECTS APPLYING TO THE HOME ECONOMICS COURSES

- | | |
|-----------------------------|--|
| EH 2. Foods and Cookery I | EH 9. Home Nursing |
| EH 3. Foods and Cookery II | EH 10. Home Sanitation |
| EH 5. Sewing I | EH 11. Home Decoration |
| EH 6. Textiles | EH 14. Child Life and Care of Children |
| EH 7. Elementary Needlework | EH 16. Costume Design |
| EH 8. Educative Millinery | EH 17. Laundering |

CREDIT COURSES

GRADES OF WORK. Credit courses are offered in both high-school, or entrance-credit subjects, and college subjects. The courses in each case are the full equivalent of resident courses in like subjects.

BY WHOM CONDUCTED. The courses are prepared under the supervision of the heads of departments of the Agricultural College Faculty, and are taught by specialists in correspondence study under the same regulations that govern resident work.

EXAMINATION. Examinations may be taken at the College or under conditions approved by the College. In the latter case, arrangements can often be made with the local county superintendent, or city superintendent of schools, to conduct the examination.

REGULATIONS. 1. Enrollments for correspondence-study work will be received at any time during the year, and students may continue their work uninterrupted throughout the entire year.

2. Correspondence students will be expected to complete any course for which they are enrolled within twelve months from the date of enrollment.

3. Not more than two courses are advised by correspondence at any one time. It is recommended that a student carry but one subject at a time, particularly where only part of the time is given to the work.

4. Each subject listed under the various departments constitutes what is known as a correspondence "course."

5. Students enrolling for correspondence courses must meet the prerequisites the same as if undertaking the work in residence.

6. A student may not be enrolled for correspondence work while in attendance at any institution of learning without special permission from the Dean or proper authorities in the institution of which he is a student.

FEEES. An enrollment fee of \$10 is charged for residents of Kansas; \$15 for nonresidents. For this amount the student is entitled to eight semester hours of college work, or three semester credits of high-school work, and is given a year in which to finish them. No fee is refunded because of the student's inability to enter upon the course for which once registered. Extensions of time can be granted only where the work has been delayed because of personal illness of the student. All such cases must be taken up individually with the director of this department.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing outfits, stationery and other materials required in their courses, also to pay postage on lessons one way.

FOR WHOM INTENDED. Though credit courses offered by the Home-study Service are still limited, the number is steadily growing, and it is the purpose of the department to add courses whenever a demand for them becomes evident. The other types of work are sufficiently broad to be of value to a great variety of people. The following classes in particular should be able to profit by them:

1. Those who have completed a common-school course, but for any reason are unable to attend high school.
2. High-school graduates temporarily or permanently unable to attend college.
3. Students whose attendance at high school or college has been interrupted.
4. Students who for any reason have fallen behind in their work and wish to use their spare time catching up.
5. The strong, aggressive student who does not wish to halt his progress for vacations and other interruptions.
6. High-school and grade classes in practical courses that need supplementing and enrichment.
7. Teachers who wish further professional or other training, or who need help in planning and conducting their work.
8. Professional and business men who wish to keep growing along some line of interest, professional or avocational.
9. Clubs and other organizations which wish to make systematic studies.
10. Men and women who wish effective help in meeting the demands in their vocations for technical and scientific knowledge and training.

COURSES OF INSTRUCTION.

The list of Credit Courses offered is being extended constantly, the new courses added in each case being those for which there seems to be the most demand. The following is the present list:

HIGH-SCHOOL COURSES

	<i>Agriculture</i>	<i>Units of credit.</i>	<i>Assignments.</i>
POA 1. Elementary Agriculture I.....		½	20
POA 2. Elementary Agriculture II.....		½	20
<i>Drawing</i>			
PCD 3. Mechanical Drawing I.....		½	20
PCD 4. Mechanical Drawing II.....		½	20
<i>English</i>			
PCE 1. Grammar and Composition.....		½	20
PCE 2. Literature		½	20
PCE 3. Composition		½	20
PCE 4. Literature		½	20
PCE 5. Composition		½	20
PCE 6. Literature		½	20
<i>Mathematics</i>			
PCM 1. Algebra I		½	20
PCM 2. Algebra II		½	20
PCM 3. Algebra III		½	20
PCM 4. Plane Geometry I.....		½	20
PCM 5. Plane Geometry II.....		½	20
PCM 6. Solid Geometry		½	20

	<i>History</i>	<i>Units of credit.</i>	<i>Assignments.</i>
PCH 1. Greek History		½	20
PCH 2. Roman History		½	20
PCH 3. Medieval History		½	20
PCH 4. Modern History		½	20
PCH 5. American History I.....		½	20
PCH 6. American History II.....		½	20
<i>History (Alternative arrangement)</i>			
PCH-A. Ancient History		½	20
PCH 3. Medieval History		½	20
PCH 4I. Modern History I.....		½	20
PCH 4II. Modern History II.....		½	20
PCH 5. American History I.....		½	20
PCH 6. American History II.....		½	20

COLLEGE CREDIT COURSES

DIVISION OF AGRICULTURE

	<i>Agronomy</i>	<i>Semester credits.</i>	<i>Assignments.</i>
CA 3. Grain Crop Production.....		2	16
CA 4. Forage Crop Production.....		2	16
<i>Animal Husbandry</i>			
CL 1. Types and Classes of Live Stock.....		1	8
CL 2. History of Breeds.....		2	16
CL 3. Principles of Feeding.....		3	24
<i>Horticulture</i>			
CH 1. Orcharding		2	16
CH 2. Gardening		3	24
CH 3. Floriculture		2	16
CH 4. Green-house Construction and Management.....		3	24
CF 1. Farm Forestry		2	16
<i>Poultry Husbandry</i>			
CPP 1. Farm Poultry Production.....		1	8
DIVISION OF ENGINEERING			
CE 5. Concrete Construction		1	8
*CE 2. Mechanical Drawing I.....		2	16
*CE 6. Mechanical Drawing II.....		3	24
CE 4. Kinematics		3	24
<i>Civil Engineering</i>			
CE 1. Highway Engineering I.....		2	16
<i>Shop Practice</i>			
*CE 7. Metallurgy		2	16
<i>Steam and Gas Engineering</i>			
CE 3. Farm Motors		2	16
CE 8. Heating and Ventilation A.....		2	16
CE 9. Airplane Mechanics		1	18
DIVISION OF HOME ECONOMICS			
<i>Domestic Art</i>			
CHE 1. Textiles		2	16

* In preparation.

<i>Domestic Science</i>		<i>Semester credits.</i>	<i>Assign- ments.</i>
*CHE 2. Foods I		1	8
DIVISION OF GENERAL SCIENCE			
<i>Economics and Sociology</i>			
CEC 1. Economics		3	24
CEC 2. Agricultural Economics		3	24
CS 2. Rural Sociology		3	24
CS 3. Sociology		3	24
<i>Education (Professional)</i>			
CP 1. Industrial Education		3	24
CP 2. Educational Psychology		3	24
CP 4. History of Education		3	24
CP 5. Principles of Education		3	24
CP 6. Methods of Teaching		3	24
CP 7. Educational Administration		3	24
CP 8. Psychology		3	24
CP 9. School Discipline		2	16
CP 10. Rural Education		3	24
CP 11. Agricultural Education		2	16
CP 12. Home Economics Education		2	16
<i>English</i>			
OCE 1. College Rhetoric I		3	24
OCE 2. College Rhetoric II		3	24
OCE 3. Business English		3	24
OCE 4. The Short Story		3	24
<i>Geology</i>			
CG 1. Dynamic Geology		2	16
<i>Mathematics</i>			
CM 7. Plane Trigonometry		3	25

* In preparation.

Student Organizations

THE STUDENTS' SELF-GOVERNING ASSOCIATION

The Students' Self-Governing Association was organized on broad lines in the spring of 1919, with the whole-hearted approval and sanction of the Faculty. The association was formed "for the purpose of placing the control and advancement of student interests and activities in the hands of the student body itself, with the firm belief that this arrangement will cause an increased self-control, resulting in higher ideals and better coöperation, and that officers of sufficient wisdom and maturity may be found so that appeal to College authorities shall be unnecessary."

All students enrolled under any department of the College are eligible for membership. The annual membership fee is 50 cents. Special dues to include admission to student activities may be voted by the association.

The officers of the association are a president and a vice president, elected by the association as a whole, and a secretary and a treasurer, elected by the executive council of the association.

The supreme governing council of the Student Association is known as the executive council. This body consists of nineteen members, and its membership is made up as follows: The president and the vice president of the association; two members from each of the College classes; two from the Literary Society Council; one from the Women's Pan-Hellenic Council; one from the Men's Pan-Hellenic Council; one from the "K" fraternity; one from the Women's Athletic Association; one from the Y. W. C. A. cabinet; one from the Y. M. C. A. cabinet; and one from the School of Agriculture. Regular meetings of the council are held once a month.

There are standing committees on discipline, finance, social affairs, calendar, school spirit, and points, and other temporary or standing committees may be provided for from time to time as occasion demands. All chairmen of committees are appointed by the executive council. Each chairman submits a list of members desired for his committee, which appointments must be ratified by the executive committee before they become effective.

All regulations passed by the executive council, by committees, and by the entire association, are considered valid and binding upon all students in so far as said actions are not disapproved by the Faculty and the President of the College.

THE STUDENT COUNCIL

The Student Council was a representative body which was organized in 1909, received official sanction from the Board of Regents and the Faculty of the College, and functioned successfully until replaced in the spring of 1919 by the Students' Self-governing Association and its executive council.

The Student Council consisted of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elected a delegate, who had the privilege of speaking on subjects pertaining to his school, but had no vote. At each meeting of the council a member of the Faculty was privileged to be present and to participate in the discussions.

The Student Council occupied an interesting and valuable place in the College life, and as a whole may be said to have been 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 Students' Council were submitted to the President and Faculty for approval.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Home Economics Hall is the headquarters of the association, to which all young women of the College are at all times cordially welcome. An office for the general secretary and rest rooms for the young women are maintained in this building during the College year.

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. At the opening of the College semesters the incoming trains are met by "Big Sisters," who assist new women students, the "Little Sisters," in securing suitable lodging and boarding places. If any prospective woman student will write to the general secretary of the association, her "Big Sister" will correspond with her during the summer vacation.

During the College year various social functions are held for the young women. The first of these is an informal reception to enable the College girls to become acquainted with one another. Once each year the two associations entertain jointly.

The religious life of the young women is fostered by the weekly vesper services in the Home Economics Hall. The different churches of the city extend a cordial welcome to the College women, and through the efforts of the association they are encouraged to active participation in the services of the church of their choice.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College Library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

THE HENRY SCATTERGOOD FRIENDLY GROUP

The Henry Scattergood Friendly Group, an organization of the Society of Friends young people, holds its regular meeting Sunday afternoons during the College year, and considers the problems confronting the student in his religious and civil life. It aims to find in Christian association a broader spiritual service in College life.

To prospective students, the group offers a cordial welcome.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin literary societies are open to both sexes; the Ionia, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council, which coöperates with a Faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety oratorical contest.

In the School of Agriculture there are two literary societies; one for young men, the Lincoln, and one for young women, the Philomathian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES

The Block and Bridle Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Live-stock problems of all kinds are taken up, and members of the Faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State. The Klod and Kernel Klub meets on the first and third Tuesdays of each month. Junior and senior agronomy students are eligible to membership.

ENGINEERING SOCIETIES

The various technical societies of the Division of Engineering meet weekly in departmental seminars for lectures, presentation of papers, and discussion of notable articles appearing in the technical press or in the journals of the national societies. On special occasions all of the societies meet together as the Engineers' Association, for lectures by eminent practicing engineers.

The students in mechanical and electrical engineering are organized as student branches of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, respectively.

The purpose of these various societies is to acquaint the students with the latest development in the fields of engineering and architecture, to

give them more definite ideas as to the opportunities in their professions and the requirements for success in their profession, to promote acquaintance and fellowship among the students, and to further the interest of the Division of Engineering in the College and the State.

THE COLLEGE BAND

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the gymnasium the College is prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall football teams are organized; in the fall and winter, basket ball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity with young men for general physical training. In the gymnasium, under a physical director, they receive training suitable for their needs. Basket-ball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations consist of fraternities, sororities, and societies. Of these, Alpha Zeta and Gamma Sigma Delta draw their members from students in the Division of Agriculture; Alpha Psi draws its members from the Veterinary Department; Sigma Tau from the Division of Engineering; Omicron Nu from the Division of Home Economics, while the McDowell Club is an honorary organization of women students and teachers of the Department of Music. There are chapters of Sigma Delta Chi and Theta Sigma Phi, journalistic fraternities; of Pi Kappa Delta, the debating fraternity; of Zeta Kappa Psi, the debating sorority. The military students have a chapter of "Scabbard and Blade," the national fraternity; and the athletic men have the "K" fraternity. Of honorary societies there are the Quill Club, composed of those who have gained distinction in writing, and the "Forum," for those who have secured forensic honors.

In addition to these student organizations there is a chapter of Phi Kappa Phi, to which students of the highest scholarship are elected. (See "Honor Societies.")

School of Agriculture

(The Secondary School)

HARRY LLEWELLYN KENT, *Principal*¹

A. P. DAVIDSON, *Associate Principal*

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

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

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

THE COURSE OF STUDY

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

The curriculum in home economics emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

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

ADMISSION. Students who are fourteen years of age or older, and who have completed the eighth grade of the public schools, are admitted with-

1. Resigned.

out examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Whenever there is a question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

The Principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of seventeen years are required to complete one of the three-year curricula as outlined before they choose work not included in the curriculum.

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

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

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

Curriculum in Agriculture

(SCHOOL OF AGRICULTURE)

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

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
Stock Judging I An. Husb. 51..... 3(0-6)	Stock Judging II An. Husb. 52..... 3(0-6) <i>or</i>
Industrial Arithmetic A Math. 51..... 4(4-0)	Algebra I Math. 63..... 4(4-0)
English I Engl. 51..... 4(4-0)	English II Engl. 54..... 4(4-0)
Beginning Poultry Poult. Husb. 51..... 2(1-2)	Breeds and Breeding An. Husb. 53..... 2(2-0)
Carpentry I Shop 51..... 2(0-4)	Farm Gas Engines I Farm Engr. 75..... 2(1-2)
	Fruit Growing Hort. 51..... 3(2-2)
	Farm Insects Ent. 62..... 3(2-2)
Physical Training M-I Phys. Ed. 51A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
Music*	Music*

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
Farm Crops Agron. 51..... 5(4-2)	Soils and Fertilizers Agron. 56..... 3(2-2)
Elementary Chemistry Chem. 51..... 4(3-2)	Elementary Agricultural Chemistry Chem. 53..... 4(3-2)
English III Engl. 61..... 4(4-0)	English IV Engl. 64..... 4(4-0)
Dairying Dairy Husb. 61..... 2(1-2)	Live-stock Production An. Husb. 55..... 3(3-0)
Physical Training M-I Phys. Ed. 51A..... 1(0-3) <i>or</i>	Physical Training M-II Phys. Ed. 52..... 1(0-3) <i>or</i>
Military Science I† Mil. Tr. 101..... 1(0-4)	Military Science II† Mil. Tr. 102..... 1(0-4)
Music*	Music*
<i>Elective</i> , 4 credits from the following:	<i>Elective</i> , 4 credits from the following:
Feeds and Feeding An. Husb. 54..... 2(2-0)	Elementary Zoölogy Zoöl. 51..... 3(1-4)
Elementary Dairy Judging Dairy Husb. 63..... 1(0-3)	Carpentry II Shop 54..... 3(0-6)
Algebra I or II Math. 63 or 64..... 4(4-0)	Algebra I or II Math. 63 or 64..... 4(4-0)
Elementary Traction Engines I Farm Engr. 66..... 2(0-4)	Farm Gas Engines II Farm Engr. 77..... 3(0-6)
Blacksmithing I Shop 69..... 2(0-4)	Blacksmithing II Shop 72..... 2(0-4)
Elementary Farm Machinery Farm Engr. 51..... 2(1-2)	Concrete Construction I Ap. Mech. 51, 55..... 2(1-2)

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

THIRD YEAR

Elementary Farm Management Ag. Ec. 51..... 3(2-2)	Elementary Agricultural Economics Ag. Ec. 56..... 3(3-0)
Physics A-I Physics 51 4(3-2)	Physics A-II Physics 52 4(3-2)
English V Engl. 71 3(3-0)	Civics Hist. 63 4(4-0) <i>or</i>
American Nation I Hist. 59 4(4-0)	American Nation II Hist. 60 4(4-0)
Physical Training M-I Phys. Ed. 51A..... 1(0-3) <i>or</i>	Farm Writing Ind. Jour. 51..... 4(2-4)
Military Science I† Mil. Tr. 101..... 1(0-4)	Physical Training M-II Phys. Ed. 52..... 1(0-3) <i>or</i>
Music* <i>Elective</i> , 5 credits from the following:	Military Science II† Mil. Tr. 102..... 1(0-4)
Plane Geometry I Math. 66 4(4-0)	Music* <i>Elective</i> , 5 credits from the following:
Diseases of Farm Animals Surg. 51 2(2-0)	Plane Geometry II Math. 67 4(4-0)
Elementary Grain Marketing Mill. Ind. 52..... 3(2-2)	Physiology and Hygiene Anat. 51 4(4-0)
Weed Control and Seed Identification Agron. 58..... 2(0-4)	Incubation Practice Poult. Husb. 55..... 1(-)
	Elementary Bacteriology Bact. 52 3(2-2)
	Brooding Practice Poult. Husb. 58..... 1(-)
	Elementary Traction Engines II Farm Engr. 69..... 2(0-4)
	Elementary Beekeeping Ent. 65 3(2-3)

Curriculum in Mechanic Arts

(SCHOOL OF AGRICULTURE)

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

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
English I Engl. 51 4(4-0)	English II Engl. 54 4(4-0)
Algebra I Math. 63 4(4-0)	Algebra II Math. 64 4(4-0)
Free-hand and Object Drawing Arch. 51 3(0-6)	Geometrical Drawing Ap. Mech. 72..... 3(0-6)
Farm Gas Engines I Farm Engr. 75..... 2(1-2)	Elementary Traction Engines I Farm Engr. 66..... 2(0-4)
Carpentry I Shop 51 2(0-4)	Molding I Shop 96 2(0-4)
Concrete Construction I Ap. Mech. 51, 55..... 2(1-2) <i>or</i>	Elementary Botany Bot. 51 3(2-2) <i>or</i>
Elementary Botany Bot. 51 3(2-2)	Concrete Construction I Ap. Mech. 51, 55..... 2(1-2)
Blacksmithing I Shop 69 2(0-4)	Blacksmithing II Shop 72 2(0-4)
Physical Training M-I Phys. Ed. 51 A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
Music*	Music*

* Elective.

† All male students are required to take Physical Training during the first year of their attendance and Military Training during the next year.

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
English III Engl. 61 4(4-0)	English IV Engl. 64 4(4-0)
Plane Geometry I Math. 66 4(4-0)	Plane Geometry II Math. 67 4(4-0)
Physics A-I Physics 51 4(3-2)	Physics A-II Physics 52 4(3-2)
Shop Drawing I Ap. Mech. 75, 80..... 3(1-4)	Shop Drawing II Ap. Mech. 85, 90..... 3(1-4)
Machine Shop I Shop 87 3(0-6)	Strength of Materials Ap. Mech. 70..... 3(3-0)
Military Science I † Mil. Tr. 101..... 1(0-4) <i>or</i>	Military Science II † Mil. Tr. 102..... 1(0-4) <i>or</i>
Physical Training M-I Phys. Ed. 51 A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
<i>Elective</i> , 3 credits from following:	<i>Elective</i> , 3 credits from following:
Concrete Construction II Ap. Mech. 60..... 3(0-6)	Concrete Construction III Ap. Mech. 65..... 3(0-6)
Carpentry II Shop 54 3(0-6)	Carpentry III Shop 57 3(0-6)
Blacksmithing III Shop 75 3(0-6)	Farm Gas Engines II Farm Engr. 77..... 3(0-6)
	Blacksmithing IV Shop 78 3(0-6)

THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
Modern History I † Hist. 55 4(4-0)	Modern History II † Hist. 56 4(4-0)
Solid Geometry Math. 71 4(4-0)	Algebra III Math. 72 4(4-0)
Civics Hist. 63 4(4-0)	Economics Econ. 51 3(3-0)
English V Engl. 71 3(3-0)	
Military Science I † Mil. Tr. 101..... 1(0-4) <i>or</i>	Military Science II † Mil. Tr. 102..... 1(0-4) <i>or</i>
Physical Training M-I Phys. Ed. 51 A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
<i>Elective</i> , 5 credits from the following:	<i>Elective</i> , 8 credits from the following:
Blacksmithing V Shop 81 3(0-6)	Blacksmithing VI Shop 84 3(0-6)
Machine Shop II Shop 90 2(0-4)	Machine Shop III Shop 93 3(0-6)
Carpentry IV Shop 60 2(0-4)	Carpentry V Shop 63 2(0-4)
Farm Gas Engines III Farm Engr. 80..... 3(0-6)	Farm Gas Engines IV Farm Engr. 82..... 3(0-6)
Elementary Traction Engines II Farm Engr. 69..... 2(0-4)	Elementary Traction Engines III Farm Engr. 72..... 2(0-4)
	Shop Drawing III Ap. Mech. 95..... 2(0-4)

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

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the next year.

Curriculum in Home Economics

(SCHOOL OF AGRICULTURE)

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

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
Elementary Food Study I Food and Nut. 55..... 3(1-4)	Elementary Food Study II Food and Nut. 56..... 3(1-4)
Garment Making I Clo. and Text. 57..... 3(1-4)	Garment Making II Clo. and Text. 58..... 3(1-4)
General Science Bot. 52 4(2-4)	El. Design Ap. Art 51..... 3(0-6)
English I Engl. 51 4(4-0)	English II Engl. 54 4(4-0)
Industrial Arithmetic W Math. 52 4(4-0)	Algebra I Math. 63 4(4-0) or
	Gardening Hort. 56 2(1-2)
	Carpentry H Shop 66 2(0-4)
Physical Training W-I Phys. Ed. 75 A..... 1(0-3)	Physical Training W-II Phys. Ed. 76..... 1(0-3)
Music*	Music*

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
Food Problems I Food and Nut. 57..... 2(0-4)	Food Problems II Food and Nut. 58..... 4(2-4)
Clothing Problems and Design Clo. and Text. 59..... 4(2-4)	Home Management Hshld. Econ. 63..... 3(2-2)
Elementary Chemistry Chem. 51 4(3-2)	El. Household Chemistry Chem. 52 4(3-2)
English III Engl. 61 4(4-0)	English IV Engl. 64 4(4-0)
Household Insects Ent. 51 2(2-0)	
Economics Econ. 51 3(3-0)	Civics Hist. 63 4(4-0)
Physical Training W-I or W-III Phys. Ed. 75 A or 77... 1(0-3)	Physical Training W-II or W-IV Phys. Ed. 76 or 78.... 1(0-3)
Music*	Music*

THIRD YEAR

FIRST SEMESTER	SECOND SEMESTER
Home Sanitation Hshld. Econ. 64..... 3(2-2)	House Planning and Furnishing Ap. Art 56..... 4(1-6)
Dressmaking and Millinery Clo. and Text. 60..... 3(0-6)	Child Care and Home Nursing Hshld. Econ. 65..... 3(2-2)
Physiology and Hygiene Anat. 51 4(4-0)	Elementary Bacteriology Bact. 52 3(2-2)
English V Engl. 71 3(3-0)	English VI Engl. 74 4(4-0)
Ancient History I† Hist. 51 4(4-0)	Ancient History II† Hist. 52 4(4-0)
Physical Training W-I or W-III Phys. Ed. 75 A or 77... 1(0-3)	Physical Training W-II or W-IV Phys. Ed. 76 or 78.... 1(0-3)
Music*	Music*
<i>Elective:</i>	<i>Elective:</i>
Physics H-I Physics 61 4(3-2)	Physics H-II Physics 62 4(3-2)
Elements of Poultry Keeping Poult. Husb. 52..... 2(2-0)	

* Elective.

† American Nation I and II or Modern History I and II may be substituted for the corresponding terms of Ancient History.

Agricultural Courses

AGRICULTURAL ECONOMICS

51. ELEMENTARY FARM MANAGEMENT. Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Farm Crops, Soils and Fertilizers, and Live-stock Production. Assistant Professor Davidson.

56. ELEMENTARY AGRICULTURAL ECONOMICS. Third year, second semester. Class work, three hours. Three semester credits. Prerequisites: Agron. 51 and 56; An. Husb. 55.

The course presents the more important principles pertaining to the business side of farming. Farm organization, the characteristics of the factors of production and the intensity culture are followed by a study of farm tenancy, the forces determining the value of agricultural products, and the problems of marketing. Finally profits of farmers in relation to their efficiency and their ability to purchase land are discussed. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics*; and Ely and Wicker's *Elementary Principles of Economics*.

AGRONOMY

51. FARM CROPS. Second year, first semester. Class work, four hours; laboratory, two hours. Five semester credits. Prerequisite: Elementary Botany. Assistant Professor Davidson.

The course involves a study of both grain and forage crops, approximately one-half semester being given to each. Emphasis is placed upon the economic production of those crops which are of greatest importance in Kansas. The laboratory work is planned to acquaint the student with the different grain and forage plants and their habits of growing. Text: Wilson and Warburton's *Field Crops*.

56. SOILS AND FERTILIZERS. Second year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Elementary Chemistry; Farm Crops. Assistant Professor Davidson.

The course involves a study of the physical nature of soils and their adaptation to crops, together with proper methods of handling to maintain good physical condition, to conserve moisture and to prevent washing and blowing. Means of maintaining the fertility of the soil, the care and use of barnyard manure; green manure and commercial fertilizers are also considered. In the laboratory and on field trips different soils are studied with reference to their physical properties and their relation to crops and methods of management. Text: Whitson and Walter's *Soils and Fertilizers*.

58. WEED CONTROL AND SEED IDENTIFICATION. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Farm Crops. Mrs. Harling.

This course deals with the control and eradication of weeds; the identification of weed plants and seeds; and germination and purity testing. Field trips are made, and the assembling of a herbarium of the common farm weeds is required.

ANIMAL HUSBANDRY

51. STOCK JUDGING I. First year, first semester. Laboratory, six hours. Three semester credits.

This course consists in score-card practice in judging horses, beef cattle, dairy cattle, sheep, and swine. By means of this practice the students become familiar with the general points to be observed in judg-

ing market types and classes of live stock. One-fourth of this time is given to the study of dairy cattle, which instruction is given in the Department of Dairy Husbandry. Text: *Craig's Judging Live Stock*.

52. STOCK JUDGING II. First year, second semester. Laboratory, six hours. Three semester credits.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine, with practice in scoring and judging breeding animals.

53. BREEDS AND BREEDING. First year, second semester. Class work, two hours. Two semester credits. Prerequisite: Stock Judging I.

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

54. FEEDS AND FEEDING. Second year, first semester. Class work, two hours. Two semester credits.

This course consists of a comparative study of the various feeds as to their usefulness and their relation to successful and economical feeding of live stock. It involves a study of the digestive system and the processes of nutrition, and a study of the origin, nature, grades, and value of the various by-products that are used in feeding operations. Text: Henry and Morrison's *Feeds and Feeding*, abridged edition.

55. LIVE-STOCK PRODUCTION. Second year, second semester. Class work, three hours. Three semester credits. Prerequisites: Stock Judging I and II.

This course involves a study of successful and economical methods of growing and finishing cattle, sheep, and hogs for market purposes, as well as the breeding of both market and pure-bred animals. Lectures, supplemented by agricultural newspaper work and Experiment Station records.

DAIRY HUSBANDRY

61. DAIRYING. Second year, first semester. Lecture, one hour; laboratory, two hours. Two semester credits. Mr. Atkeson.

This course includes lectures on the various breeds of dairy cattle, milk and its composition, Babcock testing, separation, and churning. Two individual lectures are given to the agricultural students on feeding the dairy herd, and two additional lectures on cheese making to the home-economics students.

Laboratory.—The laboratory work comprises the operation of the Babcock test, separating milk, churning, and soft-cheese making.

62. STOCK JUDGING. (An. Husb. 51.) Assistant Professor Cave.

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

63. ELEMENTARY DAIRY JUDGING. Second year, first semester. Laboratory, three hours. One semester credit. This course cannot be taken without Dairying (course 61). Assistant Professor Cave and Mr. Atkeson.

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

HORTICULTURE

51. **FRUIT GROWING.** First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Mr. Pickett.

This course includes a study of the principles of vegetable gardening and fruit growing. The first half of the semester is given to the problems of general fruit growing, and the vegetable gardening comprises practice in garden making and lectures during the last half of the semester.

56. **GARDENING.** First year, second semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Pratt.

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

MILLING INDUSTRY

52. **ELEMENTARY GRAIN MARKETING.** Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Professor Fitz.

This course includes the study of methods of handling and storing grain, together with the marketing of surplus grain from the farm. It involves study of the method of selling or buying, shipping and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts and shipments of grain. The laboratory work consists of practice in sampling bulk grain and in examining and grading different kinds and types of such grain. A brief study is also made of the by-products resulting from the manufacture of food products, and their comparative costs.

POULTRY HUSBANDRY

51. **BEGINNING POULTRY.** First year, first semester. Recitation, one hour; laboratory, two hours. Two semester credits. Mr. Fox.

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

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

52. **ELEMENTS OF POULTRY KEEPING.** Third year, first semester. Recitation, two hours. Two semester credits. Professor Lippincott and Mr. Fox.

This course covers the same ground as Beginning Poultry, except that no laboratory work is required.

55. **INCUBATION PRACTICE.** Third year, second semester. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. One successful hatch must be brought off in either a hot-air or hot-water incubator.

58. **BROODING PRACTICE.** Third year, second semester. Three times a day, seven times a week, for a period of not less than four weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Beginning Poultry. To be preceded or accompanied by Incubation Practice.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A record of the cost of fuel and feed, of gains in weight, and of mortality is required. A group of at least fifty chicks must be successfully brooded for at least four weeks in any of the several types of brooders.

Veterinary Medicine and Physiology Courses

ANATOMY AND PHYSIOLOGY

51. PHYSIOLOGY AND HYGIENE. Third year, second semester. Class work, four hours. Four semester credits. Doctor Vawter.

Sufficient consideration is given to the anatomy or structure of the body to enable the student to understand more fully the functions of the proper parts. The normal functions of the various organs of the body are studied. The importance of the normal functioning of the body for the prevention of diseases, and also diseases that may arise from improper performance of the various organs, are discussed. Text: Conn and Buddington's *Advanced Physiology and Hygiene*.

SURGERY AND MEDICINE

51. DISEASES OF FARM ANIMALS. Third year, second semester. Class work, two hours. Two semester credits.

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

General Science Courses

BACTERIOLOGY

52. ELEMENTARY BACTERIOLOGY. Third year, second semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Professor Bushnell.

This is an elementary course in the principles of bacteriology. Bacteriological problems are considered from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc. It includes a discussion of microorganisms as related to air, water, and foods.

Laboratory—Various microscopic forms of importance in fermentation; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

BOTANY

51. ELEMENTARY BOTANY. First year, both semesters. Class work, two hours; laboratory, two hours. Three semester credits.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity; and the structure and work of the root, stem, and leaf system are studied in some detail. The biology of the flower and its peculiar

adaptations to insect or wind pollination are emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water, and soil, and on the relation of the biology of the plants to agricultural practice.

52. GENERAL SCIENCE. First year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits.

This course deals with problems of elementary science as related to home-economics work. The major part of the work is a study of plants such as molds, bacteria, plant tissues, and the storage of foods in plants. Some time is given to a study of physical and chemical problems of an elementary nature. The problems studied are chosen because of their relation to the work of the household.

CHEMISTRY

51. ELEMENTARY CHEMISTRY. Second year, first semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Mr. Keith.

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

52. ELEMENTARY HOUSEHOLD CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

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

53. ELEMENTARY AGRICULTURAL CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

The study of the metals, begun the previous semester, is first completed. The chemical composition and chemistry of the growth of plants and animals are then taken up, and the general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work follows these lines and is made as practical as possible. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

ECONOMICS

51. ECONOMICS. Second or third year, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

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

ENGLISH

51. ENGLISH I. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Leonard.

This course has a twofold purpose: to develop in the student the ability to interpret readily from the printed page, and to give instruction in the elementary principles of composition. For the first aim, short selections from the readers are used, with readings from textbooks, biographies, current periodicals, and works of a vocational nature. In connection with the text, practice work in letter writing and business forms is emphasized. Texts: Searson and Martin, *Studies*, Advanced Course; Hanson, *Two Years' Course in English Composition*.

54. ENGLISH II. First year, second semester. Class work, four hours. Four semester credits. Miss Leonard.

This course is a continuation of English I. It includes a review of grammar, practice in the use of the dictionary, and a thorough study of the paragraph. Oral composition is required. Emphasis is placed on the writing of themes on topics of keenest interest to the student. Text: Hanson, *Two Years' Course in English Composition*, chapters IX-XIII, inclusive.

61. ENGLISH III. Second year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Russel.

The work of this course consists of a study of American literature. Class readings, class discussions, written sketches, abstracts, and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairns, *American Literature for Secondary Schools*, to page 147.

64. ENGLISH IV. Second year, second semester. Class work, four hours. Four credits. Miss Leonard and Miss Russel.

This course is a continuation of the work in English III, completing the work of the text. Selections from the works of Poe, Webster, Lincoln, Longfellow, Whittier, Emerson, Lowell, Holmes and others are chosen for study, and some written work is required. Text: Cairns, *American Literature for Secondary Schools*, page 147 to end.

71. ENGLISH V. Third year, first semester. Class work, three hours. Three semester credits. Miss Leonard and Miss Russel.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first-year work in commercial usage. Texts: Hanson, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

74. ENGLISH VI. Third year, second semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Leonard.

This is a course in English classics. It includes an intensive study of representative classics. Abstracts, outlines, paraphrases, and original themes are required. Texts: Selections from the works of Shakespeare, Scott, Burns, Tennyson, and others.

ENTOMOLOGY

51. HOUSEHOLD INSECTS. Second year, first semester. Class work, two hours. Two semester credits. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history, and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

61. FARM INSECTS. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Associate Entomologist McColloch.

This is a study of the elementary anatomy, structure, and physiology of insects, complete enough to give clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

Laboratory.—The laboratory work is designed to acquaint the student with the more common injurious insects found on the farm. The preparation and use of various sprays, poisons, baits, and fumigants are also taken up.

65. ELEMENTARY BEEKEEPING. Third year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Farm Insects.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping. A study is made of bee diseases and of the standard methods to be used in their eradication and control.

HISTORY

51, 52. ANCIENT HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

The history of civilization in the Nile and the Tigris-Euphrates valleys serves as an introduction to the more serious work of this course, in which the emphasis is placed upon the history of Greece and Rome and western Europe down to 800 A.D. In addition to the greater political events characterizing the history of these regions, special attention is given to the institutional life of this period, to the social, economic, and intellectual forces at work in the different states, as well as to their governmental organization. Text: Westermann's *The Story of the Ancient Nations*.

55, 56. MODERN HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

Beginning with 800 A.D., a general survey is made of the development of Europe down to the present time and conditions. The more important events of the eleven centuries comprising this period are treated in as full detail as time will permit. The social, economic, cultural, religious, and diplomatic phases are emphasized. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period and to the political developments and international relations, especially the changes which have prepared the way for the present European situation. Text: Harding's *New Medieval and Modern History*.

59, 60. AMERICAN NATION I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Assistant Professor James and Miss Orem.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation

and establishment of the constitution; the rise of the West and its influence, socially, politically, and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the termination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Second and third years, both semesters. Class work, four hours. Four semester credits. Assistant Professor James and Miss Orem.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text: Guiteau's *Government and Politics in the United States*, Kansas edition.

INDUSTRIAL JOURNALISM AND PRINTING

51. FARM WRITING. Third year, second semester. Class work, two hours; laboratory, four hours. Four semester credits. Miss Polson.

The course treats of the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

51. INDUSTRIAL ARITHMETIC A. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; and (2) the application of these principles to practical problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science are made the basis of the problem work. Farm investments, farm accounts, and farm values receive special attention. Text: Stratton and Remick's *Agricultural Arithmetic*.

52. INDUSTRIAL ARITHMETIC W. First year, first semester. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied so as to meet the needs of young women. Text: Same as for the course above.

63. ALGEBRA I. First year, both semesters. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course includes a study of simple algebraic expressions and the use of the equation; a treatment of the methods of finding distances by means of scale drawings, similar triangles, and elementary trigonometric functions; a discussion of the various uses of graphs and of positive and negative numbers. Text: Rugg and Clark's *Fundamentals of High-school Mathematics*.

64. ALGEBRA II. First and second years, both semesters. Class work, four hours. Four semester credits. Prerequisite: Algebra I. Miss Holroyd and Miss McKittrick.

The chief topics considered are solution of simultaneous equations, both graphically and algebraically, factoring, fractions and fractional equations, square roots, radicals, and an introduction to quadratic equations. Text: Rugg and Clark's *Fundamentals of High-school Mathematics*.

66. PLANE GEOMETRY I. Second and third years, first semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Second and third years, second semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry I. Assistant Professor Fehn.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Third year, first semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry II. Assistant Professor Fehn and Miss Holroyd.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* form the subject matter of this course.

72. ALGEBRA III. Third year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Assistant Professor Fehn and Miss Holroyd.

This course includes, besides a rapid review of factoring, fractions, linear equations, roots, radicals, and exponents, a treatment of quadratic forms with graphical work and theory, ratio and proportion, variation, the progressions, and the binomial theorem for positive integral exponents. Text: Hawkes, Luby and Touton's *Second Course in Algebra*.

MILITARY TRAINING

All young men are required to take military training during their second year of attendance in the School of Agriculture. Their work in this branch is identical, so far as it goes, as that of the men in the College corps of cadets. The following work is taken:

101. MILITARY SCIENCE I. Lectures, recitations, and military drill, four hours a week. One semester credit.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the soldier, squad, and company in close and extended order; preliminary instruction, sighting, position, and aiming drills, gallery practice, nomenclature, and care of rifle and equipment.

(b) *Theoretical*. Theory of target practice; individual and collective; military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Lectures, recitations, and military drill, four hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," elsewhere in this catalogue.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

51A. PHYSICAL TRAINING M-I. First semester. Three hours. One semester credit. Required of all young men during their first semester in the school.

The course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each semester. Swimming is taught in the spring. A physical examination is made of each student when he enters. During the fall rugby football and soccer football are given. From the first of December to the end of the semester the work is in the gymnasium. Elementary calisthenics and Swedish movements, elementary apparatus, and games are taught.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in the school, as well as for gaining the highest development of vital power and health for future duties.

52. PHYSICAL TRAINING M-II. Second semester. Three hours. One semester credit. Required of all young men during their second semester in the school.

This course is a continuation of Physical Training M-I. In the spring, as soon as weather conditions allow, the work consists of baseball and track and field athletics.

WOMEN'S DEPARTMENT

75A, 76. PHYSICAL TRAINING W-I AND W-II. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond and Dean Van Zile.

This is an introductory course. It includes corrective exercises, light apparatus work, folk dancing, games, and swimming. A physical examination is made of each young woman before she enters upon the work.

Instruction in hygiene and social problems is an essential part of course 75A. In these lectures, which are given by Mary P. Van Zile, Dean of Women, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented.

77, 78. PHYSICAL TRAINING W-III AND W-IV. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond.

These courses are a continuation of Physical Training W-I and W-II. Esthetic dancing, Swedish gymnastics, games, and swimming are taught in these courses.

PHYSICS

51. PHYSICS A-I. Second or third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Assistant Professors Stewart and Smith.

The fundamental laws of mechanics, heat and sound are presented in this course. The application of principles to the common things of everyday life is emphasized. The laboratory work is based upon the work done in class, and is outlined in such a manner as to give the students special drill in exact measurements. Text: Black and Davis's *Practical Physics*.

52. PHYSICS A-II. Second or third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics A-I. Assistant Professors Stewart and Smith.

This course is a continuation of Physics A-I. The subjects of magnetism, electricity, and light are considered. An introductory study is made of the units used in measuring electrical energy, the principles involved in current distribution, the uses now being made of electricity, the ordinary phenomena of light, and questions of modern illumination. Text: Black and Davis's *Practical Physics*.

61. PHYSICS H-I. Third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Professor Hamilton.

The work given in this course has a direct bearing on the principles of mechanics, sound and heat as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text: Tower, Smith and Turton's *Physics*.

62. PHYSICS H-II. Third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics H-I. Professor Hamilton.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity and light are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text: Tower, Smith and Turton's *Physics*.

ZOOLOGY

51. ELEMENTARY ZOOLOGY. Second year, second semester. Class work, one hour; laboratory, four hours. Three semester credits.

This course deals with the natural history of animals. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology. The laboratory work consists of one three-hour period a week. This work is carried on for the most part out of doors. Ponds and streams, meadows and woodlands are visited and animals are studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not possible out in the field.

Mechanic Arts Courses

ARCHITECTURE AND DRAWING

51. FREE-HAND AND OBJECT DRAWING. First year, first semester. Laboratory, six hours. Three semester credits. Mr. _____.

The work of this course includes exercises in drawing simple figures illustrating the effects of geometrical arrangement and the laws of design; the principles of perspective are studied and illustrated by drawing from geometric solids and simple objects. Practice is given in free-hand lettering and in sketching objects of the shops and out-of-doors.

APPLIED MECHANICS

51. CONCRETE CONSTRUCTION I RECITATION. First year, both semesters. Lectures and recitations, one hour. One semester credit. Mr. Robert.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making

of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, bridges, and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

55. CONCRETE CONSTRUCTION I LABORATORY. First year, both semesters. Laboratory work, two hours. One semester credit. Must accompany or follow Concrete Construction I Recitation (Ap. Mech. 51). Mr. Robert and Mr. Budden.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms for such objects as machine and building foundations, floors, sidewalks, fence posts, and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

60. CONCRETE CONSTRUCTION II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction I Laboratory (Ap. Mech. 55). Mr. Robert.

Field work is given in practical plain and reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing concrete, with special reference to building and bridge construction. Simple laboratory tests of steel, of concrete and of reinforced concrete beams are also included.

65. CONCRETE CONSTRUCTION III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction II (Ap. Mech. 60). Mr. Robert.

This course includes standard tests for fineness, specific gravity, soundness, and strength of cement, for voids, uniformity coefficient, and cleanness of sand and stone, and for the effect of variation of these factors on the strength of mortars and concretes.

70. STRENGTH OF MATERIALS. Second year, second semester. Class work, three hours. Three semester credits. Prerequisite: Concrete Construction I Recitation (Ap. Mech. 51). Mr. Robert.

The course embraces an elementary study of the strength of beams, columns, and other structural and machine elements, of wood, steel concrete, and other materials. Text: Merriman's *Strength of Materials*.

72. GEOMETRICAL DRAWING. First year, second semester. Drafting-room practice, six hours. Three semester credits. Mr. Smutz.

This course comprises free-hand lettering, the use of drawing board, T-square and instruments, geometrical constructions, and orthographic projections and sections of simple objects. Accuracy is emphasized. Text: French and Svensen's *Mechanical Drawing for High Schools*.

75. SHOP DRAWING I LECTURE. Second year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Geometrical Drawing. Geometry I (Math. 66) must accompany or precede this course. Mr. Durland.

A study is made of orthographic, cabinet, and isometric projections, revolutions, the development of surfaces and sheet-metal drafting. Text: French and Svensen's *Mechanical Drawing for High Schools*.

80. SHOP DRAWING I LABORATORY. Second year, first semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 75). Mr. Durland.

Practice is given in lettering, in the construction of orthographic, cabinet, and isometric projections of objects, revolutions, intersections and development of surfaces, sheet-metal drafting and the construction of paper models of sheet-metal problems.

85. SHOP DRAWING II LECTURE. Second year, second semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Shop Drawing I (Ap. Mech. 75, 80). Mr. Durland.

A continuation of the preceding course, with the study of conventional methods of representation, working drawings, technical sketching, and methods of reproducing working drawings. Text: French and Sven-sen's *Mechanical Drawing for High Schools*.

90. SHOP DRAWING II LABORATORY. Second year, second semester. Drafting-room practice, four hours. Two semester credits. Must accom-pany the lecture (Ap. Mech. 85). Mr. Durland.

Working drawings are made from plates during the first part of the semester. Later, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making tracings and blue prints.

95. SHOP DRAWING III. Third year, second semester. Drafting-room practice, four hours. Two semester credits. Prerequisite: Shop Draw-ing II (Ap. Mech. 85, 90). Mr. Durland.

Practice is given in making working drawings from free-hand sketches of machine parts, assembly drawings, and in designing simple machine parts by empirical methods.

FARM ENGINEERING

51. ELEMENTARY FARM MACHINERY. Second year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Parsons.

In this course the student is taught the principles underlying the con-struction, operation, and adjustment of the different types of farm ma-chinery. Instruction is also given in fencing, rope work, and belt splicing. Proper adjustment and operation of machines is taught in the labora-tory and in the field.

66. ELEMENTARY TRACTION ENGINES I. First and second years, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor Sanders and assistants.

A study is made of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating sys-tems, and carburetors; operation, care, repair, and testing of gas traction engines.

69. ELEMENTARY TRACTION ENGINES II. Third year, both semesters. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Traction Engines I (Farm Engr. 66). Assistant Professor Sanders and assistants.

Practice is given in the operation, care, and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests, and field tests.

72. ELEMENTARY TRACTION ENGINES III. Third year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Eleme-nary Traction Engines II (Farm Engr. 69). Assistant Professor Sanders and assistants.

This is a continuation of Elementary Traction Engines II, and includes special tests on gas traction engines.

75. FARM GAS ENGINES I. First year, both semesters. Class work, one hour; laboratory, two hours. Two semester credits. Assistant Pro-fessor Sanders and assistants.

A study is made of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems,

lubrication, governing; selection, erection, and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

77. FARM GAS ENGINES II. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor Sanders and assistants.

A detailed study is made of gas-engine operation and care, with special attention to ignition systems, carburetors, and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters, and carburetors; tests of ignition equipment and carburetors are also studied.

80. FARM GAS ENGINES III. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines II (Farm Engr. 77). Assistant Professor Sanders and assistants.

This course consists of the operation, repair, and testing of gas and oil engines.

82. FARM GAS ENGINES IV. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines III (Farm Engr. 80). Assistant Professor Sanders and assistants.

This is a continuation of Gas Engines III, and includes special tests.

SHOP WORK

51. CARPENTRY I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Parker and Mr. Aiman.

This is a course of exercises in constructive carpentry, which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

54. CARPENTRY II. Second year, both semesters. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. Aiman.

This course includes exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the face-plate, and with hollow chucks. Some of the exercises are: tool handles, dumbbells, rolling-pins, napkin rings, table legs, porch posts, balusters, built-up and solid newel posts, columns, and rosettes.

57. CARPENTRY III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry II (Shop 54). Mr. Parker and Mr. Aiman.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture molding, picture frames, and simple pieces of furniture, which are stained, varnished, or otherwise finished.

60. CARPENTRY IV. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Carpentry III (Shop 57). Mr. Parker and Mr. Aiman.

This course consists of hand work with the rabbet, router, beading and matching planes, and with the dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jambs, and molding.

63. CARPENTRY V. Third year, second semester. Laboratory, supplemented by lectures, four hours. Two semester credits. Prerequisite: Carpentry IV (Shop 60). Mr. Parker and Mr. Aiman.

The fundamental factors to be taken into consideration in the construction of buildings, as selection of the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of the sills, joists, bridging and studding, and bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above.

66. CARPENTRY H. First year, second semester. Laboratory, four hours. Two semester credits. For women only. Mr. Parker and Mr. Aiman.

A practical course in woodwork, in which the student makes simple articles, the making of which gives the proper training in the use of tools, and familiarity with the different kinds of woods, stains, varnishes, and paints. Supplementary lectures are given along with the laboratory work in order to bring out the different points more clearly.

69. BLACKSMITHING I. First year, first semester. Laboratory, four hours. Two semester credits. Mr. Lynch and Mr. Granell.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting, and punching, together with instruction in the proper use and care of the fire and tools, and in handling the metals in the forge. Tools required: A two-foot rule, a pair of five-inch outside calipers, a center punch and a ball-pein hammer weighing, with handle, about two pounds.

72. BLACKSMITHING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Blacksmithing I (Shop 69). Mr. Lynch and Mr. Granell.

This work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade. Tools required: Same as for Blacksmithing I.

75. BLACKSMITHING III. Second year, first semester. Laboratory, supplemented by lectures, six hours. Three semester credits. Prerequisite: Blacksmithing II (Shop 72). Mr. Lynch and Mr. Granell.

A practical course in the various forging operations, with practice both as a blacksmith and helper, including the planning and laying out of work with special provisions for duplicate parts. Forging and forming tools are made as the nature of the work requires. Lectures are given so that the principles underlying the different operations may be thoroughly understood. Tools required: Same as for Blacksmithing I.

78. BLACKSMITHING IV. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing III (Shop 75). Mr. Lynch and Mr. Granell.

This course includes the theory of hardening, tempering, and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer, and shaper tools; forging and heat treating special and high-speed steels. Instruction is by lectures and demonstrations. Tools required: Same as for Blacksmithing I.

81. BLACKSMITHING V. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing IV (Shop 78). Mr. Lynch and Mr. Granell.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied so that the knowledge acquired will be as complete as possible. Tools required: Same as for Blacksmithing I.

84. BLACKSMITHING VI. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing V (Shop 81). Mr. Lynch and Mr. Granell.

This is a continuation of Blacksmithing V, with practice with the oxyacetylene and thermit processes of welding. Tools required: Same as for Blacksmithing I.

87. MACHINE SHOP I. Second year, first semester. Laboratory, six hours. Three semester credits. Mr. Jones and Mr. Bundy.

Practical machine work in the building and assembling of gas engines and wood lathes. Exercises are given to bring into use the various machines in the shops. Tools required: A four-inch scale or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

90. MACHINE SHOP II. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Machine Shop I (Shop 87). Mr. Jones and Mr. Bundy.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

93. MACHINE SHOP III. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Machine Shop II (Shop 90). Mr. Jones and Mr. Bundy.

A continuation of the preceding term's work, with work on the milling machines and universal grinder.

96. MOLDING I. First year, second semester. Laboratory, four hours. Two semester credits. Mr. Grant.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand, and facings; also, open sand work, sweep molding, machine molding, core making, setting of cores, gates, and risers, and different methods of venting.

Home Economics Courses

APPLIED ART

51. ELEMENTARY DESIGN. First year, second semester. Laboratory, six hours. Three semester credits.

The principles underlying pleasing color combinations, fine proportions, and consistent arrangement of parts are studied. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes, and orderly arrangement. Original problems are given in the application of these principles.

56. HOUSE PLANNING AND FURNISHING. Third year, second semester. Class work, one hour; laboratory, six hours. Four semester credits. Prerequisite: Elementary Design.

Planning of a house, also each room, with regard to convenience and comfort. An adaptation is made to location and needs of the family, sanitation, modern conveniences, etc. Principles of color, form and arrangement are studied in application to all problems involved in home decoration, such as window, door and wall spacings, woodwork, wall coverings and floor coverings; appropriate furniture, and the arrangement of these in different rooms.

CLOTHING AND TEXTILES

57. **GARMENT MAKING I.** First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits.

In this course and the following, practice is given in the fundamental stitches and in the use of the sewing machine and of commercial patterns in the making of undergarments. A study is made of the characteristics of cotton fiber and cotton goods suitable for underwear, and practice is given in identifying the various kinds and qualities of cotton goods on the market. In the selection of the material, trimming and style of the garments which are made, attention is given to cost, durability, laundering qualities, and hygiene. An itemized account is kept of the time and money used in making each garment, and comparisons are made with ready-to-wear garments.

58. **GARMENT MAKING II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits.

This course is a continuation of Garment Making I, in which the laboratory work consists in the making of cotton garments of more difficult construction.

59. **CLOTHING PROBLEMS AND DESIGN.** Second year, first semester. Recitation, two hours; laboratory, four hours. Four semester credits.

This course deals with the planning, selecting, making and care of clothing for the different members of the family. Clothing design is studied with a view to its usefulness in selecting styles, colors and materials of ready-made clothing, as well as in planning garments from the standpoints of cost, health, suitability and style; each girl plans her own clothing budget and keeps account of her clothing expenditures. The clothing needs of the other members of the family are considered, with special attention to infants and children, and budgets are worked out for actual families. The advantages and disadvantages of ready-made clothing, and the problems which arise in its purchase, are considered. The selection and care of household linens are studied.

In the laboratory work, children's clothing is made and practice is given in mending, renovating, and remodeling worn clothing.

60. **DRESSMAKING AND MILLINERY.** Third year, first semester. Laboratory, six hours. Three semester credits.

Through work in the laboratory the problems connected with the construction of silk and wool dresses and of millinery are studied, each girl completing at least one wool or silk dress and one hat. The choice of materials, trimming and style appropriate to each individual is considered. Practice may be obtained in simple embroidery and other hand-work used in trimming dresses or hats.

FOOD ECONOMICS AND NUTRITION

55. **ELEMENTARY FOOD STUDY I.** First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits.

The recitations in this course and in Cooking II are spent in a brief study of the source, composition, production and marketing of the various foods studied in the laboratory. The laboratory work includes practice in cooking fruits, vegetables, cereals and starchy products, simple desserts, candies, and the use of fats in frying and in salad dressings.

56. **ELEMENTARY FOOD STUDY II.** First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Prerequisite: Course 55 or its equivalent.

Flour mixtures and leavening agents are studied, especially as applied to the making of hot breads, cake and pastry; the remainder of the laboratory work is devoted to the principles involved in the cooking of various

protein-containing foods, such as eggs, milk, cheese, meats, fish, poultry, legumes and nuts. One or two simple meals are prepared and served in the laboratory. Especial emphasis is laid on the planning of menus for meatless meals.

57. **FOOD PROBLEMS I.** Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisites: Courses 55 and 56, or their equivalent.

The canning and drying of fruits, vegetables and meats; the preparation of jellies, jams, preserves and pickles; preservation of eggs; more advanced work with flour mixtures, including bread making; preparation of more elaborate desserts, such as ice creams, sherbets, frappés, and steamed puddings; the making of various salads and sandwiches, and the utilization of left-over foods, comprise the work of this course.

58. **FOOD PROBLEMS II.** Second year, second semester. Recitation, two hours; laboratory, four hours. Four semester credits. Prerequisites: Courses 55, 56, and 57, or their equivalent.

In this and the preceding course, special emphasis is laid on the dietetic value and economic uses of foods. The work of this course includes the following: a brief consideration of the requirements of an adequate diet, together with planning of meals to meet these requirements; modifications of diet as required for students, men at hard manual labor, infants and small children, school children, the sick and aged; planning food for family groups and at stated costs; conservation of food, fuel and labor; practice in marketing and serving; planning and serving meals for special occasions and for large numbers. Meals are frequently prepared and served by the class throughout the semester to illustrate the principles brought out in class discussion.

HOUSEHOLD ECONOMICS

63. **HOME MANAGEMENT.** Second year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits.

This course deals with the planning, furnishing and management of the home from the standpoint of efficiency. It includes a study of kitchen plans and equipment; arrangement of other rooms and of storage space; equipment and methods in cleaning and laundering; planning schedules of housework; planning family expenditures; keeping household accounts; buying household supplies.

64. **HOUSE SANITATION.** Third year, first semester. Recitation, two hours; laboratory, two hours. Three semester credits.

The location, ventilation, heating and lighting of the house, and rural and municipal water supply and sewage disposal, are considered from the standpoints of health, convenience and cost. The sanitary care of the house and of foods is studied, and the relation between public health problems and home sanitation is examined. The laboratory work includes the first-hand study of the sanitary conditions and equipment of local homes, streets, stores and other buildings, of the local water supply and sewage-disposal systems, and of local public health activities affecting the home.

65. **CHILD CARE AND HOME NURSING.** Third year, second semester. Recitation, two hours; laboratory, two hours. Three semester credits.

This course deals with the care of the mother and the preparation of the clothing and other supplies before the baby's birth; the bathing, dressing, feeding and daily routine of the infant; the care and training of children at different stages in their development, in accordance with their physical, mental, and emotional needs; the nature and symptoms of the diseases to which children are susceptible; the methods of preventing these diseases and of nursing the sick child; the treatment of emergencies and accidents in the home.

Special Courses

SPECIAL COURSES RELATED TO ENGINEERING

Automobile Repair
Tractor Operation
Carpentry
Machine Shop Work
Foundry Practice

Blacksmithing
Telegraphy
Radio Telegraphy
Electrical Repair Work

The following special courses are intended for those who have not the time or the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of automobile repair, tractor operation, carpentry, blacksmithing, foundry practice, machine shop work, electrical repair work, telegraphy, or radio telegraphy.

Students can enroll in any of the above courses, except radio, telegraphy, and electrical repair work, on the first Monday of any month from September to May. Courses in electrical repair work, radio, and telegraphy begin on the first Monday of January only. The length of the course depends upon the previous training and experience of the individual. Those pursuing courses for tractor operators, blacksmiths, carpenters, foundrymen, and telegraphers should arrange to remain at the College two months. The training for auto mechanics, machinists, or electricians requires a greater length of time. Students may remain for eighteen weeks if they desire to do so.

There is no charge for tuition, but an incidental fee of \$10 is charged at entrance, as is also a sick benefit fee of \$1.50, which entitles the student to free medical attendance from the College physician. Laboratory charges to cover the cost of materials used are made in accordance with the following schedule: automobile mechanics, \$18 a month; tractor operators, \$18 a month; blacksmiths, \$18 a month; machinists, \$18 a month; carpenters, \$9 a month; foundrymen, \$9 a month; radio operators, \$9 a month; telegraphers, \$9 a month; and electricians, \$18 a month.

The College reserves the right to revise its schedule of fees at any time without notice.

AUTOMOBILE REPAIR. The course in automobile repair includes a thorough study of the construction and assembly of four, six and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting, and lighting systems; the automobile chassis, including transmission systems and differentials; tire repair; general repairing, overhauling and operation of automobiles; and sufficient shop work to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire repair equipment, and electrical equipment. All grades of work are given; the garage mechanic may supplement his knowledge with advanced and specialized work, or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTOR OPERATION. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; and shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY: A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is adapted to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the operation of lathes, planers, drill presses, boring mills, shapers, and grinding machines.

In order to enable the student to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns; work with different kinds of sands and facings; open sand work; sweep molding; machine molding; core making; setting of cores, gates, and risers; different methods of venting; and general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, and punching iron and steel, the care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, and hammers; hardening, tempering, annealing, case and pack hardening; and oxyacetylene and thermit processes of welding.

RADIO TELEGRAPHY. The work, which is intensive, is intended to fit students for commercial work, either on land or on board ships, in the least possible time. The training is similar to that which was used by the College in training radio operators for war service, and consists of instruction in the use of electrical instruments and radio apparatus, and in the use of the international code.

TELEGRAPHY. The great demand for telegraph operators has made it imperative that a number of persons be trained for this work. The course is open to both men and women, who in addition to other work devote at least four hours a day to sending and receiving. The Morse code is taught.

ELECTRICAL REPAIR WORK. This course is intended to train electricians, and includes electric wiring, and the operation of dynamos, motors, and other electrical equipment.

Farmers' Short Course

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

Many men who have chosen farming as their vocation, and who are alive to some of the advantages offered by this institution to the farmers of the State, are denied the opportunity of pursuing the College curriculum in agriculture, or even as much as one year's work in that curriculum. For such men the Agricultural College provides the Farmers' Short Course.

This course is given for a period of eight weeks, practically the months of January and February, each year. It consists of an intensive study of a number of important phases of Kansas agriculture. The scope and nature of the work are indicated by the following outline of the subjects offered:

SUBJECTS IN FARMERS' SHORT COURSE

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

Soils and Fertilizers.....	4(4-0)
Grain Crops	4(3-2)
Forage Crops	4(3-2)
Live-stock Production	8(6-4)
Live-stock Sanitation	3(3-0)
Advanced Stock Judging.....	2(0-4)
Dairying I	5(3-4)
Dairying II	5(3-4)
Farm Horticulture	8(6-4)
Poultry Husbandry	3(3-0)
Incubation and Brooding (a).....	3(0-6)
Farm Management	4(3-2)
Beekeeping	6(4-4)
Farm Insects	2(2-0)
Injurious Rodents	2(2-0)
Field Machinery	1(0-2)
Special Lectures	1(2-0)

For each hour of recitation per week usually at least one hour of outside preparation is required. Laboratory or field work requires little or no outside preparation. Each credit (standard for measuring the quantity of work done) represents not less than two hours' work per week for the entire eight weeks of the term. A regular, full-time assignment consists of not less than twenty credits, and students are usually not encouraged to take more than twenty-four credits.

All the work is elective. That is, each student selects, with the advice of members of the Faculty, the subjects of his greatest interest or those he feels will do him the most good. Besides studying the subjects heretofore listed, the student may spend one, two or three half-days each week in instruction and practice in carpentry or blacksmithing, or both.

Students desiring further work in farm engineering are referred to "Special Courses Related to Engineering," discussed elsewhere in this

(a) This work is all practice work under supervision. Each student taking the subject must report to the Poultry Farm three times a day, seven days a week.

catalogue. For example, a man may take intensive work for the training of auto mechanics or tractor operators during part or all of the months of September, October, November and December, or during part or all of the months of March, April and May, and during the months of January and February devote himself almost exclusively to Farmers' Short-course work.

It must be noted that Farmers' Short-course work cannot be taken at any other time during the year than during this midwinter, eight-week term. Furthermore, students expecting credit must continue the work for the entire term.

CERTIFICATE. Most students will find it impossible to carry all the Farmers' Short-course work in which they are interested during one eight-week term. Such students are encouraged to take other subjects for a second winter term. Subjects in addition to those already listed may be provided to meet special demands as they arise. A certificate will be granted to each student completing satisfactorily forty credit hours of short-course work.

REQUIREMENTS FOR ADMISSION. This course is intended primarily for mature individuals. High-school work in the State is becoming so general and available to all communities that the demand for short-course work for boys of high-school age is being greatly reduced. Young farmers, not in school, are especially urged to consider the advantages of the Farmers' Short Course. Students over seventeen years of age are admitted without examination.

There is no charge for tuition, but each student is required to pay, on enrollment, an incidental fee of \$5, also a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician. In several of the laboratories, laboratory deposits varying from 50 cents upward must be made to cover cost of materials used.

SELF SUPPORT. The subjects of this course are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work, many hours each week are spent in the stock-judging pavilion, laboratory, shop, and barn. This leaves the student but little time for outside labor, and students are therefore advised to come provided with as nearly all the necessary funds for the course as possible.

BRIEF DESCRIPTION OF THE WORK

SOILS AND FERTILIZERS. (Agron. 3.) In this class the various soil types common in Kansas are studied, especially with reference to their economical management for the production of profitable crops and the maintenance of fertility.

GRAIN CROPS. (Agron. 1.) The work in this subject consists of a practical study of grain-crop production. In the laboratory exercises are given for the identification of different kinds of threshed grain and the determination of damage and market classes and grades.

FORAGE CROPS. (Agron. 2.) This class makes a study of the distribution and production of important forage crops, especially for Kansas conditions. Practical exercises in identification are given in the laboratory.

LIVE-STOCK PRODUCTION. (An. Husb. 6.) The work of this class consists of a study and discussion of the elementary but fundamental principles of live-stock feeding, breeding, and management. Some attention is given to the history of breeds and pedigrees and to fitting for shows and sales. About three-fourths of the time in the laboratory is devoted to judging various classes and market grades of live stock, and the remainder to demonstrations in the killing, cutting, curing and storing of meats on the farm.

LIVE-STOCK SANITATION. (Vet. Med. 1.) This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases are considered.

ADVANCED STOCK JUDGING. (An. Husb. 7.) The work of this class consists largely of the judging of breeding classes of horses, cattle, sheep, and swine. Methods used in judging at county and State fairs are followed. Special attention is given to the selection of foundation stock for pure-bred herds.

DAIRYING I. (Dairy Husb. 1.) This class considers the general subject of farm dairying, including the composition and properties of milk, the feeding of the dairy cow, the selecting and breeding of the dairy herd, and dairy sanitation. The laboratory provides practical work with the Babcock tester, in the use of the farm separator, and in butter making.

DAIRYING II. (Dairy Husb. 3.) Among the subjects studied and discussed in this class are the following: Keeping records and accounts of dairy-farm business; building up the dairy herd; dairy buildings and equipment; silos and silage; the dairy business and soil fertility; cow-testing associations; coöperative ownership of dairy sires; and detailed plans for the management of the dairy farm. Laboratory work consists of judging dairy cattle from the standpoint of economical production and breed type. Score cards are used for the purpose of making the student systematic and accurate in the selection of dairy animals.

FARM HORTICULTURE. (Hort. 1.) The class work covers vegetable gardening and fruit growing, particular attention being paid to their relation to other farm enterprises. An attempt is made to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is considered. Methods of handling and marketing products are briefly discussed. The laboratory work gives students practice in budding, grafting and other methods of plant propagation, as well as in pruning. Spraying and orchard management are briefly discussed.

POULTRY HUSBANDRY. (Poult. Husb. 1.) The work in Poultry Husbandry covers the practical phases of poultry management, including feeding, breeding, housing, incubation, and brooding.

INCUBATION AND BROODING. (Poult. Husb. 2.) This work is entirely individual practice work, each student carrying through a hatch and brooding the chicks. The student cares for the incubator, tests the eggs, and keeps necessary records. He also has entire care of brooding and feeding the chicks during the most critical weeks.

FARM MANAGEMENT. (Ag. Ec. 1.) In this class the work in the various agricultural subjects is correlated and placed on a practical, workable basis. The principles of farm accounting, distribution of capital, laying out of fields, planning rotations, etc., are given first consideration.

BEEKEEPING. (Ent. 10.) This subject considers the elements of practical beekeeping. The topics discussed include: Life history, behavior and instincts of the honeybee; products of the apiary; and relation of bees to crop production. A study is made of the various bee diseases, together with their treatment. The laboratory exercises consist of practice in constructing hives, supers, brood frames, comb-honey sections, extracting frames, and wiring frames; also of practice in putting in and embedding foundation. Demonstrations are given of various methods of transferring bees, manipulating colonies for swarm prevention and making increase, treatment of brood diseases, and wintering. The object of the work is to give such practical training as will prepare the student to engage successfully in beekeeping.

FARM INSECTS. (Ent. 1.) The serious insect pests of the farm, garden and orchard and those affecting domestic animals are discussed in this class. Methods of control are emphasized and the importance of clean culture and good farm methods is fully considered. Lantern slides are used in some of the presentations.

INJURIOUS RODENTS. (Zoöl. 1.) In this class a study is made of injurious rodents, especially gophers, prairie dogs, rats, mice, moles and rabbits, emphasizing their habits and the methods of poisoning, trapping, and otherwise destroying them.

FIELD MACHINERY. (Farm Engr. 1.) In this subject practical laboratory work is done by the student, the purpose being to acquaint him with the factors underlying wise selection and proper care of farm machines, as well as with methods of operation of a number of the most important machines. Rope work is given due consideration. Fences and the farm power plant are studied.

SPECIAL LECTURES. It is desirable to have frequent assemblies of all Farmers' Short-course students. Many subjects of timely and special interest cannot be discussed effectively in the regular classes. Two hours each week are set apart to provide these general meetings and opportunity for the presentation of fundamental phases of the work of the course not otherwise provided for. One credit is given for attending these meetings, and every Farmers' Short-course student is urged to enroll. Among the speakers provided will be several members of the College Faculty, including the President of the College, and a few outside, well-known agricultural leaders.

Commercial Creamery Short Course

To young men in the State desiring to engage in the creamery business as managers, or as butter or cheese makers, or for those who desire to engage in the business of handling market milk or ice cream, the State Agricultural College offers an eight-week course of technical training along these lines. The scope of the work, the nature of its various phases, and the comparative amount of time devoted to each are indicated by the following outline:

SUBJECTS IN COMMERCIAL CREAMERY SHORT COURSE

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

Creamery Management	2(2-0)
Creamery Butter Making.....	8(4-8)
Market Milk	2(2-0)
Dairy Bacteriology	2(2-0)
Cheese and Ice Cream Making.....	4(2-4)
Judging Dairy Products.....	1(0-2)
Dairying II	5(3-4)
Dairy Mechanics and Refrigeration.....	2(0-4)

There is no charge for tuition in this short course. Each student is required to pay on enrollment an incidental fee of \$5, a laboratory charge of \$2, and a sick-benefit fee of \$1. This latter fee entitles him to free medical attendance by the College physician.

A certificate will be issued to Creamery Short-course students who satisfactorily complete all of the required work outlined above, and who show satisfactory evidence of having spent at least six months successfully in actual work in a creamery. Students without this practical experience may acquire it after completing the course. They will then receive their certificate.

BRIEF DESCRIPTION OF THE WORK

CREAMERY MANAGEMENT.—This class makes a study of the management of dairy manufacturing plants. Particular attention is given to overrun, manufacturing losses, costs, marketing, advertising, salesmanship, and bookkeeping.

CREAMERY BUTTERMaking.—The lectures given in this class cover receiving, grading, and testing cream and milk; neutralization, pasteurization, and cream ripening; and churning, giving particular attention to the moisture content. The laboratory work consists of buttermaking in the College creamery and provides opportunity for the application of the principles discussed in the classroom.

MARKET MILK—The problems concerned in the care and handling of milk in city milk plants are discussed in this class. The subjects considered include standardization, separation, clarification, pasteurization, and bottling of milk and cream; also the care of utensils and the distribution of milk.

DAIRY BACTERIOLOGY.—The work in this subject is chiefly laboratory work supplemented by brief lectures and explanations. It is designed for students who have had no training in chemistry and biology, and is a general study of the bacteriology of milk and milk products. Bacteriological contaminations of milk from air, water, utensils, the cow, and the

milker are discussed. Normal and abnormal fermentations, their significance and control in milk, butter, cheese, and special dairy products are considered.

CHEESE AND ICE CREAM MAKING.—The class work in this subject considers the standardization of ice cream mixes for fat and total solids; the use of the emulsifier; and the freezing, packing, and storing of ice cream. Laboratory work provides actual experience in the application of the principles studied. While the major portion of the time is devoted to ice cream, due consideration and practice is provided in the manufacture of cheddar and soft cheeses.

JUDGING DAIRY PRODUCTS.—The work provided for this class consists of scoring and judging butter, cheese, milk, and ice cream. It is chiefly laboratory work, though supplemented by occasional lectures.

DAIRYING II. This is the same subject as that included in the Farmers' Short Course, and a brief statement of the work included may be found in that write-up.

DAIRY MECHANICS AND REFRIGERATION. The work in this class provides careful consideration of the compression systems of refrigeration. It also includes the operation, care, and repair of refrigerating machinery and its auxiliaries.

COURSE IN TESTING DAIRY PRODUCTS

The law of the State requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. A four days' course for cream-station operators is offered at the College during Farm and Home Week to those who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work, and ability to pass the required examination. Applicants are given the opportunity of doing practical work in sampling, testing and grading cream. Lectures are given on points which are necessary for the successful operation of a cream station. A written examination is given on the last day of the course.

Final examinations are regularly held at the College the first Tuesday in each month. Final examinations are also held at various places throughout the State during the year for those who are unable to make the trip to Manhattan. Schedules of these examinations may be had by writing the State Dairy Commissioner, Manhattan, Kan.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the Housekeepers' Course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities. This course is given during the first fifteen weeks of each semester.

REQUIREMENTS FOR ADMISSION. Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma. Young women over twenty-one years of age are admitted without examination.

HOUSEKEEPERS' COURSE

Cookery
Sewing
Hygiene

Floriculture
Design in the Home and in Clothing
Housewifery

1. **COOKERY.** Both semesters. Laboratory, nine hours.
Stoves, stove construction, stove management, and fuels are the first topics considered. This discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures, and puddings, and to the canning and preserving of fruits and vegetables. Special attention is given to the planning and serving of meals.
2. **SEWING.** Both semesters. Laboratory, ten hours.
This course includes practice in hand and machine sewing and dress-making. The fundamental stitches are applied to simple articles and to the repairing of garments. Practice is given in the use of the sewing machine, and in the adaptation of commercial patterns. Suitable materials and trimmings are discussed, and undergarments, a shirt waist, and a cloth dress are made. Notebook work is required.
3. **HYGIENE.** Both semesters. Class work, three hours.
This course deals with the principles of elementary hygiene and their application in the maintenance of personal health and of sanitary conditions in the home and community. A study is made of the prevention and control of disease through personal hygiene, the sanitary care of the house, and public health work. Attention is also given to the recognition and reporting of symptoms, the practical care of the sick, and the giving of first-aid treatment in common emergencies in the home.
4. **DESIGN IN THE HOME AND IN CLOTHING.** Both semesters. Laboratory, six hours.

This course makes a study of the design principles used in dress and in the problems of the home. Suitable lines and colors for dress are discussed and many practical problems are given. In home decoration the study involves the choice and arrangement of furniture, the choice of wall paper and of rugs, the use of color in the home, and the selection and arrangement of pictures.

5. FLORICULTURE. Both semesters. Class work, two hours.

Lectures in the classroom are supplemented in the greenhouse by practical exercises dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purpose of window gardening, and lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and with the operations necessary for their successful culture is afforded in the laboratory practice.

6. HOUSEWIFERY. Both semesters. Laboratory, three hours.

This is a course in practical housekeeping, emphasis being placed upon efficiency in the use of time, money, and strength. It includes a study of house plans, furnishings and equipment, the cleaning and care of rooms, laundering and the care of clothing, the planning of expenditures, buying of supplies, and keeping of accounts.

One-year Curriculum in Lunch-room Management

It is the purpose of this curriculum to offer training to mature women who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be commercial ones only, as the department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The curriculum covers one year, and certificates are granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION. The curriculum is open to women twenty-five years of age or older. Applications for entrance must be made in writing, and applicants are chosen according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary.

HOW TO APPLY FOR ENTRANCE. A student desiring admission to this curriculum is asked to write a letter, stating her general qualifications and training, to the Dean of the Division of Home Economics. After consideration by the Dean of the Division, the candidates for this course will be chosen.

LUNCH-ROOM MANAGEMENT CURRICULUM

Principles of Cookery.....	4 (0-12)
Food Production and Marketing.....	3 (3-0)
Business English LR.....	3 (3-0)
Cafeteria Practice I.....	2 (0-6)
Sanitation and Hygiene.....	1 (1-0)
Furnishing and Decorating.....	1 (0-3)
Institutional Cookery.....	4 (1-9)
Accounting.....	2 (2-0)
Lunch-room Management.....	2 (2-0)
Cafeteria and Tea-room Practice.....	4 (1-12)
Lunch-room Promotion.....	1, for half semester
Meal Planning.....	1, for half semester

1. **PRINCIPLES OF COOKERY.** First semester. Laboratory, twelve hours.
The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. A standard system of measurement is taught, and special attention is given to training in accuracy, neatness, and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.
2. **FOOD PRODUCTION AND MARKETING.** First semester. Class work, three hours.
The main points in source, production, and manufacture of foods are covered. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.
3. **SANITATION AND HYGIENE.** First semester. Class work, one hour.
The sanitary control of eating-houses and food supply, together with the personal hygiene of the worker, are here discussed.
4. **CAFETERIA PRACTICE I.** First semester. Laboratory, six hours.
The purpose of this course is to make the student thoroughly familiar with the cafeteria. Experience is had in serving, checking and other details.
5. **CAFETERIA AND TEA-ROOM PRACTICE.** Second semester. Laboratory, twelve hours.
Experience in the cafeteria is continued, with practice in the preparation of food. During part of the course the students carry on a tea-room in the dining room of the department. So far as it is practicable, opportunity is given to do catering. Careful attention is given to service and cost of maintenance.
6. **BUSINESS ENGLISH LR.** First semester. Class work and practice, three hours.
This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis.
7. **FURNISHING AND DECORATING.** First semester. Laboratory, three hours.
Color, form, and arrangement as applied to wall and floor coverings, furniture, linen, china, and silver are studied.
8. **INSTITUTIONAL COOKERY.** Second semester. Class work, one hour; laboratory, nine hours.
This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.
9. **ACCOUNTING.** Second semester. Class work, two hours.
This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.
10. **LUNCH-ROOM MANAGEMENT.** Second semester. Class work, two hours.
The course covers the field organization, equipment, service, and general management of lunch rooms.
11. **MEAL PLANNING.** Second semester. Class work, one hour for half the semester.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

12. LUNCH-ROOM PROMOTION. Second semester. Class work, one hour for half the semester.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the lines of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

Degrees and Certificates Conferred

IN THE YEAR 1919

First Division, June 5

Degrees Conferred

GRADUATE COURSES

MASTER OF SCIENCE

William Hiddleson Andrews, A. B., University of Chicago, 1900
Stella Maude Harriss, B. S., Kansas State Agricultural College, 1917
Levi Jackson Horlacher, B. S. A., Purdue University, 1917
William Preston Tuttle, B. S. A., University of Kentucky, 1915

AGRICULTURAL ENGINEER

Frank Clark Lewis, B. S., Kansas State Agricultural College, 1913

CIVIL ENGINEER

Earl Livingston Hageman, B. S., Kansas State Agricultural College, 1911

ELECTRICAL ENGINEER

Lawrence Archibald O'Brien, B. S., Kansas State Agricultural College, 1914

UNDERGRADUATE CURRICULA

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

James Bell Angle	Howard Allyn Lindsley
Turner Barger	John Long MacNair
Wert Walton Bell	Coleman White McCampbell
George Yeomans Blair	Howard Waitman Phillips
John Allen Clarke	Floyd Meredith Pickrell
Shirley Blanch French	Everett Jacob Price
Fred Griffie	Louis Vernon Ritter
Earl Martin Hiestand	Louis Henry Rochford
Clara Higgins	Arthur Frithiof Swanson
Orin Willard Hinshaw	Ralph Scoles Westcott
Frank Wilson Howard	Carl Edward Wettig
William Curtis Janssen	Edwin Frederick Whedon
Lea Nathan Jewett	Frank Wilson
Robert Warren Kilbourn	

DOCTOR OF VETERINARY MEDICINE

Arthur Esco Bate	Evan Hart Richardson
Fred Robert Beaudette	August Ernest Schattenburg
Frank King Hansen	Gail Morris Umberger
Elijah Harrison Ikard	Frank Blackmore Young
Roy Reece Parker	Charles Edward Zollinger

Division of Engineering

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING

Lloyd Harmon Bunnel

BACHELOR OF SCIENCE IN ARCHITECTURE

Myron Ernest Johnson

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Edwin Osburn Adee
Roy William Haege

William Axtell Norman

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Jesse Alfred Cook
Homer Cross
Glenn Worth McCracken
John Stephen Painter

Herbert Gordon Schultz
Ralph Andrew Van Trine
Errol Thomas Williamson

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Trafford William Bigger
Seibert Fairman
Gordon Wilfred Hamilton
Stanley Paul Hunt

Dan Glen Lake
George Aaron Miller
Lawrence Artman Tilton

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Alto Mae Adams	Gussie Christina Johnson
Elizabeth Adams	Maude Emily Kershaw
Ruth Helen Allen	Mery Kirkpatrick
Madge Gladys Austin	Evalene Kramer
Edna Louise Beckman	Alpha Corrinne Latzke
Gladys Bergier	Esther Naomi Latzke
Mildred Content Berry	Lavinia Leibengood
with Frances Biggs	Mildred Kelly Levi
with Blair	Elizabeth Cora May
Vera Payne Bondurant	Olive Charlotte Logerstrom
Ruth Borthwick	Helen McClrath
Mildred Carrie Browning	Irma Ellen McKinnell
Lois Ava Burton	Mary Aletha Mason
Lucile Margaret Carey	Lora Gertrude Mendenhall
Quinta Pearl Cates	Florence Eleanor Mitchell
Mary Ita Covert	Mary Ethel Mitchell
Margaret Elizabeth Crumbaker	Hilda Ruth Moore
Florence Lillian Dial	Ruth Ann Morgan
Hattie Estelle Droll	Vera Oviatte Olmstead
Minnie Josephine Dubbs	Ruth Elizabeth Orr
Lenore Maria Edgerton	Ruth Rosabell Phillips
Ruby Anna Ellerman	Maybell Rodgers
Maurine Fitzgerald	Frances Elizabeth Russell
Murl Gann	Vera Leone Samuel
Hattie Pauline Gesner	Adelaide Seeds
Helen Isabel Gott	Nellie Gladys Shoup
Mary Frances Haack	Lola Mae Sloop
Edith Theodora Hall	Eva Jeanette Snyder
Lucile Halleck	Ethel Gladys Switzer
Alice Tibbetts Harkness	Ruth Elizabeth Thomas
Eva Harvey	Gertrude Uhley
Kathryn Browning Haycock	Myrtle Cornelia Vanderwilt
Helen Lucile Heiser	Martha Coats Webb
Sarella Lucile Herrick	Hazel Merillat Williams
Ruth Kathrina Huff	Edythe May Wilson

Division of General Science

BACHELOR OF SCIENCE

Sarah Joanna Boell	Fearl Lily Miltner
Solomon Richard Brinker	Harrison Earl Mitchell
Frank Swartz Campbell	Alice Morton
Elizabeth Agnes Cotton	Flora Roccina Parker
Nora May Dappen	Clifford Symes Rude
Philip Alexander Kennicott	Lloyd Bonham Souders
Robert Donald MacGregor	Nettie May Wismer

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Bruce Browne Brewer	Laura Dwelle Moore
Ralph Harold Heppe	Sara Chase Yost

Certificates Conferred

CERTIFICATE IN AGRICULTURE

Henry Jense Carr	Francis Chapman Sanford
Robert Jerome Foulke	Pyron Alexander Vannordstrand

CERTIFICATE IN VETERINARY MEDICINE

Chester Anderson King

CERTIFICATE IN ELECTRICIANS' SHORT COURSE

Oscar Hugh Aydelotte
Fern Frank Capps
James William Donovan
Asabel Deima Hinshaw

Olma Monroe Rath
Floyd Rice
Ralph Burton Ricklefs

CERTIFICATE IN AUTO MECHANICS' SHORT COURSE

Harold Blackburne Allen
Wayne Elsworth Anderson
Harold William Arnold
Lyman Edwin Bailey
Charles Otis Bates
Fred August Braun
Floyd Thornton Bushell
James Burke Campbell
Alfred James Carlson
Craton Edwin Carney
Olin Loue Dikeman
Raymond Dikeman
Oscar Daniel Ekstrum
George Jacob Evans
Clarence Marshel Garten
Edward Andy Henke

Arthur Robert Johnson
Ralph Nevins Johnson
Virgil W. Johnson
George Aubrey Locke
William E. McManis
Reynold E. H. Nordgren
George Barton Randle
Max Duane Roberts
Harold Sargent
Lewis Henry Schiesser
Elmer Burton Shull
Donald Oneil Signor
Alfred Walter SinClair
John J. Snodgrass
Clarence Jay Thorne
Ernest William Williams

CERTIFICATE IN BLACKSMITHS' SHORT COURSE

David M. Heilman
Wilbur Wakefield Wikoff

John Albert Young

CERTIFICATE IN MACHINISTS' SHORT COURSE

Ira Francis Hites
Marcus Alexander Hites

Archibald Hurtgen
Clyde M. Rogers

CERTIFICATE IN CARPENTERS' SHORT COURSE

Louis Ira Carpenter

Elmer Leroy Copeland

CERTIFICATE IN TRACTOR OPERATORS' SHORT COURSE

Annas Lee Anderson
Ross David Arnold
Leonard Elbert Bales
William Frederick Barber
Herbert John Barr
Fred August Barre
Henry Oliver Benedict
John William Beyer
James Lloyd Boller
George Bradbury
Willie Jacob Braum
Lee T. Burnett
Charles Edward Christoph
Justin Bert Cooke
Robert Ivan Davis
Henry Orvil Ellerman
Clarence Cornelius Ericson
Richard Andrew Erickson
Julius Christopher Fabel
Will Charles Fankhauser
Otis Lester Franklin
Clyde Dow Frost
Albert Edward Gage
Victor Leonidas Gaston
James A. Gorton
Quincy Adam Groh
Carl Harvey Hartman
Merlin Wilson Hawk
Edwin Homer Hochuli
Claude Edward Hollenbeck
Louis Jahnke
Fred Hans Johnson
Gustav Adolph Lueker

Martin Henry Lueker
Irwin Hamilton McCutchan
Eugene Joseph McGrath
Chris John Mall
William Herbert Marcy
Alva Arnold Moore
Elmer Ellsworth Murphy
Arnold Jergen Nanninga
Elwin William Niccum
Carl Leander Nohlen
John E. Oelrichs
Burr Harvey Ozment
Glenn Rolander Peterson
Carl Predmore
Edward Henry Rice
Nicol Gosler Rogler
Earl William Rubart
Fred Sachau
Charles P. Schofield
Louis Ethen Schultz
Isaac Ray Teagarden
Doyle Johnson Underwood
Laurence Reber Vaniman
Nathan Bailey Vaughn
George M. Walz
Dwight Robert Weinland
Martin Raymond Westling
Edward Francis Whelan
John S. Winzeler
Dewey David Wood
Charles Stephen Wood
Paul Brower Young

CERTIFICATE IN HOUSEKEEPERS' SHORT COURSE

Claretta Odessa Allen
Lucile Henrietta KeenCelia Pipes
Katie Roberts

CERTIFICATE IN MUSIC

Nina Bess Curry

Helen McClanahan Keith

CERTIFICATE IN PUBLIC SCHOOL MUSIC

Ollie Wilson Klotz

Second Division

Degrees Conferred**Division of Agriculture**

BACHELOR OF SCIENCE IN AGRICULTURE

Carl Vincent Maloney*
Edgar Martin*

Charles Lorin Quear*

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Ravenna Elizabeth Brown**
Mary Grace Crumbaker*
Bertha Edna Flynn*
Myrtle Annice Gungelman**
Frances Keneaster Hancock*Marie Manser*
Lael Louise Porter*
Ruth Georgia Taylor*
Aurolyn Agnes Vandivert*
Donna Faye Wilson***Division of General Science**

BACHELOR OF SCIENCE

Mary Avis Blain*
Beatty Hope Fleenor*
George Albert Foltz*Addie Ruth Sandman**
Mary Fidelia Taylor*
Nellie Flo Yantis*

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Ruth Bernese Henderson*

Julia Annette Keeler**

Division of Veterinary Medicine

DOCTOR OF VETERINARY MEDICINE

Harry Jonas Austin*

Howard Adams O'Brien*

CERTIFICATE IN PUBLIC SCHOOL MUSIC

Bernice Wilson Klotz*

* August 8, 1919. ** September 1, 1919.

Honors

SENIOR HONORS

(June, 1919)

DIVISION OF AGRICULTURE

Blanche Shirley French
Fred Robert Beaudette

Fred Griffee

DIVISION OF ENGINEERING

John Stephen Painter

Glenn Worth McCracken

DIVISION OF HOME ECONOMICS

Sarella Lucile Herrick
Alpha Corrine Latzke
Esther Naomi Latzke

Frances Elizabeth Russell
Ruth Georgia Taylor

DIVISION OF GENERAL SCIENCE

Laura Dwella Moore

Nettie May Wismer

JUNIOR HONORS

(June, 1919)

DIVISION OF AGRICULTURE

Luella Clara Schaumberg

Boyd Funston Agnew

DIVISION OF ENGINEERING

Paul Lowell Fetzner

Frank Louis Sahlmann

DIVISION OF HOME ECONOMICS

Agnes Eloise Flanders
Mary Jane Hill

Loverne Webb

DIVISION OF GENERAL SCIENCE

Blanche Martha Sappenfield

Jewell Dan Sappenfield

PHI KAPPA PHI

(Class of 1919)

Fred Robert Beaudette
Fayne Vera Bondurant
Blanche Shirley French
Fred Griffee
Sarella Lucile Herrick
Alpha Corrine Latzke
Esther Naomi Latzke
Glenn Worth McCracken

Pearl Lily Miltner
Laura Dwella Moore
Vera Oviatte Olmstead
John Stephen Painter
Frances Elizabeth Russell
Vera Leone Samuel
Ruth Georgia Taylor
Nettie May Wismer

List of Students

Graduate Students

CANDIDATES FOR MASTER'S DEGREE, 1920

- Dorothy Josephine Cashen, B. S. 1917 (Carthage College), *Botany*
Manhattan
- Ernest Edward Dale, A. B. 1913 (University of Nebraska), *Botany*
Greenwood, Neb.
- George William Finley, B. S. 1896 (Kansas State Agricultural College), *Mathematics*
Santa Rosa, Cal.
- Frank Elmer Fox, B. S. 1915 (Iowa State College), *Chemistry*
Manhattan
- Leonard Sinclair Hobbs, B. S. 1916 (Texas Agricultural and Mechanical College),
Engineering
Manhattan
- Harry Llewellyn Kent, B. S. 1913 (Kansas State Agricultural College), *Education*
Manhattan
- Edward Staunton West, A. B. 1917 (Randolph Macon College), *Chemistry*
Stuart, Va.

GRADUATE STUDENTS WORKING TOWARD MASTER'S DEGREE

- Emily Harriet Anderson, B. S. 1919 (University of Wyoming), *Home Economics*
Laramie, Wyo.
- Julia Baker Alder, B. S. 1914 (Kansas State Agricultural College), *English*
Manhattan
- William Charles Bellis, B. S. 1919 (University of Arizona), *Animal Husbandry*
Berkeley, Cal.
- Katharine Maxwell Bower, B. S. 1915 (Kansas State Agricultural College), *English*
Kansas City, Mo.
- Frank Swartz Campbell, B. S. 1919 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Thomas Arthur Case, B. S. 1912 (Kansas State Agricultural College),
Veterinary Medicine
Sterling
- Percy Walter Cockerill, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Minnie Pence Curry, B. S. 1914 (Kansas State Agricultural College),
Mathematics and English
Manhattan
- William Renwick Curry, B. S. 1914 (Kansas State Agricultural College), *Education*
Manhattan
- Percy LeRoy DePuy, B. S. 1918 (Kansas State Agricultural College), *Zoology*
Manhattan
- Howard Robert DeRose, B. S. 1918 (University of Colorado), *Chemistry*
Manhattan
- Orin Willard Hinshaw, B. S. 1919 (Kansas State Agricultural College), *Horticulture*
Eureka
- Ruth Evalyn Hurd, B. S. 1918 (Carthage College), *Zoology*
Manhattan
- Charles Otis Johnston, B. S. 1918 (Kansas State Agricultural College), *Agriculture*
Manhattan
- Ernest Baker Keith, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Henry White Marston, B. S. 1919 (University of Delaware), *Animal Husbandry*
Wilmington, Del.
- Elizabeth Mohlman, B. S. 1915 (Ottawa University), *English*
Manhattan
- Mary Gladys Payne, B. S. 1913 (Kansas State Agricultural College), *Home Economics*
Emporia
- Annette Woodward Perry, B. S. 1916 (Kansas State Agricultural College), *History*
Manhattan
- Harold Arthur Pratt, B. S. 1918 (Massachusetts Agricultural College), *Horticulture*
Shrewsbury, Mass.

- Clifford Rude, B. S. 1919 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Gladys Garnand Rude, B. S. 1918 (Kansas State Agricultural College), *Zoölogy*
Manhattan
- Wilbur Neilson Skourup, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Miriam Russell Spicer, A. B. 1917 (University of Kansas), *General Science*
Lawrence
- Clara Victoria Thomas, B. S. 1919 (Nebraska Wesleyan University), *Foods and Chemistry*
Gothenburg, Neb.
- Francis Marion Wadley, B. S. 1916 (Kansas State Agricultural College), *General Science*
Manhattan
- Edith Willmann, A. B. 1919 (Columbia University), *Embryology*
New York City
- GRADUATE STUDENTS NOT WORKING TOWARD MASTER'S DEGREE
- William Hiddleson Andrews, A. B. 1900 (University of Chicago); M. S. 1919 (Kansas
State Agricultural College), *Education*
Manhattan
- Alice Lenore Brown, A. B. 1916 (University of Kansas), *Entomology*
Manhattan
- Allan Park Davidson, B. S. 1914 (Kansas State Agricultural College), *Education*
Manhattan
- Odessa Della Dow, B. S. 1906 (Kansas State Agricultural College), *Chemistry*
Manhattan
- Merrill Augustus Durland, B. S. 1918 (Kansas State Agricultural College), *Engineering*
Centralia
- Esther Gladys Hilbish, B. S. 1918 (Kansas State Agricultural College), *Home Economics*
Lewis
- William Adams Lippincott, A. B. 1903 (Illinois College); B. S. 1911 (Iowa State College);
M. S. 1917 (University of Wisconsin), *Zoölogy*,
Manhattan
- Helen Edna Rannels, B. S. 1913 (Kansas State Agricultural College), *Home Economics*
Manhattan
- Frances Elizabeth Stall, B. S. 1918 (Kansas State Agricultural College), *Music*
Kansas City
- Lois Emily Witham, B. S. 1916; M. S. 1918 (Kansas State Agricultural College), *Botany*
Manhattan

Undergraduate Students

The following list includes seniors, juniors, sophomores, freshmen and special students in College. For students in the Summer School and in special courses, see lists following this one.

Abbreviations here used denote curricula as follows: Ag, agriculture; AC, agricultural chemistry; AE, agricultural engineering; Ar, architecture; BC, biochemistry; CE, civil engineering; EE, electrical engineering; FME, flour mill engineering; GS, general science; HE, home economics; IC, industrial chemistry; IJ, industrial journalism; M, music; ME, mechanical engineering; and VM, veterinary medicine.

SENIORS

Genevra Mae Adams (HE); Atchison
Mabel Christmas Adams (HE); Garden City
Ida Gertrude Adee (GS); Manhattan
Boyd Funston Agnew (Ag); Yates Center
Glen Allen (Ag); Burlington
Nelson Joseph Anderson (GS); Burchard,
Neb.
John Wendell Andrews (GS); Manhattan
Mildred Jeanette Arends (HE); Kansas City
Emmet Stanley Bacon (VM); Emporia
Herbert Nickson Baker (Ag); Tonganoxie
Helen Hunt Bales (HE); Manhattan
John William Barker (GS); Pratt
Hugh Donald Barnes (CE); Blue Mound
Carroll Mueller Barringer (Ag); Conover,
N. C.
Helen Cecile Beck (HE); Manhattan
Clyde E. Beckett (CE); El Dorado
Adelaide Evelyn Beedle (HE); Salina
Sherman Floyd Bell (Ag); Perry
Mabel Rose Bentley (GS); Valhalla
Elmo Murray Berroth (VM); Arkansas City
Ernestine Biby (HE); Topeka
Everett Allen Billings (Ag); Maple Hill
Bertha Johanna Biltz (HE); Lindell
Helen Williamine Blank (HE); Emporia
Homer Conley Boyd (VM); Manhattan
Nelson Boyle (Ag); Spivey
Cleve Somerset Briggs (IJ); Parsons
William Herbert Brooks (Ag); Stafford
Joseph Oscar Brown (Ag); Sanford, Fla.
Clarence Leland Browning (EE);
Manhattan
Esther Bruner (HE); St. Joseph, Mo.
Vernon Everett Bundy (IJ); Manhattan
Arthur Newton Burditt (GS); Ness City
Phyllis Harriet Burt (HE); Eureka
Bessie Catherine Burkdoll (HE); Ottawa
Loring Enner Burton (GS); Manhattan
Raymond Campbell (Ag); Parsons
Myrtle Carey (HE); Houston, Tex.
Hettie Carris (HE); Topeka
Dora Lydia Cate (IJ); Manhattan
Vera Cates (HE); Manhattan
William Kamp Charles (IJ); Republic
Imogene Marjorie Chase (GS); Manhattan
Catherine Aleph Christman (HE); Wichita
Elizabeth Duncan Circle (GS); Kiowa
Russell Fesler Coffey (VM); Iola
Frank Harold Collins (GS); Wellsville
Sarah Alda Conrow (HE); Manhattan
Joseph Hamilton Cool (Ag); Glasco
Warren Eugene Crabtree (Ag); Manhattan
Vernon Simpson Crippen (Ag); Langdon
Simon Edward Croyle (CE); New Cambria
May Dahnke (HE); Manhattan
Verla Lucille Dahnke (HE); Manhattan
Bertha Lewis Danheim (HE); Blue Rapids
Helen Josephine Dawley (HE); Waldo
Louise Dawson (GS); Clifton, Ariz.
Lulu Elizabeth Deist (HE); Harper
Arthur Reginald Denman (Ag); Manhattan
Laura Viola Denman (GS); Manhattan
Charles Boddie Downer (EE); Kansas City
Hugh Byron Dudley (IJ); Kansas City
Roy Kiefner Durham (GS); Anthony
Hazel Viola Dyer (HE); Oberlin
Charles Ranger Enlow (Ag); Harper
Theodore Henry Enns (IJ); Inman
John Franklin Erdley (VM); Holton
Sivert Eriksen (VM); Kensal, N. Dak.
Margaret Salina Etzold (HE); Liberal
Mabel Lena Evans (HE); Liberal
Morris Evans (Ag); Topeka
Hobart Fairman (ME); Manhattan
Ward Willard Fetrow (Ag); Haddam
Paul Lowell Fetzer (ME); Manhattan
Ina Ruth Findley (GS); Manhattan
Paul Levi Findley (Ag); Manhattan
Agnes Eloise Flanders (HE); Westboro, Mo.
William Robert Folck (EE); Little River
William Edward Forney (GS); Cottonwood
Falls
Abijah Wilcox Foster (Ag); Fairchild, Wis.
Ralph Leon Foster (IJ); Courtland
Ralph Emerson Franklin (EE); Horton
Earle Wesley Frost (GS); Blue Rapids
Mary Abigail Furneaux (HE); Moran
Gladys Lorena Ganshird (HE); Manhattan
Walter David Gardner (Ag); Kansas City
Ethel Victoria Garrett (HE); Manhattan
Isaac Frank Gatz (VM); McPherson
Marie Gehr (HE); Manhattan
Lester Frank Gfeller (EE); Junction City
Laberta Ruth Ghormley (HE); Hutchinson
Howard M. Gillespie (Ag); Danville
Grace Iola Gish (GS); Manhattan
Bertha Elizabeth Glenn (HE); Manhattan
Ruth Stephens Goodrum (HE); Lamar,
Mo.
Edwin Edgar Gottman (Ag); Kansas City
John Francis Grady (CE); Lansing
Robert Albert Graves (EE); Abilene
Mamie Grimes (HE); Manhattan
Dora Eva Grogger (HE); Manhattan
Harold Reed Guilbert (Ag); Wallace
Frank Harold Gulick (Ag); Winfield
John Spence Gullede (EE); Siloam
Springs, Ark.
Joseph Cunningham Gullede (Ag);
Manhattan
Eva Maud Gwin (HE); Morrowville
Mary Elizabeth Hagenbuch (HE); Troy
William Carlton Hall (Ag); Coffeyville
George Hamilton (ME); Manhattan
Marie Hammerly (HE); Manhattan
Claude Gustave Hansen (ME); Sedgwick
Ruth Anna Harding (HE); Manhattan
Robert Stanton Hargis (GS); Inman
Floyd Hawkins (IJ); Manhattan
Marie Ellen Haynes (HE); Emporia
Francis Augustin Hennessy (Ag); Fulton
Harry Bernice Hickman (VM); Norton,
Mo.
Mary Jane Hill (HE); Burlington
Reginald Hinde (Ag); Manhattan
Mary Hitch (HE); Guymon, Okla.
Ralph Ward Hixson (VM); Hiawatha
Lester Hoffman (GS); Abilene
Samuel Willet Honeywell (EE); Poe
Walter Rawlins Horlacher (Ag); Colby
Carl Lewis Howard (Ag); Oakley
David Marion Howard (Ag); Coldwater
Stuart Laverne Hunt (VM); Blue Rapids
Claude Elton Hutto (GS); Manhattan
Clarence Huycke (ME); Ellsworth
William Lewis Ikard (VM); Manhattan
Guilford John Ikenberry (Ag); Quinter
Jane Jenkins (HE); Boulder, Colo.
Helen Myrtle Johnson (HE); Wichita
Myrtle Johnson (GS); Manhattan
Samuel Ray Johnson (VM); Blanchard,
Iowa
Mary Catherine Johnston (HE); Gardner
Clare Kimport (Ag); Dellvale
Chester Anderson King (VM); Emporia
Amanda Kirkpatrick (HE); Montrose
Elizabeth Emily Kirkpatrick (HE)
Manhattan
Joseph Ralph Lamont (GS); Manhattan
Harold Fred Laubert (Ar); St. Joseph, Mo.
Clay Forrest Laude (Ag); Rose
Helen Unnetta Lawrence (HE);
Junction City
Carolyn Elizabeth Lear (HE); Stafford
Paul Revier Lemly (EE); Ramona
Lois Emily Litchfield (HE);
Blackwell, Okla.
Lucile Carol Logan (HE); Lyons
Ann Marie Lorimer (HE); Olathe
Gladys Love (HE); Kansas City, Mo.
Frances Evelyn Lovett (HE); Eureka
Bessie Lenore Lyman (HE); Manhattan
Edits Sprankle McHugh (EE); Bucklin
Ernest Lee McIntosh (Ag); Manhattan

SENIORS—concluded.

- Anna Leah McIntyre (HE); Topeka
 Leo Alphonsus Magrath (VM);
 Williamsburg
 Calvin Medlin (JJ); Manhattan
 Josephine Alta Meldrum (HE);
 Cedar Vale
 Velma Mae Meserve (HE); Ellis
 Adda Middleton (HE); Minneapolis
 Ward Ray Miles (Ag); Green
 Lloyd Rayburn Miller (OE); Belleville
 Nina Irene Miller (HE); Neodesha
 John Russell Mingle (Ag); Holton
 Florence Irene Mirick (HE); Otis
 Isaac Tennyson Mock (VM); Idana
 John Delmont Montague (Ag); Anthony
 Clara Belle Moore (HE); Holton
 Eloise Morrison (HE); Topeka
 Mollie Manerva Smith Moser (HE);
 Westphalia
 Harry Allyson Moore (IJ); Manhattan
 Manoog Muguerditch Muguerditch (Ag);
 Manhattan
 Edith Mabel Muir (HE); Salina
 Joseph Linn Mullen (Ag); Clay Center
 Arthur Leroy Myers (Ag); Windom
 Clifford Howard Myers (ME); Hutchinson
 Jesse Bowman Myers (Ag); Milton
 Elinor Frances Neal (HE); Topeka
 * Laura Edna Shingledecker Neale (IJ);
 Manhattan
 Philip Earl Neale (Ag); Manhattan
 Harry Hibbard Nelson (Ag); Wakarusa
 Ralph Dale Nichols (Ag); Scranton
 Floyd Earl Oakes (Ag); Gypsum
 Glenn William Oliver (Ag); Howard
 Edlena O'Neil (HE); Quindaro
 Nellie Maria Payne (GS); Manhattan
 Nevels Pearson (Ag); Manhattan
 Frederick John Peters (Ag);
 Oak Harbor, Ohio
 Benjamin Rankin Petrie (Ag); Pratt
 Helen Margaret Boyd Petrie (GS); Pratt
 Telford Ruddell Pharr (Ag); Manhattan
 Hervey Phipps (VM); Pueblo, Colo.
 Leo Dewey Ptacek (Ag); Emporia
 Edna Winifred Pyle (HE); Morrill
 Arthur Cecil Ramsey (GS); Osage City
 Phoebe Frances Rebstock (HE); Newton
 Lyman Jay Rees (CE); Talmage
 Winfield John Ritter (VM); Parsons
 Lloyd William Roberts (OE); Pomona
 Ada La Verne Robertson (HE); Washington
 William Ellet Robison (Ag); Towanda
 Carl Otto Roda (Ag); Paradise
 Cleo Prudence Roderick (HE); Attica
 Walter William Rodewald (Ag); Vassar
 Amanda Christina Rosenquist (HE);
 Osage City
 Lenora Olive Rude (GS); Manhattan
 Winfield Foster Runyen (Ag); Topeka
 Guy Allegra Russell (OE); Lakin
 Frank Louis Sahlmann (EE); Lincoln
 Blanche Martha Sappenfeld (GS);
 Clifton
 Jewell Dan Sappenfeld (GS); Clifton
 Luella Mabel Clara Schaumburg (Ag);
 La Crosse
 Merrill Philip Schlaegel (VM); Vermillion
 Eliza Lucretia Scholer (HE); Milo
 Ira John Shoup (Ag); Udall
 Grover Meeker Simpson (VM); Salina
 Marjory Hannah Simpson (HE);
 Nowata, Okla.
 Louis Vallieres Skidmore (VM);
 Manhattan
 Caroline Elizabeth Sloop (IJ); Manhattan
 Grace King Smith (HE); LeRoy
 James Campbell Snapp (Ag); Manhattan
 Martin Hayden Soule (EE); Independence
 Jay Erskine Stanton (VM); Manhattan
 Oscar Steanson (Ag); Oklahoma City, Okla.
 Christine Stebbins (HE); Columbus
 Velda Elizabeth Stewart (HE); Morganville
 Ella Belle Stinson (HE); Kansas City
 Roscoe Noyes St. John (ME);
 Rocky Ford, Colo.
 Josephine Sullivan (HE); Wamego
 Theodore Thomas Swenson (Ag); Lindsborg
 Charles Swingle (Ag); Manhattan
 Brainard Louis Taylor (VM);
 Arkansas City
 Earl Hicks Teagarden (Ag); Wayne
 Leona Emma Teichgraeber (HE);
 Lindsborg
 Donald Cheney Thayer (Ag); Manhattan
 Marie Laura Thomas (HE); Auburn, Ind.
 Kyle David Thompson (Ag); Densmore
 Francis Totten (Ag); Beattie
 Carl Fenton Trace (Ag); Carterville, Mo.
 Mabel Troutfetter (GS); Colby
 Yuk En Tseu (IG); Honolulu, Hawaii
 William Tully Turnbull (GS); Manhattan
 William Ira Turner (Ag); Milton
 Mark Florea Upson (Ag); Sabinal, Tex.
 Perttu Hannes Virtanen (Ag); Butte, Mont.
 Edith Grace Wakefield (HE); Culver
 Arthur Joseph Walker (GS); Manhattan
 Albert Neal Waters (Ag); Blue Rapids
 Sheppard Arthur Watson (Ag); Eudora
 Merrill Worthing Watt (Ag); Topeka
 Loverne Webb (HE); Cedar Vale
 Francis George Welch (Ag); Hartford
 Willard Welsh (Ag); Newton
 Bula Mae Wertenberger (HE);
 Manhattan
 Edith Marie Wheatley (GS); Rosedale
 Elizabeth Whetstone (HE); Pomona
 Brenner Bagnall White (VM); Delphos
 Ivan Alfred White (Ag); Winfield
 Emma Whitton (GS); Kiowa
 Andrew Wilber Wilcox (GS); Manhattan
 Marshall Parrish Wilder (IJ); Douglass
 Alma Luella Wilkin (HE); Aulne
 Edna May Wilkin (HE); Aulne
 Faye Williams (HE); Gardner
 Homer Bryan Willis (Ag); Manhattan
 Harberd Stephen Wise (Ag); Wichita
 Homer Carlton Wood (Ag); Manhattan
 Harold Stephen Woodard (Ag); Glen Elder
 Maude Ellen Carter Woods (HE);
 Tonganoxie
 Theodore Franklin Yost (Ag); La Crosse
 Fay Aileen Young (HE); Le Roy
 Fred Frank Young (Ag); Penderis
 Philip Hsun Young (Ag);
 Hangchow, China

JUNIORS

- Earl Abbott (EE); Garden City
 Gladys Virginia Addy (HE); Manhattan
 Cora Barbara Akers (HE); Conway
 George Clarence Anderson (Ag); Bronson
 Jennie Anderson (HE); Muskogee, Okla.
 Esther Etta Andrews (HE); Manhattan
 Ardis Corinne Atkins (HE); Manhattan
 Ray Allen Axtell (Ag); Dimmitt, Tex.
 Charlotte Hosier Ayers (HE); La Harpe
 Harriett May Baker (GS); Emporia
 Lowell Edwin Baldwin (EE); Garnett
 Florence Banker (HE); Lawrence
 Paul Willis Barber (GS); Bluff City
 Ida May Bare (HE); Protection
 Edgar Hugh Barger (VM); Smith Center
 * Philip Asa Barnes (Ag); Blue Mound

° Deceased

* Under auspices of Federal Board for Vocational Education.

JUNIORS—continued.

- Harold Winthrop Batchelor (GS); Manhattan
Louis Bloyce Bate (VM); Wichita
Thomas Baumgartner (Ag); Manhattan
Ernest Leo Bebb (EE); Reading
Lindley Charles Binford (GS); Haviland
Joseph Alvin Bogue (VM); Manhattan
Cecil Lloyd Bower (CE); Mound City
Fred William Boyd (Ag); Joplin, Mo.
Martin D. Brechbill (GS); Ramona
Roy Shipman Breese (EE); Manhattan
*Arthur Hays Brewer (CE); Manhattan
Duke Daniel Brown (Ag); Marysville
Elsa Ann Brown (HE); Manhattan
Guy Mahlon Brown (ME); Manhattan
John Farr Brown (Ag); Toronto
Albert Joseph Brubaker (ME); Ellsworth
Gladys Elizabeth Bushong (GS); Manhattan
Rex Dean Bushong (VM); Manhattan
Jamie Irene Cameron (HE); Manhattan
Samuel David Capper (Ag); Ames
Walter Bryan Carey (GS); Hutchinson
Ida Pearl Carr (HE); Anthony
Gladys Beatrice Carson (HE); Liberal
Hortense Caton (HE); Winfield
Benjamin Finley Clapham (VM); Lane
Ercelle LaVeta Clark (GS); Hutchinson
Marian Cecile Clarke (GS); Paola
Robert Earl Cleland (Ag); Manhattan
Sylvester Jay Coe (Ag); St. Augustine, Fla.
Sylvan Harold Coffman (Ag); Chase
Bessie Olive Cole (HE); Kinsley
Arthur Bright Collom (GS); Maressa, Ill.
Carl Marcus Conrad (AC); Elk City
Gertrude Vivian Conroy (HE); Manhattan
Arthur Everett Cook (Ag); Russell
Christine Carol Cool (HE); Plainville
Robert Francis Copple (Ag); Glasco
Nora Corbet (HE); Leona
Hubert James Counsell (EE); Garden City
Marceline Willard Couture (HE); Topeka
Everett Russell Cowell (Ag); Clay Center
Judith Rae Briggs Craig (HE); Hope, Ark.
Royce Brainerd Crimmin (FME); Bradford, Mass.
Ruby Louise Crocker (IJ); Matfield Green
Mary Natalie Cruzen (GS); Gallatin, Mo.
Oscar Cullen (ME); Lebanon
Dorsie Lawrence Deniston (Ag); Stafford
Abbie Clair Dennen (HE); Manhattan
Addison Curtis DePuy (ME); Manhattan
Walt Ellwood Dickerson (CE); Wichita
Alexey Euguenievich Dobrohotov (Ag); Viazniki, Russia
Claire Ansel Downing (IC); Wichita
Vinnie Drake (HE); Manhattan
George Milton Drumm (Ag); Manhattan
Myers Duphorne (EE); Sharon Springs
Linn Edmund Eberwein (Ag); Lawrence
Roy Frederick Eckart (ME); Paola
Edwin Elcock (CE); Wichita
Fred Emerson (VM); Ottawa
Jessie Belle Evans (GS); Goodland
Bly Ewalt (HE); Medicine Lodge
Ethel Feese (GS); Pratt
Ray Ferree (Ag); Yates Center
Howard Daniel Finch (Ag); White Water
George Wilber Fisher (EE); Sedalia, Mo.
Otto Franklin Fisher (ME); Sedalia, Mo.
Torby Glenn Fletcher (FME); Wichita
Elsie Gladys Filippo (HE); Abilene
Conie Caroline Foote (HE); Downs
Gladys Evelyn Ford (HE); Seneca
John Fredenberg (VM); Council Grove
Dewey Mason Fullington (ME); Idana
Clifford Gallagher (VM); Perth
Ruth Emma Gardenhire (HE); Alma
Oscar Deane Gardner (EE); Louisburg
Henry Gilbert Gentry (Ag); Winfield
William Hopper Getty (Ag); Downs
Ernest Eugene Gilbert (Ar); Manhattan
Mary Helen Gilbert (HE); Manhattan
Ruth Harriet Gilles (HE); Kansas City
Howard Lewis Gingery (VM); Pawnee City, Neb.
George Albert Gingrich (Ag); Wakefield
Mable Celesta Ginter (HE); Manhattan
Geneva Goddard (HE); Dunavant
Fannie Harriet Gorton (HE); Manhattan
Irene Florence Graham (HE); Manhattan
Chester Eugene Graves (Ag); Wellsville
Hannah Elizabeth Greenlee (HE); Kansas City
Hilborn Hall Groat (VM); Silver Lake
Garnet Vivean Grover (HE); Iola
Bertha May Gwin (HE); Washington
Fred Lynn Hall (EE); Alma
Marguerite Frances Hammerly (GS); Manhattan
*Frank Hare (VM); Dawn, Mo.
Ruth Garfield Harrison (HE); Jewell City
Lucile Clara Hartman (HE); Hutchinson
Ethel Porter Hatfield (GS); Wichita
Charles Marion Haughton (CE); Wichita
Joseph Elbert Helt (EE); Winfield
*Clyde Russell Hemphill (Ag); Chanute
Margaret Effie Hendricks (HE); Fort Smith, Ark.
Homer Henney (Ag); Horton
Ethan Allen Herr (Ag); Medicine Lodge
Chester Albern Herrick (Ag); Manhattan
Grace Hibarger (GS); Wichita
Russell Dean Hilliard (EE); Westmoreland
George Winfred Hinds (Ag); Manhattan
Frank Hoath (Ag); Anthony
Glenn Oscar Hoffines (Ag); Marquette
Edna Letha Hoke (HE); Manhattan
Dalton Roy Hooton (Ag); Garnett
William Harold Hoots (Ag); Winfield
Nellie Marie Hord (HE); Colony
Opal Maye Horr (GS); Thayer
Clara Belle Howard (HE); Colby
Oliver Howells (Ar); Rosedale
Fred Harold Hull (Ag); Portis
Bruce Charles Hutchins (ME); Ellsworth
Dan Leo Jantz (AE); Larned
Jerry Dillard Jarmon (VM); Coffeyville
Edward John Jelden (VM); Columbus, Neb.
Hope Forrester Jenkins (EE); Kingman
George Scott Jennings (Ag); Winfield
*Francis Jordan (Ag); Manhattan
Clifford Frederick Joss (EE); Topeka
Everett Barton Kain (Ag); Rocky Ford, Colo.
Walter August Karlowski (IJ); Sylvan Grove
Madge Elizabeth Kasten (HE); Colby
Mildred Kaucher (HE); St. Joseph, Mo.
Elithe Electa Kaul (GS); Glen Elder
George Lowell Kelley (Ag); White Cloud
Ray Edwin Kellogg (FME); Wichita
Foley Kiang (Ag); Hangchow, China
Harriette Louise Klaver (HE); Kingman
Russell Vernon Knapp (ME); Norton
Violet Virginia Knaus (GS); McPherson
Clifford Kniseley (GS); El Dorado
William Henry Knostman (GS); Wamego
Raymond Scott Knox (EE); Jetmore
Carl Albert Kreth (Ag); Onaga
*Ernest Lester Lahr (Ag); Abilene

* * Under auspices of Federal Board for Vocational Education.

JUNIORS—concluded.

- Maude Ella Lahr (GS); Waynoka, Okla.
 Ira Kaull Landon (Ag); Oklahoma City, Okla.
 Homer Waldo Larson (ME); Manhattan
 Walter Frank Law (IJ); Sheridan, Ark.
 Blanche Lea (IJ); Greensburg
 George Wesley Leeson (GS); Council Grove
 Ione Elizabeth Leith (IJ); Irving
 Merle James Lucas (EE); Pratt
 Geta Lund (IJ); Manhattan
 Norman Dale Lund (CE); Protection
 Norman LeRoy Lupton (Ag); Sterling
 Robert Henry Lush (Ag); Altamont
 Eugene Sidney Lyons (Ag); Lawrence
 Rollo Wade McCall (Ag); Brewster
 Clarence Hewitt McCandless (EE); Cottonwood Falls
 Ross McCausland (GS); Wichita
 Herbert William McClelland (GS); Manhattan
 Elmer David McCollom (Ag); Bogard, Mo.
 Dewey Zollie McCormick (Ag); Zeandale
 Helen McNeal (HE); Joplin, Mo.
 Franz Joseph Maas (ME); Alta Vista
 Genevieve Madden (HE); Horton
 Paul Christoph Mangelsdorf (Ag); Atchison
 Carl Marrs (EE); Bradford
 Florence Ethel Mather (HE); Manhattan
 Hilery Edwin Mather (Ag); Manhattan
 Rex Arthur Maupin (Ag); St. Joseph, Mo.
 Raymond Ellsworth Means (CE); Protection
 Carl Franklin Mershon (Ar); Oakley
 Albert Metz (Ag); Anthony
 Tressie Edna May Middleton (HE); Manhattan
 Marguerite Helen Miller (HE); Salina
 Marshall Miller (EE); Manhattan
 Helen Amy Mitchell (HE); Salina
 Clinton Hawthorne Morgan (Ag); Hays
 Leonard Glenn Morgan (VM); Manhattan
 Mollie Morton (IJ); Ellsworth
 Dorothy Moseley (HE); Alma
 Donald Joseph Mosshart (ME); Manhattan
 James Herbert Moyer (Ag); Hiawatha
 Barbara Elizabeth Murray (HE); Ash Grove, Mo.
 Marianne Muse (HE); Manhattan
 Alice Helen Mustard (HE); Manchester
 Anna Belle Neal (GS); Topeka
 Helen Isabel Neiman (HE); White Water
 *Cluell Ansel Newell (Ag); Matfield Green
 Charles Nitcher (Ag); Hardy, Neb.
 Hans Christian Olsen (GS); Farwell, Neb.
 Gerda Pauline Olson (HE); Wichita
 Ruby Elizabeth Orth (GS); Manhattan
 Reeves Ayers Osborne (Ag); Burrton
 Merton Louis Otto (Ag); Riley
 Clementine Paddleford (IJ); Manhattan
 John Hale Parker (Ag); Ottawa
 Ellen La Verne Pennel (HE); Oregon, Mo.
 Thomas Gilbert Perry (VM); Wichita
 Orin Ross Peterson (Ag); Caney
 John Kent Pike (EE); Chanute
 Faye Marie Powell (HE); Iola
 Elva Mae Price (HE); Baileyville
 James Wendle Pryor (ME); Kansas City
 Clarence Benedict Quigley (Ag); Blaine
 Velva Rader (HE); Caney
 Roland Culler Ragle (CE); Coffeyville
 Helen Gertrude Ramsey (HE); St. Francis
 Laurens Hawn Reyburn (Ag); Leavenworth
 Henry Irving Richards (Ag); Howard
 Gladys Irene Ritts (HE); Topeka
 Kathryn Roderick (HE); Emporia
 Lydia Eugenia Rogers (BC); Goodwell, Okla.
 Ethel Caroline Roop (HE); Wakefield
 Warren Earl Rothweiler (EE); Bison
 Charlotte Frances Russell (IJ); Winfield
 Esther Arrilla Russell (HE); Stafford
 Marion Elizaeth Sanders (HE); Leavenworth
 Chauncey Elias Sawyer (VM); Carlyle
 Abraham Burton Schmidt (AE); Canton
 Lee Ashton Scott (VM); Westphalia
 Myra Edna Scott (GS); Manhattan
 Flavel Theodora Scriven (EE); Lucas
 William Dennis Scully (ME); Belvue
 Marcia Anna Seeber (GS); Great Bend
 Ursula Susie Senn (HE); Lasita
 Guy Shelley (CE); Wichita
 Harry Kenneth Shidler (CE); Girard
 Robert Shoffner (AE); Kipp
 David Loyd Signor (Ag); Manhattan
 Paul Louis Sites (CE); Phillipsburg
 Hortense Slavens (HE); Neosho Falls
 Helen Virginia Sloan (HE); Independence
 Clara Mary Smith (HE); Mound City, Mo.
 Clayton Needham Smith (Ag); Pawhuska, Okla.
 Samuel Smith (Ag); Florence
 Samuel Ross Smith (Ag); Fort Riley
 Nathaniel Sheridan Spangler (Ag); Abilene
 Harold Marshall Spiker (Ag); Emporia
 George Elmer Starkey (Ag); Syracuse
 Mildred Sterling (HE); Clay Center
 William Thomas Sterling (Ag); Herington
 Elma Ruth Stewart (HE); Topeka
 Lillian Colene Stewart (HE); Hamilton, Mo.
 Morton Stigers (EE); Manhattan
 Charles Harold Stinson (Ag); Carlyle
 Thomas Granville Storey (EE); Freeport
 Mabel Mangelhild Swanson (HE); Manhattan
 Florence Mathilda Swenson (HE); Kansas City, Mo.
 Joseph Eugene Thackrey (GS); Valentine, Neb.
 Corinne Bertha Thiele (GS); Hanover
 Charles Albert Thresher (Ag); Jetmore
 John Edward Tillotson (IJ); Manhattan
 Everett Tunnicliff (VM); Rawlins, Wyo.
 Grace Leoti Turner (GS); Milton
 Wright Edmund Turner (Ag); Iola
 Ethel Grace Van Gilder (HE); Manhattan
 Loren Gilbert Van Zile (GS); Manhattan
 Ray Bates Watson (Ag); Wichita
 Arthur Weber (Ag); Horton
 Norine Ardeth Weddle (GS); Lindsay
 Sara Esther Weide (HE); Yates Center
 Ray Weinheimer (VM); Ottawa
 Lucile Whan (IJ); Manhattan
 Raymond Francis White (Ag); Winfield
 Frances Josephine Whitmire (HE); West Plains, Mo.
 Jennings Elliott Williams (VM); Windsor, Mo.
 Marion Manning Williams (VM); Muscotah
 Ruth Evalyn Willis (HE); Manhattan
 John Cathcart Wilson (GS); Manhattan
 Paul Benjamin Winchel (EE); Parker
 Cora Winget (HE); Jennings
 Elizabeth McNew Winter (HE); Gainesville, Tex.
 Lee Winter (GS); Lecompton
 Elsie Wolfenbarger (HE); Winkler
 Lois Wood (HE); Emporia
 Margaret Woodman (IJ); Manhattan
 Warren Mudgette Woodman (Ag); Vermillion
 Floyd Wayne Work (EE); Windom
 Esther Wright (HE); Welsh, Ia.
 Clemens Harry Young (Ag); Manhattan
 Susan Elizabeth Young (HE); Jewell
 Clarence Le Roy Zimmerman (EE); Olathe
 Lloyd Zimmerman (EE); Lockney, Tex.

* Under auspices of Federal Board for Vocational Education.

SOPHOMORES

Edith Dorothy Abbott (IJ); Manhattan
 Kathryn Ruth Adams (HE); Manhattan
 *James Frederick Adee (VM); Manhattan
 Jessie Gertrude Adee (HE); Wells
 Clarence Eugene Agnew (Ag); Yates Center
 John Akers (Ag); Conway
 James Henry Albright (GS); Winfield
 Dale Allen (ME); Burlington
 Jesse Levi Allen (Ag); Norwich
 Joseph Levi Allen (Ag); Leavenworth
 Fern Catherine Allison (GS); Kinsley
 Helen Rose Anderson (GS); Thayer
 Nelson Henry Anderson (Ag); Neosho Falls
 Georgia Fern Andrews (HE); Wichita
 Paul McKee Anthony (EE); Westmoreland
 Willard Armstrong (GS); Larned
 William Allen Atchison (Ag); Topeka
 Aldis Lynn Austin (Ag); Irving
 Florence Adelaide Austin (HE); El Dorado
 Oscar Hugh Aydelotte (EE); Manhattan
 Lillian Edna Ayers (GS); La Harpe
 Vida Mildred Ayers (HE); Sabetha
 Mildred Mae Baer (HE); Wichita
 Edgar Francis Bailey (EE); Pratt
 Harold Theodore Baker (AE); Tonganoxie
 Herbert Bales (Ag); Manhattan
 Marion Henry Banks (ME); Wichita
 Justus Wheeler Barger (Ag); Newkirk, Okla.
 Helen Mildred Barnett (HE); Denison
 Burton Bernard Bayles (Ag); Clay Center
 Hazel Reba Beeks (HE); Geuda Springs
 Winifred Margaret Bell (HE); Kinsley
 Marjorie Marie Berger (GS); Sylvan Grove
 Joseph Ersal Beyer (EE); Mooreland, Okla.
 Ivaloo Elizabeth Bickel (HE); Barnes
 Florence Arnold Bingham (GS); Junction City
 Rose May Blackwelder (HE); Isabel
 William Blakely (Ag); Neodesha
 Daniel Blanchard (GS); Manhattan
 Gladys Emelia Bollinger (HE); Everest
 Marguerite Mildred Bondurant (HE); Ness City
 Curtis Clegg Bost (Ag); Matthews, N. C.
 Walter Raymond Bradley (EE); Kidder, Mo.
 William Elwood Brandt (ME); McPherson
 Marian Elizabeth Brookover (HE); Eureka
 Awilda Brown (HE); Winfield
 Henry Lane Brown (CE); Blue Rapids
 Paul Shannon Brown (Ag); Holton
 Orville Kenneth Brubaker (EE); McPherson
 Neal Dwight Bruce (Ar); Marquette
 Frances Elizabeth Brumbaugh (HE); Vesper
 Homer Griffin Bryson (IJ); Leon
 John William Bucklee (EE); Manhattan
 Robert Lee Bumgardner (CE); Arkansas City
 Holman Lynn Bunger (Ag); Wheat Ridge, Colo.
 Leslie Burger (HE); Seneca
 William Harold Burgwin (CE); El Dorado
 Bertha Anna Burk (HE); Clifton
 Earl Frederick Burk (Ag); Ottawa
 Hartzell Burton (Ag); Wichita
 George Hoffman Bush (EE); Little River
 Georgianna Bush (HE); Little River
 Elvira Josephine Bussey (IJ); Muscotah
 Oliver Pardee Butler (Ag); Farmington
 Lawrence Byers (Ar); Abilene
 Helen Marie Calkins (HE); Burlingame
 Myrtle Louise Camp (HE); Manhattan
 Zattie Otellia Carp (GS); Wichita
 George Dale Carson (CE); Gerlaw, Ill.
 Frances Casto (GS); Guymon, Okla.
 Marian Chandler (HE); Wichita
 DeLoss Chapin (Ag); Manhattan
 Edna Chapin (GS); Manhattan
 Robert Leslie Chapman (EE); Paola
 Volney Allan Chase (Ar); Manhattan
 Ray Samuel Circle (Ag); Kiowa
 Leo Melvin Clark (Ar); Chapman
 Nita Rose Clark (HE); Wichita
 Roy Engle Clegg (Ag); Altoona
 Fred Cocherell (EE); Manhattan
 Embert Harvey Coles (Ag); Seneca
 Howard Loyd Comfort (Ag); Cawker City
 Harry Hubert Connell (CE); Bazine
 Velma Bertha Conner (HE); Blue Mound
 Frank Raymond Cooper (EE); Clearwater
 Helen Lucille Cooper (HE); Clearwater
 Samuel Lynn Copeland (Ag); Hutchinson
 Georgia Belle Crihfield (HE); Geneseo
 Anna Marie Crocker (IJ); Matfield Green
 Rolland Miller Crow (EE); Kansas City
 John Daniel Cunningham (GS); Manhattan
 Ruth Lois Cunningham (HE); Manhattan
 Esther Curtis (HE); Kansas City
 George Stuart Davis (CE); Clay Center
 Rowland Leeds Dennen (GS); Seneca
 Carl Emerson Depue (Ag); Parker
 Carl Curt Dethloff (Ag); Kansas City, Mo.
 Elizabeth Dickens (IJ); Manhattan
 Fred Hollister Dodge (Ag); Manhattan
 Earl Ralph Domoney (EE); Downs
 Irene Dora Drake (HE); Wichita
 Lester Henry Drayer (ME); Manhattan
 Margaret Dubbs (HE); Ransom
 Gerald Stone Durlinger (GS); Burrton
 Charles Sylvester Ebenstein (EE); Manhattan
 Harold Chester Elder (ME); Mankato
 Richmond Knostman Elliott (EE); Manhattan
 Eleanor Dryden Encell (HE); Howard
 Arnold Joseph Englund (Ag); Falun
 Victor John Englund (CE); Falun
 Elmer Rowland Enns (EE); Inman
 Clara Bernice Evans (HE); Liberal
 John Evans (Ag); Osage City
 Kenneth Clyde Farley (VM); Natchitoches, La.
 Frank Leonard Fellingham (ME); Peabody
 Carl Field (GS); McPherson
 Glenn Erving Findley (Ag); Manhattan
 Marjorie Fisher (GS); Manhattan
 Gertrude Evelyn Flowers (HE); Hastings, Neb.
 Paul Alfred Foltz (EE); Waco, Tex.
 Asa Herbert Ford (EE); Seneca
 Karl Frank (EE); Manhattan
 Ella Amy Franz (HE); Rozel
 Chester Metcalf Freeland (Ag); Logan, N. Mex.
 Ethel Mary Freeland (GS); Horton
 Elsie Fulton (HE); El Dorado
 Elton Milbert Gard (AE); Stafford
 Grace Lillian Gardner (HE); Hutchinson
 Truman Olvord Garinger (Ag); Admire
 Gerald Lynn Garlock (EE); Garden City
 Harold David Garver (Ag); Abilene
 Ruth Reynolds Garvin (HE); Lawrence
 Harold Paul Gaston (ME); Pratt
 David Martin Geeslin (EE); Arkansas City
 Glen Earnest Gates (CE); Kansas City
 Samuel James Gilbert (Ag); Arkansas City
 Robert Kenneth Girard (IJ); Windom

* Under auspices of Federal Board for Vocational Education.

SOPHOMORES—*continued.*

- George McGrew Glendening (EE); Circleville
 William Glenn, jr. (Ag); Manhattan
 Arthur Asher Graves (Ar); Manhattan
 Earl Francis Graves (Ag); Manhattan
 Hazel Louise Graves (HE); Manhattan
 Theodore Reed Griest (Ar); Topeka
 Ward Clarke Griffing (Ag); Manhattan
 Willis Goodrich Griffing (Ag); Manhattan
 Evan Lawrence Griffith (GS); Manhattan
 Lillian Velma Grubb (HE); Wetmore
 Edith Gay Grundmeier (HE); Barnard
 Clinton DeWitt Guy (Ag); Kansas City, Mo.
 Joseph Edward Haag (EE); Holton
 Frances Wilma Haegert (HE); Randall
 Belle Hagans (GS); Manhattan
 Mildred Josephine Halstead (HE); Manhattan
 Isabell Hamilton (HE); Hastings, Neb.
 Robert Leslie Hamilton (ME); Fort Worth, Tex.
 Agnes Handlin (GS); Manhattan
 Walter Roy Harder (Ag); Minneapolis
 Gilbert Virgil Harper (GS); Calista
 Jane Gladys Hartley (GS); Manhattan
 Ernest Hartman (GS); Raymond
 Clarence Raymond Hatfield (CE); Wichita
 Grace Headrick (HE); Winfield
 Herbert Benjamin Headrick (ME); Winfield
 George Granville Hedrick (Ag); Gardner
 Loren Bryce Hedging (ME); Burrton
 Norman Wolf Heim (GS); Ellinwood
 Fred John Hennes (EE); Burns
 Emra Adam Hepler (Ag); Manhattan
 Perry Joseph Hershey (EE); White Water
 Jack Hill (Ag); Leocompton
 Herman George Hockman (EE); Beattie
 Ernest Eugene Hodgson (Ag); Harveyville
 Irene Frances Hoffhines (HE); Marquette
 Emil Hokanson (OE); Marquette
 Glenn Henry Hollister (CE); Manhattan
 Cecil Canum Holmes (Ag); Wellington
 *Richard Hopper (ME); Manhattan
 Kenneth Oscar Howard (EE); Wichita
 Agnes Howard (HE); Winona
 Angie Howard (HE); Colby
 Harvey Earle Howard (Ar); Manhattan
 Mable Amanda Howard (HE); Manhattan
 Charles Harold Howe (GS); Chapman
 Charles Willard Howe (Ag); Garrison
 May Agnes Hunter (HE); Rock Creek
 Mattie Christine Jackson (HE); Kansas City
 Gard Thomas James (Ag); Lane
 Guy Herndon James (CE); El Dorado
 Ralph St. Clair Jennings (EE); Le Roy
 Florence Marguerite Johnson (GS); Manhattan
 Merrill Nelson Johnson (Ag); Phillipsburg
 Tracy Ebbert Johntz (ME); Abilene
 Jessie Agnes Jones (HE); Osawatomie
 Omer Karns (OE); Fort Scott
 Clarice Mildred Kendall (HE); Ottawa
 John Harold Kerr (Ag); Kinsley
 Kathleen Knittle (GS); Manhattan
 Carol Knotman (HE); Wamego
 William Harold Koenig (Ar); Nortonville
 Iva Mayra Kopp (HE); Hiawatha
 Paul Kovar (EE); Kansas City, Mo.
 Emmett Engle Kraybill (Ar); Abilene
 Herbert Henry Krehbiel (Ag); Moundridge
 Maurice Dee Laine (IJ); Herington
 Ralph Cole Lapsley (GS); Burlington
 Wing Kei Lau (Ag); Hongkong, China
 Lysie Douglas Leach (Ag); Winfield
 *Aubrey Mac Lee (VM); Manhattan
 Vera Louise Lee (HE); Glen Elder
 LeRoy Markel Leiter (CE); Protection
 Eva Bell Leland (HE); Wichita
 Ira William Lewis (GS); Downs
 William David Lobaugh (Ag); Greenleaf
 Madeline Maxine Locke (HE); Erie
 Glen McCreia Longley (CE); Lebanon
 Samuel Patterson Lyle (Ag); Manhattan
 Daniel Gail Lynch (ME); Manhattan
 Winfred Owen McCarty (Ag); Ames
 Henrietta Vera McClelland (HE); Manhattan
 Harold Joseph McGinley (Ag); Rogers, Ark.
 Elza Virginia McGraw (HE); Lebo
 Chester George McKee (ME); Minneapolis
 Harold Theodore McKeever (Ag); Circleville
 James Alexander McKitterick (VM); Greenwood, Mo.
 Paul Marquios McKown (EE); Manhattan
 Charles Clyde McPherson (EE); Iola
 Katherine Cardwell McQuillan (HE); Clifton
 Joseph Taylor Mackay (Ag); Kansas City, Mo.
 Ross James Maltby (Ar); Salina
 Louise Helen Mangelsdorf (HE); Atchison
 Thornton Jason Manry (EE); Lucas
 Ray Eugene Marshall (Ag); Manhattan
 Helen Martin (GS); Milan
 Paul Gordon Martin (CE); Junction City
 William Luther Martin (Ag); Winfield
 Rolland Sylvester Mather (Ag); Manhattan
 Ezra Perle Mauk (Ag); Manhattan
 Orpha Maust (GS); Garden City
 Hobart Irwin May (ME); Manhattan
 Albert Vincent Mead (IJ); Manhattan
 Earl Thomas Means (Ag); Everest
 Dorris Lu Verhe Mell (HE); Wetmore
 Grace Merillat (GS); Enterprise
 Arthur Leroy Meserve (Ag); Ellis
 Roy Lee Meyer (Ag); Anthony
 Bernice Ellen Miller (HE); Horton
 Edith Pearl Miller (HE); Council Grove
 William Cloud Mills (Ag); Lake City
 Alice Brady Mitchell (IJ); Kansas City, Mo.
 Halford Ernest Moody (Ag); Riley
 Cecil Moore (IC); Manhattan
 John Morrison Moore (Ag); Stockton
 Raymond Hubert Moran (GS); Claffin
 Charles Francis Morris (EE); Wichita
 Luella Lucille Morris (HE); Wichita
 Ross Davis Mowry (ME); Manhattan
 Jephtha Jerry Moxley (Ag); Osage City
 Edmond John Mueller (EE); Washington
 Donald Dudley Murphy (Ag); Halstead
 Guy Archibald Murray (OE); Nekoma
 Harold Smith Nay (ME); Manhattan
 Arria French Neal (HE); Clay Center
 Thomas Neely (Ag); Abilene
 Harry Emery Newton (Ag); Winfield
 Raymond Clyde Nichols (IJ); Buffalo
 Frank Edward Nordeen (EE); Dwight
 Guy Oden (ME); Sterling
 Hazel Lucille Olson (HE); Topeka
 Randolph Lindly Palmer (IJ); Jewell
 Amos Oliver Payne (ME); Manhattan
 Ruth Jane Peck (GS); Berryton
 Parks Brinkley Pedrick (Ag); New Orleans, La.
 Florence Utelle Persons (GS); Manhattan
 Gladys Irene Peterson (IJ); Hutchinson
 Paul John Phillips (EE); Paola
 Phil Delbert Piatt (Ag); Hamilton

* Under auspices of Federal Board for Vocational Education

SOPHOMORES—concluded.

- Robert Bryden Piatt (Ag); Hamilton
 William Dale Pierce (EE); Concordia
 Raymond Plyley (Ar); Scranton
 Charles Wallace Pratt (IJ); Wiggins, Mo.
 Hally Ralph Priestley (CE);
 Mutual, Okla.
 Michael Ptacek (Ag); Emporia
 Elsie Inez Puckey (HE); Clay Center
 Arthur William Quinlan (EE); Lyons
 Karl Quisenberry (Ag); Newton
 Helen Louise Rabe (HE); Axtell
 Jean Merrill Ragle (GS); Coffeyville
 Horace Malvern Randels (Ag); Anthony
 Floyd Ratts (VM); Atlanta
 George Harvey Reazin (EE); Manhattan
 Marion Capps Reed (GS); Manhattan
 Oliver Reed (Ag); Manhattan
 Hattie Elizabeth Reynolds (HE);
 Kansas City
 John Calvin Riddell (EE); Salina
 Louis Rudolph Ritter (Ag);
 Jonesboro, Ark.
 Carson Basil Roberts (Ag); Webb City, Mo.
 LeRoy Emerson Robinson (IJ); Cassoday
 William Chain Robison (Ag); Towanda
 Walter John Rogers (FME); Salina
 Walter Thomas Rolfe (Ar); Wetmore
 Martrie Elizabeth Rone (HE);
 Elk City, Okla.
 Paul McKinley Roote (GS); Eskridge
 Pearl Rorabaugh (GS); Lebanon
 Lee Rossell (EE); Meade
 Irvin Thomas Rothrock (GS);
 Johnson, Ark.
 Fred Forsythe Russell (Ag); Paola
 Mildred Minnie Rust (HE); Washington
 Morse Henderson Salisbury (IJ);
 El Dorado
 William Sartorius (ME); Garden City
 George Russell Schroll (Ag); Syracuse
 Dale Schwartz (Ag); Winkler
 Gladys Annette Scott (HE); Topeka
 Madge Marian Scott (HE); Kansas City
 Lester Ralph Sellers (ME); Great Bend
 James Jacob Seright (EE); Lucas
 Dorothy David Settle (HE); Rosedale
 Paul Morse Shaler (AE); Topeka
 Clare Liggett Shellenberger (Ag);
 Manhattan
 Luella Pearl Sherman (HE); Grinnell
 Mac Short (ME); Salina
 Ross Jacob Silkett (Ag); Downs
 Verne Franklin Simons (IC); Howard
 Ralph Edgar Simonson (VM);
 Danbury, Neb.
 Samuel Arnold Simpson (GS); Salina
 Harry Edwin Skoog (Ag); Corbin
 George Sherman Smith (ME);
 Independence
 Linas Burr Smith (Ar); Hutchinson
 Marion Ashton Smith (Ag); Topeka
 Rollin James Smith (ME); Topeka
 Fletcher Speck (Ag); Kansas City
 Harold Crane Spencer (IJ); La Harpe
 Jay Ralph Starkey (VM); Manhattan
 Florence Stauffer (HE); Manhattan
 James Scott Stewart (Ag); Coldwater
 Warren Roy Stewart (Ag); Manhattan
 Ross William Stice (Ag); Alta Vista
 Marguerite Marie Stotts (HE);
 Diller, Neb.
 Henry Clinton Sturgeon (Ag); Lane
 Abbie Swafford (HE); Manhattan
 Frank Arvid Swanson (Ag); Manhattan
 Eugene Rupert Sweet (Ag); Manhattan
 Harold Irwin Tarpley (EE); Kansas City
 George Emery Taylor (Ag); Manhattan
 Burdette Tegmeier (GS); Manhattan
 Helen Thayer (GS); Manhattan
 Adolphus Johnson Thomas (GS);
 Silver Lake
 Earl Emery Thomas (CE); Argonia
 Rowena Malinda Thornburg (GS);
 Formoso
 Hall Henderson Thornburgh (Ag);
 Nortonville
 Eva Lucile Travis (HE); Manhattan
 William Wesley Trego (ME); Sedgwick
 Rowena Turner (HE); Chanute
 Ruth Achsah Turner (GS);
 Fairbury, Neb.
 Carl Francis Uhrich (Ag); Wamego
 Susie Unruh (GS); Pawnee Rock
 Eva Grace Van Sook (HE); Aulne
 Mabel Van Tries (HE); Wellsville
 John Waldo Van Vliet (VM); Manhattan
 Ira Nelson Vowel (Ag); Norwich
 Earl Frederick Wakefield (CE); Leon
 Eugene Haley Walker (Ag); Manhattan
 Mabel Esther Wallace (HE); Stockton
 Sydney Edward Walton (Ag); Sterling
 Wirt Dudley Walton (Ag); Leavenworth
 Logan Byron Warlick (GS); Manhattan
 Rees Conway Warren (ME); Manhattan
 Eugene Albertice Waters (CE); Wellsville
 Millard Cummings Watkins (EE);
 Clay Center
 Florence Potter Watson (HE); Manhattan
 Esther Waugh (HE); Amherst, Mass.
 William Wallace Weaver (GS);
 Gravette, Ark.
 Ella Henrietta Webb (HE); Tonganoxie
 Vorin Edwin Whan (GS); Manhattan
 Lawrence Francis Whearty (CE);
 Westmoreland
 Elsie Mae Whitacre (HE); Winfield
 Anna Mable White (HE); Carbondale
 Claude Allen White (Ag); Lockney, Tex.
 Juanita Mae Wiest (HE); Hutchinson
 Herbert Lawrence Wilkins (GS);
 Los Angeles, Cal.
 Claude Merlin Willhoite (Ag); Manhattan
 Fred Woods Williams (VM); Sylvan Grove
 Everett Hoover Willis (Ag); Manhattan
 Albert Edgar Wilson (GS); Kinsley
 Charley Trago Wilson (Ar); Little River
 Hazel May Wilson (HE); Luray
 William Clyde Wilson (Ag); Kansas City
 Edwin Wilhelm Winkler (Ag); Rozel
 Milton Shipman Winter (Ag); Leocompton
 Earl Eugene Wintermute (Ag); Sedan
 Edwin Leonard Wolgast (EE); Alta Vista
 Robert Wolnick (ME); Blair
 Earl Bowen Wood (ME); Topeka
 Hubert Earl Woodring (EE);
 Stockville, Neb.
 Clarence Harold Worster (EE); Manhattan
 Mabel Lucile Worster (HE); Manhattan
 Chester Ewart Yenawine (EE); Manhattan
 Pauline Ross Young (HE); Manhattan
 Lulu May Zeller (IJ); Manhattan
 John Williamson Ziegler, jr. (Ag);
 Lansdowne, Pa.
 Charles Zimmerman (ME); Manhattan

FRESHMEN

- Roger Leon Abbott (CE); Garden City
 Ramona Abrams (IJ); Arkansas City
 Helen Lucile Adams (HE); Everest
 Warner Adams (Ag); Maple Hill
 Neal Dow Alleman (ME); Kansas City
 Gladys Eliza Allen (HE); Burlington
 Thomas Henry Allen (EE); Colwich
 Leonard Rhys Allott (Ag); Pueblo, Colo.
 Howard Albert Ames (Ag); Downs
 Maurine Esther Ames (HE); Moline
 Anne Susie Amstutz (HE); Halstead
 Arthur Alfred Anderson (EE); Meriden
 Benjamin William Anderson (CE);
 Agenda
 Delmar Collins Anderson (GS);
 Phillipsburg
 Eunice Miriam Anderson (GS);
 Phillipsburg
 Leslie Dewey Anderson (EE); Randolph
 Orville Clarence Anderson (CE); Maize
 Violet Anna Andre (HE); Horton
 Frank Minton Angus (ME); Sterling
 Margaret Pearl Ansdell (HE); Jamestown
 Clifford Leland Antle (EE); Emporia
 Alfred Lewis Arnold (Ag); Manhattan
 Emmons Leslie Arnold (CE); Marysville
 Wilma Frances Ashby (HE); Girard
 Hildred Aspegren (HE); Republic
 Maurine Ethel Aspey (HE); Hutchinson
 George Smith Atwood (ME); La Cygne
 Marjorie Ault (HE); Naponee, Neb.
 Hazel Josephine Avery (HE); Concordia
 Alfred Leroy Aydelotte (GS); Manhattan
 Agnes Mary Ayers (GS); La Harpe
 Marjorie Manetta Babb (IJ); Douglass
 Doris Bachelor (HE); Belleville
 Alma Margaret Baer (HE);
 Steamboat Springs, Colo.
 Marvin Bahl (Ag); Pleasanton
 Kenneth Albert Baird (Ag); Formoso
 Ralph Waldo Baird (AE); Topeka
 Meta Jennette Baker (HE); Rogers, Ark.
 Lillian Weeks Baldwin (HE);
 Cartersville, Mo.
 Eleanor Frances Ball (HE); Gallatin, Mo.
 Kenneth Ballou (Ag); Delphos
 Margaret Roberta Bane (HE); Liberal
 Edna Florence Bangs (GS); Madison
 Fred Bangs (Ag); Madison
 Galen Andrew Barber (EE); Bluff City
 Nellie Mable Bare (HE); Protection
 Nora Elizabeth Bare (HE); Protection
 Atwell Stewart Barkley (Ag);
 St. Joseph, Mo.
 William Paul Barr (IJ); Manhattan
 James Harley Barry (ME); Manhattan
 Lawrence Floyd Barth (Ag); Manhattan
 Nelson Suplee Barth (IJ); Manhattan
 Clyde Marion Baughman (Ag); Mulvane
 Carl Baumgartner (EE); Preston
 Clarence Oliver Bayer (Ag); Quincy
 Edward Rudolph Bayer (Ag); Quincy
 Frederick Harold Bayer (IJ); Yates Center
 Theodore Lawrence Bayer (IJ);
 Yates Center
 William John Bays (GS); Wichita
 Claude Philip Beach (ME); Minneapolis
 Lloyd James Beardsley (Ag); Russell
 Claude Oran Beckett (ME); El Dorado
 Douglas Clifford Beeler (Ag); Manhattan
 Ralph William Bell (EE); Kinsley
 Edith Elenora Bengston (HE); Salina
 Dudley Francis Bentley (Ag); Sterling
 Helene Elizabeth Bentley (HE); Sterling
 Sarah Edith Benton (HE); Attica
 William Glen Berry (EE); Toronto
 Anna Lillian Best (HE); Clyde
 Hattie Betz (GS); Asherville
 Mary Betz (HE); Asherville
 Perry Betz (IJ); Asherville
 Hazel Marie Billings (HE); Maple Hill
 Victor Raymond Blackledge (IJ); Onaga
 Ira Earl Blackney (GS); Home
 Helen Ann Blair (HE); Mulvane
 Werner Jesse Blanchard (ME); Manhattan
 Robert Blanks (CE); Manhattan
 Guy Martin Bonesteel (EE); Haddam
 Harvey Booth (CE); Fairview
 Mary Orebaugh Booth (HE); Fairview
 Roy Eugene Boroff (EE); Manhattan
 Carl William Bower (Ag); Manhattan
 Leone Cheever Bower (HE); Manhattan
 John Braden (Ag); Eureka
 Earl Huff Bradley (CE); Winfield
 Maurice Bradley (CE); Winfield
 Chester Leon Bradshaw (EE); Altoona
 Velma Fairy Bradshaw (HE); Sedgwick
 Eva Beth Brady (HE); Manhattan
 Sadie Brainerd (HE); White Water
 Carl Alfred Brandly (VM); Burlington
 Lola Barbara Brandt (HE); Severy
 *Albert Lorraine Bridenstine (Ag);
 Marienthal
 Ralph Eugene Bridges (CE); Arkansas City
 Nell Ruth Briggs (HE); Hope, Ark.
 Ernest Albert Briscoe (Ag); Latham
 George Thomas Bronson (VM); Waldo
 Francis Neil Brooks (CE); Peru
 Llewellyn Herbert Brooks (GS); Burden
 William Roy Brooks (ME); Fall River
 Helen Anna Brotherson (HE);
 Kansas City
 Glee Mormaduke Brott (CE);
 Junction City
 Clarence Eugene Brown (ME);
 Kansas City, Mo.
 Mary Eleanor Brown (HE); Holton
 Elizabeth Anne Browne (HE); Burdett
 Dollie Edythe Browning (GS); Manhattan
 Nina Myrtle Browning (HE); Manhattan
 Michael Joseph Brull (CE); Everest
 Lewis Jay Bryan (EE); Golden, Colo.
 Glynn Aubrey Buchanan (GS); Downs
 Charles Everett Buford (VM);
 Kansas City
 Carey Allan Bunker (EE); Oregon, Mo.
 Hazel Effie Burdette (HE); Severy
 Emily Burger (HE); Seneca
 Carl Eldin Burke (GS); Solomon
 Harris Loree Burnett (IC); Dodge City
 Harley Kercher Burns (ME); Liberal
 Oseola Hall Burr (GS); Manhattan
 George Harold Burroughs (ME);
 Binghamton, N. Y.
 *Hiram Gilbert Burt (Ag); Garden City
 Mabel Foster Burt (HE); Garden City
 Howard Ernest Burton (Ag);
 Council Grove
 Dwight Calvin Bushey (EE); Muscotah
 Archie William Butcher (IC); Solomon
 Claude Raymond Butcher (Ar); Solomon
 Bertha Viola Butler (HE); Arkansas City
 Carroll Button (Ag); Elmont
 Esteban Aquilar Cabacungan (EE);
 Reina, Isabela, P. I.
 Barbara Alice Campbell (Ar); Mulvane
 Jessie Campbell (HE); Attica
 Dale Harry Carmean (Ag); Valley Falls
 Harold Kenneth Carson (AE); Hamilton
 Paul Bryan Carson (VM); Liberal
 Audrey Byron Carter (GS); Eskridge
 *Sylvester Ulric Case (Ag); Lyons
 Marian Elsie Chaffee (HE); Lasita
 Chester Benjamin Chambers (GS);
 Pomona
 Penn Samuel Chambers (GS); Pomona

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—*continued.*

- Vera Valentine Chambers (HE); Pomona
 Roy Hubert Chandler (Ag); Englewood
 Edward Jost Chapman (CE); Leavenworth
 Earl Ambrose Chappell (GS); Norton
 Otis Bryan Chappell (EE); Haddam
 Ethel Charles (HE); Republic
 Francis Eugene Charles (Ag); Republic
 Henry Cameron Charless (AE);
 Amarillo, Tex.
 James Tsumu Cheng (GS);
 Foochow, China
 Everett Mize Chesney (Ag); Natoma
 James Childers (Ag); Wamego
 Louis Edward Childers (IJ); Wamego
 Kay Iverson Church (EE); Haddam
 Faye Nettie Churchill (HE); Lebanon
 Wallace Jerome Clapp (GS); Logan
 Kenneth Franklin Clark (Ag); Lascas, Colo.
 Malcolm Jerome Clark (Ag); Lascas, Colo.
 Otto Richard Coburn (CE); Preston
 James Calvin Coffman (Ag); Overbrook
 Theodore Dennis Cole (Ag); Arlington
 Wilbur Dean Cole (CE); Topeka
 Inez Alice Coleman (HE); Sylvia
 Nellie Jane Coleman (HE); Sylvia
 Hubert Lee Collins (Ag); Wellsville
 Gladys Florence Colton (HE); Dover, Okla.
 Evelyn Marilda Colwell (HE); Onaga
 Louis James Combs (GS); Burden
 Halbert Mark Conger (AE); Natoma
 Irene Margaret Conroy (HE); Manhattan
 Thomas Alfred Constable (ME);
 Minneapolis
 Merl Stanley Cook (CE); Dillon
 Merriam Elmer Cook (EE); Bucklin
 Charles James Coon (Ag); Manhattan
 *Edward Harry Cooper (EE); Fort Scott
 David Kennilworth Copeland (Ag);
 Beatrice, Neb.
 Merlin Dale Corbin (ME); Council Grove
 Donald Corby (EE); Arcadia
 Charles Edward Cordts (GS); Overbrook
 Catherine Elizabeth Corey (GS);
 Blue Mound
 Lewis Charles Corey (Ag); Blue Mound
 Warren Cowell (Ag); Clay Center
 Otis DeWyte Cox (Ag); Sedgwick
 Orville Robinson Cragan (GS); Kingman
 Earle Henry Crall (EE); Parsons
 Frank Wright Crawford (VM);
 Gravette, Ark.
 Harold Lee Crawford (Ag); Paola
 Scott Dougherty Criswell (Ag); Manhattan
 John Vincent Croker (EE); Clay Center
 Darcy Elmo Crooke (GS); Phillipsburg
 Erma Julia Cropper (HE); Willcox, Ariz.
 Clarence Paul Cross (EE); Wichita
 Sidney Cross (GS); Climax
 Thomas Cross (Ag); Belle Plaine
 Marietta Crowley (HE); El Dorado
 Frances Walters Croyle (HE); Manhattan
 Russell Cummings (GS); Riverside, Iowa
 Furl Hughie Cunningham (EE); Girard
 Ralph Guthrie Cunningham (GS); Formoso
 Harold Kerr Curry (AE); Dunavant
 Leslie Clifford Curtis (CE); Englewood
 *Charles Otto Dailey (ME); Eminence
 Dora Dean Dakin (GS); Ashland
 Paul Dakin (EE); Ashland
 Luna Daniels (HE); Wichita
 Earl Gilbert Darby (ME); Manhattan
 Calvin Cyrus Davidson (EE); Yates Center
 Cecile Irene Davidson (HE); Yates Center
 David Everett Davis (VM); Manhattan
 Ivan Day (AE); Cleveland
 Karl Samuel Day (EE); Dwight
 Roger Owen Day (CE); Glasco
 John Alfred Deardorff (Ag); Lyndon
 Floyd Archie Decker (EE); Troy
 Ray Lemuel Decker (EE); Troy
 Orville Marshall Deibler (EE); Manhattan
 Elsie Maybelle Deniston (IJ); Manhattan
 Helen Emily Derrick (HE);
 Kansas City, Mo.
 Elmer Frank Deshazer (CE); Merriam
 Alice Louise DeWitt (GS); Medicine Lodge
 Nell Dickman (IJ); Fostoria
 Lawrence Clyde Dillon (GS); Downs
 Eva Christine Dittmar (HE); Manhattan
 Nathan Esdridge Divelbiss (Ag); Olathe
 Helen Kinney Dix (HE); Newton
 Charles Thomas Dixon (Ag); Leon
 Arthur Wayland Donaldson (EE);
 Lost Springs
 Margaret Elanore Dowell (HE); Hamlin
 Lloyd Harold Downing (EE); Colwich
 Myrtle Sadie Dubbs (HE); Ransom
 Kent Ruggles Dudley (VM); Carlyle
 Clair Eber Dunbar (Ag); Columbus
 *Noel Nardin Dunbar (Ag); Columbus
 Wayne Elbert Dunham (ME); Little River
 Harold Dewey Dunkleberg (ME);
 Osborne
 Jack Wilbur Dunlap (Ag); Scott City
 Frank Leslie Dyer (GS); Culver
 Laura Eagleston (HE); Wichita
 Ellen Louise Easley (HE); Kansas City
 Harold Evert Eaton (GS); Osborne
 Wilma Finley Eaton (GS); Highland
 *Sidney Peter Eberhart (CE); Topeka
 James William Eby (CE); Medicine Lodge
 Marguerite Edelblute (IJ); Manhattan
 Charles Milo Edgerton (IJ); Randolph
 George Graham Edgerton (EE); Canton
 Lois Minerva Edmundson (HE);
 Kansas City
 John William Egger (Ag); Ellis
 Winifred Elder (HE); Waldo
 Leonard Paul Elliott (EE); Holton
 Dorothy Jane Ellis (HE); Pratt
 Raymond John Ellis (GS); Kansas City
 Vernon Ellsworth (ME); Formoso
 Frederick Earl Emery (VM); Baldwin
 Foster Noel Emmons (Ag); Manhattan
 John Hubert English (Ar); Sterling
 Arthur Hunter Epard (Ag); Colby
 Dale Raymond Ernst (EE); Americus
 Lester Edgar Erwin (Ag); Willis
 Herman Chester Esch (EE); Cherryvale
 *Paul Evans (Ag); Williamstown
 Charles William Ewing (Ag); Olathe
 Junius Warren Farmer (Ag);
 St. Joseph, Mo.
 Willis Lee Farmer (CE); Kingfisher, Okla.
 James Lyster Farrand (Ag); Hunter
 David Morgan Feese (CE); Manhattan
 Floyd Lee Firebaugh (Ag); St. John
 Fred Fisher (GS); Overbrook
 Edward Francis Fitzgerald (GS); Colby
 Mary Elizabeth Fitzgerald (HE);
 Waterville
 Frederick Dewey Fix (ME); Minneapolis
 Francis Preston Flack (GS); Eskridge
 Roy Lewis Fleming (Ag); Paola
 Lloyd Fletcher (Ar); Ellis
 Daniel Bishop Fogle (GS); Williamsburg
 Carl Edgar Fogleman (ME); Parsons
 *Timothy Joseph Foley (VM); Chapman
 Ester Cieta Folsom (HE); Manhattan
 *Frank Carl Foreman (E); Coldwater
 Favel Loranzo Foval (GS); Winfield
 Dan Elias Fox (Ag); Larned
 Sallie Mae Fox (HE); Ashland
 Lee William Frager (EE); Washington
 Rae Frank (IJ); Manhattan

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- John Edward Franz (VM); Rozel
 Neosho Louise Fredenburg (GS);
 Council Grove
 Joseph Wallace Freed (GS); Scott City
 Minnie Lee Freeman (HE); Anthony
 Herbert Sawyer French (ME);
 Corpus Christi, Tex.
 Minnie Grace Frey (HE); Manhattan
 Ben Wade Friedel (CE); Fort Scott
 Otis Frederic Fullhage (EE); Yates Center
 Robert Russell Fuller (Ar); Protection
 Ada Elizabeth Fullinwider (HE);
 El Dorado
 Virgil George Fulmer (EE); Emporia
 Willard Clarence Fulton (Ag); Harper
 Arthur Ray Gadbury (EE); Emporia
 Frederick Augustus Gardner (ME);
 Louisburg
 Eugene Lewis Geiger (Ag); Ottawa
 Clarence Raymond George (Ag);
 Manhattan
 Floyd Omar Gerken (VM); Ellis
 Millard Reuben Getty (Ag); Waco, Neb.
 Glen Erwin Ghormley (CE); Manhattan
 Mabel Josephine Gill (HE); Attica
 Margaret Gillett (HE); Junction City
 Gordon Webb Gilman (EE); Council Grove
 Glover Irwin Godwin (VM); Council Grove
 Albert Arthur Goering (EE); Moundridge
 Dewey Aaron Goerke (Ag); Sterling
 Merle Elmer Goff (Ag); Manhattan
 Arthur Ernest Goodwin (GS); Concordia
 Claude Franklin Goodwin (Ag); Scandia
 Daniel Gordon (GS); Manhattan
 Harold Mock Gott (Ag); Arlington
 William Gragg (ME); Severy
 Lucille Alma Gramse (HE); Perry
 Floyd George Grandfield (VM); Maize
 William John Greve (Ag); Freeport
 Carl David Gross (AE); Russell
 La Motte Grover (CE); Salina
 Augustus Wilkes Gudge (ME); Wichita
 Lola Leontine Gudge (GS); Wichita
 Florence Antoinette Haack (HE); Florence
 Paul Larkin Hadley (VM); Glen Elder
 Ray Dryer Hahn (Ag); Clay Center
 Edith Margaret Haines (IJ); Manhattan
 Ednae Lavina Hall (HE); Hoisington
 Lawrence Hall (Ag); Manhattan
 *Claude Carlyle Hampshire (AE); Garnett
 Thomas Dawson Hampson, jr. (GS);
 Fredonia
 Walter Lee Hampson (CE); Fredonia
 *William Edward Haney (EE); Lawrence
 Bess Hansen (IJ); Manhattan
 Gaylord Warren Hargadine (EE); Kinsley
 Miriam Ellen Harling (Ar); Manhattan
 John Elbridge Harner (EE); Keats
 Queenie Esther Hart (GS); Minneapolis
 Hugh Enos Hartman (EE); Manhattan
 Alma Leona Hartzog (HE); Humboldt
 Irwin Lloyd Hathaway (Ag); Newton
 Edith Laura Haupt (HE); Peabody
 Mary Susan Haupt (HE); Peabody
 Oscar Hawkins (CE); Wichita
 Margaret Mary Hawkinson (HE); Clyde
 Vera Doolittle Hedges (GS); Blue Mound
 Terrence Otis Hedrick (CE); Kansas City
 Elfrieda Hemker (GS); Great Bend
 Herbert Fred Hemker (AE); Great Bend
 Josephine Frances Hemphill (IJ);
 Clay Center
 Joseph Hendrix (CE); Lane
 Florence Anna Henney (HE); Horton
 Harold William Henney (ME); Horton
 Merle Revere Henre (EE); Kansas City
 Roy Carlyle Henre (EE); Kansas City
 William Ebenezer Henry (EE); Kiowa
 Susan Grace Herr (HE); Medicine Lodge
 Alfred Heusner (GS); Salina
 Omer Ezell Highfill (CE); Claremore, Okla.
 Ross Wayne Hill (Ag); Manhattan
 Forest Reed Hines (EE); Burns
 Howard McMice Hobb (CE); Lebanon
 Foree Hobbie (VM); Dodge City
 Earl Ayers Hockersmith (GS); Manhattan
 Howard Alfred Hodgson (EE); Eureka
 Harold William Hoffines (EE);
 Manhattan
 Paul Frederick Hoffman (IC); Manhattan
 John Henry Hofmann (CE); Oskaloosa
 Bernice Avis Hoke (HE); Manhattan
 Martha Margaret Holl (HE); Topeka
 Ola May Holland (GS); Geuda Springs
 Dorothy May Hollinger (GS); Chapman
 George Arthur Holloway (IJ); Hutchinson
 James Wing Honeywell (Ag); Leoti
 *Earl Freamount Hoover (VM); Kansas City
 Frank Hoover (CE); Downs
 Hollis Raymond Hope (IJ); Garden City
 Elmer Hopp (FME); Manhattan
 Katherine Margaret Horner (HE); Longton
 George Horney (ME); Medicine Lodge
 Francis Houlton (Ag); Florence
 Frank Whitson Houston (Ag);
 Twin Falls, Idaho
 George Henry Hudson (EE); Wilson
 Harry Newman Hudson (Ag); Topeka
 Eugene Huff (Ag); Chapman
 Claude Irvil Huffman (Ag); Nickerson
 Lee Ellsworth Huffman (GS); Nickerson
 Faith Eleanor Hull (HE); Manhattan
 Ray Clement Hume (EE); Humboldt
 Loyall Virgil Hunt (Ag); Wilmore
 Herman Tompson Hunter (Ar); Eureka
 Pahy William Hurst (ME); Medford, Okla.
 Archibald Hurtgen (ME); Manhattan
 George Dewey Huston (VM); Manhattan
 Susie Katharon Huston (HE); Manhattan
 Bion Shepard Hutchins, jr. (ME);
 Mont Ida
 Sarah Belle Hyde (HE); Altoona
 John Browning Hylton (Ag); Manhattan
 Donald Bryan Ibach (Ag); Arkansas City
 Everett Harold Ingersoll (GS); Overbrook
 Charles Frank Irwin (CE); Le Roy
 Hal Francis Irwin (Ag); Manhattan
 Chester Lowell Ives (EE); Independence
 Earl Harmon Jackson (Ag); Manhattan
 James Felix Jackson (ME); Kansas City
 Frederick Charles Janzen (EE); Hillsboro
 Paul Ronald Jenkins (GS); Salina
 Alice Marie Jennings (HE); Manhattan
 George Arthur Jennings (EE); Girard
 Lester Eugene Jennings (EE); Zeandale
 Charles Louis Jobe (EE); Sedan
 Anna May Johnson (HE); Manhattan
 Arthur Johnson (ME); Viets
 Ethel Augusta Johnson (HE); Marquette
 Irl Johnson (Ag); Winfield
 James Frank Johnson (Ar); La Crosse
 Jeannette Josephine Johnson (GS);
 Manhattan
 Julia Jeanette Johnson (HE); Herington
 Louis George Johnson (ME); Manhattan
 Mamie Bertina Johnson (HE); Manhattan
 Paul Eugene Johnson (IJ); Wamego
 Frances Allegra Johnston (IJ); Manhattan
 Harold William Johnston (ME); Kipp
 Clifford Charles Jolley (EE);
 Sharon Springs
 Erma Cynthia Jones (HE); Munden
 Margaret Ann Jones (HE); Hutchinson
 William Harold Jones (CE); Burden
 Hazel Azalia Jordan (HE);
 Grand Junction, Colo.

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Marian Jordan (HE); Manhattan
 Nellie Rose Jorns (HE); Preston
 George Harold Joy (ME); Salina
 Anette Helen Kanzer (HE); Hutchinson
 Harlan Kapka (Ag); Kansas City
 Henry Daniel Karns (Ag); Ada
 Mabel Rozella Karr (HE); McLouth
 Bert Emerson Keirns (GS); Downs
 Cordell Cline Keller (Ag); Carthage, Mo.
 Karl Ernest Keller (EE); Kinsley
 Eugene Edward Kelly (FME); Wichita
 Mary Frances Kelly (HE); Bucyrus
 Edwin Charles Kempthorne (IC); Downs
 Charles Harris Kenison (EE); Niles
 Marie Coleman Kent (HE); Franklin, Neb.
 Frank Willard Kerns (Ag); Baldwin City
 William Crawford Kerr (Ar); Manhattan
 Sara Blanche Kershaw (HE); Garrison
 Homer Herbert Kessinger (Ag); Grenola
 Leland Alfred Kettenring (EE); Salina
 Kenneth Key (CE); Wichita
 Ray Stanley Kibler (EE); Sedan
 John Marcus Kindernecht (Ag); Hays
 Jordan Carroll King (GS); Manhattan
 Frank Charles Kingsley (AE); Formoso
 Oscar Edward Kinkead (Ag); Troy
 Dorcas Wines Kirkpatrick (HE); Paradise
 Marion Gibbonney Kirkpatrick (HE);
 Belleville
 Glenn Benson Kirkwood (VM); Marysville
 Irvin Bernell Kirkwood (CE); Marysville
 Arthur Merlin Kistler (ME); Manhattan
 Ila Thelma Knight (HE); Jamestown
 Louis Myers Knight (Ag); Medicine Lodge
 William Francis Knight (Ar);
 Medicine Lodge
 Theodore Knox (Ag); Frankfort
 Alfred Brunner Koch (Ag); Burlington
 Snoda Grace Krider (HE); Cassoday
 Charles Glenn Kuykendall (AE);
 Twin Falls, Idaho
 Susie Margaret Kyle (HE); Abilene
 Jayne Pickford Lamb (IJ); Manhattan
 Helen Pauline Larson (GS); Manhattan
 Opal Juanita La Shelle (GS); Manhattan
 Ernest Arthur Laude (Ag); Humboldt
 Lulu May Leach (HE); Carbondale
 Elden Emanuel Leasure (VM); Solomon
 Herman Lee (IJ); Anthony
 Roscoe Charles Leeper (Ag); Harper
 William Werner Leeper (ME); Goff
 Joseph Bernard Lefert (EE); Burns
 Amy Louise Lemert (GS); Cedar Vale
 Louie Smith Lemert (ME); Liberal
 Paul Amherst Lerew (EE); Portis
 Willis Lloyd Lesher (CE); Dodge City
 Dale Baker Levi (CE); Olathe
 Roger Lilley (EE); Burns
 Charles Otto Lind (FME); Yates Center
 Reuben Carl Lind (Ag); Zeandale
 Frank Bertrand Linn (Ag); Manhattan
 Ching Sheng Lo (VM); Canton, China
 Charles Dewey Logan (EE); Onaga
 Florence Maria Logan (HE); Eskridge
 La Belle Marie Lomax (HE);
 Arkansas City
 Floyd Leroy Longwell (CE); Liberal
 Laura Marie Loomis (HE); Manhattan
 Robert Siegrist Love (CE); Kenneth
 Raymond Russel Luce (IJ); Anthony
 Kai Lum Lung (Ag); Canton, China
 Forrest Nathan Luthy (CE); Carbondale
 Paul Cronin Lyons (Ag); Lawrence
 Grace Lucile McAlister (HE); Topeka
 Max McCandless (GS); St. John
 Percy Howard McCandless (Ag); Natron
 Ruth Eleanor McCandless (HE); St. John
 Eva McCandles (HE); Lawrence
 Dollie McCartney (HE); Amarillo, Tex.
 James Paul McConnell (GS); Manhattan
 Eugene Emerson McCracken (CE);
 Hiawatha
 Gleason Conn McDonald (EE);
 Pawhuska, Okla.
 Lawrence Dewey McDonald (ME);
 Parsons
 Clyde McDougal (ME); Lane
 Frederick McCloy McIlhinney (EE);
 Manhattan
 Wade Melvin McFarland (Ag); Chase
 Warren Curtis McFarland (Ag); Chase
 George Raymond McGinn (EE); Winfield
 Joseph Slater McGuire (Ag);
 Pawhuska, Okla.
 Andrew James McKee (VM); Manhattan
 Joseph Warren McKinley (Ag); Admire
 Iona Grace McKinney (HE); Englewood
 William Lyle McLean (Ar); Fairbury, Neb.
 William Harry McMahan (ME); Newton
 John McMoran (ME); Coldwater
 Helen Esther McStay (GS); Downs
 Reuben Cleo Maddy (EE); Utica
 *Wilbur Samuel Magill (ME); Topeka
 George Mahaffy (GS); Ottawa
 Duella May Mall (HE); Manhattan
 Bess Mae Markley (HE); Bennington
 Gerald Clay Marrs (ME); Bradford
 Glen Efer Marsh (Ag); Hiattville
 James Fletcher Marshall (CE); Grenola
 Elmer August Martin (Ar); Stockton
 Faith Susan Martin (GS); Winfield
 Sarah Margaret Mason (HE); Belle Plaine
 Lewis Everett Masten (EE); Coldwater
 William Joseph Matthias (Ag); Perry
 Anabel Irene Maughlin (HE); Sylvia
 John Chester Maurer (Ag); Cambridge
 Ralph Merle Mead (CE); Dexter
 Clyde Westel Means (AE); Derby
 Lester Hounell Means (EE); Everest
 Lloyd Earl Means (EE); Kansas City
 Dorothy Minnie Mebus (HE); Kansas City
 Carlos Dewey Medlin (EE); Manhattan
 Raymond Lewis Medlin (EE); Manhattan
 Louise Rebecca Meecke (HE); Wichita
 Lelia Mabel Meeker (HE); Waldo
 Henry John Melcher (EE); Concordia
 Glen Clifford Melvin (EE); Wilsey
 Simplicio Sanchez Mendoza (GS);
 San Fernanos, P. I.
 Ernest Ellis Mercer (EE); Sedan
 Charles Chester Merrifield (GS); Peck
 Donald Malcolm Merritt (IJ); Manhattan
 Virginia Malinda Messenger (HE); Basil
 George Albert Meyer (EE); La Crosse
 Jacob Emery Middlekauff (Ag); Vesper
 Franklin Henry Miller (Ag); Hutchinson
 Fred Miller (Ag); Wamego
 Nancy Esther Miller (HE); Beverly
 Orion Newell Miller (CE); Arkansas City
 Walter Miller (EE); Portis
 Edgar Louis Misegades (EE); Peru
 Helen Margaret Mitchell (HE); Topeka
 Byron Christian Mohrbacher (EE);
 Manhattan
 Esther Ann Moore (HE); Protection
 Garland Lamar Moore (VM);
 Grand Junction, Colo.
 George Lewis Moore (Ag); Lebanon
 Nellie Dale Moore (HE); Protection
 James Richard Moreland (Ag); Formoso
 Cora Bessie Morford (HE); Augusta
 Edna Elizabeth Morgan (HE);
 Undercliff, Colo.
 George DeVore Morris (ME); Manhattan
 Merle Dallas Morris (VM); Paxico
 Johannes Frederick Theobald Mostert (Ag);
 Balfour, S. Africa
 Louise Saloma Moyer (HE); Hiawatha

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Alice Martha Mueldener (IJ); Lyons
 John Norton Mullender (EE); Waldo
 Margaret Valentine Murphy (Ar);
 Atchison
 *Harry Albert Myers (Ag); Americus
 Vincent Werner Nass (EE); Atchison
 George Pinckney Neal (Ag); Topeka
 Jesse Harold Neal (AE); Williamsburg
 Chandler Hamlin Nelson (Ag);
 Muskogee, Okla.
 Clifford Carlisle Nelson (GS); Ellis
 Eugene Frank Nelson (CE); Junction City
 Harry Nelson (CE); Bennington
 Nancy Nelson (HE); Paola
 Margaret Nettleton (HE); Lenora
 Jessie Adelaide Newcomb (HE); Garnett
 Lestle Wilber Newcomer (CE); Alexander
 Lella Belle Newkirk (HE); Geneseo
 Geraldine La Von Noffsinger (HE);
 Fall River
 Mahlon John Noll (GS); Florence
 Ruby May Northup (GS); Cuba
 Lillian Belle O'Brien (IJ); Manhattan
 Alpha Irene O'Neil (HE); Prescott
 Maurice Allen O'Neil (CE); Wellsville
 William Frank Orr (Ag); Manhattan
 Harvey Cyrus Osborne (IJ); Ashland
 Alfred Robb Padens (Ag);
 Independence, Iowa
 Merle Lee Padgett (Ar); Manhattan
 Mae Louise Pagels (HE); Beatrice, Neb.
 Cecile Beatrice Paine (HE); Admire
 Evan Herbert Palmer (EE); Palmer
 Lillian Grace Parker (GS); Marion
 Charles Burette Parsons (EE);
 Clearwater
 Loyal Francis Patten (ME); Liberal
 Joseph Patterson (EE); Dillon, Mont.
 Alice Leota Paynter (HE); Alton
 Mildred Lorene Pence (GS); Dunavant
 Loyd McFeaters Perkins (EE); Olathe
 Ralph Henry Peters (EE); Manhattan
 Ralph Kendrick Pfremer (EE);
 Baxter Springs
 Walter Edgar Pfundstein (EE); Chanute
 Earl Eugene Phares (CE); Burlington
 Don Homer Pickrell (ME); Leon
 Norman Vincent Platner (ME); Ellis
 Eva Mildred Platt (HE); Manhattan
 Raymond Edward Porter (EE); Glen Elder
 John Sherman Posten (ME); Caldwell
 Jay Pounds (EE); Coldwater
 Florence Mildred Powers (HE); Marion
 Earl Lewis Preston (EE); Gorham
 Lawrence John Price (Ag); Quenemo
 Madge Augusta Price (GS); Fredonia
 Helen Jeanette Priestley (HE);
 Kansas City
 Ruby Elizabeth Pruitt (HE); Goddard
 Harry Donald Pugh (Ag); Topeka
 Newton Quan (Ag); Canton, China
 Herbert Dewey Quick (Ag); Redfield
 John Monroe Raish (EE); Iola
 George Joseph Raleigh (Ag); Clyde
 Walter Patrick Raleigh (Ag); Clyde
 Marion Ellsworth Ramsey (GS);
 Osage City
 Ruth Rachael Rannels (HE); Manhattan
 Harry Elijah Ratcliff (Ag); Gaylord
 Robert Smith Rath (GS); Agenda
 Louise Rathman (HE); Wichita
 Garold Asa Ratliff (EE); Bucklin
 Margaret Marian Reasoner (IJ);
 Herington
 Wesley Philip Reazin (CE); Macksville
 Gordon Redman (Ar); Manhattan
 Leland Harold Reece (EE); Oxford
 Leona Maxine Reed (HE); Ottawa
 Louise Eilene Reed (HE); Ottawa
 Stanley Reed (GS); Burlington
 Thomas Bernard Reed (EE); Glasco
 Roger Eli Regnier (EE); Wamego
 Margaret Reich (IJ); Glen Elder
 Frederick Thomas Reyling, jr. (AE);
 Kansas City
 Keitha Mardel Rice (HE); Girard
 John William Richards (GS); Madison
 Sarah Hazel Richards (HE); Howard
 Ralph Burton Ricklefs (Ag); Troy
 Ruby Anna Ricklefs (HE); Troy
 Ivan Harris Riley (Ar); Newton
 Ruth Elizabeth Rinehart (HE); Topeka
 Glenn Alvin Rixon (Ag); St. John
 Denton Oliver Roberts (Ag); Stafford
 Max Duane Roberts (Ag); Pomona
 Mott Luther Robinson (Ag); Lowemont
 Myrt Dorwin Robison (EE); Manhattan
 Richard Jay Rogers (Ag); Louisburg
 Shirley Nugent Rogers (GS); Manhattan
 Joe Shelby Rolston (EE); Burlington
 Lillian Foster Rommel (GS); Waterville
 Nettie Corrinne Rork (HE); Muscotah
 John Whiteley Rose (Ar); Luray
 Renna Regina Rosenthal (HE); Topeka
 Clarence Virgle Rost (EE); Sedan
 Clyde Edward Rothrock (EE); Salina
 Jesse Oliver Rothrock (EE); Salina
 Glenn Lyonel Rucker (EE); Burdett
 Gretchen Rugh (HE); Abilene
 Charles Guy Russell (Ag); La Crosse
 Edith Elva Russell (HE); Paola
 Edna Blanche Russell (HE); Stafford
 Hazel Lillian Russell (HE); Winfield
 Morton Rust (ME); Downs
 Pearl Ruth (HE); Horton
 Grace Elvena Sachau (HE); Manhattan
 John Miles Sahlberg (EE); Junction City
 McSellan Sallee (ME); Marion
 Royal Theodore Sandow (GS); Dillon
 Christine Halene Saunders (HE);
 Amarillo, Tex.
 Eugenia, Bertella Saylor (HE); St. John
 Ira Ferdinand Schindler (GS);
 Valley Falls
 Freda Schlender (HE); Moundridge
 Henry William Schmitz (Ag); Alma
 Eben Ellsworth Scholer (CE); Milo
 Glen Garfield Schoof (AE); Council Grove
 Grace Dorothy Schultz (HE); Spearville
 Grace Aurora Schwandt (HE);
 Manhattan
 George Welch Sconce (IJ); Hoyt
 Charles Erwin Scott (Ag); Westmoreland
 Eugene Saxton Scott (Ag); Burlington
 Irene Scott (HE); Westmoreland
 Jay Dewey Scott (EE); Hutchinson
 Susan Scott (HE); Manhattan
 Don Seaton (Ag); Waterville
 Harold Leon Sebring (Ar); Gardner
 Opal Sarah Seeber (GS); Great Bend
 Glen Seely (GS); Wilroads
 Marie Sellers (HE); Wellington
 Ashford Clinton Settle (IJ); Quincy
 William Eugene Settle, jr. (CE);
 Wynnewood, Okla.
 Ruby Lavisa Seward (HE); Leon
 Rolland George Shafer (IJ); Milo
 Edward Shaffer (IJ); Minneola
 Randall Joel Shaw (CE); Medicine Lodge
 Helen Irma Shellhaas (GS); Abilene
 Francis Marlin Sherwood (ME); Grenola
 Ralph Jessup Shideler (IJ); Girard

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—continued.

- Robert Theodore Shideler (CE); Girard
 Frank Howard Shirck (Ag); Waterville
 Sophia Mary Shirley (HE); Osage City
 Ellen May Shoemaker (HE); Severy
 Irene Shoemaker (HE); Severy
 Margaret Evelyn Shrader (HE);
 Cedar Vale
 Veryl Wilmot Simons (FME); Howard
 (Deceased)
 Dale Stanley Simonson (Ag); Anthony
 Wesley Earl Simpson (Ag); Welda
 Percy Sims (Ag); Little River
 Leland Otis Sinderson (EE); Manhattan
 Deal Six (Ag); Versailles, Ill.
 *Joseph William Skinner (EE); Thayer
 Owen Glee Skinner (Ag); Marion
 Bernice Mary Slane (HE); Parsons
 Jeanette Alice Sleeper (HE); Topeka
 Harold Arthur Smiley (Ag); Topeka
 Boyd Walford Smith (CE); Winfield
 Charles Randolph Smith (IJ); Herington
 Ethel May Smith (HE); Carbondale
 Herbert Clayton Smith (EE); Longton
 Lucile Evelyn Smith (HE); Topeka
 Paul Cressman Smith (GS); Manhattan
 Sarah Frances Smith (HE); Durham
 Stephen Roy Smith (Ag); Beloit
 Thelma Enid Smith (GS); Manhattan
 Theodore Knostman Smith (EE);
 Council Grove
 Verna Elizabeth Smith (HE); Manhattan
 William Donald Smith (IC); Hutchinson
 William Malcolm Smith (EE);
 Burlingame
 Jessie Elmer Snyder (AE); St. John
 Vivian Melancthon Solt (ME); Barnes
 Ada Joan Songer (GS); Manhattan
 John Elbert Speer (EE); Dickens, Tex.
 Harold Spence (GS); Valley Falls
 Clarence Martin Spencer (FME); Emporia
 Ora Milo Spivey (ME); Minneapolis
 Robert Cleveland Spratt (CE);
 Kansas City
 Harry John Staib (EE); Turon
 Ernest Floyd Stalcup (ME); Hutchinson
 John Stalder (AE); Meade
 Richard Harold Stanhope (GS); Eureka
 Florence Margaret Stebbins (GS); Ellis
 Fred Aye Stewart (Ar); Rossville
 Hazel Fern Stewart (HE); Sedgwick
 Theodore Roosevelt Stickel (Ag); Padonia
 Theodore Roosevelt Still (GS);
 Tonganoxie
 Frederick Hayden Stimson (VM);
 Princeton, Mass.
 Fred Carl Stockebrand (CE);
 Yates Center
 Glenn Dale Stockwell (Ag); Larned
 Warren Edward Stone (Ar); Saffordville
 Esther Naomi Storey (HE); Freeport
 William Harvey Stotts (Ag);
 Kansas City, Mo.
 Carl Robert Stout (ME); Kansas City
 Ida May Stout (GS); Newton
 Austin William Stover (EE); Topeka
 Raymond Luther Stover (Ag); Topeka
 Clark Oliver Stratford (CE); El Dorado
 Genevieve Anna Stricklin (HE); Liberal
 Ralph Stricklin (FME); Liberal
 Arthur Stuart (Ag); Glen Elder
 Ernest Lee Stucker (EE); Cimarron
 Otto Engel Stueber (ME); Parsons
 *Ernest William Stuenkel (CE); Lenora
 * Under auspices of Federal Board for V
 Frank Hobart Stuessi (AC); Kansas City
 Julius Carl Stuewe (GS); Alma
 Sidney Clifford Stumpt (EE); Dodge City
 Susan Anna Stutz (HE); Manhattan
 Wilma Sutton (HE); Kingman
 William Ernest Swarner (CE); Rosedale
 Cecil Orton Swearingen (ME);
 Kansas City
 Lynn Darling Swisher (GS); Lyndon
 Loy Glenn Tabor (EE); Liberty, Mo.
 Frances Ione Taylor (HE); Chapman
 George Ellis Taylor (Ag); Hiawatha
 Gladys Eleanor Taylor (HE); Chapman
 Jesse Everett Taylor (Ag); Stafford
 John Frederick Tessendorf (EE); Onaga
 Eleanor Abigail Thackeray (HE);
 Simeon, Neb.
 Paul Arden Tharp (CE); Winfield
 Warren Perry Thayer (ME); Manhattan
 Leafy Esther Thierolf (HE); Wamego
 Mildred Addison Thompson (HE); Alma
 Meryl Ethelyn Thornburg (HE);
 Manhattan
 Fern Marie Thornton (HE);
 Fairbury, Neb.
 William Charles Thruston (CE);
 Kansas City
 Ada Belle Tidd (HE); Neosho Falls
 Mildred Marie Tilman (HE); Parsons
 Stuart Oscar Tindell (EE); Burlingame
 Sallie Louise Toler (HE); Anthony
 Kenneth Marshall Topping (EE);
 Overbrook
 Marion Louise Traynor (HE); Dodge City
 Orval Welton Tripp (ME); Waldo
 George Edward Troup (GS); Lincoln
 Lorna Doone Troup (GS); Abilene
 *Floyd Jacob Tucker (ME); Minneola
 Charles Lee Turley (IJ); Hutchinson
 Daniel Overton Turner (AE); Milton
 Joseph George Tustison (EE);
 Yates Center
 Emmett Joseph Tuttle (IJ); Kansas City
 James Lowell Van Gilder (Ag);
 Manhattan
 Glen William Van Orsdol (CE);
 Rossville
 Henriette Veeh (HE); Speed
 Frederic Elias Vickrey (VM); Sabetha
 Lola Beatrice Vincent (HE);
 Amarillo, Tex.
 Mable Irene Vincent (GS); Sterling
 Paul Anthony Vohs (EE); Osawatomie
 George Ellsworth Voiles (CE); Manhattan
 Emil von Riesen (CE); Marysville
 Esther Lee Waddell (HE); Alexander
 Max Harley Waddell (Ag); Olathe
 Arthur Rutherford Waits (Ag); Cassoday
 Pearl Mable Wakefield (HE); Leon
 Frank Edward Walbridge (EE);
 Kansas City
 Charles Stone Waldo (ME); Ellis
 Martha Winifred Walker (HE); Winifred
 Richard Leo Waltner (EE);
 Freeman, S. Dak.
 Homer Dexter Walton (EE);
 Armada, Mich.
 Harry Kneeland Wareham (IJ);
 Manhattan
 William Everette Wareham (GS);
 Manhattan
 George Russell Warthen (Ag);
 Webb City, Mo.
 Sheldon Edward Washburn (Ag);
 Spivey
 John Wesley Wasson (ME); Peru
 Eleanor Emily Watson (HE); El Dorado
 Lavina Amelia Waugh (HE); Hiawatha
 Charles Franklin Weddle (IJ); Topeka
 Fred Charles Weide (CE); Yates Center

* Under auspices of Federal Board for Vocational Education.

FRESHMEN—concluded.

Marie Weinheimer (HE); Ottawa
 Raleigh John Weir (EE); Beloit
 Carl Weiss (ME); Ada
 Luis Barrett Welch (Ag); Redfield
 Robert Lee Welton (Ag); Fairview
 Ruth Elizabeth Welton (HE); Fairview
 Albert Parken Wertman (Ag); Washington
 Zoe Dorothy Wertman (HE); Washington
 Garnett Emmafred Westbrook (IJ);
 Manhattan
 Frank Loy Westerman (EE); Colby
 Ruth Ida Whearty (HE); Westmoreland
 Doris Sarah White (HE); Manhattan
 Harold Maurice White (ME); Minneapolis
 Webster James White (ME); Ada
 Wilton Parker White (EE); Quincy, Ill.
 Clifford Lyle Whitmer (EE); Norwich
 Wiley Whitney (IC); Troy
 Robert Brown Whittaker (IJ);
 Yates Center
 Susanna Whitten (HE); Wakarusa
 Henry Evert Wichers (Ar); Downs
 Dietrich Virgil Wiebe (Ag); Lehigh
 Adelaide Louise Wieters (HE); Lanham
 Mary Wight (HE); Antelope
 Elmer Edward Wiley (CE); Everest
 Archie Clay Williams (Ag);
 Siloam Springs, Ark.
 Donald Paul Williams (GS); Rush Center
 Howard Williams (EE); Kiowa
 John Reed Williams (GS); Florence
 Luther Williams (Ag); Osage City
 Philip Williams (GS); Ottawa
 Raymond Montrose Williams (VM);
 Rosedale
 *Cecil Cline Wilson (Ag); Canton
 Donald Maxwell Wilson (CE);
 Warrensburg, Mo.
 Ella Inez Wilson (HE); Luray
 Fred Emery Wilson (Ar); Kinsley
 Grace Dorothy Wilson (HE); Centralia
 Jerome Wilson (GS); Kinsley
 John Leod Wilson (GS); Ottawa
 Neomi Ruth Wilson (HE); Sedgwick
 Jesse Collins Wingfield (Ag);
 Junction City
 Florence Anna Winkler (HE); Maple Hill
 George Hugh Winters (GS); Downs
 Amy Inez Wismer (GS); Pomona
 Leanore Lucy Wolfe (HE);
 Placerville, Colo.
 George Wood (Ag); Anthony
 Orwin Chester Wood (EE); Oakland
 Wallace Leland Woodard (IC); Fort Scott
 Philip Redding Woodbury (Ag); Olivet
 Grant Thomas Woodward (VM);
 Franklin, Idaho
 Daniel Marion Woodworth (Ag); Sedan
 Alden Woody (IC); Lincoln
 Oscar Griffith Woody (Ar); Lincoln
 Frank Joseph Worster (IC); Manhattan
 Bernie William Wright (Ag);
 Arkansas City
 Leroy Lawrence Wurst (EE);
 Russell Springs
 Donald Albert Yandell (VM); Dodge City
 Winston Churchill Yokum (EE); Welda
 John Anton Ziebarth (VM); Manhattan
 Harold Veere Zimmerman (GS);
 Hutchinson

SPECIAL STUDENTS

May Maria Abbott (M); Manhattan
 William Maynard Agnew (Ag);
 Yates Center
 Claretta Odessa Allen (GS);
 Wynnewood, Okla.
 George Robert Allingham (GS); Manhattan
 Lillian Louise Amos (M); Manhattan
 Neil Williams Anderson (Ag); Wichita
 Ruth Neta Andrews (M); La Crosse
 Margaret Armantrout (GS); Guthrie, Okla.
 *Elmer Rex Auseumus (Ag); Cherokee
 Andrew Ansel Axline (Ag); Pratt
 Frances Amelia Ayars (HE); Manhattan
 Ollie Emerson Babcock (M); Harper
 Adalia Capsey Backman (M); Manhattan
 Glenn Bernard Bailey (Ag); Pratt
 Grace Eliza Baker (GS); Baldwin City
 Nellie Mary Ellen Baker (GS);
 Baldwin City
 Royce Arvide Baldwin (IJ); Belleville
 Richard Roscoe Ball (Ag); Lyons
 Donald David Ballou (GS); Delphos
 Marie Marguerite Banning (HE);
 Lawrence
 Mary Graff Barcafer (GS); Kansas City
 Herbert John Barr (Ag); Larned
 Neva Neola Barrows (M); Clifton
 Alma Jessie Bauerfield (M); Yates Center
 Hazel Eva-Zella Bauerfind (HE);
 Minneapolis
 Lloyd Irwin Belveal (M); Delphos
 Charles Wessen Bennett (GS); Wichita
 Samuel Lester Blakesley (Ag);
 Fairbury, Neb.
 Ross King Blaylock (Ag); Smith Center
 Donald Earl Blocksome (GS); Ransom
 Martin Quincy Blosser (Ag); Norway
 Orille Mariette Bourossa (GS); Topeka
 Dan Dana Bramwell (GS); Belleville
 Mary Briggs (HE); Parsons
 Oliver Wendel Broberg (GS); Manhattan
 Flo Brown (M); Salina
 Pearle Elizabeth Brown (M); Blue Rapids
 Theodore Brown (Ag); Fall River
 William Earl Bruce (GS); Wichita
 Nina Ruth Burgess (GS); Manhattan
 Anna Marie Burky (M); La Crosse
 Walter Horace Burr (GS); Manhattan
 Elgin Roy Button (Ag); Topeka
 Ira Oren Call (GS); Downs
 Constantine Diamandis Calogeris (Eng);
 Manhattan
 Charles Campbell (Ar); Wichita
 Rolla Earl Campbell (Eng); Topeka
 Bryan Lee Canty (Ag); Buffalo
 Daphne Lucille Cary (M); Taloga, Okla.
 Glen Marvin Case (M); Alta Vista
 Ivy Hildreth Case (M); Alta Vista
 Mildred Fern Champion (GS); Manhattan
 Olga Elva Chappell (GS); Haddam
 Bert Edward Church (GS); Haddam
 George Samuel Clinton (Ar); Leavenworth
 Helen Martin Colburn (M); Manhattan
 Alfred John Collingwood (Ag);
 Pretty Prairie
 Victor Vincent Cool (GS); Manhattan
 Ennis Morrow Cooley (Ag);
 Jonesboro, Ark.
 Clarence Corbet (GS); Highland
 Warren Hall Coutts, jr. (GS); El Dorado
 Doris Mildred Crandall (M); Manhattan
 Arthur Weston Crocker (Ag);
 Matfield Green
 Helen Elizabeth Dale (M); Protection
 Charles DeForest Davis (Ag); Manhattan
 Jessie Hedden Davis (GS); Manhattan

* Under auspices of Federal Board for Vocational Education.

SPECIAL STUDENTS—continued.

- Lewis Brown Deal (ME); Newton
 Lloyd Eugene Deister (Ag); Stanley
 *Clyde Charles Dilley (Ag); Beattie
 Theima Marie Dobson (M); Winfield
 Alberta Douglass (HE); Lyons
 Bertha Mac Dubbs (GS); Ransom
 Netta Elizabeth Dubbs (M); Ransom
 Wayland Aubrey Dunham (GS); Topeka
 Jessie Winifred Edwards (HE); Sterling
 Milton Stover Eisenhower (IJ); Abilene
 Clelia Lauretta Elder (M); Burr Oak
 John Burton Elliot (GS); Manhattan
 Jessie Josephine Erickson (GS); Manhattan
 Gladys Winifred Faley (M); Manhattan
 James Pryor Fallis (GS); Wichita
 Leonard Clarence Fields (ME);
 Kansas City
 Dora Shartel Finley (IJ); Manhattan
 Nelle Flinn (GS); Admire
 Daisy Boswell Floyd (GS); Manhattan
 Catherine Agnes Fox (HE);
 Columbus, Ohio
 Annye Elizabeth Fraser (M); Manhattan
 Clarence Edwin Freeto (Ag); Wichita
 *Clarence Friend (Ag); Hodgenville, Ky.
 Joyce Katherine Fuger (M); Wathena
 Hazel Irene Gardner (HE); Hutchinson
 Roy Preston Garrett (GS); Manhattan
 *Jesse Conrade Geiger (CE); Wichita
 George Albert Gemmell (Ag); Manhattan
 Mary Grace Gerkin (M); Riley
 Gladys Lee Gilbreath (M); Arkansass City
 Jean Florence Gill (HE); Kansas City
 Evelyn Marie Glenn (M); Madford, Okla.
 *Clarence Raymond Gottschall (ME); Salina
 Mary Graham (HE); Manhattan
 Marion Abraham Graham (IJ); Manhattan
 Gladys Graybill (M); Newton
 Allen Edward Green (Ag); Eureka
 Sherrod Wood Griffin (Ag); Parsons
 *Richard Bernard Griffenhagen (VM);
 Colorado Springs, Colo.
 Raymond Gross (GS); Salina
 Yael Verreira Guedes (Ag);
 Brazil, South America
 Luke Albert Guilfoyle (Ag); Wamego
 Hester Hackney (HE); La Harpe
 Francis Lester Haggard (ME); Topeka
 Alvin Bentley Haines (EE); Nickerson
 Clarence Hirschell Haines (Ag); Haven
 Robb Augusta Hake (ME);
 Kansas City, Mo.
 Lloyd Lee Hamilton (IJ); Wichita
 Meade Thomas Hargis (Ag); Manhattan
 Stella Maude Harriss (GS); Fairbury, Neb.
 Margaret Ann Hawbaker (M); Neosho, Mo.
 Ada Caroline Hawkins (GS); Scandia
 Elizabeth Heath (HE); Peabody
 Bernice Elma Hedge (M); Norton
 *Harvey Doughty Henschel (Ag);
 Kansas City, Mo.
 *Orville Bryan Hoff (Ag); Kansas City, Mo.
 Norvil Forest Holbrook (GS); Jetmore
 Orval Everett Holzer (EE); Girard
 Arlie Alfrada Honeywell (GS); Seneca
 Flora Pearl Hoots (M); Winfield
 *Harold Dunbar Hopkins (EE); Udall
 John Albert Howarth (Ag); Manhattan
 Esther Aldea Huling (HE); Manhattan
 Cecil Britt Humbarger (EE); Culver
 Albert Ross Hutchinson (Ag);
 Kit Carson, Colo.
 Ralph Josiah Hutchman (Ag); Pittsburg
 Julia Ikenberry (GS); Quinter
 Paul Henry Jeffcoat (GS); Abilene
 Robert Doah Jenkins (EE); Kinsley
 *Harry Clayton Jennings (ME); Manhattan
- *Carl Johnson (Ag); Marquette
 Elsie Vera Johnson (M); Manhattan
 Graham Johnson (Ag); Norman, Okla.
 Montford Tilford Johnson (Ag);
 Norman, Okla.
 Minnie Augustine Johnston (HE);
 Manhattan
 Glen Nelson Karstadt (Ag); Bennington
 Anita Pearl Kazmaier (HE); Wellsville
 Reines Andrew Keagy (GS); Ellis
 Arthur Joseph Kelly (Ag); Wichita
 Robert Cathcart Keys (GS); Winchester
 Jacob Acil Kibler (EE); Sedan
 Ellis Kimble (EE); Liberal
 Arthur Glenn Kincaid (Ag); Wathena
 Ernest Otto King (GS); Caldwell
 Lee Travis King (GS); Manhattan
 Kathryn Alberta Kinman (M); Ashland
 Harvey Benjamin Kinsinger (EE);
 Ness City
 *Bertie Ray Kirkpatrick (Ag); Paradise
 Ruth Kathryn Kittell (Ar); Newton
 Katherine Bryona Knapp (M);
 Arkansas City
 Elsie Agnes Knox (M); Leon
 Ruth Ester Lambertson (M); Fairview
 John Ernest LaMont (EE); Manhattan
 Harold Amos Layton (GS); Osborne
 Thomas Bernard Leahy (Ag);
 Pawhuska, Okla.
 Frieda Limper (M); Manhattan
 Arnold Leone Lovejoy (M);
 Union City, Mich.
 Allan August Ludeman (Ag); Anthony
 William Francis Lyons (Ag); Lawrence
 George Barton McAlister (Ag); Waterville
 Jessie Edwina McCampbell (HE);
 Manhattan
 Albert Leon McCauley (CE); Fowler
 Roy Nellis McCue (IJ); Bucklin
 Ralph Reuben McFadden (Ag);
 Jonesboro, Ark.
 Maurine McLachlin (M); Paola
 Helen Faye Magruder (M); Pratt
 *Claude Stanton Marshall (Ag); Gardner
 Mary Matilda Marshall (HE); Manhattan
 William Worthington Marshall (Ag);
 Dallas, Tex.
 Franz Benedict Mayer (CE); Newton
 Victor Mead (GS); Wichita
 Eva Rebecca Mellenbruch (M); Hiawatha
 Marvel Mona Merillat (GS); Great Bend
 Florence Imogene Meyer (M); Anthony
 Louie Bert Micklish (Ag); Jonesboro, Ark.
 Jessie Enola Miller (IJ); Belleville
 Richard Roscoe Miller (Ag);
 Kansas City, Mo.
 Olivette Viola Mitsch (M); Woodbine
 Lura Marie Mohrbacher (HE);
 Manhattan
 Beatrice Pauline Moller (HE);
 Parkville, Mo.
 Fred Gillespie Morgan (Ag);
 Alta Vista
 Rudolph Morgenstern (GS); Salina
 Guy Mount (GS); Fredonia
 Walter Starbuck Munson (Ag);
 Utica, N. Y.
 Mabel Ardis Murphy (GS); Nickerson
 Frank Lewis Myers (VM); Topeka
 Ray Hobart Newkirk (Ag); Geneseo
 Chester Willis Oakes (Ag); Collins, Ark.
 Howard O'Brien (M); Manhattan
 Benedicto de Oliveira (Ag);
 Jannaria, Brazil
 Marjorie Lois O'Neill (GS); Topeka
 Ruth Lucile Owens (M); Russellville, Ark.

* Under auspices of Federal Board for Vocational Education.

SPECIAL STUDENTS—concluded.

- Francis Michael Padgett (GS); Beloit
 Bryan Kenneth Perreault (GS);
 Morganville
 Marie Elizabeth Peterson (M); Randolph
 Leon Gillespie Phifer (GS); Rosedale
 Harla Phillips (GS); Paola
 Irene Pieratt (GS); Hartford
 Archibald Prehn (Eng.); Manhattan
 Frances Fuller Price (GS); Paola
 Lena Price (GS); Mound Valley
 Paul Orlando Purdue (GS); Jetmore
 Jerry Thomas Quinn (Ag); Manhattan
 Alvaro Vavarro Ramos (Ag);
 Bolivia, Brazil
 * Alfred Lee Rapp (GS); Americus
 Ruth Bernetta Rathbone (M);
 Manhattan
 Earl Herbert Raymond (GS); Towanda
 Florence Elizabeth Reiner (GS);
 Manhattan
 Alice Marine Rice (M); Topeka
 Corinne Vida Richards (M);
 Kansas City, Mo.
 John Edgar Richardson (Ag);
 Manhattan
 Arthur Howard Riley (VM);
 Minneapolis, Minn.
 Frank Leslie Roark (GS); Manhattan
 Susie Robb (GS); Salina
 Ruth Roberta Robison (GS); Towanda
 Margaret Geresa Rochford (M); Osborne
 Margaret Roderick (HE); Manhattan
 LaTona Rohrer (GS); Gardner
 Roland Edmond Roney (Ag); Scranton
 Harold Ashley Rood (Ag); Peabody
 Laura Faye Russell (M); Stafford
 McKinley Guy Sampson (GS); Wichita
 Inez Sargent (GS); Smith Center
 Robert Ewing Sears (Ag); Eureka
 Roy Zolu Shearer (Ag); Mullinville
 Omer John Shields (Ag); Lost Springs
 Mae Blanche Siefkin (GS); Wichita
 Carl Franklin Simpson (GS); Tulsa, Okla.
 Viola Marguerite Simpson (M);
 Herington
 Homer Joseph Sloop (GS); Boyle
 Dwight Smith (M); Junction City
 Esther Smith (HE); Manhattan
 Grace Margie Smith (HE); Manhattan
 Bernice Myrtle Spence (M); Hanover
 Marion Stauffer (GS); Marion
 Maude Dolfinger Stewart (M);
 Phoenix, Ariz.
 Helen Sullivan (M); Ashland
 Merton Henry Swanson (GS); Manhattan
 Walter Henry Tatge (Ag); White City
 Gertrude Doud Tetrick (GS); Manhattan
 Samuel Isaac Thackrey (GS); Manhattan
 Harold Hetherington Theiss (EE);
 Hutchinson
 Mildred Hazel Thornbug (M); Formoso
 Curtis Tippin (Ag); Manhattan
 * Emile Aubrey Toms (Ag); Independence
 Willard Orin Tucker (VM); Manhattan
 Paul Tapper (Ag); Leocompton
 Dortha Estella Turner (M); Clifton
 Fernando Valdes (Ag); Santiago, Chile
 Ignacio Valdes (Ag); Santiago, Chile
 Vernon Valens Van Hook (GS); Topeka
 Arilla Wadsworth (M); Pugally, Wash.
 Florence Elizabeth Waits (GS); Cassoday
 Imogene Caroline Warner (GS); Downs
 Frances Elizabeth Washington (GS);
 Manhattan
 Mary Goldie Watts (M); Smith Center
 Harold Parker Wheeler (M); Manhattan
 Edward Francis Whelan (Ag); Purcell
 Helen Marie Wieters (GS); Lanham
 Roy Williams (Ag); Miami, Okla.
 Arthur James Williamson (M);
 Washington
 Paul Roscoe Willis (Ag); Horton
 Anna Alberta Wilson (GS); Wichita
 Maudie Margaret Wilson (HE); Sabetha
 Nathaniel Preston Woods (Eng.);
 Ellsworth

SUMMER SCHOOL

- Ida Gertrude Adee, Manhattan
 James Frederick Adee; Manhattan
 Sister Mary Zoe Ahern; Leavenworth
 Pearle Akin; Manhattan
 Harry Whitford Alexander; Manhattan
 Anne Susie Amstutz; Halstead
 James C. Anderson; Salina
 Mary Clarissa Anderson; Huron
 William Hiddleston Andrews; Manhattan
 Robert Max Armstrong; Manhattan
 Harry J. Austin; Manhattan
 Cecile Ione Baldwin; Manhattan
 Lillian W. Baldwin; Carterville, Mo.
 Ethel Loberta Bales; Manhattan
 Helen Hunt Bales; Manhattan
 Justus Wheeler Barger; Newkirk, Okla.
 Gourney A. Barker; Pratt
 John William Barker; Pratt
 John Battin; Oberlin
 Mrs. Merrel Battin; Oberlin
 Burton Bernard Bayles; Manhattan
 Esther Grace Bayles; Osage City
 Florence Loraine Beck; Riley
 Clyde E. Beckett; El Dorado
 Wirt Walton Bell; Marysville
 Howard Dale Bennett; Harper
 Ada Grace Billings; Vermillion
 Bertha Biltz; Manhattan
 Lindley Charles Binford; Haviland
 Iva Rose Bishop; Haven
 Anna Maude Blackwell; Manhattan
 Mary Avis Blain; Manhattan
 Ruth Blair; Hutchinson
 Mayme Boone; Topeka
 Mildred Botkin; Burden
 Grace A. Bradley; Norcatur
 Roy Shipman Breese; Manhattan
 Christiana Lovina Brewbaker; Manhattan
 Arthur Hayes Brewer; Manhattan
 Cleve Briggs; Parsons
 A. A. Brown; Norton
 Margaret S. Browne; Burdett
 Dollie Edythe Browning; Manhattan
 Genevieve Vador Bruce; Manhattan
 Wesley Gordon Bruce; Riley
 Harry Ray Bryson; Leon
 Consuelo Bullock; Manhattan
 Bertha Anna Burk; Clifton
 Osceola Hall Burr; Manhattan
 Georgia Elizabeth Carey; Manhattan
 Myrtle Carey; Houston, Tex.
 Flora Lydia Carl; Springfield, Mo.
 Ida Alfreda Carlson; Manhattan
 Zattie Otellia Carp; Wichita
 Frank Carr; Manhattan
 Audrey Byron Carter; Eskridge
 Frank Herbert Clark; Bendena
 Mary Gladys Clark; Manhattan
 Anne MacDonald Clarke; Manhattan
 David Charles Clarke; Manhattan.

* Under auspices of Federal Board for Vocational Education.

SUMMER SCHOOL—continued.

Fred Cockerell; Manhattan
 Helen M. Colburn; Manhattan
 Sarah Alda Conrow; Manhattan
 Christine Carol Cool; Manhattan
 Commodore F. Cool; Manhattan
 Charles James Coon; Manhattan
 Robert Stanley Coon; Manhattan
 Nadia Dunn Corby; Manhattan
 Albert Lee Costello; Manhattan
 Sister Mary Hypatia Coughlin;
 Leavenworth
 Kathryn Louise Coyne; Linwood
 Verral Janice Craven; Erie
 Alverta May Cress; Manhattan
 Claude B. Cross; Emporia
 Blaine Crow; Havensville
 Ethel Ann Crumbaker; Onaga
 Mary Grace Crumbaker; Onaga
 Sister Mary Brigida Cunneen;
 Leavenworth
 Elsie Winifred Cuthbert; Manhattan
 Bertha Louise Danheim; Blue Rapids
 David Charles Clarke; Manhattan
 Sarah E. Davies; Riley
 Marion Bradford Davis; Manhattan
 Helen Josephine Dawley; Manhattan
 Birdie Ethel Dean; Nickerson
 Mildred Emma Dean; Nickerson
 Sister Mary Lorain Degan; Leavenworth
 Abbie Clair Dennen; Manhattan
 Percy Leroy DePuy; Manhattan
 Sister Mary Francis Derben; Leavenworth
 Sister Marianna De Tarr; Leavenworth
 Gladys De Vore; Winfield
 Henry Dougherty; Manhattan
 Sister Octavia Dougherty; Leavenworth
 Odessa Della Dow; Manhattan
 Thomas Drake; Manhattan
 Minnie Josephine Dubbs; Ransom
 Hazel Viola Dyer; Oberlin
 Richmond Knostman Elliott; Manhattan
 Maggie Ellis; Westmoreland
 John Melvin England; LeRoy
 Nelle Elnora Ensign; Waterville
 Sister Mary Oswald Erb; Leavenworth
 Sister Joan Marie Erbacher; Leavenworth
 Sivert Eriksen; Manhattan
 William Raymond Essick; Eureka
 Elsie May Ester; Peck
 Mabel L. Evans; Liberal
 Aleita Pauline Faley; Manhattan
 Lillian Elizabeth Faidley; Manhattan
 Sister Frances Antonia Fasenmyer;
 Leavenworth
 Arthur Roy Fehn; Manhattan
 Eloise Flanders; Manhattan
 Beatty Hope Fleenor; Manhattan
 Vernet Edward Fletcher; Manhattan
 Daisy Boswell Floyd; Manhattan
 Sister Mary Judith Flynn; Leavenworth
 George Albert Foltz; Oswego
 Frank Carl Foreman; Coldwater
 Addison Forrester; Manhattan
 Blanche Forrester; Manhattan
 Ralph Emerson Franklin; Horton
 Peter Cornelius Funk; Allen
 Mary Abigail Furneaux; Moran
 Gladys Lorena Ganshird; Manhattan
 Ruth Emma Gardenhire; Alma
 Walter David Gardner; Kansas City
 Ethel Victoria Garrett; Manhattan
 Roy Preston Garrett; Manhattan
 Sister Mary Josepha Geary; Leavenworth
 Ruth Naomi Gehr; Manhattan
 George Albert Gemmel; Manhattan
 Clarence Raymond George; Manhattan
 Ealom Jasper George; Concordia
 Mary Gerkin; Riley
 Mary Helen Gilbert; Manhattan
 Emilie Gingrich; Wellsville
 Gladys Gist; Manhattan
 J. A. Glaze; Manhattan
 Clara M. Glendening; Circleville
 George F. Glendening; Circleville
 George McGrew Glendening; Circleville
 Adella Elizabeth Glenn; Manhattan
 Bertha Elizabeth Glenn; Manhattan
 Mary Alice Gordon; Manhattan
 Fannie Harriet Gorton; Manhattan
 Mary Graham; Manhattan
 Greta Hazel Gramse; Perry
 Chester Eugene Graves; Manhattan
 Ivy Pearle Green; Manhattan
 Dora Grogger; Manhattan
 Claribel Florence Grover; Iola
 Garnet Vivian Grover; Iola
 Myrtle Annice Gunselman; Holton
 Bertha May Gwin; Washington
 Eva M. Gwin; Washington
 Dorothy E. Hadley; Topeka
 Belle Hagans; Manhattan
 Joseph Robert Hall; Kansas City
 Elida May Hand; Clay Center
 Ruth Anna Harding; Marion
 Miriam Ellen Harling; Manhattan
 Sister Mary Carmelita Harman;
 Leavenworth
 Claude B. Harris; Manhattan
 Freda Louise Haslam; Manhattan
 Ada Haukenberry; Manhattan
 Floyd Hawkins; Manhattan
 Elsie Ernestine Hawkinson; Lindsborg
 Edgar Sylvester Haworth; Sharon
 Ellen R. Haworth; Newton
 Gladys Marguerite Hayes; Riley
 Herbert H. Haymaker; Manhattan
 Dorothy Louise Heartburg; Manhattan
 Sister Mary Felix Hebert; Leavenworth
 Marjorie Elizabeth Heinerich; Clay Center
 Ruth Bernese Henderson; Alma
 Francis Augustin Hennessy; Fulton
 Ella Evangeline Henning; Smith Center
 Alta Sarah Hepler; Manhattan
 Susan Grace Herr; Medicine Lodge
 Ethel Bebe Hibner; Gardner
 Ross Wayne Hill; Manhattan
 Jackson Benjamin Hinds; Pleasanton
 Oralea Hinson; Stockdale
 Mary Hitch; Guymon, Okla.
 Orville Bryan Hoff; Kansas City, Mo.
 Gladys Evelyn Hoffman; Manhattan
 Lester H. Hoffman; Abilene
 Araminta Holman; Leavenworth
 John Hoover; Manhattan
 Richard Hopper; Manhattan
 Fred Harold Hull; Portis
 George F. Humphrey; Herington
 Argie May Hunt; Blue Rapids
 Walter T. Hunt; Manhattan
 Donald Hunter; Manhattan
 Ruth Evalyn Hurd; Freeport, Ill.
 Louis Edgar Hutto; Manhattan
 Edith Jones Iles; Manhattan
 Doris L. Jacka; Norton
 James Lawrence Jacobson; Kingman
 Edward John Jelden; Columbus, Neb.
 Louis Marion Johnson; Manhattan
 Blanche Crank Judd; Manhattan
 Anna E. Keyes; Manhattan
 Sarah Katrina Kimport; Dellvale
 Chester Anderson King; Emporia
 Eva Sarah King; Emporia
 Julia King; Manhattan
 Amanda Kirkpatrick; Montrose
 Bernice Wilson Klotz; Wilson
 Joseph Ralph LaMont; Manhattan
 Clay Forrest Larde; Humboldt
 Poy Yueu Lim; Manhattan

SUMMER SCHOOL—continued.

Edith Inez Lindley; Leon
 Hazel Marie Lindley; Leon
 Ethel Marian Lindsay; Perry
 Godfrey Fred Longhofer; Woodbine
 Geta Lund; Manhattan
 Dorothy Elizabeth Lush; Altamont
 Margaret Frances Lush; Altamont
 Robert Henry Lush; Altamont
 Bessie Lenore Lyman; Manhattan
 Grace L. Lyness; Walnut
 Hazel Alma Lyness; Walnut
 Elvera C. McCammon; Manhattan
 Ruth Marie McCleary; Axtell
 Sister Antonia McDonagh; Leavenworth
 Edna Lucile McElroy; Clay Center
 Ralph R. McFadden; Manhattan
 Nelle Drake McGrath; Manhattan
 Mary Teresa McKenna; Springfield, Mo.
 Sister Rose Catherine McKiernan;
 Leavenworth
 Cary Reid Machir; Kansas City, Mo.
 Geneve Madden; Horton
 Wilbur Samuel Magill; Topeka
 Duella May Mall; Manhattan
 Elva Ione Mall; Manhattan
 Carl Vincent Maloney; Kalamazoo, Mich.
 Paul Christoph Mangelsdorf; Atchison
 Daniel Claire Marshall; Kinsley
 Emily Irene Marshall; Kinsley
 Lee Webster Marshall; Manhattan
 Edgar Martin; Manhattan
 Leila Belle Martin; Stafford
 William L. Martin; Winfield
 Francis Hodgen Martling; Kansas City
 Hilery E. Mather; Manhattan
 Rex A. Maupin; Manhattan
 Calvin J. Medlin; Manhattan
 Bernice Ellen Miller; Horton
 Susan E. Millier; Tarkio, Mo.
 Hugh Roswell Miracle; Wamego
 Florence Irene Mirick; Otis
 Burnece Moore; Cleburne, Tex.
 Harry Allyson Moore; Manhattan
 Thomas Edwin Moore; Manhattan
 Tillie Moore; Junction City
 Lulu Vaughn Morgridge; Longton
 Eloise Morrison; Topeka
 William Clay Morrow; Manhattan
 Ross Davis Mowry; Manhattan
 Edith Mabel Muir; Salina
 Stella Constance Munger; Manhattan
 Walter Starbuck Munson; Utica, N. Y.
 Ruth Inez Murphy; Manhattan
 Alice H. Mustard; Manhattan
 Telie Edward Naiziger; McPherson
 Mrs. T. E. Naiziger; McPherson
 Blanche Mae Nason; Manhattan
 Clell Ansel Newell; Matfield Green
 Michael J. Nolan; Wichita
 Floyd Earl Oakes; Manhattan
 Howard Adams O'Brien; Luray
 Sister M. Sylvia O'Leary; Leavenworth
 Benedict Oliveria; Brazil
 Edlena O'Neil; Quindaro
 F. W. Osterhout; Lansing
 Flora Roccina Parker; Ottawa
 Nellie Maria Payne; Manhattan
 Fliger S. Pemberton; Junction City
 Frederick John Peters; Salina
 Tilford Ruddell Pharr; Manhattan
 Hervey Phipps; Manhattan
 Arthur Henry Platt; Manhattan
 Blanche Marie Platt; Manhattan
 Lael Louise Porter; Deadwood, S. Dak.
 Stephen Lee Potter; Manhattan
 Frances Price; Paola
 James Wendell Pryor; Kansas City
 Charles Lorin Quear; Atlanta, Ind.
 Chester F. Quear; Atlanta, Ind.
 Jerry Thomas Quinn; Manhattan
 Karl Spangler Quisenberry; Manhattan
 Alvario Navarri Ramos; Brazil
 Arthur Cecil Ramsey; Osage City
 Burton Reap; Manhattan
 Bruce David Reazin; Topeka
 Garnett W. Reed; Kansas City, Mo.
 Oliver B. Reed; Manhattan
 E. C. Rees; Girard
 F. A. Rhine; Cleburne
 Ernest Francis Robinson; Manhattan
 Howard Hardy Robinson; Washington
 William Ellett Robison; Towanda
 Alberta Roswurm; Manhattan
 Mona Agnes Rudy; Manhattan
 Winfield Foster Runyen; Topeka
 Sister Mary Ryan; Leavenworth
 Mary Margaret Ryan; Manhattan
 Orra Salmon; Manhattan
 Addie Ruth Sandman; Harline, Neb.
 Harry Weber Schaper; Mulvane
 Lois Wilma Schlaegel; Olsburg
 Margaret Ursula Schneider; Logan
 George Welch Sconce; Hoyt
 Myra Scott; Manhattan
~~Zora Scott; Ransom~~
 Ursula S. Senn; Lasita
 Hazel Shellenberger; Manhattan
 Ralph J. Shidler; Girard
 Laura Edna Shingledecker; Manhattan
 Lillian Hazel Shoff; Wichita
 Marjory Hannal Simpson; Nowata, Okla.
 Leland Otis Sinderson; Manhattan
 Hazel A. Skidmore; Osage City
 Homer Joseph Sloop; Boyle
 Lola Mae Sloop; Boyle
 Dorothy Virginia Smith; Manhattan
 Grace King Smith; LeRoy
 Grace Margie Smith; Manhattan
 Helen Imogene Smith; Kiowa
 Sister Mary Donata Smith; Leavenworth
 Rollin James Smith; Topeka
 Vesta Smith; Parsons
 Iva B. Spangler; Sharon
 Lenna Spear; Edmond, Okla.
 Clyde Leslie Spring; Manhattan
 Gertrude Frances Srack; Manhattan
 Frances Elizabeth Stall; Manhattan
 Jesse Gaylord Stanton; Wakeeney
 Florence Stauffer; Marion
 Marion Westley Stauffer; Marion
 Oscar Steanson; Oklahoma City, Okla.
 Millie Oltmans Stein; Halstead
 William Conrad Stein; Halstead
 Lillian Colene Stewart; Hamilton, Mo.
 Yelda Elizabeth Stewart; Morganville
 Goldie M. Stollar; Mankato
 Marie Story; Manhattan
 Mayme Elizabeth Stout; Newton
 Kathleen Inez Stoutimore; Winfield
 Helen Strain; Clyde
 Iva Viola Strebel; Altan
 Girlie Marie Strowig; Paxico
 Violet Hope Stuart; Zeandale
 Clarina May Sumners; Manhattan
 Lauretta Victoria Sumners; Manhattan
 Lillian Sumners; Manhattan
 Abbie D. Swafford; Manhattan
 Elsie Malvena Swanson; Manhattan
 Mabel Manghild Swanson; Manhattan
 Theodore T. Swenson; Lindsborg
 Harry Alcid Swim; Severance
 Lucy Lillian Taylor; Fort Scott
 Mabelle LaVone Taylor; Zeandale
 Mary Fidelia Taylor; Newton
 Mary Hobbs Taylor; Fort Scott
 Neva I'Vene Taylor; Zeandale
 Ruby E. Taylor; Fort Scott
 Gertrude Doud Tetrick; Manhattan
 Corinne Bertha Thiele; Hanover

SUMMER SCHOOL—concluded.

Frederick D. Thomas; Garrison	Edward Staunton West; Manhattan
Kyle David Thompson; Densmore	Julia Marian Westgate; Manhattan
Mabel Thompson; Junction City	C. Lucile Whan; Manhattan
Meryl Ethelyn Thornburg; Manhattan	Albert Freeman Whisnant; Riley
Mildred Hazel Thornburg; Manhattan	Frances Josephine Whitmire; West Plains, Mo.
Nellie Thornburgh; Manhattan	Emma S. Whitton; Kiowa
Rose Viola Tipton; McPherson	Thelma Geraldine Wilkerson; Topeka
Ernest Henry Tolin; Soldier	Alma Luella Wilkin; Manhattan
Frank Raymond Townsend; Madison	Edna May Wilkin; Manhattan
Ella Florence Travis; Iola	Cecil Williams; Olsburg
Minnie Marie Ubel; Wamego	John Cathcart Wilson; Manhattan
John Bennett Underwood; Towanda	Ruby Esther Wilson; Oklahoma City, Okla.
Mark Florea Upson; Sabin, Tex.	William Clyde Wilson; Manhattan
Mary Laura Vaile; Brownell	Mildred Henrietta Wismer; Pomona
Aurolyn Agnes Vandivert; Iowa City, Iowa	Lois Emily Witham; Manhattan
Hermione Alice van Laer; Topeka	Ethel Frances Wood; Manhattan
Winona Ethel Van Vleck; Rossville	Homer Carlton Wood; Manhattan
Perttu Hannes Virtanen; Manhattan	Thomas M. Wood, Kents
Frances Elizabeth Washington; Montezuma	Maude Ellen Carter Woods; Tonganoxie
Martha Coats Webb; Manhattan	Nellie Flo Yantis; Manhattan
Susie Alice Weber; Logan	Lloyd D. Zimmerman; Manhattan
Nannie Agnes Wesley; Bancroft	

Students in Special Courses

The abbreviations following the names of students have the following significations: AMSC, automobile mechanics' short course; BSC, blacksmiths' short course; CSC, carpenters' short course; CCSC, commercial creamery short course; ESC, electrical short course; FSC, farmers' short course; HSC, housekeepers' short course; LRMSC, lunch-room management short course; MSC, machinists' short course; RSC, radio short course; SA1, School of Agriculture, first year; SA2, School of Agriculture, second year; SA3, School of Agriculture, third year; SASp, School of Agriculture, special; TOSC, tractor operators' short course; FBVE, Federal Board for Vocational Education (noncollegiate).

Jeremiah W. Abbott (AMSC); Fairbury, Neb.	Rolland Paul Bailod (SASp), Marion
Walter Abell (TOSC); Oakley	George Marion Baird (AMSC); Formoso
William Fred Adams (FBVE); Ridgeway, Mo.	Paris Alonzo Baker (AMSC); Cullison
Jessie Adams Allingham (HSC); Manhattan	Leonard Elbert Bales (FSC); Manhattan
Alfred Anderson (FBVE); Junction City	Paul Henry Ballance (AMSC); Minneapolis
Alfred E. Anderson (TOSC); Lindsborg	Frank Clark Ballard (AMSC); Dighton
Arthur Emanuel Anderson (AMSC); Courtland	Louis Marvin Ballou (TOSC); Delphos
Einer David Anderson (AMSC); Falun	Alvin Kornelius Banman (SASp); Hillsboro
Fred John Anderson (TOSC); Kinsley	John A. Barkemeyer (FSC); Halstead
Tilbert Sylvester Anderson (ESC); McPherson	Walter Russell Barr (FSC); Atlanta, Ill.
William A. Anderson (AMSC); Waterville	Marion Richard Barr (SASp); Manhattan
Will Henry Angell (FSC); Portis	Louise Anna Barre (HSC); Tampa
Archibald Bertrand Armstrong (SASp), Manhattan	Reuel Vernon Barrington (SASp); Sedan
Ross Howard Arneal (AMSC); Colby	Alexander Montgomery Barrow (TOSC); W. Collingwood, N. J.
Fred Walter Artz (FBVE); Reger, Mo.	Russell Bartlett (FBVE); Stafford
Samuel Otis Deignon Arrin (FBVE); Wichita	Cecil Louis Batchelder (TOSC); Citrusgrove, Tex.
James Austin Ashley (FSC); Rexford	Lemuel Earl Bateman (FBVE); Oskaloosa
Chester Gladstone Aument (FBVE); Junction City	Lawton Virnon Baugh (TOSC); Emporia
Bradley Overseith Austin (SASp); Leoti	Gilbert Emerson Baxendale (FBVE); Lincoln
Robert Allan Austin (FBVE); Oskaloosa	Raymond Gibbon Bayles' (SASp); Manhattan
Robert Harold Ayers (FSC); Centralia	Charles Louis Beal (SASp); Kinsley
Francis Bernard Bailey (AMSC); Saguache, Colo.	Menno A. Becker (AMSC); McPherson
	Paul Becker, Jr., (AMSC); White City
	Melvin Howard Beetch (TOSC); Carlton
	Drummond Allen Bell (AMSC); Yates Center

STUDENTS IN SPECIAL COURSES—continued.

Frederick Bell (FBVE); Kansas City
 John Raymond Bengtson (FSC); Robinson
 John Vernon Benham (TOSC); Wellsville
 Howard Dale Bennett (SASp); Manhattan
 Clayton Stanley Bentley (SASp); Jerome
 Ronald Spencer Bentley (FSC); Jerome
 George I. Bergen (SASp); Manhattan
 Laura Selma Berger (HSC); Hanover
 Leith John Bergier (FBVE); Downs
 Herman H. Besthorn (AMSC); Bushton
 Edward Gail Betts (SA1); Detroit
 Adolph Louis Betz (FBVE); Alton, Ill.
 Dean Robert Billings (AMSC); Maple Hill
 Asa George Bird (FBVE); Fort Scott
 Ernest Alwyn Bird (FSC); Hope
 Elson Joseph Bishop (SASp); Glasco
 Robert D. Bishop (FSC); Wichita
 Wilber E. Bjork (BSC); Levant
 Roy Merideth Blackwelder (TOSC); Pratt
 Terrace William Blair (FBVE); Page, Neb.
 Katherine Gladys Blaylock (HSC);
 Smith Center
 Floyd Arthur Bleger (FBVE); Saxman
 Emery Blevins (SA1); Highland
 Loyd Blosser (SASp); Norway
 Leon Leslie Blystone (FBVE); Kanorado
 Charles Bohak (TOSC); Caldwell
 Robert Francis Boecker (AMSC); Parsons
 Preston Fay Bolenbaugh (TOSC);
 Enid, Okla.
 Walter Christ Boller (FBVE); Newton
 Earl Phil Bolton (FSC); Council Grove
 James Calvin Bones (AMSC); Norton
 Earl Everett Bonesteel (TOSC); Haddam
 Jessie Lucile Bouton (SASp);
 Medford, Okla.
 William Bowers (FBVE);
 Indianapolis, Ind.
 Edna Boydston (HSC); Sterling
 Glenn Arthur Bozarth (AMSC); Manhattan
 Ransom Duane Branch (SA1); Sterling
 Fred August Braun (TOSO); Council Grove
 Willie Jacob Braun (TOSC); Council Grove
 John Albert Bravence (FBVE); Rossville
 Earl Brazzel (AMSC); Purcell
 Everett Bretches (AMSC); Longton
 Walter Maurice Bretches (AMSC); Abilene
 Orval Albert Bricker (FBVE);
 Kansas City
 Anna Rosetta Briggs (SA2); Protection
 Henry David Briggs (SA1); Sedan
 John William Briggs (SASp); Protection
 Joe Bright (TOSC); Ackerman, Miss.
 Richard Henry Bron (FBVE); Wichita
 Clifford Leo Brown (TOSC); Quincy
 Walter Asa Brunson (AMSC); Wichita
 Hugh Brush (TOSC); Hallet
 Perry Wilbur Buchanan (AMSC);
 Leavenworth
 Chester R. Buckles (TOSC);
 Superior, Neb.
 Stanley Wayne Burgess (SASp);
 Manhattan
 Bryan Olen Burget (AMSC); Goff
 Clarence McKinley Burk; (FSC); Clifton
 Roy Dalton Burlison (FBVE);
 Arcola, Mo.
 Frank Burns (FBVE); St. Louis, Mo.
 John Carl Louis Burre (FSC);
 Leavenworth
 Edward Henry Burton (FSC); Manhattan
 Thomas Martin Butler (SA2); Glasco
 Arch Wallace Button (FBVE);
 Quapaw, Okla.
 William Keith Butts (AMSC); Goff
 James Monroe Callender (SA2);
 Manhattan
 Matthew John Calto (FBVE);
 Columbus, Neb.
 Sumner Hays Cammack (FBVE);
 McCune
 Benjamin Augustine Campbell (SA3);
 Morganville
 Daniel Raymond Campbell (AMSC);
 Leavenworth
 Earl D. Campbell (FBVE); Washington
 Robert Wellington Campbell (ESC);
 Wichita
 Walter Edward Canning (TOSC);
 Manhattan
 Joseph Edmund Caplis (FSC);
 El Paso, Tex.
 Arvid Oscar Carlson (FBVE); Overbrook
 Ethyl Olivia Carlson (SA1); Falun
 Susan Loretta Carmody (SASp);
 Manhattan
 Henry Jencie Carr (TOSC); Jamestown
 Snow Carr (AMSC); Olivet
 Henry M. Carsten (TOSC); Jennings
 Doyle Henry Carter (FBVE);
 Trenton, Mo.
 Edward Harner Casinger (FBVE);
 Kennett, Mo.
 Myron Glenn Cassidy (SASp);
 Manhattan
 Harriette Sarah Cates (HSC);
 Manhattan
 Bert M. Caughey (AMSC); Lenora
 John Wesley Cavender (FBVE);
 Wellsville
 Charlie Monroe Caviness (FBVE);
 West Plains, Mo.
 Gertrude Mae Childs (HSC); Republic
 Arthur Julius Christenson (TOSC);
 Jamestown
 Chris Paul Christensen (AMSC);
 Waterville
 Otis Roy Christian (FBVE); Manhattan
 Frank Brayton Clark (AMSC); Alden
 Josephine Clark (HSC); Junction City
 Mary Gladys Clark (SASp); Manhattan
 Jerome Elmer Clary (AMSC); Manhattan
 Bessie Ann Cleland (HSC); Hiattville
 Irvin Leonard Cleveland (TOSC); Larned
 Eugene Clevenger (FBVE); Cato, Mo.
 Arthur William Closson (FBVE);
 Portland, Iowa
 William Russell Clough (FBVE);
 Penelosa
 Dwight Dewitt Coffin (SASp); Salem, Ill.
 Philip Townsend Coffin (FSC); Scott City
 Lawrence Alten Cole (MSC);
 North Topeka
 Gertrude Myrtle Colton (SA2);
 Dover, Okla.
 Stephen Orvil Combs (FSC); Howard
 Albert Bryson Conaway (AMSC);
 Havensville
 Benjamin Joseph Conaway (AMSC);
 Havensville
 Ida Augusta Conrow (SA3); Manhattan
 William Amy Conrow (SASp); Manhattan
 Bernard John Conroy (SASp); Manhattan
 Ignatius Donald Conroy (SASp);
 Manhattan
 Earl Manly Cook (FSC); Dillon
 John Cook (FSC); St. Francis
 Lyman D. Cook (FSC); Beloit
 Robert Belden Cook (SA1); Manhattan
 William Edgar Cook (SASp); Cherryvale
 Robert Stanley Coon (AMSC); Manhattan
 Silas Cooper (FBVE); West City, Mo.
 Ralf Sampson Copenhagen (AMSC);
 Manhattan
 Metheny John Copeland (FBVE); Quinter

1. Tractor Operator, second 8 weeks; Blacksmithing and Carpentry, third 8 weeks.
3. Auto Mechanics Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—*continued.*

- Philip A. Corcoran (FBVE); Kansas City
 Jesse Earl Coslet (FBVE); Waverly, Mo.
 Harry Albert Cossel (AMSC); Glasco
 Albert Lee Costello (FBVE); Topeka
 August Albert Cowling (AMSC);
 Leavenworth
 William Earl Crail (TOSC); Fort Dodge
 Creston George Cramer (AMSC);
 Kanorado
 George Crandall (SA1); Kingman
 Fred Cravens (FSC); Medicine Lodge
 Frank Marrison Crawford (AMSC);
 Midland, S. Dak.
 Ray Creamer (FBVE); Dixon, Mo.
 Kenneth Calvin Creswell (AMSC);
 Minneola
 George Cross (FSC); Goddard
 Ruth Brown Crowson (SASp); Manhattan
 William Burbank Crowthers (FBVE);
 Philadelphia, Pa.
 Harold William Curry (AMSC);
 St. Francis
 Robert Lincoln Curtis (FBVE); Stafford
 Guiseppe Cutitta (FBVE);
 Kansas City, Mo.
 Charles Francis Cyr (FSC);
 Franklin, Neb.
 Erling Dahl (SASp); Montrose
 Marion Clifford Danby (MSC); Cassoday
 Orville Darling (FBVE); Norton
 Russell Dewey Davault (FBVE);
 St. Louis, Mo.
 Keith Burnett Davidson (SASp); Glasco
 Rice Davies (FSC); Liberal
 Edgar William Davis (FBVE); Lyons
 George Willis Davis (AMSC); Eskridge
 Robert Ivan Davis (ESC); Enid, Okla.
 Orville Thomas Deadman (TOSC);
 Manhattan
 William L. Debbrecht (AMSC); Andale
 Edwin Forrest Deho (TOSC);
 Marshall, Okla.
 Frank Irwin Decker (AMSC);
 Birmingham
 Martha Livingston Denny (HSC);
 Manhattan
 Clyde E. Dent (FSC); Council Grove
 Albert Ellsworth Derby (AMSC);
 Fort Worth, Tex.
 Curtis William Dickson (MSC);
 Woodston
 Bennie Henry Diehl (TOSC); Enterprise
 Sadie Jane Diehl (HSC); Enterprise
 Olin Love Dikeman (AMSC); Niotaze
 Charles Orville Dirks (FBVE); Latham
 John Armstrong Dirks (SA1); Latham
 Leon Dixon (FSC); Holton
 Mrs. H. E. Dodge (HSC); Leoti
 Lewis Edward Dollison (FSC);
 Council Grove
 Dayrel Elijah Dove (ESC); Severy
 Alan Metzler Downey (SA1);
 Kansas City, Mo.
 Erwin Parker Drake (FSC);
 Wagoner, Okla.
 William Roy Drennon (FBVE); Topeka
 William Apple Dresser (FSC); Piper
 William Dreyer (TOSC); Kiowa
 Clancy Harry Duke (TOSC); Dighton
 George Wilson Duncan (FSC); Flush
 Arlie Duree (FBVE); Leavenworth
 Giles Norton Dye (FBVE); Salina
 Ray Edward Early (SASp); Topeka
 Samuel M. Eby (FBVE);
 Marshalltown, Iowa
 John Charles Eckart (TOSC); Manhattan
 Ernest Edward Egger (AMSC); Ellis
 Clark Trevator Eimer (FBVE); Blair
 Evelyn S. Ellis (SA1); Friend
 Lester L. Elder (TOSC); Woodston
 Frank Shields Elliott (FSC); Reece
 Vernon Morgan Edmiston (FSC);
 Coffeyville
 Ross Smith Emmons (FBVE); Joplin, Mo.
 James Endicott (FBVE); Ethel, Neb.
 Clarence Victor Erickson (TOSC); Clifton
 Charles Esslinger (FSC); Madison
 Alfred Lealand Evans (TOSC);
 Miltonvale
 Marlin D. Evans (AMSC); Rossville
 Ray Hunter Ewalt (SASp); Manhattan
 Alfred Fankhauser (FSC); Madison
 Minnie Metta Fankhauser (SA2);
 Madison
 Arlie Wayne Farrar (MSC); Lyndon
 Howard Griever Faulkner (FSC);
 Leavenworth
 Charles Willard Fay (FBVE);
 Manhattan
 John Fred Feldhus (FBVE);
 St. Louis, Mo.
 Herbert Gillespie Ferguson (AMSC);
 Gypsun
 Robert Emmett Field (FBVE);
 Leavenworth
 Daniel Figg (FBVE); Wheeling, Mo.
 George Michael Fisher (SA1); Holton
 Henry Charles Fisher (AMSC); Blue Hill
 Charles Raymond Fitch (FBVE);
 Miltonvale
 Dennis Fitzgerald (TOSC); Manhattan
 Clarence E. Fix (AMSC); Minneapolis
 Joseph Henry Flack (AMSC); Maple Hill
 Irene Elizabeth Fleming (LRMSU);
 Emporia
 Anna Mae Fletcher (SA1); Rock Creek
 Vernett Edward Fletcher (SA2); Manhattan
 Fritz Richard Flottman (FBVE); Burden
 Grace Rebecca Foltz (SA2); Wakarusa
 James Eugene Foote (FSC); Fulton
 Arthur Wesley Ford (BSC); Manhattan
 Jess J. Ford (AMSC); Manhattan
 Robert Miles Forrester (SASp); Manhattan
 Thomas James Fowler (FBVE);
 Muscatine, Iowa
 Paul Clifford Frank (AMSC); Manhattan
 Otis Lester Franklin (AMSC); Hepler
 Roy Henry Freed (TOSC); Loomis, Neb.
 Claude Melvin Freeman (ESC); Blue Mound
 Emanuel Fromm (FSC); Eima
 Lyle Burton Frost (AMSC); Manhattan
 Guy James Fulcher (AMSC); Lansing
 Donald Hall Fulton (SASp); Manhattan
 William F. Furnas (AMSC); Sharon
 Junius Alan Gaddis (AMSC); Parsons
 Arthur Gallemore (FBVE); Seneca, Mo.
 Lena Emma Ganstrom (HSC); Hollis
 John Clarence Gard (FBVE); Dwight
 Chester Clarence Gardner (FBVE); Iola
 Leland Edwin Gardner (TOSC);
 St. Francis
 Loyd William Garner (AMSC); Manhattan
 Ada Rosetta Gates (HSC); Hill City
 Lewis S. Geckeler (FSC); Independence
 Marie Josephine Gehrke (HSC); Herington
 Glenn Edward Gentner (AMSC); Leoti
 Ralph Emerson George (AMSC); Earleton
 Ellen Fredericka Gerhard (HSC); Girard
 Robert Orel Giffin (TOSC); Burlington
 Kenneth Gilbert (FSC); Liberal
 Theodore R. Gill (SASp); Manhattan
 Karl Arthur Glatt (SASp); Enterprise
 Edwin Kinsley Glover (SASp); Manhattan

4. Tractor Operator Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—continued.

- 5 Herbert Albert Goering (ESC); Moundridge
 Emilio Vazquez Gomez (SASp),
 San Antonio, Tex.
 John I. Goodrum (FSC); Mayfield
 Samuel L. Gorham (FSC); Garden City
 Francis John Gorman (TOSC); Hartford
 William Joseph Gorman (TOSC);
 Neosho Falls
 Otis J. Gould (SA3); Manhattan
 Emmett Stanley Graham (SASp);
 Manhattan
 Lola Jane Graham (SASp); Manhattan
 Clair Emerson Green (FSC); Lyndon
 William Elijah Green (FBVE);
 Fordland, Mo.
 Henry Greenfelder (FBVE); Grandin, Mo.
 John Greene (SASp); Genoa, Colo.
 Charles Gregory (TOSC); Devizes
 Alfred Eugene Griffith (FSC); Pratt
 Earl Grumme (TOSC); Clay Center
 Julius Wayne Grutzmacher (AMSC);
 Westmoreland
 Victor Albert Guerin (FBVE);
 St. Joseph, Mo.
 Ralph Clarence Gugler (AMSC); Ellis
 Lewis John Guides (AMSC); Fairview
 Rexford Guipre (SASp); Simpson
 Theodore Earl Guss (FSC); Coldwater
 William W. Haas (BSC); Navarre
 Elta Haege (HSC); Manhattan
 Amanda Amelia Hafenstein (HSC); Alma
 Frank Alexander Hagan (SA2); Manhattan
 Sterling Harold Haist (FBVE);
 Kansas City, Mo.
 Carl Henry Halberg (SA1); Ottawa
 James Wren Hale (SASp); Miami, Tex.
 Ralph Earl Hale (AMSC); Miami, Tex.
 Geneva Mary Hall (HSC); Topeka
 Joseph Robert Hall (SASp); Kansas City
 William Thomas Hall (FSC); Edwardsville
 Robert Andrew Hamill (SASp); Colby
 John Dewey Hardesty (TOSC); Pratt
 Harriet Michael Hardin (SASp);
 Manhattan
 Alverda Mae Hare (HSC); Lamar, Colo.
 Hubert Hamilton Harmon (TOSC);
 Lawrence
 Dennis Kendall Harper (FBVE);
 Manhattan
 Arthur E. Harr (AMSC); Greenleaf
 5 George Andrew Harrah (SASp);
 Kansas City, Mo.
 Glynn Wayne Harris (SASp); Bennington
 Mervin Samuel Harris (AMSC);
 Kansas City
 Roy Charles Harreson (FBVE); Satanta
 Ralph Lawton Hartley (AMSC); Norton
 Wilma Gwendolyn Hartley (SASp);
 Manhattan
 Carl Hartman (SA1); Manhattan
 Charles Phillip Hartman (AMSC);
 Mont Ida
 Louis Worden Harvey (TOSC); Manhattan
 Warren Veach Harvey (TOSC); Manhattan
 Herman Haupt (AMSC); Glen Elder
 Howard Marshall Hautz (AMSC);
 Scott City
 Norma Elizabeth Hawk (SA1); Manhattan
 Zariel Griffith Hawk (AMSC); Walton
 Walter B. Hayen (TOSC); Marion
 Floyd William Hayes (FSC); Bronson
 Harry Winfred Haynes (SA1); Grantville
 Garnett Prudence Heath (LRMSC);
 Junction City
 Fannie Lee Heath (HSC); Manhattan
 Myrtle Heath (HSC); Kinsley
 Ernest Marion Hebrank (SA1);
 Council Grove
 Edwin Hedstrom (SA3); Manhattan
 Herbert Christian Heinzman (AMSC);
 Manhattan
 John Hench (TOSC); Ransom
 Paul Hendricks (TOSC); Glen Elder
 Esther Ione Hendrix (HSC);
 Kansas City, Mo.
 William Alexander Hendrix (AMSC);
 Modoc
 Jessie James Hennon (FBVE); Sterling
 Ross Dale Hensley (SA1); Moscow, Idaho
 Christie Cynthia Hepler (SASp);
 Manhattan
 Caldwell Valdemar Hessin (SASp);
 Manhattan
 Roscoe Easter Hey (ESC); Overbrook
 Marion George Hiatt (FBVE); Norton
 Joseph Francis Hickert (AMSC); Clayton
 Howard William Higbee (FSC); Fall River
 Henry Albert Hildenbrand (AMSC); Bala
 Jefferson Milton Hill (FBVE);
 Russellville, Ala.
 Randall Conrad Hill (SA3); Manhattan
 Joe Edward Hitt (FSC); Collyer
 Earl Nelson Hittle (TOSC); Silver Lake
 Harley James Hixon (FBVE); Dearing
 Gladys Ophelia Hofmann (HSC);
 Manhattan
 Louie E. Hollingsworth (AMSC);
 Geuda Springs
 Virgil Braxton Hollingsworth (FSC);
 Hunnewell
 John Stephen Holloway (AMSC);
 Lecompton
 William Gerald Holloway (FBVE);
 Lecompton
 Thomas Van Holmes (SASp);
 Los Angeles, Cal.
 Emil Henry Homolka (FBVE);
 Manhattan
 Earl Robert Honeywell (SASp);
 Manhattan
 William Madison Hopkins (AMSC);
 Brookville
 Carl Hopp (SA1); Oronogo, Mo.
 Roderick White Hopper (SA1); Manhattan
 Charles Orville Horchem (TOSC); Ransom
 Pete Horchem (TOSC); Ransom
 Harold Hubert Horton (SA1); Richland
 Wright Merritt Horton (FSC); Madison
 Theodore William Howland (BSC);
 Ludell
 Charles Grant Hoyt (TOSC);
 Junction City
 Hobart Leonard Hoyt (AMSC); Lyons
 Everett Elmo Hughes (AMSC); Oak Hill
 Camilla Mae Huling (LRMSC); Topeka
 Harold Bernreuter Humburg (SA3); Bison
 George F. Humphrey (FBVE);
 Longdale, Okla.
 Ira Maxwell Hutchison (TOSC);
 Forest Hill, W. Va.
 Frederick Oswald Imhoff (FSC); Hanover
 Herbert Atlee Irwin (FSC);
 Conway Springs
 Glenn Charles Isaac (FSC); Elsmore
 Charles Robertson Jackson (BSC);
 Coldwater
 George B. Jackson (AMSC); Garnett
 George Jacobs (FBVE); La Crosse
 Peter Fred Jacobsen (FBVE);
 Merville, Iowa

3. Auto Mechanics Short Course, first 8 weeks.
5. Blacksmithing Short Course, first 8 weeks.
6. School of Agriculture, first year, first semester.

STUDENTS IN SPECIAL COURSES—*continued.*

Gurner Arthur Jevons (TOSC); Wakefield	Emma Larson (SASp); May Day
David William Jewett (FSC); De Soto	Ernest Larson (AMSC); Clay Center
Carl William Johnson (FSC); Little River	Louis Lauretson (SA1); Kansas City
Dorothy Elizabeth Johnson (HSC); Beloit	Edna Carrol Lee (HSC); Louisburg
George Phillip Johnson (AMSC); Manhattan	Richard Frederick Lee (FBVE); Popular Bluff, Mo.
Lavida Ward Johnson (HSC); Osage City	Albert Edwin Legler (FSC); Leona
Lillie Marie Johnson (SA1); Walsburg	Everett A. Lewis (TOSC); Larned
Lula Anette Johnson (SASp); Walsburg	³ Dewey Lilly (TOSC); Olivet
Maurice Calvin Johnson (FSC); Wakarusa	Percy Claude Lilly (AMSC); Olivet
Myrtle Naomi Johnson (SASp); Leonardville	Louis Fred Lindberg (TOSC); Vesper
Victor Emanuel Johnson (TOSC); Leonardville	Enfred Gusstof Lindholm (AMSC); Lindsborg
William Carl Johnson (SA1); Salina	George Daniel Lingelbach (SASp); Minneola
Donald Calhoun Jones (TOSC); Manhattan	Bonnie Lingenfelter (HSC); Fredonia
Hugh Louis Josserand (SASp); Copeland	Clarence John Linnebin (AMSC); Goddard
Floyd Cecil Justice (SA1); Fall River	Orville Henry Livingston (FBVE); Oakley
Oscar Allen Karnis (AMSC); Studley	Fred Richard Lloyd (TOSC); Oak Hill
Donald Walker Karr (AMSC); Gridley	William Jess Lloyd (AMSC); Eskridge
Harry Elzworth Keener (FBVE); Argonia	Maude Edrie Lohrman (HSC); Topeka
Paul Weisner Keith (TOSC); La Cygne	Ellis Long (FSC); Fredonia
Harvey J. Kelling (FSC); Cedar	Jesse Chester Long (SASp); Manhattan
⁴ James Lex Kelly (FSC); Corbin	William Clair Long (FSC); Madison
Ralph Scott Kendle (TOSC); Council Grove	Charles Henry Loomis (FSC); Merriam
John A. W. Kennedy (SASp); Junction City	Rudolph Lundeen (AMSC); McPherson
Robert George Kersey (AMSC); Westmoreland	John Fred Luthi (FBVE); Junction City
Charles James Keyes (SASp); Manhattan	Vernon Andrew Luthy (AMSC); Sharon
Russell Stanley Kifer (FBVE); Springfield, Mo.	Walter Henry Lutz (SASp); Sharon Springs
Cyrus Theodore Kimball (TOSC); Eskridge	Arthur McAlister (TOSC); Moline
John William Kimple (TOSC); Coldwater	William Harley McAlpin (FBVE); Silvis, Ill.
Clarence Leo King (CCSC); Hays	Rodney Harold McCollum (FSC); Elmdale
Eva Sarah King (SASp); Emporia	Roy Dewey McClure (FBVE); Hugoton
⁴ Herbert Adam Kinman (SASp); Kansas City	Walter Burnett McCollum (TOSC); Redfield
Roy Taylor Kinman (SA1); Ashland	Alva Galen McDaniel (AMSC); Hepler
Samuel Frederick Kinsinger (TOSC); Ness City	Carroll William McDonald (SASp); Plainville
Vesta Eulela Kinyon (HSC); Manhattan	Albert McDysan (FBVE); Plains
⁴ Ruth Marguerite Kirkendall (SASp); Wichita	John Buel McFadden (AMSC); Manhattan
Scott James Kirkpatrick (AMSC); Webber	Floyd Lester McIrvin (TOSC); Geuda Springs
David Charles Klemm (FBVE); Piney, Ark.	Clarence Dale McKee (SASp); Manhattan
Andrew Thomas Knapp (TOSC); Leavenworth	Samuel Ralph McKee (FSC); Rexford
Benjamin Niles Kneeland (AMSC); Kismet	Arthur Eugene McLeod (BSC); Belle Plaine, Iowa
Edward Franklin Knepp (AMSC); Louisburg	Neil Patrick McLean (FBVE); Paola
Peter Knight (FBVE); Savannah, Ga.	James Alfred McNamee (TOSC); Junction City
Wilbur Clarence Knight (SASp); Manhattan	Cleo J. McNay (TOSC); Peabody
Guy Perry Knisely (SASp); La Cygne	Samuel Louis McNay (TOSC); Manhattan
Curtis Arnold Koch (AMSC); Westphalia	Henry Eugene McNutt (FBVE); Bucyrus
Edna Mary Kohler (SASp); White City	Earl Jeremiah McWilliams (FBVE); Alta Vista
Edward E. Kohler (AMSC); White City	Clarence Mertin Machmer (TOSC); Wakefield
Ernest Kohler (SA2); Forest Park, Ill.	Harold Warren Machmer (TOSC); Wakefield
Lillian Kohler (SA2); White City	Oscar Mack (FBVE); Ottumwa, Iowa
Louise Anne Krigbaum (FSC); Topeka	William E. Mackender (SASp); Riley
Roy C. Kronvall (AMSC); Winona	Leo Ripley Maguire (FBVE); Geneseo
Elmer Henry Kruger (MSC); Sylvan Grove	Frank Raymond Mahaffey (FBVE); Riceville, Iowa
Wendell D. Kunz (AMSC); Kimball, Neb.	Adolph Daniel Mall (CSC); Clay Center
Henry A. Kurtz (FBVE); Burlington	Chris John Mall (AMSC); Clay Center
Louie Henry Kurz (AMSC); Clay Center	
James Clark Lane (TOSC); Yates Center	
Edwin Langenwalter (FSC); Halstead	
Thomas Miller Larsen (SASp); Kansas City	
Carl Oscar Emanuel Larson (FSC); Riley	
Clara Christina Larson (SASp); Topeka	

4. Tractor Operator Short Course, first 8 weeks.

7. Housekeepers' Short Course, first semester.

8. Auto Mechanics Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—continued.

- William Henry Malone (FBVE);
Fort Scott
- Lloyd Cecil Mann (FBVE);
Des Moines, Iowa
- Myrtle Mann (FSC); Mildred
- Fred W. Manthe (TOSC); Fostoria
- Verner Donelson Maring (AMSC);
Detroit
- Robert Dale Mark (TOSC); Coldwater
- Glenn Wheeler Markley (AMSC);
Augusta
- Lee Webster Marshall (SASp);
Manhattan
- James Francis Martin (FBVE); Adams
- Wilson Marion Martin (FBVE);
Dunavant
- Joaquin B. Martinez (SASp);
Mercedes, P. I.
- George P. Masquot (FBVE); Horton
- Albert Emile Matthey (SASp); Merriam
- Hazel Irene May (SASp); Manhattan
- William Clyde May (SASp); Manhattan
- Willie Ralph Mayer (AMSC); Alta Vista
- Edith Allene Mayfield (SASp); Manhattan
- Cecil Ione Medlin (SASp); Manhattan
- Gerald David Meek (SASp); Topeka
- John Henry Meek (SA3); Idana
- Paul Miller Meek (TOSC); Centralia
- Joseph Leo Melroy (TOSC); Norton
- Martha Mary Menssen (HSC); White Cloud
- Joseph Bailey Merwin (TOSC); Kinsley
- William Hozea Messenger (SASp);
Manhattan
- Raymond Bertrund Messing (SASp);
Ashland
- Herman Dennis Metz (SA3); Manhattan
- Merlin Everett Meyer (AMSC); Sabetha
- Jay Russel Michael (AMSC); Cullison
- Ralph Ore Michael (AMSC); Cullison
- Oliver Harrison Mickey (FBVE); Wichita
- Buford John Miller (SASp); Piedmont
- Cecil Miller (FBVE); Manhattan
- George Dewey Miller (FBVE); Henley, Mo.
- George Duane Miller (FBVE); Nortonville
- Helen Gould Miller (SASp); Manhattan
- J. Philip Miller (TOSC); Utopia
- Elisha Paul Milton (FBVE); Larned
- Fred Milton (TOSC); La Cygne
- Nelson Houston Mock (AMSC); Anthony
- William Martin John Mockler (FBVE);
Edwardsville, Ill.
- Haro Krine Mohlman (SASp); Manhattan
- Lawrence Christ Molzen (TOSC); Newton
- Charles Joshep Moore (SASp);
Pine Bluff, Ark.
- Freda R. Moore (HSC); Morland
- Homer Vincil Moore (FSC); Mont Ida
- John Louis Moore (FBVE); Fredonia
- Lloyd Burton Moore (TOSC); Burlington
- Roscoe Foster Moore (AMSC); Maple Hill
- James Harry More (TOSC); Anness
- Albert Wesley Morris (FBVE); Persons
- Alva Barney Morris (FBVE); Topeka
- Robert Merton Morrison (MSC);
Phillipsburg
- Rowland Clark Morrow (AMSC);
Leavenworth
- Nellie Frances Morse (HSC); Guilfoil
- Frank S. Moss (FSC); Beloit
- William Thomas Mullen (FBVE);
Densmore
- Eugene Lawrence Mullender (AMSC);
Waldo
- Lloyd William Mullendoe (FBVE);
Clearwater
- Benjamin Richmond Mulnix (FBVE);
McPherson
- Alvin Frederick Munson (AMSC); Burdick
- Elmer Ellsworth Murphy (AMSC);
Maple Hill
- J. Kenneth Muse (SASp); Manhattan
- Louis Henry Mussman (FBVE);
Augusta, Mo.
- Ona Vashii Muxlow (SASp); Manhattan
- Walter Erret Myers (AMSC); Winfield
- Charles Browning Nabb (FBVE);
Yates Center
- Frank Ernest Naden (AMSC); Lyons
- Ezra Edwin Naffziger (BSC); Columbus
- Walter Tjaart Nanninga (AMSC); Bala
- Orin Edward Nay (FBVE);
Kansas City, Mo.
- George Howard Nebb (TOSC); Glen Elder
- William Curtis Neely (AMSC); Parsons
- Eugene Neff (FBVE); Salina.
- Alton Harry Neill (FBVE); St. John
- Harry Homer Neill (AMSC); Fredonia
- Carl F. Nelson (BSC); Smolan
- Carl Otto Nelson (FBVE); Agenda
- Louise Nelson (HSC); Moray
- Myrtle Nelson (HSC); Manhattan
- Sadie Emelia Myrtle Nelson (SA1);
Keats
- Ruth Fowler Nettleton (SA1); Chanute
- Carl Chester Neuer (SASp);
Kansas City, Mo.
- Carrie Aileen Neusbaum (SASp);
Manhattan
- Elwin William Niccum (MSC);
North Topeka
- George Thomas Nicholson (FBVE);
Hutchinson
- Owen Daten Nicolay (FBVE); Osage City
- Walter Nieder (RSC); Lone Star
- Lorenz Nielsen (AMSC); Emporia
- Sam Nightengale (AMSC); McPherson
- Reinhardt Noll (FSC); Ransom
- Bertha Sophia Nordgren (HSC); Olsburg
- Georgiana Norris (SA2); Hutchinson
- Onie Linsey Norton (SA3); La Cygne
- Bernice Bridwell Oakes (HSC); Manhattan
- Francis Ronald Odette (AMSC);
Garden City
- William George O'Brien (SASp);
Omaha, Neb.
- Gustav O'Donnell (FBVE); Harvey, Ill.
- Joseph O'Donnell (AMSC); Green
- Ralph Marcus O'Donnell (SASp);
Medford, Okla.
- Carl Clinton O'Hara (FSC); Partridge
- Floyd Robert Oliver (SASp); Neodesha
- Carl Conrad Olson (FSC); Angola
- Carl William Olson (TOSC); Brookville
- Clifford Roswell Olson (TOSC); Clyde
- Eben Carl Olson (TOSC); Marquette
- Edwin C. Olson (ESC); Clyde
- Hazel Verne Olson (SA1); Dwight
- Nels Peter Olson (SASp); Brookville
- Otto Olson (AMSC); Leonardville
- Emmet Gerherd Oltjen (FSC); Leona
- Patrick Leo O'Meara (TOSC);
Council Grove
- Harold Temple O'Neil (SASp); Winfield
- Herbert Orval O'Neal (FBVE); Nashville
- Purl Harvey O'Neal (FBVE); Dillon
- Fred Phillip O'Neil (FBVE); Kansas City
- Mary Elizabeth O'Neil (SASp); Prescott
- Howard L. Orr (SASp); Hammond
- John W. Otto (AMSC); Haven

4. Tractor Operator Short Course, first 8 weeks.

8. Auto Mechanics Short Course, first semester.

STUDENTS IN SPECIAL COURSES—*continued.*

- Francis Millard Outhier (FSC);
Homestead, Okla.
- William Joseph Overton (SASp);
Lees Summit, Mo.
- Charles Edward Paden (AMSC); Lenora
- Arthur Bretton Palmer (AMSC); Winfield
- Elmer Lee Palmer (FBVE);
Kansas City, Mo.
- Albert Tilden Parker (FBVE); Kirwin
- Mary Florence Parr (LRMSC); McPherson
- John W. Parrish (FSC); Derby
- Newton John Parrish (AMSC); Larned
- Richard Harry Parsons (FSC);
Arkansas City
- Alfred Milton Patterson (TOSC);
Manhattan
- George Walter Patterson (SASp); Clifton
- George Francis Payne (FSC);
Weatherford, Okla.
- William Fayne Peck (SASp); Manhattan
- Fliger S. Pemberton (FBVE);
Junction City
- William Russell Pendleton (SASp);
Manhattan
- Julian Davis Pennington (TOSC); Edna
- Harry Perkins (AMSC); Manhattan
- Peyton Ira Perkins (AMSC); Conway
- William Fred Perkins (SASp); Oswego
- Curtis Reinard Peterson (TOSC);
Lost Springs
- Delpha Peterson (HSC); Walsburg
- Harry Albert Peterson (TOSC); Topeka
- Benjamin F. Pfister (SASp); Fort Scott
- John Newton Hagan Phlegar (FBVE);
Russell
- Edna Marie Pieman (HSC); Vassar
- Lenna Pierce (HSC); Minneapolis
- Clarence A. Pittenger (AMSC); Blaine
- Leslie Pittenger (AMSC); Blaine
- Charles Richard Pittman (FBVE);
Brunswick, Mo.
- Leslie Hopper Pitzer (TOSC); Pratt
- Norman Vincent Plummer (SASp); Horton
- Harold Thornton Poland (AMSC);
Junction City
- Rosella Charlotte Pollard (LRMSC);
Manhattan
- Carl Polson (MSC); Baileyville
- Armer Porter (FBVE); Fredonia
- Ray Porter (FBVE); Enterprise
- William Bernhardt Porter (BSC);
Alvin, Tex.
- Hermine Alma Johanna Postier (HSC);
Inman
- Le Sette Mal Vena Postier (HSC); Inman
- Martha Caroline Marie Postier (HSC);
Inman
- Julia Carrie Pottenger (LRMSC);
Jeffersonville, Ind.
- Carrie Agnes Povenmire (HSC); Gridley
- Frank A. Povenmire (TOSC); Gridley
- Russell Meridith Prescott (SASp);
Parkerville
- Ben Ferguson Price (FSC); Reading
- Mary M. Price (SASp); Mound Valley
- Joseph Henry Priot (FBVE); Case, Mo.
- Mildred Pritchard (HSC); Junction City
- Albert John Pruitt (AMSC); Goddard
- Basilio Orpilla Pulanco (SASp);
Union, P. I.
- Lawrence Francis Quaney (TOSC);
Ozawkie
- Paul Swart Quick (FBVE); Quick City, Mo.
- Henry Patrick Quinn (SASp); Manhattan
- Charles Steed Raffington (SASp);
Hutchinson
- Frank Merritt Rainey (SASp); Alma
- James Harry Ramsey (SA3); Colony
- Melvin William Randle (TOSC); Stockton
- Rasmus Leonard Rasmusson (TOSC);
Lindsborg
- Harry Porter Rector (AMSC); Winona
- Orie Adelbert Reddick (CGSC); Holton
- Christine Ross Redmond (HSC); Topeka
- Ethel Marie Redman (HSC); Kiowa
- Raymond Victor Reece (TOSC); Oxford
- Willis D. Reed (TOSC); Stockton
- Peter Kenneth Regehr (TOSC); Hillsboro
- Cornelius Pete Regier (FSC); White Water
- Gustav Regier (FSC); Moundridge
- John L. W. Regier (AMSC); Moundridge
- Ralph J. Reich (FSC); Downs
- Willie E. Remple (BSC); Hillsboro
- Earl Joseph Rencin (AMSC); Barnes
- William Edward Reynolds (FBVE);
Dupo, Ill.
- Lyle Verne Rhine (BSC); Cleburne
- Clarence Raymond Rice (TOSC); Olpe
- Edward E. Rice (AMSC); Greenleaf
- Floyd Rice (ESC); Delphos
- Lorenzo Rice (AMSC); Kansas City
- Carl Ernest Richardson (ESC); Barelay
- Clinton Richardson (FSC); Stafford
- Edward Stanton Riley (TOSC); Willard
- Leo Fred Riley (SA1); Manhattan
- India Reinhold (SASp); St. Francis
- Alvin Verne Ritts (SASp); Topeka
- Andrew Dean Robb (TOSC); Topeka
- Millard Fillmore Roberts (FBVE); Marion
- Charley Lee Robinson (FBVE); Downs
- Warren Homer Robinson (FSC);
North Topeka
- Nell Roderick (SASp); Manhattan
- August William Roediger (AMSC);
Wakefield
- Bernhardt William Roepke (FSC); Barnes
- Samuel Nicholas Rogers (SA1); Manhattan
- Lawrence Edward Rogler (FSC);
Matfield Green
- Nicol Gosler Rogler (SASp); Matfield Green
- Helen La Dema Rolley (HSC); Holton
- Glen Victor Romig (FSC); Topeka
- LeRoy Everett Root (FBVE); Ozawkie
- Claude Parke Rose (FBVE); Fort Scott
- Rudolph Frederick Rose (AMSC); La Cygne
- Carl Arther Rostina (AMSC); McPherson
- Alberta Roswurm (SA3); Manhattan
- Glen Frederick Rotchford (AMSC);
Council Grove
- Nellie May Rowe (SASp); St. John
- Vance Mather Rucker (SASp); Burdett
- Ruth Wilma Rudolph (HSC); Lawrence
- Edgar Earl Rundell (TOSC); Stafford
- Paul Albert Runquist (TOSC); Falun
- Troy Rushing (FBVE); Tylertown, Miss.
- Arthur LeRoy Russell (FBVE); Peabody
- Grace Elizabeth Russell (HSC); La Crosse
- Homer Wesley Russell (AMSC); Wamego
- Stanley Dewey Russell (SASp); Winfield
- George Wesley Rutz (AMSC); Hope
- Katherine Ryan (SA1); Manhattan
- Fred H. Sachau (AMSC); Manhattan
- Harry James Sallee (FBVE); Long Island
- Orra Salmon (SASp); Manhattan
- Rufino Andres Salvatierra (SASp);
Santo Domingo, P. I.

3. Auto Mechanics Short Course, first 8 weeks.

9. Carpenters' Short Course, first 8 weeks.

10. Housekeepers' Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—continued.

- Earnest Clarence Sander (AMSC); Hilltop
 Lydia Esther Sandow (SASp); Dillon
 Francis C. Sanford (TOSC); Belleville
 Harold Sargent (SA1); Manhattan
 Steven Alfred Sargent (AMSC); Riley
 Fred W. Saterlee (FBVE); Junction City
 Ivan Virgel Sawyer (TOSO); Fairview
 Frances Elizabeth Scheu (HSC); Manhattan
 Leo Joseph Schilz (FBVE); Fulton
 Chris Michael Schlicher (FBVE); Vassar
 Harry Junior Schmidt (FBVE);
 Kansas City, Mo.
 Thurman Allen Schooler (AMSC);
 Hiawatha
 Jennie Bernice Schofield (SASp);
 Manhattan
 Andrew Frederick Schrader (BSC); Dillon
 Carl Christian Schrader (SA1); Dillon
 Jacob Carl Schwindt (AMSC); Olpe
 Ross Owen Scott (FBVE); Agra
 Isaac Wesley Seamands (FBVE);
 Joplin, Mo.
 Robert Sehart (AMSC); Parsons
 Carl Ernest Seydell (SA1); Wichita
 Rolland Orville Shadday (FSC);
 Crestline
 Evelyn Gladys Sharp (SASp); Rogers, Ark.
 Charles D. Shaw (TOSC); McPherson
 John William Shaw (FSC); Haddam
 Sidney Clinton Shepherd (SASp);
 Trinidad, Colo.
 Veryl Colbert Sheppard (TOSC); Wellsville
 John Thomas Sherman (FSC); Leona
 Lawrence Lester Sherman (FSC); Leona
 Harry Shoebrook (FSC); Horton
 Alma Doriene Shore (SASp); Milan
 Chester Daniel Shupe (FSC); Sitka
 Ezra Isaac Sidebotham (FSC);
 Manhattan
 Howard Good Siebert (AMSC); Marion
 Albert William Siler (SASp); Fredonia
 Ernest Lee Siler (SASp); Wells
 Andrew Anton Simon (AMSC); Oakland
 Willard Robert Slaymaker (AMSC);
 Peabody
 John D. Smid (TOSC); Hazelton
 Joseph Earl Smid (SASp); Fowler
 Clarence Rothwell Smith (FSC); Bronson
 Claude Ervin Smith (FSC); Belle Plaine
 Houston Joseph Smith (SASp); Manhattan
 James Leroy Smith (FBVE); Gladden, Mo.
 Jerry Smith (FBVE); Kiowa
 Malcolm Melvin Smith (AMSC); Manchester
 Rupert Harold Smith (FSC); Delphos
 John Raymond Smithheiser (SA3);
 Danville
 Joseph James Smithheiser (TOSC);
 Danville
 John P. Snare (SA2); Ogden
 Jesse Elmer Snyder (FSC); St. John
 Roy Lee Snyder (TOSC); La Cygne
 Ralph L. Sours (SASp); Fall River
 Eddie Vincil Spaht (FSC); Elk City
 Vern Washington Stambaugh (TOSC);
 Maple Hill
 Levi Bryan Stants (SASp); Hope
 Jesse Gaylord Stanton (FBVE); Wakeeney
 Irvin Earl Stark (AMSC); Abilene
 Leo Melvin States (FSC); Logan
 Chester Wilbur Stead (AMSC); Emporia
 Lorin Earl Stead (AMSC); Emporia
 Howard Douglas Steele (AMSC);
 Manhattan
 Richard S. Steele (SASp); Winfield
 Roy August Steffen (AMSC); White Cloud
 Frank Bruce Stephens (FBVE);
 Greenville, Mo.
 Harold Ralph Stephens (FSC); Walnut
 Raymond John Sierbenz (TOSC);
 Hartford
 Bert Leroy Stilwell (AMSC); Larned
 Carl Henry Stirtz (TOSC); Abilene
 Charles M. St. John (SA1); Caney
 Orlo Otis St. John (MSC); Leoti
 William Daniel Stoltenberg (FSC);
 Holyrood
 Olin Franklin Storer (AMSC); Studley
 Paul Franklin Stockard (TOSC); Abilene
 Jacob B. Stouffer (TOSC); Glen Elder
 Clyde E. Stout (FBVE); St. Joseph, Mo.
 Ada Florence Stowell (SASp); Vliets
 Ray Allen Stratford (AMSC); El Dorado
 Carl Herman Stromer (FBVE);
 Garner, Iowa
 Jacob Strunk (FBVE); Dillon
 Donald John Stuart (SASp); Manhattan
 Roy Stuffebeam (FBVE); Fort Scott
 Alfred Lonnon Sturn (AMSC); Bushton
 Emma Stutz (SA3); Manhattan
 George Edward Stutz (SASp); Manhattan
 Albert Subera (TOSC); Caldwell
 Homer Lewis Sumner (SASp); Manhattan
 Rolla Summers (AMSC); Mont Ida
 Ruben Bernard Sundgren (SA1); Sitka
 George William Sutter (SASp);
 Kansas City, Mo.
 Albert Frederick Swan (AMSC); Topeka
 Robert Burns Swan (FBVE); Wayside
 Phillip Earl Swaney (TOSC); Belleville
 Joseph Frank Swarner (FBVE); Hartford
 Christopher Elmer Swart (AMSC); Riley
 Edna Anna Swart (HSC); Riley
 Albert William Swenson (FSC);
 Concordia
 Walter Garfield Swenson (AMSC); Lyons
 Paul James Swift (AMSC); Delavan
 Harry A. Swim (SASp); Manhattan
 Richard August Syring (AMSC); Alta Vista
 Joseph Benjamin Symms (SA1); Atchison
 Jesse Harper Tanner (TOSC); St. John
 John Thomas Tanner (AMSC); St. John
 George Rea Tarvin (FSC); Parsons
 Mary Elizabeth Tatkenhorst (HSC); Meade
 Melvin Beaumont Taylor (TOSC); Winfield
 Ray Teagarden (FSC); La Cygne
 Daniel Teare (FBVE); Farmington
 Fred Cass Teel (FBVE); Parsons
 Harry Hughes Teeter (AMSC); Oberlin
 Edmond Lee Thackrey (SA1); Simeon, Neb.
 Charley Admetus Thomas (FBVE);
 Cimarron
 Louise S. Thomas (HSC); Portis
 Lawrence Enos Thrush (BSC); Wakefield
 Robert Clifton Towery (FBVE); Grass
 Frank Raymond Townsend (FBVE);
 Madison
 Thomas Barker Tracy (SASp); Kansas City
 Frederick Leroy Travis (FBVE);
 Hornell, N. Y.
 Charles Homer Trego (FBVE); Humboldt
 Harold McKinley Trott (TOSC);
 Manchester
 Harold Junius Tucker (AMSC);
 Kansas City
 Royal Newton Umphres (FVE);
 Long Beach, Cal.

3. Auto Mechanics Short Course, first 8 weeks.

4. Tractor Operator Short Course, first 8 weeks.

5. Blacksmithing Short Course, first 8 weeks.

STUDENTS IN SPECIAL COURSES—concluded.

Frances Mae Van Sickle (HSC); Green	Charlie Lee White (SASp); Tulia, Tex.
Eddie James Vermillion (FBVE); Coffeyville	David Roundtree White (TOSC); Manhattan
Olin Orson Vickers (FBVE); Topeka	Lindon Victor White (TOSC); Manhattan
Kenneth Raymond Vilander (FSC); Manhattan	Avis Wickham (SA3); Manhattan
Virginia Veronica Vilven (HSC); Wamego	Fay Edith Wickham (SA1); Manhattan
Mona May Vogelman (SA1); Clay Center	Harry Loyal Wickstrum (AMSC); Green
Clyde McFarland Voshell (SASp); Bucklin	Horace Harry Wilkie (TOSC); Belleville
William Von Waaden (FSC); Hanover	John Camp Wilkins (SASp); Kansas City
Charles Roy Wallace (FBVE); Washington	Cyrus Pierce Williams (SA1); Huiter
Melvin Claycomb Wallace (SA2); Eureka	Francis Reid Williams (SASp); Wakefield
Benjamin Guthrie Walters (SA1); Highland	Lawrence Cooper Williams (FBVE); Goshen, Ind.
Fred John Walter (FSC); Lecompton	Everett M. Wilson (ESC); Rozel
John Erwin Walters (FSC); Earlton	Lee Alfred Wilson (FBVE); Milford
Ferne Argie Ward (SA2); Bancroft	William Wilson (TOSC); Manhattan
Leo Leroy Ward (FBVE); Kiowa	Ray Byron Winfrey (FBVE); Independence, Mo.
Clarence Milford Warlan (ANSC); Lincolnville	DeWitt Talmage Wintamute (FSC); Wright
Joseph Leroy Warlen (AMSC); Lincolnville	Fred William Winzler (TOSC); Lamont
Lyle S. Warner (SASp); Iola	George Winzler (FSC); Hill Top
Merle Burton Warner (FBVE); Burrton	Raymond John Wismer (SA1); Pomona
Guy Leslie Warren (TOSC); Wamego	Anna B. Withington (FSC); Lawrence
Roy Lee Waters (AMSC); St. Francis	Harry Lee Wobbe (FBVE); Uniontown
Harry Elmer Watkins (AMSC); Manhattan	Herbert O. Woellhof (AMSC); Broughton
Carl Otto Watson (FBVE); Pittsburg	Charles F. Womses (FSC); Reading
Everett John Weeks (SASp); Belvue	Chester Stanley Wood (SASp); Manhattan
Helen E. Weeks (SASp); Belvue	Joe Earl Wood (CCSC); Manhattan
William Hargrave Weeks (SA1); Belvue	Lester Harold Wood (FSC); Dodge City
² Charles Monroe Wehry (MSC); Peabody	Emma Gertrude Woolfolk (HSC); Topeka
Frank William Weickert (TOSC); La Cygne	Clarence Johnson Worden (SA1); Woodston
Charles Weir (FSC); Spring Hill	Garnett M. Work (AHSC); Ashton
Charles Lawrence Weir (AMSC); Oberlin	Walter Henry Wulkuhle (FSC); Lecompton
² Robert Harold Weir (TOSC); Winfield	Wilber Judson Wylie (FSC); Doniphan, Mo.
William Henry Weir (SA1); Topeka	Roy Orville Yarrow (AMSC); Wakefield
Pierre Weishaar (TOSC); Nortonville	Irvin F. Yost (TOSC); Hesston
Richard Clinton Wells (SASp); Manhattan	Albert John Young (AMSC); Eskridge
William Robert West (TOSC); Coats	James Irvine Young (BSC); Wakefield
Earle Whitney Westgate (TOSC); Manhattan	John Albert Young (BSC); Wakefield
Julia Marian Westgate (SASp); Manhattan	Roberta Belle Young (SASp); Manhattan
Lon Hurt Weyland (FBVE); Boonville, Mo.	William Burnard Youngkamp (SA1); Manhattan
James M. Whitaker (FBVE); Topeka	Walter William Zabel (FSC); Onaga
Charles Fletcher White (FBVE); Louisville, Ky.	

3. Auto Mechanics Short Course, first 8 weeks.

4. Tractor Operator Short Course, first 8 weeks.

Students by States and Counties, 1919-1920

Kansas	3,088	Minnesota	1
Arizona	2	Mississippi	3
Arkansas	18	Missouri	85
California	3	Montana	1
Colorado	15	Nebraska	25
Delaware	1	New Jersey	1
Florida	2	New York	-3
Georgia	1	North Carolina	1
Idaho	5	Oklahoma	32
Illinois	13	Pennsylvania	1
Indiana	3	South Dakota	2
Kentucky	2	Texas	19
Iowa	18	West Virginia	1
Louisiana	1	Wyoming	1
Massachusetts	4		
Michigan	3	Total	3,354

FOREIGN COUNTRIES

Armenia	1	Mexico	1
Brazil	3	Philippine Islands	4
Chili	2	Russia	1
China	1	South Africa	1
Finland	1		
Greece	1	Total	22
Hawaii	1		

Grand total, 3,376

KANSAS COUNTIES

Allen	4	Logan	9
Anderson	39	Lyon	35
Atchison	18	McPherson	43
Barber	27	Marion	43
Barton	11	Marshall	37
Bourbon	28	Meade	7
Brown	39	Miami	27
Butler	40	Mitchell	22
Chase	10	Montgomery	19
Chautauqua	18	Morris	34
Cherokee	7	Morton	5
Cheyenne	8	Nemaha	24
Clark	18	Neosho	14
Clay	43	Ness	18
Cloud	34	Norton	16
Coffey	25	Osage	41
Comanche	21	Osborne	32
Cowley	62	Ottawa	33
Crawford	19	Pawnee	18
Decatur	7	Phillips	14
Dickinson	64	Pottawatomie	49
Doniphan	25	Pratt	21
Douglas	30	Rawlins	2
Edwards	18	Reno	46
Elk	15	Republic	28
Ellis	13	Rice	42
Ellsworth	7	Riley	727
Finney	14	Rooks	10
Ford	16	Rush	13
Franklin	42	Russell	18
Geary	25	Saline	40
Gove	8	Scott	5
Graham	2	Sedgwick	82
Grant	4	Seward	18
Gray	3	Shawnee	97
Greenwood	46	Sheridan	3
Hamilton	2	Sherman	2
Harper	35	Smith	17
Harvey	32	Stafford	25
Haskell	1	Stevens	1
Hodgeman	5	Sumner	37
Jackson	19	Thomas	15
Jefferson	30	Trego	3
Jewell	17	Wabaunsee	45
Johnson	21	Wallace	3
Kearny	1	Washington	40
Kingman	12	Wichita	4
Kiowa	3	Wilson	18
Labette	25	Woodson	24
Lane	3	Wyandotte	63
Leavenworth	43		
Lincoln	17	Total	3,088
Linn	21		

Record of Attendance, 1863-1919.

COLLEGE YEAR.....	Summer School.....	Housekeeper short course.....	Com'cial creamery short course.....	Dairy short course...	Farmers' short course	Apprentice.....	Special.....	Preparatory.....	Subfreshman.....	School of Agriculture.	Freshman.....	Sophomore.....	Junior.....	Senior.....	Graduate.....	Counted twice.....	Total.....	Graduated.....
1863-64								08			14	8	1				107	
1864-65								60			14	7	1				113	
1865-66								154			11		1	5			178	6
1866-67																	168	
1867-68								146			11	10	2	5	1		194	5
1868-69								163			13	7	3	5	3		202	3
1869-70								162			22	10	3	2			*217	3
1870-71																	194	5
1871-72											24	14	3	6			183	5
1872-73								103			26	10	2	2			143	5
1873-74																	232	5
1874-75																	234	9
1875-76																	150	4
1876-77																	207	9
1877-78								75			42	23	5	5			276	7
1878-79											89	16	12				267	7
1879-80											166	81	25	11	3		267	8
1880-81											178	88	24	9			312	8
1881-82											227	80	19	11			347	12
1882-83											241	60	30	12			395	17
1883-84											255	92	26	18	5		401	14
1884-85											271	71	35	16	2		438	21
1885-86											273	91	35	24	4		481	21
1886-87											303	100	44	24	10		472	22
1887-88											305	92	46	27	2		445	25
1888-89											266	103	41	28	7		514	27
1889-90											307	105	63	28	10		593	52
1890-91											343	135	50	53	12		584	35
1891-92											336	139	62	37	10		557	39
1892-93											339	110	66	43	29		555	39
1893-94											275	141	72	42	25		572	57
1894-95											276	108	89	64	30		647	66
1895-96											353	121	67	71	32		734	55
1896-97											321	163	69	62	46		803	69
1897-98											316	174	77	82	57		870	53
1898-99											306	177	92	65	40		1094	58
1899-00											276	163	109	69	27		1321	60
1900-01											348	183	80	74	40		1396	52
1901-02											396	206	120	65	32		1574	55
1902-03											471	229	141	86	24		1605	102
1903-04											289	208	161	114	20		1462	107
1904-05											289	188	122	117	26		1690	96
1905-06											373	214	145	110	30		1937	119
1906-07											411	269	149	133	24		2192	116
1907-08											450	337	202	148	26		2308	139
1908-09											491	381	243	171	28		2523	232
1909-10											456	417	286	170	26		2305	146
1910-11											533	412	288	248	34		2407	204
1911-12											337	461	328	261	44		2628	232
1912-13											444	432	355	268	55		2927	269
1913-14											516	431	324	327	64		3089	229
1914-15											658	560	383	321	48		3314	357
1915-16											575	368	383	321	76		3340	210
1916-17											605	454	305	401	68		2777	3340
1917-18											422	471	378	262	36		2406	190
1918-19											231	349	294	239	34		144	2991
1919-20											810	322	254	201	34		144	3352
1919-20											894	401	300	269	43		167	

** Estimated.

** Calendar year.

College Enrollment, 1919-1920.

THE DIVISIONS.	Men.	Women.	Total.
The Division of Agriculture	638	2	640
Graduate Students	8		8
Seniors	83	1	84
Juniors	79		79
Sophomores	110		110
Freshmen	168		168
Special Students	71		71
Students in Farmers' Short Course	116	1	117
Students in Creamery Short Course	3		3
The Division of Veterinary Medicine	89		89
Graduate Students	1		1
Seniors	24		24
Juniors	21		21
Sophomores	9		9
Freshmen	30		30
Special Students	4		4
The Division of Engineering	914	4	918
Graduate Students	2		2
Seniors	29		29
Juniors	61		61
Sophomores	118		118
Freshmen	317	3	320
Special Students	25	1	26
Students in Short Course for Auto Mechanics	185		185
Students in Tractor Operators' Short Course	187		187
Students in other Engineering Short Courses	40		40
The Division of Home Economics		574	574
Graduate Students		5	5
Seniors		89	89
Juniors		85	85
Sophomores		93	93
Freshmen		216	216
Special Students		23	23
Students in Housekeepers' Short Course		57	57
Students in Lunch-room Management Short Course		6	6
The Division of General Science	263	240	503
Graduate Students	14	14	28
Seniors	27	20	47
Juniors	21	30	51
Sophomores	38	32	70
Freshmen	107	53	160
Special Students	56	91	147
The School of Agriculture (Secondary School)	165	59	224
Students in Agriculture	36		36
Students in Mechanic Arts	18		18
Students in Home Economics		22	22
Special Students	111	37	148
Noncollegiate Special Students*	180		180
The Summer School	159	256	415
Totals	2418	1125	3543
Counted twice	87	80	167
Net Totals (not including lists cited below)	2331	1045	3376
The Division of College Extension			6703
Students in Credit Courses			285
Students in Vocational Courses			122
Students in Reading Courses			6296

* Under the auspices of the Federal Board for Vocational Education.

Home Study Service Students

(Instruction by Correspondence)

For the year January 1, 1919, to January 1, 1920, the new enrollments for credit courses numbered 285, and those for extension or vocational courses 122. These numbers do not include enrollments holding over from the previous year. During the same period there were sent out 1,296 free reading courses, about 60,000 Boys' and Girls' Club lessons, 5,000 lessons to stationary engineers, and 2,500 follow-up lessons.

In the following list of enrollments, those taking credit courses are indicated by (c), and those taking vocational courses by (e). Vocational enrollments from the penitentiary are not included in the list, though they are included in the above number.

Adams, Cecyle (c); Oil City
 Adams, Kathryn R. (c); Topeka
 Alvord, Rauffe C. (c); Porcupine, S. Dak.
 Anderson, Mary (c); Huron
 Anderson, J. C. (c); Bennington
 Archer, Mabel (c); Norcatur
 Archer, Wm. L. (c); Densmore
 Armstrong, Max (c); Manhattan
 Ayers, Charlotte (c); La Harpe
 Baker, B. C. (e); Ashland
 Bauersfeld, Mrs. C. A. (c); Yates Center
 Baumgartner, Thomas R. (c); Devol, Okla.
 Barnes, Elmer B. (e); Grigsby
 Belt, Dorothy (c); Lane
 Berger, Marjorie (c); Sylvan Grove
 Bertram, Mrs. Mae (e); St. Francis
 Best, Laura (c); Admire
 Biby, Ernestine (c); Topeka
 Bixby, John (c); Coffeyville
 Botkin, Mildred N. (e); Burden
 Bowen, Velma (c); Covert
 Bowers, D. N. (c); Almena
 Bowers, James (e); Lawrence
 Boyer, F. P. (c); Bartlesville, Okla.
 Boyle, Nelson (c); Manhattan
 Boyle, John P. (c); Stilwell
 Bradley, Grace (c); Wichita
 Bradshaw, Irwin (c); Bucklin
 Brady, Nell (c); Smith Center
 Bray, Marian C. (c); Turon
 Brooks, Edwin H. (c); Tescott
 Brooks, Wm. H. (c); Manhattan
 Broternack, Mrs. Wayne (e); Kirwin
 Brown, Flossie (e); Natoma
 Brown, Francis M. (c); St. Marys
 Bruce, Wesley G. (c); Clay Center
 Bullen, B. F. (e); Syracuse
 Buller, J. S. (c); Coldwater
 Bullimore, R. (e); Tonganoxie
 Burkdoll, Bessie (c); Lane
 Burton, S. E. (c); Kearney, Neb.
 Butler, Vida (c); Albert
 Callinder, James (c); Manhattan
 Campbell, Barbara (c); Mulvane
 Campbell, D. R. (e); Manhattan
 Carr, Frank (c); Manhattan
 Carey, Myrtle (c); Manhattan
 Carlile, Mabel (c); Turon
 Cates, Vera (c); Pawnee, Okla.
 Cise, Buford (e); Salina
 Child, Paul (c); Le Roy
 Crithird, Virgil (c); Leon
 Clingan, Ella (c); Springfield, Mo.
 Close, Delmer (c); Belleville
 Clawson, Mrs. R. H. (e); Manhattan
 Coe, Maude M. (c); McPherson
 Coffin, Thelma E. (c); Le Roy
 Coffman, Harold (c); Chase
 Collins, Maurine (c); Belleville
 Copple, Robert F. (c); Manhattan
 Corby, Mrs. Nadia D. (c); Manhattan
 Corbett, Edith V. (e); Leona
 Cottrell, Roger C. (c); Irving
 Couch, Alvan H. (e); Haviland
 Covert, Mary Ida (c); Crawfordville
 Cromer, Fred B. (c); Manhattan
 Crow, Blaine (c); Havensville
 Cullum, Mae (c); Garnett
 Da Roin, Alice Claire (c); White City
 Dalton, Ruth M. (c); Frankfort
 Davis, Alberta (c); Topeka
 Davis, L. E. (e); Salina
 Deist, Lulu E. (c); Harper
 Dick, David P. (e); Newton
 Dick, Herbert (e); Newton
 Dickerhoof, Margaret (e); Stafford
 Dow, Davida (c); Salina
 Drevits, P. A. (e); Smolan
 Dubbs, Minnie (c); Ransom
 Duncan, Maud (e); Edgerton
 Ellis, Maggie (c); Westmoreland
 Elliott, J. C. (c); Belleville
 England, Melvin (c); Manhattan
 Enlow, Chas. R. (c); Harper
 Estes, Maude (c); Kansas City, Mo.
 Fine, A. M. (c); Quenemo
 Findley, Paul L. (c); Kiowa
 Fitzgerald, Mary (c); Waterville
 Fitzgerald, R. McLellan (e);
 Mumford Court, Mo.
 Fleming, Irene E. (c); Emporia
 Flippo, Gladys (c); Abilene
 Flynn, Bertha (c); Humboldt
 Foltz, Geo. A. (c); Oswego
 Ford, Gladys (c); Seneca
 Foster, Ralph L. (c); Penniman, Va.
 Fraim, Mrs. Ross (e); Liberal
 Freeman, Eli C. (c); Manhattan
 Frey, John (c); Manhattan
 Frost, Earl W. (c); Blue Rapids
 Funston, C. Edgar (c); Deerfield
 Furneaux, Abbie (c); Manhattan
 Gardner, Deane (c); Louisburg
 Gardner, Fred A. (c); Louisburg
 Garinger, Florence (c); Manhattan
 Garrett, E. L. (c); Coldwater
 Garvin, Artis Marie (c); Lawrence
 Gates, Clara (c); Esbon
 Gearn, W. A. (e); Harrison, Okla.
 Gillette, Margaret (c); Junction City
 Gill, Mary (e); Lawrence
 Githens, Otto B. (c); Scandia
 Goodwin, Ruth (c); Lamar, Mo.
 Gordan, Leila M. (c); Holton

HOME STUDY SERVICE STUDENTS—*continued.*

- Gordon, M. Alice (c); Leonardville
 Graham, Chas. H. (c); Stuttgart
 Graham, Emmett (c); Manhattan
 Graham, Mary (c); Garden City
 Graves, Chester (c); Manhattan
 Gramse, Greta (c); Eudora
 Greer, Monte W. (e); Burlingame
 Guernier, John W. (c); Coffeyville
 Guifre, Rexford (c); Simpson
 Haegle, Emma C. (c); Harlan
 Hall, Gussie (c); White Cloud
 Hancock, Gaylord (c); Emporia
 Haukenberry, Ada (c); Manhattan
 Haukenberry, Everett (c); Manhattan
 Harding, Ruth (c); Marion
 Hargiss, M. T. (e); Pittsburg
 Harling, Roy (e); Kincaid
 Harter, Earl P. (e); Mankato
 Harwood, Maud L. (c); Silvan Grove, Mo.
 Harvey, Cora (e); Neal
 Heaton, Leslie (c); Rush Center
 Hedquist, E. N. (e); Assaria
 Heinze, Elizabeth (c); Holyrood
 Hemphill, Albert (c); Blair, Neb.
 Hering, Olive (c); Stafford
 Herren, Sherman (c); Manhattan
 Higgins, H. P. (e); Blaine
 Hill, Robert Albert (c); Derby
 Hitch, Mary (c); Guymon, Okla.
 Hagenbuck, Mary E. (c); Troy
 Holtsclaw, Otis M. (c); Longton
 Honeywell, Alfred (c); Seneca
 Horlicker, W. R. (c); Colby
 Houghton, W. W. (c); Emporia
 Houser, H. O. (c); Wichita
 Howard, D. C. (c); Coldwater
 Howard, Frank W. (c); Oakley
 Howard, Frank L. (c); New York City
 Hull, Ira E. (e); Zenith
 Hull, Fred H. (c); Portis
 Hume, James (c); Humboldt
 Ikenberry, Mrs. Julia (c); Manhattan
 Isaacs, O. L. (e); Peabody
 Isaacson, Robert (c); Leavenworth
 Jackman, Mr. Joy E. (c); Independence
 Johnson, A. C. (e); Cawker City
 Johnson, Helen (c); Wichita
 Johnson, Leoti (c); Guymon, Okla.
 Johnston, Mary (c); Gardner
 Jones, E. A. (c); Munden
 Kahn, Helen C. (c); Dwight
 Kell, John L. (c); Hunter
 Kerr, Wm. C. (c); Manhattan
 Kirk, Jesse K. (e); Bazaar
 Kirkwood, Mildred (c); Marysville
 Kelmp, Harry A. (c); Leavenworth
 King, H. L. (c); Cedar Rapids, Iowa
 Knoy, Cecil (c); Dodge City
 Kosel, John (c); Bowman, N. Dak.
 Kramer, Jeffe (c); Spivey
 Lafferty, Mary Pearl (c); Ellsworth
 Lahr, Ernest L. (c); San Antonio, Tex.
 Lang, Ralph O. (e); Sylvia
 Larson, Merville (c); Vesper
 Lear, Caroline (c); Stafford
 Leith, Ione (c); Irving
 Leum, Lung Vied (c); Stanford Univ., Cal.
 Litchfield, Lois (c); Manhattan
 Lockhart, Karl (c); Humboldt
 Love, H. W. (e); Kenneth
 Lunt, C. C. (c); Pratt
 Lyons, E. S. (c); Lawrence
 Macauley, Amy (e); Topeka
 Magee, Alice (c); Manhattan
 Mall, Elva (e); Soldier
 Mallory, S. V. (e); Summerfield
 Mangelsdorf, Paul C. (c); Atchison
 Marby, Stanton (c); Camp Funston
 March, Elizabeth (e); Oaks, S. Dak.
 Martin, Helen (c); Harper
 Martin, Vola Ruth (c); Chandler, Okla.
 Marvin, C. A. (c); Branson
 Maupin, Forest (c); Derby
 May, Mattie (c); Manhattan
 McCall, Elizabeth (e); Leonardville
 McCampbell, Earl (e); Wakeeney
 McConnell, Edw. S. (c); Belvue
 McFarland, Eugene (e); Topeka
 McGehee, Inez (c); Belleville
 McGilliard, Paul (c); K. S. A. C.
 McKeeman, Mark (c); Manhattan
 McKittrick, F. M. (e); Wilson
 McMillan, Bessie (c); Home
 Meyer, Ralph (c); Junction City
 Means, Violet (e); Edgerton
 Meliza, Fern Elizabeth (e); La Harpe
 Meserve, A. L. (c); Ellis
 Meserve, Velma (c); Hays
 Middleton, Adda (c); Ada
 Miller, Carl (e); Winfield
 Miller, Cecil (e); Meade
 Miller, J. M. (c); Manhattan
 Miller, Mathilde E. (c); Kansas City, Kan.
 Mills, C. A. (e); Lansing
 Mitchell, E. W. (c); Lovewell
 Mogge, Frieda E. (c); Alma
 Mohlman, Haw K. (c); Manhattan
 Montgomery, Katherine (c);
 Cottonwood Falls
 Moore, W. A. (e); Gridley
 Moorman, Allan (c); Manhattan
 Morlan, F. B. (e); Courtland
 Morris, Chas. F. (c); Wichita
 Moser, Mrs. Mollie S. (c); Westphalia
 Moyer, M. O. (c); Savonburg
 Muir, Edith (c); Manhattan
 Mullen, Joseph (c); Broughton
 Myers, C. H. (c); Hutchinson
 Myers, Jesse B. (c); Camp Funston
 Maher, Wm. A. (c); Kansas City
 Neel, Ward S. (e); Greeley
 Neely, Tom (c); Abilene
 Neighbor, Charles Henry (c); Junction City
 Nelson, Harry H. (c); Wakarusa
 Nevins, Eulalia (c); Dodge City
 Nicholson, Bethel (c); Wellington
 Nieman, Helen (c); White Water
 Nuzum, Fred (c); White Cloud
 Oerke, Bess (c); Caldwell
 Olander, Rena (c); Little River
 Olson, Arnold (e); Clay Center
 Palmer, Blanche (c); Sterling, Colo.
 Palmer, William (c); Leon
 Perrill, L. T. (c); Asherville
 Peters, J. F. (c); Funston
 Pharr, T. R. (c); Manhattan
 Phillipenny, Roberta J. (c); Manhattan
 Porter, Mrs. Sybil (e); K. S. A. C.
 Potter, S. L. (c); Westmoreland
 Powell, Faye M. (c); Iola
 Price, Elva (c); Baileyville
 Prickett, Doris (c); Wamego
 Prizer, R. M. (c); Clyde
 Quigley, C. B. (c); Blaine
 Ragh, Roland (c); K. S. A. C.
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 Ramsey, O. A. (c); Topeka
 Read, C. W. (c); Cottonwood Falls
 Rebstock, Phoebe (c); Newton
 Reed, Clifford C. (c); Junction City
 Reid, Mrs. Josephine (e); Great Bend
 Reuter, Mrs. Wm. (e);
 Parkersburg, W. Va.
 Reynolds, Hattie E. (c); Camp Grant, Ill.
 Rhine, F. A. (c); Cleburne
 Richmond, Cecil K. (c); Topeka
 Riggs, Grace (e); Independence, Mo.
 Roberts, Norman L. (c); Manhattan

HOME STUDY SERVICE STUDENTS—concluded.

Robinson, Edith (c); Atwood
 Robinson, W. E. (c); Towanda
 Rommell, Lillian (c); Waterville
 Rust, John H. (c); Morrowville
 Sanderson, Agnes (c); Little River
 Sanderson, Gertrude (c); Little River
 Sandman, Abbie (c); Manhattan
 Saum, Loyal K. (c); Norton
 Savatzky, John (e); Buhler
 Schaal, Laurence (c); Manhattan
 Schoneweis, Carl H. (e); Clay Center
 Scott, W. W. (c); El Dorado
 Seute, Herman (e); Lowemont
 Shell, Gladys (e); Deerhead
 Short, Laura Mae (e); Topeka
 Simpson, Lenora (c); Kansas City, Mo.
 Sloop, Homer J. (c); Manhattan
 Smith, Clara M. (c); Mound City
 Smith, Edith (c); Little River
 Smith, Madge (c); Little River
 Smith, Mildred (c); Burlingame
 Smythe, Ruth (c); Junction City
 Snapp, J. C. (c); Manhattan
 Snider, Moose (c); Dodge City
 Spring, Clyde (c); Manhattan
 Stackhouse, G. L. (e); McClure, Ohio
 Stalder, Edw. J. (e); Long Island
 Starr, Esther May (c); Towanda
 Steely, Edna (c); Rulo, Neb.
 Stein, Mrs. Mollie S. (c); Centralia
 Sterling, Mildred (c); Clay Center
 Stevenson, Rev. (e); Council Grove
 Stewart, Lillian (c); Watson, Mo.
 Stewart, Velda (e); Morganville
 Stonge, Esther (c); Riley
 Strahl, Paul (e); Overland Park
 Strowig, Gertie Marie (c); Topeka
 Stuejord, Ivar Olson (e); Hays City
 Summers, H. L. (c); Manhattan
 Swimm, Harry (c); Severance
 Swingle, Chas. F. (c); Manhattan
 Tayer, Marie (e); Waldron
 Taylor, Edith M. (c); Concordia
 Taylor, Ruth (c); Tyro
 Terrell, Henrietta (e); Herington
 Thackery, Joe T. (c); Kansas City, Mo.
 Thayer, Wm. B. (e); Martin City, Mo.
 Thiele, Louis S. (e); Haddam
 Thomas, Marie L. (c); Selma
 Thompson, J. A. (e); Delaware
 Thompson, Lela B. (e); Geneseo
 Thompson, Otis E. (e); Peabody
 Thompson, Rilla (c); McPherson
 Thornburg, Rowena (c); Formoso
 Thrum, Ludwig (c); Belleville
 Totten, Florence (c); Kansas City, Mo.
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 Tupper, Paul (c); Lecompton
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 Vale, Mary L. (c); Brownell
 Van Tries, Mabel (c); Wellsville
 Viers, Belle (c); Manhattan
 Vita, Sister Mary (c); Bancroft
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 Weatherbee, Clifford C. (c); Montrose
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John Burton Elliott, *Accompanist*

The Saint Cecilia Club

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Marian Clarke
Netta Dubbs
Ina Findley
Joyce Fuger
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Ruth Gilles
Gladys Graybill
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Esther Story
Arrilla Wadsworth
Faye Williams

Frances Stall, *Accompanist*

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