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No. 31

MASSACHUSETTS
AGRICULTURAL COLLEGE

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THE M. A. C. BULLETIN
AMHERST, MASSACHUSETTS

VOLUME XV JANUARY, 1923 NUMBER I

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THE SIXTIETH ANNUAL REPORT OF THE
MASSACHUSETTS AGRICULTURAL COLLEGE.

PART II.—CATALOGUE OF THE COLLEGE FOR
1922-1923



MASSACHUSETTS
AGRICULTURAL COLLEGE
AMHERST, MASS.

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M. S. L.
JULY, 1952

PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION, BOSTON, Jan. 31, 1923.

To the Honorable Senate and House of Representatives.

GENTLEMEN:— In accordance with the provisions of section 8 of chapter 75 of the General Laws, I transmit to you herewith, for the use of the General Court, the annual report of the Massachusetts Agricultural College for the year ending Nov. 30, 1922.

Respectfully yours,

PAYSON SMITH,
Commissioner of Education.

The Commonwealth of Massachusetts

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Nov. 30, 1922.

To the Commissioner of Education.

SIR:— On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith Part II of the sixtieth annual report of the trustees for the fiscal year ended Nov. 30, 1922, this being the catalogue of the college.

Respectfully yours,

KENYON L. BUTTERFIELD,
President.

SEP 20 1923

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THE MASSACHUSETTS
AGRICULTURAL COLLEGE

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and 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 of life. — *Act of Congress, July 2, 1862.*

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

CALENDAR.

1922-23.

REGULAR AND TWO-YEAR COURSES.

1922.

September 27, Wednesday, 1.30 P.M.	. . . . .	Fall term begins; assembly.
October 12, Thursday . . . . .	. . . . .	Holiday, Columbus Day.
November 29-December 4, Wednesday, 12 M.-Monday, 7.30 A.M.	. . . . .	Thanksgiving recess.
December 22, Friday, 5 P.M. . . . .	. . . . .	Fall term ends.

1923.

January 2, Tuesday, 7.30 A.M.	. . . . .	Winter term begins.
February 22, Thursday . . . . .	. . . . .	Holiday, Washington's Birthday.
March 23, Friday, 5 P.M. . . . .	. . . . .	Winter term ends.
March 26, Monday, 1 P.M. . . . .	. . . . .	Spring term begins.
April 19, Thursday . . . . .	. . . . .	Holiday, Patriots' Day.
May 30, Wednesday . . . . .	. . . . .	Holiday, Memorial Day.
June 9-11, Saturday-Monday . . . . .	. . . . .	Commencement.
June 14-16, Thursday-Saturday . . . . .	. . . . .	Entrance examinations.
September 19-22, Wednesday-Saturday . . . . .	. . . . .	Entrance examinations.
September 26, Wednesday, 1.30 P.M. . . . .	. . . . .	Fall term begins; assembly.
October 12, Friday . . . . .	. . . . .	Holiday, Columbus Day.
November 28-December 3, Wednesday, 12 M.-Monday, 7.30 A.M.	. . . . .	Thanksgiving recess.
December 21, Friday, 5 P.M. . . . .	. . . . .	Fall term ends.
December 31, Monday, 1 P.M. . . . .	. . . . .	Winter term begins.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was organized under the national land grant act of 1862. This legislation is also known as the Morrill act, the original bill having been framed by Justin Smith Morrill, Senator from Vermont, and its final enactment secured under his leadership. It provided that public lands be assigned to the several States and territories, the funds from the sale of which were to be used to establish and maintain colleges of agriculture and mechanic arts. The Massachusetts Agricultural College was among the first of these institutions established. When this act was passed the Massachusetts Institute of Technology was already organized, and the State of Massachusetts definitely decided that the instruction in the mechanic arts should be at the institute, and that the new institution should confine its work to agriculture. On this account the Massachusetts Agricultural College has the unique distinction of being the only separate agricultural college in the country.

In 1863 the State of Massachusetts accepted the provisions of the Morrill act and incorporated the Agricultural College. The location at Amherst was decided only after long and careful study by the original Board of Trustees. The college was formally opened to students on the 2d of October, 1867, with a faculty of four teachers and with four wooden buildings.

The Massachusetts Legislature has granted money for the erection of practically all of the buildings now on the grounds. In view of the fact that the annual income from the original endowment has been only a few thousand dollars, it has been necessary for the State to assume responsibility for the current expenses of the institution.

ORGANIZATION. — The college is a State institution, and as such is subject to the laws governing and the rules applying to all State departments and institutions. The work of the college is directed by a board of eighteen trustees. Four of these are ex-officio members, — the Governor of the State, the Commissioner of Education, the Commissioner of Agriculture and the president of the college. The other fourteen members are appointed by the Governor for terms of seven years each, or two each year. The immediate control of the institution is vested in the president of the college. The administrative officers, having supervision of the various departments of activity, are directly responsible to the president.

In carrying out its purpose the college has organized three distinct yet correlated types of work, — namely, research, resident instruction and extension service.

RESEARCH. — Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established and supported as a department of the college.

For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the Federal government. In 1906 the Federal government largely increased its support on condition that the money thus provided should be used only for research. The station now receives about three-fourths of its support from the State.

The station is under the direct supervision of the Board of Trustees; the chief officer is the director, who is responsible to the president. It is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of these departments are heads of corresponding departments in the college. The station publishes numerous bulletins and two annual reports, one scientific, the other popular. These publications are free and circulate extensively.

RESIDENT INSTRUCTION. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The chief aim of the institution, through its resident instruction, is to prepare men and women for the agricultural vocations. The term "agricultural vocations" is here used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, floriculture, landscape gardening and forestry. Students are also trained for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for scientific work in chemistry, entomology, botany and microbiology.

Though training for the agricultural vocations is thus the chief concern of the college, students should find the course one that trains them admirably for pursuits in which the sciences are an essential preparation. The course of study aims also to combine an adequate general education with specialized technical and practical training.

FOUR-YEAR COURSES. — Twenty-nine teaching departments offer instruction in agriculture, horticulture, sciences, the humanities, rural social science and rural home making. A system of major courses permits the student to elect major work in one of eighteen departments, and to specialize in it and allied subjects for a period of two years. The degree of bachelor of science is granted on the satisfactory completion of the four years' work of collegiate grade.

SHORT COURSES. — In order to extend the advantages of the institution to those men and women who cannot or do not care to take advantage of the four-year course, various short courses are offered. Chief among these are a two-year course in practical agriculture, a summer school of agriculture and country life, and a winter school of agriculture.

GRADUATE SCHOOL. — The graduate school is organized to provide the necessary training for scientific leadership in agriculture and allied sciences. The degrees of master of agriculture, master of landscape architecture, master of science, doctor of agriculture and doctor of philosophy may be earned upon the completion of satisfactory study, research and thesis.

THE EXTENSION SERVICE. — The extension service is an organized effort

to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, for various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose sole business it is to present the instruction of the college to individuals and various organizations throughout the State.

LOCATION AND EQUIPMENT. — The Agricultural College is located in the town of Amherst. The grounds comprise more than 650 acres, lying about a mile north of the village center. The college has also a demonstration forest of 755 acres, located 6 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is 97 miles from Boston, and may be reached by the Central Massachusetts division of the Boston & Maine Railroad, or by the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

MILITARY DRILL. — By Federal law military drill is required of all regular students attending the Massachusetts Agricultural College.

THE TRUSTEES.

ORGANIZATION OF 1922.

MEMBERS OF THE BOARD.

	TERM EXPIRES
CHARLES A. GLEASON of North Brookfield	1923
JAMES F. BACON of Boston	1923
FRANK GERRETT of Greenfield	1924
HAROLD L. FROST of Arlington	1924
CHARLES H. PRESTON of Danvers	1925
CARLTON D. RICHARDSON of West Brookfield	1925
DAVIS R. DEWEY of Cambridge	1926
JOHN F. GANNON of Pittsfield	1926
ARTHUR G. POLLARD of Lowell	1927
GEORGE H. ELLIS of West Newton	1927
ELMER D. HOWE of Marlborough	1928
ATHERTON CLARK of Newton	1928
NATHANIEL I. BOWDITCH of Frammingham	1929
WILLIAM WHEELER of Concord	1929

MEMBERS EX OFFICIO.

His Excellency GOVERNOR CHANNING H. COX, *President of the Board of Trustees.*
 KENYON L. BUTTERFIELD, *President of the College.*
 PAYSON SMITH, *State Commissioner of Education.*
 ARTHUR W. GILBERT, *State Commissioner of Agriculture.*

OFFICERS OF THE TRUSTEES.

His Excellency GOVERNOR CHANNING H. COX of Boston, *President.*
 CHARLES A. GLEASON of North Brookfield, *Vice-President.*
 RALPH J. WATTS of Amherst, *Secretary.*
 FRED C. KENNEY of Amherst, *Treasurer.*
 CHARLES A. GLEASON of North Brookfield, *Auditor.*

STANDING COMMITTEES OF THE TRUSTEES.¹

Committee on Finance.

CHARLES A. GLEASON, <i>Chairman.</i>	ARTHUR G. POLLARD.
GEORGE H. ELLIS.	CARLTON D. RICHARDSON.
NATHANIEL I. BOWDITCH.	ATHERTON CLARK.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, <i>Chairman.</i>	PAYSON SMITH.
ELMER D. HOWE.	DAVIS R. DEWEY.
JAMES F. BACON.	JOHN F. GANNON.

ARTHUR W. GILBERT.

Committee on Farm.

NATHANIEL I. BOWDITCH, <i>Chairman.</i>	GEORGE H. ELLIS.
FRANK GERRETT.	ARTHUR W. GILBERT.

CARLTON D. RICHARDSON.

¹ The president of the college is ex-officio member of each committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
CHARLES A. GLEASON.

ELMER D. HOWE.
ATHERTON CLARK.

CHARLES H. PRESTON.

Committee on Experiment Department.

CHARLES H. PRESTON, *Chairman.*
ARTHUR W. GILBERT.

ARTHUR G. POLLARD.
HAROLD L. FROST.

CARLTON D. RICHARDSON.

Committee on Buildings and Arrangement of Grounds.

GEORGE H. ELLIS, *Chairman.*
FRANK GERRETT.
WILLIAM WHEELER.

JAMES F. BACON.
CHARLES H. PRESTON.
ATHEPTON CLARK.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.

DAVIS R. DEWEY.
NATHANIEL I. BOWDITCH.
JOHN F. GANNON.

ARTHUR W. GILBERT.

OFFICERS OF THE INSTITUTION.

As of Nov. 1, 1922.

OFFICERS OF GENERAL ADMINISTRATION.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College.	
HENRY S. GREEN, A.B., LL.D.	Mount Pleasant.
Librarian of the College.	
PHILIP B. HASBROUCK, B.Sc.	31 Fearing Street.
Registrar of the College.	
SIDNEY B. HASKELL, B.Sc.	2 Mount Pleasant.
Director of the Experiment Station.	
FRED C. KENNEY	Mount Pleasant.
Treasurer of the College.	
EDWARD M. LEWIS, A.M.	National Bank Block.
Dean of the College.	
CHARLES E. MARSHALL, Ph.D.	44 Sunset Avenue.
Director of the Graduate School.	
RICHARD A. MELLEN, B.Sc.	Fearing Street.
Field Agent.	
JOHN PHELAN, A.M.	Mount Pleasant.
Director of Short Courses.	
RALPH J. WATTS, B.Sc.	101 Butterfield Terrace.
Secretary of the College.	
JOHN D. WILLARD, B.A.	31 Lincoln Avenue.
Director of the Extension Service.	

THE FACULTY OF INSTRUCTION.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College and Head of the Division of Rural Social Science.	
MAX F. ABELL, B.Sc.	North Amherst.
Assistant Professor of Farm Management.	
GEORGE W. ALDERMAN, B.A.	North Pleasant Street.
Instructor in Physics.	
CHARLES P. ALEXANDER, Ph.D.	120 Pleasant Street.
Assistant Professor of Entomology.	
EDGAR L. ASHLEY, A.M.	Amherst House.
Professor of German.	
ROY C. AVERY, M.Sc.	15 Spring Street.
Instructor in Microbiology.	
LUTHER BANTA, B.Sc.	Sunset Avenue.
Assistant Professor of Poultry Husbandry.	
MARY A. BARTLEY	50 Pleasant Street.
Instructor in Home Economics.	
ARTHUR B. BEAUMONT, Ph.I.	51 Amity Street.
Professor of Agronomy and Head of Department.	
CARL M. BOGHOLT, B.Sc.	The Davenport.
Instructor in English.	
THOMAS BRADY, Jr., Captain, Cavalry, U. S. A.	Kendrick Place.
Assistant Professor of Military Science and Tactics.	
ALEXANDER E. CANCE, Ph.D.	9 Fearing Street.
Professor of Agricultural Economics and Head of Department.	

JOSEPH S. CHAMBERLAIN, Ph.D.	Mount Pleasant.
Professor of Organic and Agricultural Chemistry.	
WALTER W. CHENOWETH, M.Sc.	North Amherst.
Professor of Horticultural Manufactures and Head of Department.	
ORTON L. CLARK, B.Sc.	12 College Street.
Assistant Professor of Botany.	
HERBERT L. COLLINS, B.Sc.	35 North Prospect Street.
Instructor in Physical Education.	
G. CHESTER CRAMPTON, Ph.D.	Fernald Hall.
Professor of Insect Morphology.	
WILLIAM H. DAVIS, Ph.D.	8 Allen Street.
Assistant Professor of Botany.	
LLEWELLYN L. DERBY	25 Taylor Street, Holyoke.
Instructor in Physical Education.	
BROOKS D. DRAIN, B.Sc.	50 Pleasant Street.
Assistant Professor of Pomology.	
HENRY T. FERNALD, Ph.D.	44 Amity Street.
Professor of Entomology, Head of Department, Chairman of Division of Science.	
JAMES A. FOORD, M.Sc.Agr.	54 Lincoln Avenue.
Professor of Farm Management, Head of Department, Head of Division of Agriculture.	
PHILIP E. FOSS, B.Sc.	42 Lincoln Avenue.
Instructor in Zoölogy.	
WILLARD K. FRENCH, B.Sc.	10 Nutting Avenue.
Assistant Professor of Pomology.	
GEORGE E. GAGE, Ph.D.	The Davenport.
Professor of Animal Pathology and Head of Department of Veterinary Science and Animal Pathology.	
MARY E. M. GARVEY, B.Sc.	29 South Prospect Street.
Instructor in Microbiology.	
GUY V. GLATFELTER, M.Sc.	10 Kendrick Place.
Assistant Professor of Animal Husbandry.	
HELENA T. GOESSMANN, M.Ph.	35 South Pleasant Street.
Instructor in English.	
CLARENCE E. GORDON, Ph.D.	38 Lincoln Avenue.
Professor of Zoölogy and Geology, and Head of Department.	
HAROLD M. GORE, B.Sc.	70 Lincoln Avenue.
Assistant Professor of Physical Education.	
CHARLES H. GOULD, B.Sc.	170 South Pleasant Street.
Assistant Professor of Pomology.	
JOHN C. GRAHAM, B.Sc.Agr.	68 Lincoln Avenue.
Professor of Poultry Husbandry and Head of Department.	
EMORY E. GRAYSON, B.Sc.	Belchertown.
Instructor in Physical Education.	
LAURENCE R. GROSE, A.B., M.F.	45 Amity Street.
Professor of Forestry and Head of Department.	
CHRISTIAN I. GUNNESS, B.Sc.	105 Butterfield Terrace.
Professor of Rural Engineering and Head of Department.	
MARGARET HAMLIN, B.A.	12 North East Street.
Agricultural Counsellor for Women.	
ELMER A. HARRINGTON, Ph.D.	7 Allen Street.
Professor of Physics.	
ROY D. HARRIS, B.Sc.	12 Chestnut Street.
Assistant Professor of Vegetable Gardening.	
ARTHUR K. HARRISON	8 Allen Street.
Assistant Professor of Landscape Gardening.	
WILLIAM R. HART, M.A., LL.B.	97 Pleasant Street.
Professor of Agricultural Education and Head of Department.	
PHILIP B. HASBROUCK, B.Sc.	31 Fearing Street.
Professor of Physics and Head of Department.	
CURRY S. HICKS, B.Pd.	The Davenport.
Professor of Physical Education and Hygiene, and Head of Department.	
MRS. CURRY S. HICKS ¹	The Davenport.
Instructor in Physical Education.	

¹ Temporary.

ARAO ITANO, Ph.D.	Amherst House.
Assistant Professor of Microbiology.	
HENRY F. JUDKINS, B.Sc.	103 Butterfield Terrace.
Professor of Dairying and Acting Head of Department.	
ARTHUR N. JULIAN, A.B.	4 Fairview Way.
Assistant Professor of German.	
HERMAN KOBBE, Major, Cavalry, U. S. A.	Sunset Avenue.
Assistant Professor of Military Science and Tactics.	
MARSHALL O. LANPHEAR, B.Sc.	4 Nutting Avenue.
Instructor in Agronomy.	
JOHN B. LENTZ, A.B., V.M.D.	3 Dana Street.
Assistant Professor of Veterinary Science and College Veterinarian.	
EDWARD M. LEWIS, A.M.	National Bank Block.
Professor of Languages and Literature, Head of Department and Acting Head of Division of Humanities.	
JOSEPH B. LINDSEY, Ph.D.	47 Lincoln Avenue.
Goessmann Professor of Agricultural Chemistry and Head of Department.	
WILLIAM L. MACHMER, M.A.	25 Amity Street.
Professor of Mathematics and Assistant Dean.	
WARREN B. MACK, B.Sc. ¹	84 Pleasant Street.
Instructor in Pomology.	
ALEXANDER A. MACKIMMIE, A.M.	North Amherst.
Professor of French.	
JOHN J. MAGINNIS, B.Sc.	35 North Prospect Street.
Instructor in Agricultural Economics.	
CHARLES E. MARSHALL, Ph.D.	44 Sunset Avenue.
Professor of Microbiology and Head of Department.	
FREDERICK A. McLAUGHLIN, B.Sc.	4 Nutting Avenue.
Assistant Professor of Botany	
CHARLES A. MICHELS, M.Sc.	9 Fearing Street.
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FRANK C. MOORE, A.B.	10 Allen Street.
Assistant Professor of Mathematics.	
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Assistant Professor of Floriculture.	
JOHN B. NEWLON	North Amherst.
Instructor in Rural Engineering.	
JOSEPH F. NOVITSKI, B.Sc. ²	4 Tyler Place.
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Professor of Botany and Head of Department.	
JOHN E. OSTRANDER, A.M., C.E.	33 North Prospect Street.
Professor of Mathematics and Head of Department.	
LAURENCE H. PARKER, A.B.	The Davenport.
Professor of Citizenship and Acting Head of Department of Economics and Sociology.	
CHARLES H. PATTERSON, A.M.	26 Lincoln Avenue.
Professor of English.	
HARLOW L. PENDLETON, B.Sc.	105 Main Street.
Instructor in Dairying.	
CHARLES A. PETERS, Ph.D.	Sunset Place.
Professor of Inorganic and Soil Chemistry.	
JOHN PHELAN, A.M.	3 Mount Pleasant.
Professor of Rural Sociology and Head of Department.	
NORMAN E. PHILLIPS, B.Sc. ³	18 Northampton Road.
Assistant Professor of Beekeeping.	
WAYLAND R. PORTER, B.Sc.	Belchertown Road.
Instructor in Mathematics.	
WALTER E. PRINCE, A.M.	29 Amity Street.
Assistant Professor of English.	
GEORGE F. PUSHEE	North Amherst.
Instructor in Rural Engineering.	

¹ Paid from Federal funds for vocational education.³ Resigned October 31.² On leave of absence.

FRANK P. RAND, A.M.	North Amherst.
Assistant Professor of English.	
VICTOR A. RICE, B.Sc.Agr.	10 Woodside Avenue.
Assistant Professor of Animal Husbandry.	
WILLIAM F. ROBERTSON, B.Sc.	10 Nutting Street.
Instructor in Horticultural Manufactures.	
ROLAND W. ROGERS, B.Sc.	32 North Prospect Street.
Assistant Professor of Horticulture.	
SCHUYLER M. SALISBURY, B.Sc.Agr.	12 Nutting Avenue.
Professor of Animal Husbandry and Head of Department.	
WILLIAM C. SANCTUARY, B.Sc.	South Pleasant Street.
Professor of Poultry Husbandry.	
DONALD W. SAWTELLE, M.Sc.	13 Fearing Street.
Assistant Professor of Agricultural Economics.	
FRED C. SEARS, M.Sc.	Mount Pleasant.
Professor of Pomology and Head of Department.	
PAUL SEREX, JR., M.Sc.	Lincoln Avenue.
Assistant Professor of Chemistry.	
FREDERICK E. SHNYDER, A.B., Major, Cavalry, U. S. A.	Amherst House.
Professor of Military Science and Tactics.	
JAMES V. V. SHUFELT, B.Sc., Captain, Cavalry, U. S. A.	Mount Pleasant.
Assistant Professor of Military Science and Tactics.	
NEWELL L. SIMS, Ph.D.	16 North Prospect Street.
Professor of Rural Sociology.	
EDNA L. SKINNER, B.Sc.	50 Lincoln Avenue.
Professor of Home Economics, Head of Department, Adviser of Women.	
RICHARD W. SMITH, JR., B.Sc.	17 Fearing Street.
Instructor in Dairying.	
GRANT B. SNYDER, B.Sc. Agr.	17 Fearing Street.
Instructor in Vegetable Gardening.	
JAMES L. STRAHAN, M.Sc.	50 Amity Street.
Assistant Professor of Rural Engineering.	
LEWIS W. TAYLOR, B.Sc.	Poultry Plant.
Instructor in Poultry Husbandry.	
CHARLES H. THAYER	South East Street.
Instructor in Agronomy.	
CLARK L. THAYER, B.Sc.	North Amherst.
Professor of Floriculture and Head of Department.	
WESTON C. THAYER, B.Sc.	14 Nutting Avenue.
Instructor in Animal Husbandry.	
GUY A. THELIN, B.Sc.	21 Pleasant Street.
Instructor in Agronomy.	
PAUL E. THISELL, A.B.	81 Pleasant Street.
Instructor in French.	
CHARLES H. THOMPSON, M.Sc.	Mount Pleasant.
Assistant Professor of Horticulture.	
HAROLD F. THOMPSON, B.Sc.	Lexington.
Professor of Vegetable Gardening and Head of Department.	
RAY E. TORREY, Ph.D.	Care of Mrs. H. D. Fearing.
Assistant Professor of Botany.	
PAUL W. VIETS	5 Kendrick Place.
Supervisor of Placement Training.	
FRANK A. WAUGH, M.Sc.	Campus.
Professor of Landscape Gardening, Head of Department, Head of Division of Horticulture.	
WINTHROP S. WELLES, B.Sc.	23 Lincoln Avenue.
Professor of Agricultural Education.	
CHARLES WELLINGTON, Ph.D.	34 Amity Street.
Professor of Chemistry.	
T. GEORGE YAXIS, M.Sc.	5 Tillson Court.
Assistant Professor of Dairying.	

THE EXPERIMENT STATION STAFF.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House, President of the College.
SIDNEY B. HASKELL, B.Sc.	2 Mount Pleasant.
Director.	
JAMES R. ALCOCK	North Amherst.
Laboratory Assistant in Animal Nutrition.	
HARRY L. ALLEN	89 Main Street.
Laboratory Assistant in Chemistry.	
PAUL J. ANDERSON, Ph.D.	25 Lincoln Avenue.
Research Professor of Botany.	
JOHN G. ARCHIBALD, B.Sc.Agr.	West Pelham.
Assistant Research Professor of Chemistry.	
ALYN S. BALL	94 Main Street.
Laboratory Assistant in Botany.	
ARTHUR B. BEAUMONT, Ph.D.	51 Amity Street.
Professor of Agronomy and Head of Department.	
ARTHUR I. BOURNE, B.A.	12 East Pleasant Street.
Assistant Research Professor of Entomology.	
ALEXANDER E. CANCE, Ph.D.	9 Fearing Street.
Professor of Agricultural Economics and Head of Department.	
WALTER W. CHENOWETH, M.Sc.	North Amherst.
Professor of Horticultural Manufactures and Head of Department.	
ORTON L. CLARK, B.Sc.	12 College Street.
Assistant Professor of Botany.	
ROBERT L. COFFIN	19 Phillips Street.
Investigator in Agriculture.	
CHARLES O. DUNBAR, B.Sc.	84 Pleasant Street.
Investigator in Chemistry.	
HENRY T. FERNALD, Ph.D.	44 Amity Street.
Professor of Entomology and Head of Department.	
JAMES A. FOORD, M.Sc.Agr.	54 Lincoln Avenue.
Professor of Farm Management and Head of Department.	
HENRY J. FRANKLIN, Ph.D.	East Wareham.
Assistant Research Professor in charge of Cranberry Substation.	
ARTHUR P. FRENCH, B.Sc.	5 Hitchcock Street.
Investigator in Pomology.	
GEORGE E. GAGE, Ph.D.	The Davenport.
Professor of Animal Pathology and Head of Department of Veterinary Science and Animal Pathology.	
EDWIN F. GASKILL, M.Sc.	North Pleasant Street.
Assistant Research Professor of Agriculture.	
JOHN C. GRAHAM, B.Sc.	68 Lincoln Avenue.
Professor of Poultry Husbandry and Head of Department.	
CHRISTIAN I. GUNNESS, B.Sc.	105 Butterfield Terrace.
Professor of Rural Engineering and Head of Department.	
FRANK A. HAYS, Ph.D.	Sunset Avenue.
Research Professor of Poultry Husbandry.	
EDWARD B. HOLLAND, Ph.D.	28 North Prospect Street.
Research Professor of Chemistry.	
ARAO ITANO, Ph.D.	Amherst House.
Assistant Professor of Microbiology.	
LORIAN P. JEFFERSON, M.A.	The Davenport.
Assistant Research Professor of Agricultural Economics.	
CARLETON P. JONES, M.Sc.	8 Nutting Avenue.
Assistant Research Professor of Chemistry.	
HENRY F. JUDKINS, B.Sc.	103 Butterfield Terrace.
Professor of Dairying and Acting Head of Department.	
WEBSTER S. KROUT, M.A.	Lexington.
Assistant Research Professor of Botany.	
JOHN B. LENTZ, A.B., V.M.D.	42 Lincoln Avenue.
Assistant Research Professor of Veterinary Science.	

JOSEPH B. LINDSEY, Ph.D.	47 Lincoln Avenue.
Vice-Director, Professor of Chemistry and Head of Department.	
CHARLES E. MARSHALL, Ph.D.	44 Sunset Avenue.
Professor of Microbiology and Head of Department.	
FRED W. MORSE, M.Sc.	40 Pleasant Street.
Research Professor of Chemistry.	
A. VINCENT OSMUR, M.Sc.	16 Northampton Road.
Professor of Botany and Head of Department.	
JOHN E. OSTRANDER, A.M., C.E.	33 North Prospect Street.
Meteorologist.	
NORMAN J. PYLE, D.V.M. ¹	- -
Assistant Research Professor of Avian Pathology.	
RUBY SANBORN, A.B.	45 Pleasant Street.
Investigator in Poultry Husbandry.	
FRED C. SEARS, M.Sc.	Mount Pleasant.
Professor of Pomology and Head of Department.	
JACOB K. SHAW, Ph.D.	5 Fairview Way.
Research Professor of Pomology.	
HAROLD F. TOMPSON, B.Sc.	Lexington.
In charge of Market Garden Field Station, Professor of Vegetable Gardening and Head of Department.	
ANNA M. WALLACE, M.A.	Inwood.
Curator, Department of Botany.	
FRANK A. WAUGH, M.Sc.	Campus.
Head of Division of Horticulture.	
HARLAN N. WORTHLEY, B.Sc.	120 Pleasant Street.
Investigator in Entomology.	

CONTROL SERVICE STAFF.

OLIVER S. FLINT, B.Sc.	18 Nutting Avenue.
Analyst.	
HENRI D. HASKINS, B.Sc.	Easthampton.
Official Chemist, Fertilizer Control.	
MILDRED H. HOLLIS	17 Fearing Street.
Analyst.	
JAMES T. HOWARD	7 Phillips Street.
Inspector.	
FRANK J. KOKOSKI, B.Sc.	Northampton Road.
Analyst.	
JOHN J. SMITH	9 Phillips Street.
Collector of Blood Samples.	
PHILIP H. SMITH, M.Sc.	102 Main Street.
Official Chemist, Feed Control.	
RAYMOND W. SWIFT, B.Sc.	North Amherst.
Analyst.	
LEWELL S. WALKER, B.Sc.	19 Phillips Street.
Assistant Official Chemist, Fertilizer Control.	

THE EXTENSION SERVICE STAFF.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College.	
JOHN D. WILLARD, B.A.	31 Lincoln Avenue.
Director.	
JOHN B. ABBOTT, M.Sc.	21 Pleasant Street.
Extension Professor of Agronomy.	
WILLIAM R. COLE	5 East Pleasant Street.
Assistant Extension Professor of Horticultural Manufactures.	
GEORGE L. FARLEY, M.Sc.	61 Amity Street.
State Club Leader.	

¹ Appointment effective November 15.

CLIFFORD J. FAWCETT, B.Sc.	7 Woodside Avenue.
Extension Professor of Animal Husbandry.	
ROBERT D. HAWLEY, B.Sc.	5 Hitchcock Street.
Supervisor of Extension Schools and Exhibits.	
WILLIAM F. HOWE	North Amherst.
Assistant State Club Leader.	
WILLIAM P. B. LOCKWOOD, M.Sc.	West Newton.
Extension Professor of Dairying.	
LOUIS M. LYONS, B.Sc.	10½ Kellogg Avenue.
Extension Editor and Supervisor of Correspondence Courses.	
ALLISTER F. MACDOUGALL, B.Sc.	41 East Pleasant Street.
Extension Professor of Farm Management.	
ROBERT J. MCFALL, Ph.D.	20 Spring Street.
Extension Professor of Agricultural Economics.	
WILLIAM C. MONAHAN, B.Sc.	34 Pleasant Street.
Extension Professor of Poultry Husbandry.	
DOROTHY W. MURDOCK	87 Pleasant Street.
Assistant State Club Leader.	
EARLE H. NODINE, B.Sc.	21 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.	
SUMNER R. PARKER, B.Sc.	South Amherst.
Supervisor of County Agent Projects.	
LUCY M. QUEAL, B.Sc.	8 Kellogg Avenue.
Assistant Professor of Home Economics.	
RALPH W. REDMAN, B.Sc.	3 Hallock Street.
Assistant Director.	
LUCILE W. REYNOLDS, B.Sc.	87 Pleasant Street.
State Leader of Home Demonstration Agents.	
MARION L. TUCKER	46 Pleasant Street.
Assistant Extension Professor of Home Economics.	
RALPH A. VAN METER, B.Sc.	7 East Pleasant Street.
Extension Professor of Pomology.	
JOSEPH F. WHITNEY, B.Sc., M.L.A. ¹	- -
Assistant Extension Professor of Landscape Gardening.	

THE LIBRARY STAFF.

HENRY S. GREEN, A.B., LL.D.	Mount Pleasant.
Librarian.	
ETHEL A. GREEN, A.M.	Mount Pleasant.
Library Assistant.	
LENA V. CHAPMAN	77 South Pleasant Street.
Assistant in charge of circulation.	
KATHARINE POWELL	9 Amity Street.
Department Librarian.	
BESSIE M. WEYMOUTH	87 Pleasant Street.
Cataloguer.	

OTHER OFFICERS.

JOHN K. BROADFOOT	130 Pleasant Street.
Cashier.	
THOMAS F. BUTTERWORTH	3 Phillips Street.
Engineer.	
GRACE CHARMAN	Infirmary.
Resident Nurse.	
LAWRENCE S. DICKINSON, B.Sc.	2 Fairview Way.
Superintendent of Grounds.	
LULU DIETHER	Draper Hall.
Manager of the Dining Hall.	
ANNA M. GABRIEL	Infirmary.
Resident Nurse.	
SAMUEL C. HUBBARD	North Amherst.
Foreman, Department of Floriculture.	

CLARENCE A. JEWETT	112 Pleasant Street.
Superintendent of Buildings.	
JOHN J. LEE	38 Cottage Street.
Assistant to the Military Detail.	
Mrs. MARIE MARSH	Abigail Adams House.
Matron.	
WILLIAM E. MARTIN	5 Phillips Street.
Laboratory Assistant, Department of Horticultural Manufactures.	
ENOS J. MONTAGUE, B.Sc. . . . .	. . . . . Campus.
Farm Superintendent.	
ADELBERT SHEFFIELD	North Amherst.
Superintendent of Dairy Manufactures.	

GRADUATE ASSISTANTS.

MEHMED ALI, A.B.	14 North College.
Department of Agronomy.	
ELEANOR F. CHASE, B.Sc.	Abigail Adams House.
Department of Chemistry.	
NATHAN I. EPSTEIN, B.Sc.	9 Fearing Street.
Department of Chemistry.	
RENZY E. FLIKKEMA, A.B.	13 North College.
Department of Chemistry.	
JULIA P. HODGDON, B.A.	The Davenport.
Department of Microbiology.	
JOHN F. JOHNSON, B.Sc. . . . .	. . . . . Poultry Plant.
Department of Poultry Husbandry.	
JOHN G. MCCRIMMON, B.Sc. Agr.	84 Pleasant Street.
Department of Microbiology.	
RAYMOND A. MOONEY, B.Sc.	North Amherst.
Department of Agronomy.	
DAVID POITER, B.Sc.	Clark Hall.
Department of Botany.	
J. RAYMOND SANBORN, B.Sc.	North Amherst.
Department of Microbiology.	
HARRISON M. TIETZ, B.Sc.	84 Pleasant Street.
Department of Entomology.	
HUBERT YOUNT, B.Sc. Agr.	9 Fearing Street.
Department of Agricultural Economics.	

STANDING COMMITTEES OF THE FACULTY.

1922-23.

COMMENCEMENT.

Dean LEWIS.
 Treasurer KENNEY.
 Secretary WATTS.
 Mr. S. R. PARKER.
 Professor THAYER.

COURSE OF STUDY.

President BUTTERFIELD.
 Dean LEWIS.
 Professor HART.
 Professor WAUGH.
 Professor PATTERSON.
 Professor FERNALD.
 Professor OSTRANDER.
 Professor MARSHALL.
 Professor CHAMBERLAIN.
 Professor PHELAN.
 Professor FOORD.

DISCIPLINE.

Dean LEWIS.
 Professor MACHMER.
 Professor PHELAN.
 Professor CHENOWETH.
 Professor HICKS.

EMPLOYMENT.

Professor JUDKINS.
 Treasurer KENNEY.
 Secretary WATTS.
 Professor THAYER.

ACADEMIC ACTIVITIES BOARD.

Professor MACHMER.
 Assistant Professor GOULD.

ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.
 Professor PATTERSON.
 Professor OSMUN.
 Professor ASHLEY.
 Professor MACHMER.

HEALTH AND SANITATION.

Professor MARSHALL.
 Dean LEWIS.
 Treasurer KENNEY.
 Professor HICKS.
 Miss SKINNER.

LIBRARY.

Professor MARSHALL.
 Professor PATTERSON.
 Professor CANCE.
 Dr. GREEN.

SCHOLARSHIP.

Professor MACHMER.
 Dean LEWIS.
 Professor HASBROUCK.
 Assistant Professor RAND.
 Professor MACKIMMIE.
 Professor PATTERSON.
 Professor PARKER.
 Professor HICKS.
 Assistant Professor TORREY.

STUDENT LIFE.

Professor PATTERSON.
 Secretary WATTS.
 Professor PHELAN.
 Professor SEARS.
 Professor MACKIMMIE.
 Professor THAYER.

ATHLETIC BOARD.

Dean LEWIS.
 Professor HASBROUCK.
 Professor OSMUN.

THE COLLEGE

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of character, which, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before the date of the examination. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

CERTIFICATES. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present in the prescribed and restrictive elective groups at least three of the necessary fourteen and one-half credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June Amherst, Department of Physics building.
Massachusetts Institute of Technology,
Cambridge, Mass.
Worcester, Horticultural Hall.

In September Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 14–16, inclusive, 1923. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.¹
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
1.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Second Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Third Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1923, the examinations will be given September 19–22, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M. Registration.¹
1.15–5.00 P.M. Greek, elementary and intermediate.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Third Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

¹ Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Fourth Day.

8.00 A.M. French, German, Spanish, required and elective.

1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year.

Fourteen and one-half units must be offered for admission in accordance with the entrance requirements as stated below. Entrance credits gained either by certificate or by examination will hold good for one year.

Entrance Requirements.

1. *Prescribed.* — The following units are prescribed: —

English 1	1½
English 2	1½
A foreign language	2
Algebra	1½
Plane geometry	1
	7½

2. *Restricted Electives.* — Three units to be selected from —

Science	1, 2 or 3
History (American history and civics included)	1, 2 or 3
A second foreign language	2 or 3
Additional work in first foreign language	1 or 2

3. *Free Margin.* — Free margin of four units to consist of any substantial work (including agriculture,¹ general science and a fourth year of English) for which credit of not less than one-half unit earned in one year is given toward a secondary school diploma.

Units presented in the free margin group are not to be offered by examination or by certificate, but presented by submitting a principal's statement to the effect that such units have been earned in a secondary school, and have been credited toward a diploma issued by such a school.

4. One unit of history must be offered in either the restricted electives or the free margin.

5. If elementary algebra and plane geometry are counted as three units, the total requirement will be fifteen units.

6. Both the credits under the prescribed group and the restricted elective group must be presented either by certificate from an approved school or by examination, or by a combination of both.

The following is a list of subjects in which the entrance credits must be offered in the prescribed and restricted elective groups: —

¹ See page 30 for details.

<i>Mathematics and Science.</i>	
Botany ¹	½ or 1
Chemistry ¹	1
Algebra	1½
Plane geometry	1
Solid geometry	½
Trigonometry	½
Physics ¹	1
Geology	½
Physical geography	½
Physiology	½
Zoölogy ¹	½

<i>History.</i>	
Ancient	1
Medieval and modern	1
English	1
General	1
United States and civics	1

<i>English.</i>	
English 1	1½
English 2	1½

<i>Foreign Language.</i>	
Elementary French	2
Elementary German	2
Elementary Spanish	2
Elementary Latin	2
Elementary Greek ²	2
Intermediate French	1
Intermediate German	1
Intermediate Spanish	1
Intermediate Latin	1
Intermediate Greek ²	1
Advanced French	1
Advanced German	1
Advanced Spanish	1
Advanced Latin	1

No applicant deficient in both algebra and plane geometry will be admitted.

PRESENTATION OF NOTE-BOOKS.—The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Entrance credit in agriculture is granted on the following basis:—

I. The Massachusetts Agricultural College accepts a maximum of four credits in agriculture from any secondary or county agricultural high school in Massachusetts offering work in that subject, provided evidence of such work having been done is submitted on a principal's statement, as is indicated in the "free margin" group.

¹ Note-book required as part of the preparation will be credited as part of the examination.

² Examination in September only.

II. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, one credit is granted for each full year of work performed under the following plan: —

Work of the Winter Term. — (a) The study of textbooks such as are suitable for secondary school instruction in agriculture.

(b) Course of Study: A general outline of suggested topics for study.

(c) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

(d) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (a) An exhibit of work.

(b) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is four.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary textbook study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens' "Introduction to Botany" and Bergen & Davis' "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from any standard textbook, with laboratory work on the properties of the common elements and their simpler compounds. No particular work is prescribed. The keeping of a note-book is required.

Students who do not take chemistry in the preparatory school begin the subject in college, and are required to do extra work during the first two terms, as outlined under chemistry, courses 1 and 2, page 92.

MATHEMATICS. — (a) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of

linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — **Solid Geometry:** The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both classroom work and laboratory practice. The work covered in the classroom should be equal to that outlined in Hall & Bergen's "Textbook of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOÖLOGY, PHYSICAL GEOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, textbooks entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Textbook in General Zoölogy." For geology, A. P. Brigham's "A Textbook of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United

States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good textbooks, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — The study of English in school has two main objects, which should be considered of equal importance: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation, and the development of the habit of reading good literature with enjoyment.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. *Books for Reading*. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

The books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except that for any book in Group I a book from any other may be substituted.

GROUP I. CLASSICS IN TRANSLATION.

The "Old Testament," at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther.

The "Odyssey," with the omission, if desired, of Books I-V, XV and XVI.

The "Æneid."

The "Odyssey" and the "Æneid" should be read in English translations of recognized literary excellence.

GROUP II. DRAMA.

Shakespeare: "Merchant of Venice," "As You Like It," "Julius Cæsar."

GROUP III. PROSE FICTION.

Dickens: "A Tale of Two Cities."

George Eliot: "Silas Marner."

Scott: "Quentin Durward."

Hawthorne: "The House of the Seven Gables."

GROUP IV. ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: "The Sir Roger de Coverley Papers."

Irving: "The Sketch Book," selections covering about 175 pages.

Macaulay: "Lord Clive."

Parkman: "The Oregon Trail."

GROUP V. POETRY.

Tennyson: "The Coming of Arthur," "Gareth and Lynette," "Lancelot and Elaine," "The Passing of Arthur."

Browning: "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus."

Scott: "The Lady of the Lake."

Coleridge: "The Ancient Mariner."

Arnold: "Sohrab and Rustum."

B. Books for Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. DRAMA.

Shakespeare: "Macbeth," "Hamlet."

GROUP II. POETRY.

Milton: "L'Allegro," "Il Penseroso," "Comus."

Book IV of Palgrave's "Golden Treasury" (first series), with special attention to Wordsworth, Keats and Shelley.

GROUP III. ORATORY.

Burke: "Speech on Conciliation with America."

Washington's "Farewell Address," Webster's "First Bunker Hill Oration," and Lincoln's "Gettysburg Address."

GROUP IV. ESSAYS.

Macaulay: "Life of Johnson."

Carlyle: "Essay on Burns," with a brief selection from Burns' poems.

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(a) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(b) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

FRENCH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

GERMAN. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

SPANISH. — *Elementary*: The necessary preparation for this examination is stated in the description of the two-year course in elementary Spanish recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year Spanish (elective subjects for admission). — For a third credit unit in Spanish as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in Spanish will be given unless the candidate has presented elementary Spanish on certificate, or has written the examination in elementary Spanish.

No examination for a fourth credit in Spanish will be given unless the candidate has presented both elementary and intermediate Spanish upon certificate, or has written the examination in both elementary and intermediate Spanish.

GREEK. — *Elementary*. — Greek grammar and composition: Translation into Greek of short sentences illustrating common principles of syntax.

The examination in grammar and prose composition will be based on the first four books of Xenophon's "Anabasis."

Intermediate. — Homer's "Iliad," Books I and II (omitting Book II, 494 to end), and the Homeric forms, constructions, idioms and prosody.

Prose composition, consisting of continuous prose based on Xenophon, and other Attic prose of similar difficulty.

Translation of passages of Homer at sight.

The examinations in Greek, elementary and intermediate, will be given in September only.

LATIN. — *Elementary*. — Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (b) the translation of passages of Latin prose at sight.

Intermediate. — Cicero (third oration "Against Catiline" and the orations "For Archias" and "For Marcellus") and sight translation of prose.

Advanced. — Vergil (Æneid, II, III and VI) and sight translation of poetry.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this require-

ment, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.
5. A statement from the proper officer, giving the total number of credits required for graduation by the institution from which the applicant is transferring, and, of this total, the number that the applicant has satisfactorily completed at the time of transfer.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. To matriculate, candidates must offer twelve and one-half of the fourteen and one-half units required for admission, and will be conditioned in those subjects not passed. At least five and one-half credits must be in the prescribed group. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of \$5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses, see "Short Courses."

9. Application for admission as a "Special Student" should be made to the Dean.

COURSES OF INSTRUCTION.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours per week. Freshman credit is computed on the basis of total clock hours per week spent in class room and study. For details, see the description of the courses.]

FRESHMAN YEAR.

First Term.

All work required.

SUBJECT.	Courses and Numbers.	Credit in Clock Hours per Week.
Agriculture	Agronomy 1	6
Algebra	Mathematics 1	12
Chemistry	Chemistry 1 or 4	12 or 9
English	English 1	6
Language	French or German 1 or 4	9
Military (for men)	Military 1	3
Recreation (military substitute for women).	Physical Education 4	3
Physical Education (military substitute for men).	Physical Education 7	3
Hygiene (for men)	Physical Education 1	1
Recreation (for men)	Physical Education 2	1
Rural Home Life (for women)	Rural Home Life 1	2
Total credits (clock hours per week).	. . . . .	47 or 50

College life (attendance without credit).

Second Term.

Agriculture	Agriculture 2	6
Algebra	Mathematics 2	6
or Solid Geometry	Mathematics 3	6
Mensuration	Mathematics 4	6
Chemistry	Chemistry 2 or 5	15 or 9
English	English 2	6
Language	French or German 2 or 5	9

FRESHMAN YEAR — *Concluded.**Second Term — Concluded.*

SUBJECT.	Courses and Numbers.	Credit in Clock Hours per Week.
Military (for men)	Military 2	3
Recreation (military substitute for women).	Physical Education 5	3
Physical Education (military substitute for men).	Physical Education 8	3
Total credits (clock hours per week).	. . . . .	45 or 51

College life (attendance without credit).

Third Term.

Agriculture	Agriculture 3	12
Trigonometry	Mathematics 5	9
Botany	Botany 3	9
English	English 3	6
Language	French or German 3 or 6	6
Military (for men)	Military 3	3
Recreation (military substitute for women).	Physical Education 6	4
Physical Education (military substitute for men).	Physical Education 9	3
Recreation (for men)	Physical Education 3	1
Total credits (clock hours per week).	. . . . .	46

SOPHOMORE YEAR.

First Term.

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Botany	25	1	4	3
English	25	2	-	2
Physics	25	3	2	4
Zoölogy	25	2	4	4
Military (for men)	25	3	-	3
Microbiology (military substitute for men and women).	25	2	-	2
Physical Education (military substitute for men).	30	-	2	1
Physical Education (military substitute for women).	27	-	3	1
Physical Education (for men) . . .	25	-	1	-1
Total required	-	-	-	16
<i>Elective.</i>				
Animal Husbandry	25	2	2	3
Chemistry	25	1	4	3
Drawing	25	-	6	3
French	25 or 28	3	-	3
German	25 or 28	3	-	3
Rural Engineering	25	-	4	2
Rural Home Life (for women) . . .	25	1	4	3

Minimum credit for first term, 18.

Maximum credit for first term, 22.

¹ Credit given in spring term.

SOPHOMORE YEAR — *Continued.**Second Term.*

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Agricultural Economics	26	5	—	5
English	26	2	—	2
Physics	26	3	2	4
Military (for men)	26	3	—	3
Microbiology (military substitute for men)	26	2	—	2
Physical Education (military substitute for men).	31	—	2	1
Agricultural Education (military substitute for women).	26	2	—	2
Physical Education (military substitute for women).	28	—	3	1
Total required	—	—	—	14
<i>Elective.</i>				
Animal Husbandry	26	2	2	3
Botany	26	1	4	3
Chemistry	26	1	4	3
Drawing	26	—	6	3
Economic Sociology	26	5	—	5
Entomology	26	3	—	3
French	26 or 29	3	—	3
German	26 or 29	3	—	3
Mathematics	26	2	—	2
Rural Home Life (for women)	26	1	4	3
Zoölogy	26	1	4	3

Minimum credit for second term, 18.

Maximum credit for second term, 22.

SOPHOMORE YEAR — *Concluded.**Third Term.*

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Agronomy	27	4	2	5
English	27	2	-	2
Rural Sociology	27	3	-	3
Military (for men)	27	3	-	3
Microbiology (military substitute for men and women).	27	2	-	2
Physical Education (military substitute for men).	32	-	2	1
Physical Education (military substitute for women).	29	-	3	1
Physical Education (for men)	26	-	1	1 ¹
Total required	-	-	-	13 or 14
<i>Elective.</i>				
Botany	27	1	4	3
Chemistry	27	1	8	5
Chemistry	30	3	4	5
Drawing	27	-	6	3
Entomology	27	2	-	2
Entomology	28	-	4	2
French	27 or 30	3	-	3
Geology	27	3	4	5
German	27 or 30	3	-	3
Horticulture	27	2	2	3
Mathematics	27	-	6	3
Physics	27	3	2	4
Rural Engineering	26	-	4	2
Rural Home Life (for women)	27	1	4	3

Minimum credit for third term, 18.

Maximum credit for third term, 22.

¹ Credit for Physical Education 25 and 26 given in third term.

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, which is arranged by the student and his adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

RULES GOVERNING MAJORS.

RULE 1. Election. — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

RULE 2. Minimum Credits. — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

RULE 3. Maximum Credits. — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

RULE 4. Humanities and Rural Social Science. — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

RULE 5. Advisers. — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student elects his major. The adviser has full authority to prescribe the student's work up to 45 hours. He will, however, so far as practicable, recognize the individual needs of the student. It is also expected that students will seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. Free Electives. — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

RULE 7. Registration. — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the Schedule Room five weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his major, his class and the name and address of parent or guardian. When the major courses have been entered on this card, and the hours of free elections added by the student, the card, accompanied by one hour plan, must be returned to the Schedule Room two weeks before the beginning of the final examination period.

RULE 8. *Change of Major.* — Applications for change of major may be made to the dean in writing at any time; when approved by both major advisers concerned and by the dean and the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

AGRONOMY. (Major.)
 Professor ARTHUR B. BEAUMONT, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	
					Credit.		Credit.		Credit.
Agronomy	50 I.	5	I.	Chemistry 25	3	Agronomy 50	5	Agronomy 75	5
Agronomy	51 III.	3		German 25 or 28	3	Chemistry 51	8	Farm Management 76	3
Agronomy	75 I.	5				Animal Husbandry 50	3		
Agronomy	77 II.	5							
Animal Husbandry	50 I.	3	II.	Botany 26	3	Chemistry 52	8	Agronomy 77	5
Chemistry	51 I.	8		Chemistry 26	3				
Chemistry	52 II.	8		German 26 or 29	3				
Farm Management	70 I.	3		Mathematics 26	2				
Farm Management	77 III.	3	III.	German 27 or 30	3	Agronomy 51	3	Farm Management 77	3
		43		Mathematics 27	3				
				Geology 27	5				
			IV.						

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25 and 26, German 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
 ADVISED. — Mathematics 26 and 27.

ANIMAL HUSBANDRY. (Major.)

Professor S. M. SALISBURY, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.			Junior.			Senior.		Credit.
						Credit.			Credit.			
Agromony	50 I.	5	I.	Animal Husbandry 25	. 3	Animal Husbandry 50	. 3	Animal Husbandry 75	. 3			
Animal Husbandry	50 I.	3		Agromony 50	. 5	Farm Management 76	. 3					
Animal Husbandry	51 II.	3		Dairying 50	. 5							
Animal Husbandry	52 III.	3	II.	Animal Husbandry 26	. 3	Animal Husbandry 51	. 3	Animal Husbandry 78	. 3			
Animal Husbandry	53 III.	3		Veterinary 50	. 5	Animal Husbandry 81	. 1					
Animal Husbandry	75 I.	3		Farm Management 75	. 3							
Animal Husbandry	78 II.	3	III.	Chemistry 30	. 5	Animal Husbandry 52	. 3	Animal Husbandry 79	. 3			
Animal Husbandry	79 III.	3				Animal Husbandry 53	. 3	Animal Husbandry 82	. 1			
Animal Husbandry	81 II.	1										
Animal Husbandry	82 III.	1	IV.									
Dairying	50 I.	5										
Farm Management	75 II.	3										
Farm Management	76 I.	3										
Veterinary	50 II.	5										
		44										

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Chemistry 30.
 ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

DAIRYING. (Major.)
Professor HENRY F. JUDKINS, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Junior.	Senior.	Credit.
Agricultural Economics	53 III.	5	I.	Animal Husbandry 25 . . 3	Dairying 50 5	Chemistry 76 5	5
Animal Husbandry	50 I.	3		Chemistry 25 3	Microbiology 50 5	Microbiology 82 5	5
Animal Husbandry	81 II.	1		Rural Engineering 25 . . 2	Animal Husbandry 50 . . 3		
Animal Husbandry	82 III.	1	II.	Animal Husbandry 26 . . 3	Dairying 82 1	Animal Husbandry 81 . . 1	1
Chemistry	76 I.	5			Microbiology 51 5	Dairying 75 5	5
Dairying	50 I.	5				Farm Management 75 . . 3	3
Dairying	52 II.	1					
Dairying	51 III.	5	III.	Chemistry 27 3	Chemistry 30 5	Agricultural Economics 83 5	5
Dairying	75 II.	5		Rural Engineering 26 . . 2	Dairying 51 5	Animal Husbandry 82 . . 1	1
Dairying	76 III.	5			Rural Engineering 52 . . 5	Dairying 76 5	5
Farm Management	75 I.	3					
Microbiology	50 I.	5	IV.				
Microbiology	51 II.	5					
Microbiology	82 I.	5					
Rural Engineering	53 III.	5					
		59					

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 25, 27.
 ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

FARM MANAGEMENT. (Major.)
Professor JAMES A. FOORD, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	Credit.	
					Credit.		Credit.			
Agronomy	50 I.	5	I.	Animal Husbandry 25	3	Agronomy 50	5	Rural Engineering 75	4	
Animal Husbandry	50 I.	3		Rural Engineering 25	2	Dairying 50 (or 77 III)	5	Farm Management 76	3	
Animal Husbandry	51 II.	3		Animal Husbandry 50	3					
Animal Husbandry	53 III.	3	II.	Animal Husbandry 26	3	Animal Husbandry 51	3	Farm Management 75	3	
Dairying	50 I.	5				Microbiology 50	5	Farm Management 78	1	
Dairying	77 III.	5						Rural Engineering 78	5	
Farm Management	75 II.	3								
Farm Management	76 I.	3	III.	Chemistry 30	5	Microbiology 50	5	Farm Management 77	3	
Farm Management	77 III.	3		Horticulture 27	3	Animal Husbandry 53	3	Farm Management 79	1	
Farm Management	78 II.	1		Rural Engineering 26	2	Dairying 77	5	Rural Engineering 79	5	
Farm Management	79 III.	1	IV.							
Microbiology	50 II.	5								
Microbiology	50 III.	5								
Rural Engineering	75 I.	4								
Rural Engineering	78 III.	5								
Rural Engineering	79 III.	5								
		49								

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, and Horticulture 27.
ADDITIONAL INFORMATION. — Botany 26, Drawing 26, Entomology 26 and 27, Dairying 51, Pomology 50, 51, 76 and 78, and Veterinary 75, 76 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

POULTRY HUSBANDRY. (Major.)
 Professor JOHN C. GRAHAM, *Advisor.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics	53 III.	5	I.			Agronomy 50	5	Poultry 75	5
Agronomy	50 I.	5				Animal Husbandry 50	3	Poultry 76	4
Animal Husbandry	50 I.	3				Poultry 50	5	Veterinary 85	3
Farm Management	75 II.	3							
Poultry Husbandry	59 I.	5	II.			Poultry 51	3	Farm Management 75	3
Poultry Husbandry	51 II.	3						Poultry 77	5
Poultry Husbandry	52 III.	5						Veterinary 86	3
Poultry Husbandry	75 I.	5	III.						
Poultry Husbandry	76 I.	4				Agricultural Economics 53	5	Poultry 79	4
Poultry Husbandry	77 II.	5				Poultry 52	5	Veterinary 87	3
Poultry Husbandry	79 III.	4	IV.						
Veterinary Science	85 I.	3							
Veterinary Science	86 II.	3							
Veterinary Science	87 III.	3							
		56							

SOPHOMORE RECOMMENDATIONS. — Students intending to major in Poultry Husbandry are urged to take Zoology 26, Rural Engineering 25, 26. STRONGLY ADVISED. — Microbiology 50 I, Rural Engineering 52 III, Zoology 76 II.

FLORICULTURE.

PROFESSOR CLARK L. THAYER, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.			Junior.			Senior.		
						Credit.			Credit.			Credit.
Botany	50 I.	2	I.	Drawing 25	.	.	Floriculture 50	.	.	Floriculture 75	.	. 3
Botany	51 II.	2					Floriculture 53	.	.	Horticulture 50	.	. 5
Floriculture	50 I.	4					Botany 50	.	.			
Floriculture	51 II.	4	II.	Drawing 26	.	.	Floriculture 51	.	.	Floriculture 76	.	. 3
Floriculture	52 III.	4		Entomology 26	.	.	Botany 51	.	.	Floriculture 79	.	. 3
Floriculture	53 I.	4		Mathematics 26	.	.						
Floriculture	55 III.	3										
Floriculture	75 I.	3	III.	Entomology 27	.	.	Floriculture 52	.	.	Floriculture 77	.	. 3
Floriculture	76 II.	3		Horticulture 27	.	.	Floriculture 55	.	.	Floriculture 80	.	. 3
Floriculture	77 III.	3		Mathematics 27	.	.				Horticulture 51	.	. 5
Floriculture	79 II.	3										
Floriculture	80 III.	3	IV.									
Horticulture	50 I.	5										
Horticulture	51 III.	5										
		48										

SOPHOMORE ELECTIVE PREREQUISITES. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27; Mathematics 26, 27 for students who wish to elect courses in Landscape Gardening.

ADDITIONAL INFORMATION. — Substitutions in sophomore prerequisites may be made in conference with the adviser.

ADVISED. — The department advises all students who major in this subject to take Entomology 50 and Landscape Gardening 75.

LANDSCAPE GARDENING. (Major.)
Professor FRANK A. WAUGH, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Floriculture	78 III.	3	I.	Drawing 25 3		Landscape Gardening 50 5		Landscape Gardening 75 3	
Horticulture	50 I.	5				Horticulture 50 5		Landscape Gardening 76 4	
Horticulture	51 III.	5						Landscape Gardening 80 4	
Landscape Gardening	50 I.	5	II.	Drawing 26 3 Mathematics 26 2 Entomology 26 3		Landscape Gardening 51 4 Landscape Gardening 78 or 79 3		Landscape Gardening 78 or 79 Landscape Gardening 81 3	
Landscape Gardening	76 I.	4	III.	Drawing 27 3 Mathematics 27 3 Horticulture 27 3		Landscape Gardening 52 5 Horticulture 51 5 Floriculture 55 3		Landscape Gardening 77 4 Landscape Gardening 82 4	
Landscape Gardening	77 III.	4							
Landscape Gardening	78 II.	3							
Landscape Gardening or Landscape Gardening	79 II.	3	IV.						
Landscape Gardening	80 I.	4							
Landscape Gardening	81 II.	4							
Landscape Gardening	82 III.	4							
		56							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27.
 ADDITIONAL INFORMATION. — Modifications may be permitted when they appear advisable.

POMOLOGY. (Major.)

Professor FRED C. SEARS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	
				Term.	Credit.	Term.	Credit.	Term.	Credit.
Agricultural Economics	53 III.	5	I.			Botany 50 . . .	1-4	Horticultural Manuf. 75 . . .	5
Agronomy	77 II.	5				Pomology 50 . . .	3	Pomology 75	3
Botany	50 I.	1-4					Pomology 77	3	
Horticultural Manufactures	75 I.	5					Pomology 80	1	
Horticultural Manufactures	76 II.	3	II.			Pomology 51	3	Agronomy 77	5
Pomology	50 I.	3				Pomology 54	3	Horticultural Manuf. 76 . . .	3
Pomology	51 II.	3						Pomology 76	3
Pomology	52 III.	3					Pomology 81	1	
Pomology	54 II.	3	III.					Pomology 78	3
Pomology	75 I.	3				Horticulture 27	3	Pomology 82	1
Pomology	76 II.	3						Rural Engineering 78 . . .	5
Pomology	77 I.	3							
Pomology	78 III.	3	IV.						
Pomology	80 I.	1							
Pomology	81 II.	1							
Pomology	82 III.	1							
Rural Engineering	78 III.	5							
		51-54							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Horticulture 27. ADVISED. — Rural Engineering 26, Entomology 26 and 27. ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose.

VEGETABLE GARDENING. (Major.)

Assistant Professor ROY D. HARRIS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	
					Credit.		Credit.		Credit.
Agronomy	75 I.	5	I.			Agronomy 75	5	Vegetable Gardening 75	5
Agronomy	77 II.	5				Botany 50	2		
Botany	50 I.	2							
Botany	51 II.	2	II.	Botany 26	3	Agronomy 77	5	Vegetable Gardening 76	5
Vegetable Gardening	52 II.	5				Botany 51	2		
Vegetable Gardening	53 III.	5				Vegetable Gardening 52	5		
Vegetable Gardening	75 I.	5	III.	Horticulture 27	3	Vegetable Gardening 53	5	Vegetable Gardening 77	5
Vegetable Gardening	76 II.	5							
Vegetable Gardening	77 III.	5	IV.						
		39							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Botany 26, Horticulture 27.

ADVISED. — Rural Engineering 26, Entomology 26 and 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose.

ECONOMIC BOTANY. (Major.)
 Professor A. VINCENT OSMUN, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	Credit.
					Credit.		Credit.		
Botany	52 I.	3	I.	Chemistry 25	. . . 3	Botany 52	. . . 3	Botany 75	. . . 5
Botany	53 II.	3		German 25 or 28	. . . 3	Botany 55	. . . 3	Botany 78	. . . 5
Botany	54 III.	3				Chemistry 51	. . . 8	Botany 86	. . . 1
Botany	55 I.	3							
Botany	56 II.	3	II.	Chemistry 26	. . . 3	Botany 53	. . . 3	Botany 76	. . . 5
Botany	75 I.	5		German 25 or 29	. . . 3	Botany 56	. . . 3	Botany 79	. . . 5
Botany	76 II.	5		Botany 26	. . . 3			Botany 82	. . . 3
Botany	77 III.	5						Botany 87	. . . 1
Botany	78 I.	5							
Botany	79 II.	5	III.	German 27 or 30	. . . 3	Botany 54	. . . 3	Botany 77	. . . 5
Botany	80 III.	5		Botany 27 ¹	. . . 3			Botany 80	. . . 5
Botany	82 II.	3						Botany 83	. . . 3
Botany	83 III.	3						Botany 88	. . . 1
Botany	86 I.	1							
Botany	87 II.	1	IV.						
Botany	88 III.	1							
Chemistry	51 I.	8							
		62							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — German 25 or 28, 26 or 29, 27 or 30, Botany 26.

ADVISED. — Chemistry 25 and 26.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose. Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).

¹ May be taken in junior or senior year.

AGRICULTURAL CHEMISTRY. (Major.)
 PROFESSOR CHARLES A. PETERS, *Advisor.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.		Credit.
Chemistry	51 I.	8	I.	Chemistry 25	3	Chemistry 51	8	Chemistry 76	5	. . . . .
Chemistry	52 II.	8		Chemistry 26	3	Chemistry 52	8	Chemistry 80	5	
Chemistry	62 III.	5	II.					Chemistry 77	3	. . . . .
Chemistry	65 III.	5						Chemistry 86	3	
Chemistry	76 I.	5	III.	Chemistry 27	5	Chemistry 62	5	Chemistry 92, 94	3	. . . . .
Chemistry	77 II.	5					Chemistry 65	5	Chemistry 87 . . . . .		3
Chemistry	80 I.	5	IV.					Chemistry 91, 93, 95	5	. . . . .
Chemistry	86 II.	3								
Chemistry	87 III.	3								
Chemistry	92 II.	3 ¹								
Chemistry	94 II.									
Chemistry	91 III.	5								
Chemistry	93 II.									
Chemistry	95 III.	50 ²								

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25, 26 and 27.

ADVISED. — German 25 or 28, 26 or 29, 27 or 30, Physics 27.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left for the student to choose.

¹ Courses 92, 94 may be changed from 3 credits to an option of 3 or 5 credits. Students will select one course from groups 92, 94, and 91, 93, 95 respectively.

² Only 45 credits required.

ECONOMIC ENTOMOLOGY. (Major.)

Professor HENRY T. FERNALD, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.		
Botany	50 I.	3	I.	French 25 or 28 or German 25 or 28 Chemistry 25	3	Entomology 54	3	Entomology 76	5		
Botany	52 I.	3				Entomology 53		Entomology 85		3	
Entomology	50 I.	3				Botany 50 or 52		Horticulture 50		3	
Entomology	52 II.	3	II.	French 26 or 29 or German 26 or 29 Entomology 26 Botany 26	3	Zoölogy 50	3	Entomology 77	3		
Entomology	53 I.	5				Chemistry 51				Entomology 90	3
Entomology	54 I.	3									
Entomology	55 III.	3									
Entomology	75 III.	4				Microbiology 50					5
Entomology	70 I.	5	III.	French 27 or 30 or German 27 or 30 Entomology 27 Horticulture 27	3	Entomology 55	3	Entomology 78	4		
Entomology	77 II.	3									
Entomology	78 III.	4									
Entomology	90 II.	3									
Zoölogy	50 I.	3	IV.			Pomology 79	3	Pomology 78	3		
Zoölogy	54 II.	3				Vegetable Gardening 50				3	
Chemistry	51 I.	8									
		42 or 47									

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Entomology 26 and 27, Botany 26, Horticulture 27.

ADVISED. — French or German 25 to 27 or 28 to 30, Chemistry 25; the other subjects (except Entomology) in the last three columns above are merely suggested as desirable to choose from.

MICROBIOLOGY. (Major.)
 Professor CHARLES E. MARSHALL, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry	51 I.	8	I.	Chemistry 25	3	Microbiology 50	5	Microbiology 81	5
Chemistry	52 II.	8		German or French 25 or 28 3		Chemistry 51	8	Microbiology 82	5
Microbiology	50 I.	5	II.	German or French 26 or 29 3		Microbiology 51	5	Microbiology 75	5
Microbiology	50 II.					Chemistry 52	8	Microbiology 80	5
Microbiology	50 III.					Microbiology 50	5		
Microbiology	51 II.	5							
Microbiology	51 III.		III.	Chemistry 27	5	Dairying 51	5	Microbiology 76	5
Microbiology	52 III.	5		German or French 27 or 30 3		Microbiology 50	5	Microbiology 83	5
Microbiology	81 I.			Physics 27	5	Microbiology 51	5		
Microbiology	82 I.	5				Microbiology 52	5		
Microbiology	83 III.								
Microbiology	80 II.		IV.						
Microbiology	75 II.	5							
Dairying	51 III.								
Microbiology	76 III.	5							
		46							

SOPHOMORE ELECTIVE (RECOMMENDATIONS). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.
 ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left for the student to choose.

RURAL JOURNALISM. (Major.)

—, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.		Senior.	Credit.
						Journalism	Economics and Sociology		
Rural Journalism	50 I.	3	I.			Journalism 50	Journalism 77	3	
Rural Journalism	51 II.	3				Journalism 53	Journalism 80	3	
Rural Journalism	52 III.	3				Economics and Sociology 51		5	
Two out of three:—									
Rural Journalism	53 I.	3	II.			Journalism 51	Journalism 78	3	
Rural Journalism	54 II.	3			Economics and Sociology 26	Journalism 54	Journalism 81	3	
Rural Journalism	55 III.	3						5	
Two out of three:—									
Rural Journalism	77 I.	3	III.			Journalism 55	Journalism 79	3	
Rural Journalism	78 II.	3				Journalism 52	Journalism 82	3	
Rural Journalism	79 III.	3				Agricultural Economics 51		5	
One from:—									
Entomology	90 II.	3	IV.						
Animal Husbandry	53 III.	3							
Landscape Chemistry	73 I. 87 III.	3							
All:—									
Rural Journalism	80 I.	4(5)							
Rural Journalism	81 II.	4(5)							
Rural Journalism	82 III.	4(5)							
Rural Sociology	78 II.	5							
Agricultural Economics	51 III.	5							
Economics and Sociology	51 I.	5							
		45-47							

SOPHOMORE PREREQUISITES. — All sophomore English.

SOPHOMORE RECOMMENDATIONS. — French or German; Drawing 25. For agricultural journalism especially; Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

AGRICULTURAL ECONOMICS. (Major.)
 PROFESSOR ALEXANDER E. CANCE, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics	50 I.	5	I.			Agricultural Economics	50 5	Agricultural Economics	77 5
Agricultural Economics	52 II.	5				Economic Sociology	51 5	Agricultural Economics	79 5
Agricultural Economics	53 III.	5						Farm Management	76 3
Agricultural Economics	75 II.	3							
Agricultural Economics	76 II.	5	II.			Agricultural Economics	52 5	Agricultural Economics	76 5
Agricultural Economics	78 III.	5				Economic Sociology	50 5	Agricultural Economics	75 5
Agricultural Economics	77 I.	5				Rural Sociology	51 3		
Agricultural Economics	79 I.	5	III.						
Economic Sociology	51 I.	5				Agricultural Economics	53 5	Agricultural Economics	78 3
Economic Sociology	50 II.	5				Rural Sociology	52 3		
Farm Management	76 I.	3	IV.						
Rural Sociology	51 II.	3							
Rural Sociology	52 III.	3							
		49							

ADDITIONAL INFORMATION. — The sophomore electives are left to the student to choose. Animal Husbandry is suggested for terms I and II, and Economic Sociology for term III.

AGRICULTURAL EDUCATION. (Major.)
Professor WILLIAM R. HART, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Education	50 I.	5	I.	Animal Husbandry 25	3	Agricultural Education	50	Agricultural Education	76
Agricultural Education or Agricultural Education	51 I.	5		Rural Engineering 25	2	Agricultural Education	51	Agricultural Education	80
Agricultural Education	51 II.	5	II.	Entomology 26	3	Agricultural Education	51	Agricultural Education	75
Agricultural Education	52 III.	5		Animal Husbandry 26	3	Agricultural Education	80	Agricultural Education	80
Agricultural Education	75 II.	3		Entomology 27	3	Agricultural Education	52	Agricultural Education	76
Agricultural Education	76 I.	3	III.	Horticulture 27	3	Agricultural Education	77	Agricultural Education	77
Agricultural Education	76 III.	3		Rural Engineering 26	2	Agricultural Education	80	Agricultural Education	80
Agricultural Education	77 III.	5							
Agricultural Education	80 I.	1-5							
Agricultural Education	80 II.	1-5							
Agricultural Education	80 III.	1-5							
Agricultural Education	80 IV.	1-5							

ADDITIONAL INFORMATION. — Courses 50, 51, 76 and 80 or their equivalents are required of all candidates for teaching. Credits vary from 14 to 18. Courses 51 and 77 are required of all candidates for county agent work. Students who are intending to teach are recommended to take as many of the sophomore electives listed above as possible in the sophomore year. Programs for juniors and seniors are planned on the basis of individual needs, with a view to the most desirable preparation for the attainment of the student's aim. Some of the aims for which programs are planned are as follows: teaching vocational agriculture; teaching non-agricultural subjects in vocational agricultural schools and departments; teaching agriculture in high schools not of the vocational type; county agent work and Junior Extension work; directing physical education and county Y. M. C. A. work; rural school supervision and rural leadership; positions as supervisors and directors of agricultural teaching; and college positions in Agricultural Education.

RURAL SOCIOLOGY. (Major.)
PROFESSOR JOHN PHELAN, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	
					Credit.		Credit.		Credit.
Agricultural Economics	50 I.	5	I.		Economic Sociology 51	5		Agricultural Economics 50	5
Agricultural Economics	52 II.	5			Rural Sociology 50	3		Economic Sociology 75	5
Agricultural Economics	53 III.	5						Rural Sociology 79	1-3
Agricultural Economics	75 II.	5	II.		Economic Sociology 50	5		Agricultural Economics 52	5
Economics and Sociology	51 I.	5			Rural Sociology 51	3		Agricultural Economics 75	5
Economics and Sociology	50 II.	5						Rural Sociology 77	3
Economics and Sociology	75 I.	5						Rural Sociology 80	1-3
Economics and Sociology	77 III.	5							
Rural Journalism	55 III.	3	III.		Economic Sociology 77	5		Agricultural Economics 53	5
Rural Sociology	50 I.	3			Rural Journalism 55	3		Rural Sociology 81	1-3
Rural Sociology	51 II.	3			Rural Sociology 52	3			
Rural Sociology	52 III.	3							
Rural Sociology	77 II.	3							
Rural Sociology	79 I.	1-3							
Rural Sociology	80 II.	1-3							
Rural Sociology	81 III.	1-3							
		58-64							

ADDITIONAL INFORMATION. — The sophomore electives allowed are left to the student to choose.

DESCRIPTION OF COURSES

DESCRIPTION OF COURSES.

DIVISION OF AGRICULTURE.

Professor FOORD.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Freshman Agriculture.

1. **I.** A survey course, continuing throughout the year, intended to put the student in touch with agriculture in all its major aspects, dealing primarily with the problems of Massachusetts farms but not excluding the agriculture of the United States.

1 class hour.

1 2-hour laboratory period, 3 study hours, credit, 6.

Professor REDMAN in co-operation with the
DIVISIONS OF AGRICULTURE and HORTICULTURE.

(For the first term, 1922-23, this work will be Agronomy 1 **I**, which see.)

2. **II.** As stated under Course 1 **I**.

2 class hours.

4 study hours, credit, 6.

3. **III.** As stated under Course 1 **I**.

2 class hours.

1 4-hour laboratory period, 6 study hours, credit, 12.

Agronomy.

Professor BEAUMONT, Assistant Professor MICHELS, Mr. THELIN, Mr. THAYER,
Mr. LANPHEAR.

The courses in agronomy are designed to present the fundamental knowledge concerning the soil and the principal products of the field. The basic course in soils is required of all students. The electives purpose to meet the needs of those specializing in soils and field crops and other specialized fields including both pure and applied science.

The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are conveniently near the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders and the like.

The crops' laboratories include one for seed study, with lockers for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes

steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, and collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar and two store-rooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn, grasses, clovers, etc., are grown for demonstration purposes, and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

Required Courses.

1. **I. AGRONOMY.** — Freshmen. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and the plant products, to make the students familiar with the common field, garden and orchard crops of Massachusetts.

1 class hour.

1 2-hour laboratory period, 3 study hours, credit 6.

Assistant Professor MICHELS and Mr. THELIN.

27. **III. SOILS AND FERTILIZERS.** — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor BEAUMONT and the DEPARTMENT.

Prerequisite, Freshman-required Chemistry.

Elective Courses.

50. **I. FIELD AND FORAGE CROPS.** — For juniors; seniors may elect. History, classification and production of corn and of those grasses, legumes, root and tuber crops suited to New England conditions. Crops of less importance in New England are briefly considered. The work includes lecture, laboratory and field study.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor MICHELS and Mr. THELIN.

Prerequisites, Agronomy 27, Botany 3.

51. **III. ADVANCED FIELD CROPS.** — For juniors; seniors may elect. Study of the cereals and other field crops not taken up or only briefly considered in Course 50. General problems of crop production are also considered, and the work is not entirely confined to New England conditions. The laboratory work includes a study of the cereals, the quality of seeds, grains and crop products, crop problems and field work with such crops as are available.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MICHELS and Mr. THELIN.

Prerequisite, Agronomy 50.

75. **I. ADVANCED SOILS.** — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous

vegetation and other factors which indicate the fertility and adaptation of the soil; accompanied by a laboratory study of the physical properties of the soils sampled.

2 class hours.

1 4-hour and 1 2-hour laboratory period, credit, 5.

Professor BEAUMONT and the DEPARTMENT.

Prerequisite, Agronomy 27. Advised, Geology 27.

77. II. MANURES AND FERTILIZERS. — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and culture work.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor BEAUMONT and Mr. LANPHEAR.

Prerequisite, Agronomy 27. Advised, Chemistry 27.

78. II. BREEDING OF FIELD CROPS. — Seniors. Deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MICHELS.

Prerequisite, Agronomy 51.

Animal Husbandry.

Professor SALISBURY, Assistant Professor RICE, Assistant Professor GLATFELTER, Mr. THAYER.

It is the purpose of this department to present comprehensive information on the subject of animal husbandry. The first courses are studies of the breeds, types and market classes of live stock. These are followed by courses in judging, breeding and management.

The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180. The equipment for classroom instruction includes upwards of 125 head of dairy cattle which are superior representatives of Jersey, Guernsey, Ayrshire and Holstein breeds; considerable numbers of Berkshire and Chester White pigs; pure-bred Percherons; and several work teams of various types. The department has a collection of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine; and a set of over 250 lantern slides portraying the leading prize-winning producing and breeding animals of the principal breeds of horses, cattle, sheep and swine. There is also a collection of the different foodstuffs available for the use of New England farmers. All this equipment is being added to from time to time as funds are available.

Elective Courses.

25. I. TYPES AND BREEDS OF LIVE STOCK. — Sophomores. Covers the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY and Mr. THAYER.

26. **II. TYPES AND BREEDS OF LIVE STOCK.** — Sophomores. Continuation of Course 25.

2 lectures.

1 2-hour laboratory period, credit, 3.
Professor SALISBURY and Mr. THAYER.

50. **I. FEEDS AND FEEDING.** — For juniors. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."

3 class hours.

Credit, 3.
Assistant Professor RICE.

Prerequisite, Chemistry 30 or 6.

51. **II. FEEDS AND FEEDING.** — For juniors. A study of feeding practice as related to all farm animals. Considerable work will be given in the formulating of rations.

3 class hours.

Credit, 3.
Assistant Professor RICE.

Prerequisite, Animal Husbandry 50.

52. **III. ADVANCED STOCK JUDGING.** — For juniors; seniors may elect. Designed to equip students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits are made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor SALISBURY.

Prerequisites, Animal Husbandry 25 and 26.

53. **III. PRINCIPLES OF BREEDING.** — For juniors; seniors may elect. Designed to familiarize students with the problems that are involved in animal improvement; to acquaint them with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. Supplementary reading.

3 class hours.

Credit, 3.
Assistant Professor RICE.

Prerequisites, Animal Husbandry 25, 26, Zoölogy 25.

75. **I. BEEF AND SWINE PRODUCTION.** — A study of the leading breeds of beef cattle and swine, together with the work of some of the most successful breeders. Considerable time will be given also to the production of commercial beef and pork. In this course such livestock management problems as apply to beef cattle and swine will be included.

2 lectures.

1 2-hour laboratory period, credit, 3.
Assistant Professor GLATFELTER.

Prerequisites, Animal Husbandry 50, 51 and 53.

78. **II. HORSE AND SHEEP PRODUCTION.** — A study of the production of these animals planned in the same manner as that of the previous course.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY.

Prerequisites, Animal Husbandry 50, 51 and 53.

79. **III. DAIRY CATTLE AND MILK PRODUCTION.** — A study of the leading breeds of dairy cattle, the most successful breeders and famous breeding animals, advanced registry testing and feeding for production, sales methods and advertising.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY.

Prerequisites, Animal Husbandry 51, 52 and 53.

81. **II. DAIRY AND ANIMAL HUSBANDRY.** — Seminar for seniors majoring in dairying and animal husbandry.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING AND ANIMAL HUSBANDRY.

82. **III.** A continuation of Course 81.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING AND ANIMAL HUSBANDRY.

Dairying.

Professor JUDKINS, Assistant Professor YAXIS, Mr. PENDLETON, Mr. SMITH.

The dairy manufactures building is new, well lighted and of sanitary construction. It is designed and equipped especially for teaching dairy manufactures. The equipment includes all kinds of machinery that are considered essential to the proper handling of milk and the making of cream, butter, ice cream and soft cheeses.

Course 77 is for students who desire a general idea of dairy work and manufacturing processes. Part of the courses are arranged to give instruction in general dairy work as associated with Massachusetts agriculture; part are arranged to give to a smaller group of students more complete work in dairy manufactures. Those majoring in dairy manufactures should have at least one summer's experience in a commercial plant before graduation.

Elective Courses.

50. **I. MILK AND MILK COMPOSITION.** — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

51. **III. MARKET MILK.** — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection.

3 class hours.

1 4-hour laboratory period, credit, 5.

Professor JUDKINS and Mr. SMITH.

Prerequisites, Dairying 50, Microbiology 50.

52. **II. JUDGING DAIRY PRODUCTS.** — For juniors.

1 2-hour laboratory period, credit, 1.

Professor JUDKINS.

75. **II. BUTTER MAKING.** — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; dairy machinery and care thereof; problems.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

Prerequisite, Dairying 50.

76. **III. MILK PRODUCTS.** — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream. Some ice-cream plants will be visited. The cost of this required trip will probably be \$12 to \$15.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Mr. PENDLETON.

Prerequisite, Dairying 51.

77. **III. DAIRYING.** — For seniors; juniors may elect. A general course primarily for those who wish to take only one course in dairying. The work covers briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.

3 lecture hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

Farm Management.

Professor FOORD, Assistant Professor ABELL.

The purpose of the courses in this department is to present various considerations of farming as a business. This involves a knowledge of the cost of production and the profit from the different enterprises such as dairy, poultry or orchard; a study of the enterprises, and the relative amounts of each that will give the best use of labor and equipment on the farm under consideration.

The college farm of 250 acres is under the general supervision of the Department of Farm Management, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Elective Courses.

75. **II. FARM ACCOUNTS AND COST ACCOUNTING.** — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour.

2 2-hour laboratory periods, credit, 3.
Professors FOORD and ABELL.

76. **I. FARM MANAGEMENT.** — For seniors; juniors may elect. A study of farming as a business; regions and types of farming; the general principles of farm management and the influence of size, production, live stock and crop farming on the farmer's labor income; arrangement of fields and buildings; use of land, capital and labor; choosing and buying a farm.

2 class hours.

1 2-hour laboratory period, credit, 3.
Assistant Professor ABELL.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26, and some farm experience.

77. **III. FARM MANAGEMENT.** — For seniors; juniors may elect. A further and more specific study of the principles and practices as outlined in Course 76, with reference to their application to different regions of the United States and especially to New England. Trips to successful farms are a required part of the course.

1 class hour.

1 4-hour laboratory period, credit, 3.
Professors FOORD and ABELL.

Prerequisites, Farm Management 75 and 76.

78. **II. SEMINAR.** — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.
The DEPARTMENT.

79. **III. SEMINAR.** — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.
The DEPARTMENT.

Poultry Husbandry.

PROFESSOR GRAHAM, PROFESSOR SANCTUARY, ASSISTANT PROFESSOR BANTA, MR. TAYLOR.

The introductory courses (50, 51, 52) give a knowledge of the general routine of elementary poultry keeping. The advanced studies prepare men for the successful operation of poultry plants, either as owners or managers. Graduate work, preparation for further teaching, extension or investigation.

The poultry plant consists of 8 acres of land sloping gently to the west. The buildings consist of three incubator cellars equipped with a number of lamp incubators and two mammoth machines with a total capacity of 9,000 eggs; a pipe brooder house (open pipe system) and 40 colony brooder houses which give a brooding capacity for 7,000 chicks, the equipment for these houses including a large variety of coal-stove brooders and kerosene hovers; a long laying house 14 by 180 feet, which accommodates 500 layers, furnishing facilities for student work in pen management, utility and fancy judging, etc.; and a laboratory 14 by 80, for killing, picking, drawing, trussing, packing, crate fattening and cramming. The fattening equipment consists of a modern sanitary all-steel battery with 16 compartments and 10 wooden crates, accommodating, altogether, 350 birds. There are also a storage building, 28 by 64 feet, for root cellar, poultry carpentry, poultry mechanics, feed room and storage; an experimental breeding house, 18 by 60; a combination laying, testing and breeding house, 18 by 72, for experimental purposes; a model laying house, 18 by 30, for 100 hens, and a house 20 by 40, for 200 hens. The six old experiment-station houses, each 12 by 18 feet, are used as special mating and overflow pens. The total capacity for laying hens is 1,600. A manure shed 14 by 18 feet; an oil and tool house 10 by 12; an incinerator 10 by 10; and two backyard model poultry houses 8 by 10 and 8 by 8 give a total of 76 buildings, not including a pheasant run, 16 roosting sheds 10 by 10, and numerous small coops for natural incubation and brooding.

Elective Courses.

50. **I. POULTRY FEEDS AND FEEDING.** — For juniors; seniors may elect. A study of the principles and practices of poultry nutrition and their relationship to other poultry problems. An important part of the work will be the practical management of a pen of birds for a period of weeks, including observations and detailed record keeping.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

51. **II. POULTRY HOUSING AND SANITATION.** — For juniors; seniors may elect. A consideration of the biological and economic principles fundamental in the efficient designing, practical construction and equipping poultry farm buildings; also of external parasites and the insecticidal agents for their control.

3 class hours.

Credit, 3.

Assistant Professor BANTA.

Prerequisite, Poultry 50.

52. **III. INCUBATION, BROODING AND GROWING.** — For juniors; seniors may elect. A study of the fundamental principles of incubation and rearing

chicks; also of modern equipment, including small and mammoth incubators and various types of brooding apparatus.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor SANCTUARY and Mr. TAYLOR.

Prerequisite, Poultry 51.

75. **I. JUDGING AND CULLING.** — Seniors. A study of the origin and evolution of our standard breeds and varieties. Judging for production quality, using trap-nested birds; culling the flock; judging exhibition quality by score card and comparison. Several farms will be visited, also several of the leading Connecticut Valley Poultry Shows. Poultry Judging Teams competing in the Intercollegiate Contest at Madison Square Garden are trained in this course.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

Prerequisite, Poultry 52.

76. **I. MARKET POULTRY AND POULTRY PRODUCTS.** — Seniors. A study of the market classes of poultry, eggs and feathers, the requirements of different markets, methods of marketing, the cold storage of poultry and eggs. Preserving eggs, judging and scoring of live and dressed market poultry and market eggs are important features. Students are required to fatten pens of chickens by different methods and rations, keeping accurate data of the gains in weight and quality, also the costs of feed and labor, and resultant profit or loss. The annual market poultry show is staged under the direction of members of this class.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor GRAHAM and Mr. TAYLOR.

Prerequisite, Poultry 52.

77. **II. POULTRY BREEDING.** — Seniors. A study of the principles of breeding and their application to poultry. Practice work in record keeping, pedigree hatching, stud and flock mating will be required as the season permits.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor SANCTUARY.

78. **III. FARM POULTRY.** — Seniors; juniors may elect. For those students who desire a general knowledge of poultry husbandry but who cannot devote more than one term to the subject; it is not intended for students specializing in poultry, and such students are admitted only by special permission. Emphasis is placed on the farm flock and its economic management. Utility classification, housing, culling, feeding, hatching, rearing, production, marketing and disease control receive special consideration.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

79. **III. POULTRY FARM ORGANIZATION.** — Seniors. A study of the organization of the poultry farm for greatest efficiency. The layout of fields and buildings, crop rotations, records, accounts and advertising will receive consideration. One or more trips will be made to representative successful poultry farms.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor GRAHAM.

Prerequisite, Poultry 77.

Rural Engineering.

Professor GUNNESS, Assistant Professor STRAHAN, Mr. PUSHEE, Mr. NEWLON.

The courses in rural engineering are planned to give a working knowledge of those phases of engineering which apply directly to the farm. It is expected that the student will acquire a clear understanding of modern farm practice as it relates to permanent improvements of the farm and the farmstead, and in the selection and use of farm equipment.

This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines, tractors and pumps. A complete assortment of engine accessories, consisting of carburetors, magnetos, etc., is available for thorough instruction in gas engines. A small dynamo and switchboard are used in the study of farm-lighting systems. The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Elective Courses.

25. **I. CARPENTRY.** — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.
Mr. PUSHEE.

26. **III. REPAIR OF FARM EQUIPMENT.** — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering, babbiting and fitting bearings, lining up shafting, lacing belts and splicing rope. Practice in the use of machinist's tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.
Mr. NEWLON.

52. **III. FARM ENGINEERING.** — A general course dealing with field implements, gas engines, water supply, lighting, sewage disposal, farm buildings, drainage and irrigation.

3 class hours.

2 2-hour laboratory periods, credit, 5.
The DEPARTMENT.

75. **I. FARM STRUCTURES.** — For seniors; juniors may elect. Study of the strength and durability of building materials; water supply; lighting and heating systems for the farm; lightning protection; drawing plans, writing

specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor STRAHAN.

Prerequisite, Rural Engineering 52 or Landscape Gardening 50.

78. **II and III. FARM MACHINERY.** — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines and gas tractors. Special attention is given to the use of power on the small farm.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

79. **III. DRAINAGE AND IRRIGATION ENGINEERING.** — For seniors; juniors may elect. Covers the engineering phase of drainage and irrigation. The various systems are studied, and practice is given in the design of drainage and irrigation systems. Field work gives practice in surveying for drains, platting, locating drains, erecting batterboards and laying tile. Practice is given in assembling equipment for spray irrigation, and the flow of water through nozzles is studied by means of laboratory tests.

2 class hours.

1 2-hour and 1 4-hour laboratory period, credit, 5.

Assistant Professor STRAHAN.

81. **III. DAIRY MECHANICS.** — A study of dairy machinery, including steam boilers, engines, pumps, traps, refrigeration machinery, and heat-controlling devices. Practice is given in pipe fitting, packing valves, lacing belts, and similar repair jobs on the equipment used in dairy plants. Not given in 1922-23.

1 lecture.

1 4-hour laboratory period, credit, 3.

Professor GUNNESS and Mr. NEWLON.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Floriculture.

Professor THAYER, Assistant Professor MULLER.

The courses in floriculture are intended to present a general knowledge of all phases of greenhouse design, construction, heating and management, the culture of florists' crops (under glass and in the field), floral decoration and arrangement. The department aims to train students so that they may take up commercial floriculture (either in the growing or retail business) and the management of conservatories on private estates, in parks and cemeteries.

The department is especially well equipped for the teaching work, probably being surpassed in no other agricultural college. French Hall, with its laboratories, classrooms and offices, furnishes excellent facilities for the purposes of instruction. The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall range of 7,200 square feet, a durable, practical, commercial range composed of palm and fern, violet, carnation, rose and students' houses; the old Durfee range of 7,400 square feet, devoted to the growing of decorative, conservatory and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This also includes a small garden of about 4,700 square feet devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained and is being enlarged from year to year; at the present time the collection consists of several hundred species and varieties, and provides an excellent opportunity for the study of garden flowers.

Elective Courses.

50. **I. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. Designed to familiarize students with the methods followed in the management of greenhouses and of greenhouse crops and the principles underlying the same; history and development of the floricultural industry; preparation of soils; fertilizers; potting; watering; ventilation; control of insects and diseases; methods of plant propagation; forcing of plants. At some time during the term the members of the class will be required to take a one-day trip to visit large commercial establishments. Lectures, assigned readings, reports and laboratory practice.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor THAYER.

Prerequisite, Horticulture 27.

51. **II. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. Continuation of Course 50. Several field trips, to study floricultural establishments in the vicinity, will be made during the laboratory periods.

2 class hours.

1 4-hour laboratory period, credit, 4.

Professor THAYER.

52. **III. FLORAL ARRANGEMENT.** — A study of the principles underlying the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangement, table decorations, home, church and all interior decorations; a study of color as applied to such work. Lectures, assigned readings and reports. This course will be limited to ten students.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor THAYER.

53. **I. GREENHOUSE CONSTRUCTION AND HEATING.** — For juniors; seniors may elect. The location, types, arrangement, construction, cost, equipment, heating and ventilating of greenhouse structures; the drawing of plans and study of specifications for commercial houses and conservatory ranges. Such practical work as glazing and the construction of concrete benches and cold frames is included as facilities allow. Lectures, assigned readings and problems.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor THAYER.

55. **III. GARDEN FLOWERS AND BEDDING PLANTS.** — Juniors and seniors. A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture and uses of the various plants are considered; identification of material. Lectures, assigned readings and reports.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER and Assistant Professor MULLER.

75. **I. COMMERCIAL FLORICULTURE.** — Seniors. A detailed study of the important commercial cut flower crops and potted plants. Visits will be made to commercial establishments during the term. The lectures are supplemented with textbooks and assigned readings.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MULLER.

Prerequisite, Floriculture 51.

76. **II. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 75.

77. **III. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 76.

79. **II. CONSERVATORY PLANTS.** — Seniors. A study of the foliage and flowering plants used in conservatory work; methods of propagation, culture, use and arrangement; identification of plants. Lectures, assigned readings and reports.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 51.

80. **III. SEMINAR.** — For seniors majoring in floriculture. Advanced study of subjects pertaining to some phase of floriculture. All students are assigned specific problems and pursue study in these problems by reading and research; the results of this study must be presented in the form of a thesis. Seminars are conducted weekly.

2 to 6 laboratory hours, not to exceed 3 credits.

Professor THAYER and Assistant Professor MULLER.

Forestry.

Professor GROSE.

The forestry courses are intended primarily for prospective owners or managers of farm woodlots, and the field work is focused on typical New England problems. These courses are broad enough, however, to furnish valuable preparation for students planning to study forestry in graduate schools.

The department has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; and a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is on the college farm. Forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing a large number of trees not native to New England. The Mount Toby Demonstration Forest has an area of approximately 750 acres, and contains the various types of forest growth found throughout the State. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings, cuttings for utilization, and forest plantings are conducted by the department.

55. **I. WOODLOT FORESTRY: ESTIMATING AND BUSINESS MANAGEMENT.** — For juniors and seniors. Topics: forest mapping; timber-cruising, determining rate of growth and possible cut; financial returns; forest taxation; our national timber supply, present and future.

1 2-hour and 1 4-hour laboratory period, credit, 3.

Professor GROSE.

56. **II. WOODLOT FORESTRY: LOGGING, MILLING AND MARKETING.** — For juniors and seniors. Topics: felling trees; sawing logs; hauling logs; the portable mill; the stationary mill; seasoning, measuring and shipping lumber;

lumber grades and prices; legal forms; by-products of the woodlot; adaptability of species to uses; wood-using industries of Massachusetts.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor GROSE.

57. **III. WOODLOT FORESTRY: TIMBER-RAISING.** — For juniors and seniors. Topics: forest planting; weeding; release cuttings; pruning; thinning; salvage cutting; protection from insects, fungi, fire, etc.; final cutting methods for natural reproduction of the forest.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor GROSE.

58. **III. WOODLOT FORESTRY: BRIEF SURVEY.** — A condensation of Courses 55, 56 and 57 for those who have only one term to give to forestry.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor GROSE.

Horticultural Manufactures.

Professor CHENOWETH, Mr. ROBERTSON.

The courses aim to give a practical knowledge of the problems connected with food preservation. Emphasis is placed upon the conservation of the cheaper grades of fruits and vegetables, to the end that the whole crop may be marketed at a profit and that wholesome food products may result from what would otherwise be lost. The social and economic values of this work are constantly emphasized.

The department occupies three laboratory rooms in Flint Laboratory, two in Fisher Laboratory, with offices in Wilder Hall and French Hall. The general equipment of the department, both for the use of students and for manufacturing purposes, may be grouped under the following heads:—

1. *Canning.* — A modern canning outfit, including both steam-pressure cookers and hot-water baths, hand and power can sealers, peeling and slicing machines, a string-bean cutter, heat-penetration thermometers, electric incubator and a large assortment of all types of home canning equipment.

2. *Evaporation.* — Two small orchard evaporators, a tunnel drier, peeling machines, slicers and a general assortment of driers adapted to home evaporation.

3. *Fruit Juices, Butters, etc.* — A hand cider mill, a motor-driven hydraulic press, a steam-jacketed kettle, an apple-butter cooker, and cider and vinegar testing apparatus.

Elective Courses.

75. **I and III. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A practical course in food preservation dealing primarily with fruits and vegetables. The canning of fruits and vegetables as practiced in the home and in commercial canneries; evaporation of fruits and vegetables, the various types of equipment and methods of preparation of products. The manufacture of (a) fruit products, such as butters, jams, jellies, fruit juices, marmalades, preserves, vinegars, pastes, etc.; (b) vegetable products, as pickles, piccalilli, sauerkraut, soups, etc. Particular attention is given to study and use of all types of equipment suitable for use in the home or small factory, together with methods for testing a large variety of manufactured

products. The emphasis is on canning, drying and study of equipment. This course will be repeated as nearly as possible in the spring term of 1922-23.
2 class hours. 3 2-hour laboratory periods per week, credit, 5.
Professor CHENOWETH.

76. **II. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A continuation of Course 75. The emphasis in this course is placed on the manufacturing and testing of fruit and vegetable products.
1 class hour. 2 laboratory periods per week, credit, 3.
Professor CHENOWETH.

Prerequisite, Horticultural Manufactures 75.

77. **III. HORTICULTURAL MANUFACTURES.** — Continuation of courses 75 and 76, dealing primarily with maple products, the canning of meats and spring vegetables, and studies of special problems involved in establishing and operating home and farm factories.
2 2-hour periods per week, credit, 2.
Professor CHENOWETH.

Horticulture.

Professor WAUGH, Assistant Professor THOMPSON, Assistant Professor ROGERS.

The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and vegetable gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.

Elective Courses (General).

27. **III. NURSERY PRACTICE.** — For sophomores; juniors and seniors may elect. Treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor THOMPSON.

50. **I. PLANT MATERIALS.** — For juniors; seniors may elect. Aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor THOMPSON.

Prerequisite, Horticulture 27.

51. **III. PLANT MATERIALS.** — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor THOMPSON.

Prerequisite, Horticulture 50.

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

The purposes of the courses are: (1) To train men for the profession in all its branches. As a rule graduates should first enter the employ of established landscape architects, nurserymen or park superintendents, and after an apprenticeship of several years those who have the requisite technical and business ability may set up for themselves. (2) To train men for public-service work in national, State and municipal parks and forests. (3) To train men for country planning, this function being exercised through various public institutions and organizations. (4) To train teachers and extension workers in lines of landscape gardening and civic improvement. (5) To give a broad and liberal general education stressing the fundamental principles of art.

The department has large, well-lighted drafting rooms, with necessary equipment, such as planimeters, eidograph, pantograph, blue-printing outfit, etc.; and a complete outfit of surveying instruments, including transits, levels, plane tables, prismatic compasses, hand levels, etc. The college campus presents an unusually good collection of the plant materials used in landscape gardening.

Elective Courses.

50. **I. MAPPING AND TOPOGRAPHY.** — Juniors. Reconnaissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.

Assistant Professor HARRISON.

Prerequisites, Mathematics 26 and 27, Drawing 25, 26 and 27, Horticulture 27.

51. **II. ELEMENTS OF LANDSCAPE GARDENING.** — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.

Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 50.

52. **III. GENERAL DESIGN.** — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.

Assistant Professor HARRISON.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

75. **I. THEORY OF LANDSCAPE ART.** — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.

3 class hours.

Credit, 3.

Professor WAUGH.

76. **I. CIVIC ART.** — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 52.

77. **III. COUNTRY PLANNING.** — Seniors. As stated under Course 76.

3 3-hour laboratory periods, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 76.

78. **II. ARCHITECTURE.** — Alternating with Course 79; given in 1922–23. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.

3 class hours.

Credit, 3.
Assistant Professor HARRISON.

79. **II. CONSTRUCTION AND MAINTENANCE.** — Alternating with Course 78; given in 1923–24. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.

3 class hours.

Credit, 3.
Assistant Professor HARRISON.

80. **I. THEORY OF DESIGN.** — Juniors. As stated under Course 52. [Will be given in the summer term when that is established; meantime, will be given in term **I**, senior year.]

120 laboratory hours, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 52.

81. **II. ESTATE DESIGN.**

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

82. **III. PARK DESIGN.**

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

Pomology.

Professor SEARS, Assistant Professor DRAIN, Assistant Professor FRENCH, Assistant Professor GOULD, Mr. MACK.

The object of the courses is to give a training which shall be thoroughly practical and yet scientific. This will fit the men to enter the field of practical fruit-growing, or it will furnish an excellent foundation for further study.

The department has 50 acres in fruit plantations. The apple orchards comprise about 35 acres, and there are blocks of pears, peaches, plums and cherries. In small fruits there are plantings of strawberries, raspberries, blackberries, currants and gooseberries. There are three vineyards, with a total area of 5 acres, in which the leading varieties and the principal types of pruning and training are represented. In these plantations are 50 varieties of grapes, representing three native American species and many hybrids; 20 varieties of peaches; 20 varieties of pears; 25 of plums, including five species and many hybrids; and 100 varieties of apples.

The department has an excellent equipment of spraying and dusting machinery, including various styles and sizes of power sprayers, and many types of barrel pumps and smaller sprayers. There is also an excellent assortment of orchard tools, including plows, harrows, fertilizer sowers, etc.

Fisher Laboratory is one of the best planned and equipped packing and storage plants in the United States. It includes six refrigerated rooms; four storage rooms not refrigerated; one large laboratory room and one classroom, besides ample storage room for fruit packages and equipment. The equipment for the building itself includes four types of apple sizers; packing tables and box and barrel presses of various types, besides all kinds of packages and the smaller equipment necessary for thoroughly modern work in grading and packing fruit. The department is equipped with lockers and with pruning and other tools for the use of students in laboratory work, which is made a leading feature in all the courses in pomology.

Elective Courses.

50. **I. PRACTICAL POMOLOGY.** — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Horticulture 27.

51. **II. PRACTICAL POMOLOGY.** — For juniors; seniors may elect. As stated under Course 50.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Pomology 50.

52. **III. SMALL FRUITS.** — For juniors; seniors may elect. A study of the growing of small fruits, including raspberries, blackberries, strawberries, currants, gooseberries and grapes, dealing with such questions as their propagation, selecting a site for the plantation, soils, fertilizers, pruning, spraying, etc.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Pomology 51.

54. **II. SYSTEMATIC POMOLOGY.** — Seniors. A study of the varieties and nomenclature of the different fruits, with critical descriptions; special reference given to relationships and classification. Lectures, laboratory and field exercises.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Mr. MACK.

Prerequisite, Pomology 52.

75. **I. SYSTEMATIC POMOLOGY.** — Seniors. As stated under Course 54.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 54.

76. **II. PRACTICAL POMOLOGY.** — For juniors; seniors may elect. As stated under Course 50.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Pomology 51.

77. **I. COMMERCIAL POMOLOGY.** — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor GOULD.

Prerequisite, Pomology 51.

78. **III. SPRAYING.** — Seniors. A study of (a) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (b) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (c) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 76.

79. **II. GENERAL POMOLOGY.** — For seniors; juniors may elect. Planned to meet the needs of students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. Consists of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor DRAIN.

80. **I. SEMINAR.** — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student is assigned a major and a minor problem in lines of work in which he is particularly interested. He pursues his studies both by reading and research, and the materials obtained will be worked into theses which are presented to the seminar for discussion. No lectures are given, but seminar meetings are held for one period each week.

Credit, 1.

The DEPARTMENT.

81. **II. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.

The DEPARTMENT.

82. **III. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.

The DEPARTMENT.

Vegetable Gardening.

Professor TOMPSON, Assistant Professor HARRIS, Mr. SNYDER.

The courses cover the principles and practices of the commercial production of vegetables in the open, and the forcing of vegetables in cold frames, hotbeds and greenhouses. They are designed for students who wish to engage in the business for themselves or for others, or who wish to become teachers or investigators in the more technical phases of the subject.

The department has 12 acres of land, greenhouses, hotbeds and cold frames, with modern equipment devoted to the production of a wide variety of crops. These afford excellent subject-matter for study, and opportunity for close contact with the actual problems of the business.

Elective Courses.

50. **III. GENERAL VEGETABLE GARDENING.** — Juniors; seniors may elect. A general course for students not specializing in vegetable gardening. Designed to teach the fundamentals of vegetable gardening, soils, fertilizers, garden crops, general methods of management.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HARRIS.

52. **II. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. A study of the principles of vegetable gardening. Deals with such questions as the selection of a location; soils, manures and fertilizers, green manure and cover crops; seeds and seeding; the construction and management of hotbeds and cold frames; garden planning, planting, tillage, irrigation; control of insects and diseases; harvesting, marketing and storing. Includes a detailed study of the cultural requirements of the common vegetable crops, and the principles of rotation and double cropping. Text and reference books. Laboratory and field exercises.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor HARRIS.

Prerequisites, Horticulture 27, Agronomy 75.

53. **III. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. As stated under Course 52.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 52.

75. **I. SYSTEMATIC VEGETABLE GARDENING.** — Seniors. Includes the systematic study of varieties, types and strains of the leading vegetable crops; the establishing of types, determination of quality of varieties; seed growing, variety improvement, roguing, seed harvesting, curing and storing.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 53.

76. **II. GREENHOUSE CONSTRUCTION AND VEGETABLE FORCING.** — Seniors. A study of types, materials, construction, location, arrangement, capacity and cost of greenhouses for growing vegetables. A brief consideration of the heating plant, — the type, installation, piping and management; also the study of greenhouse vegetable crops and their production as practiced by commercial growers.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 75.

77. **III. COMMERCIAL VEGETABLE GROWING.** — Seniors. A consideration of vegetable growing as a business. A study of this specialized type of farming, including places where developed, types, extent, economic importance, capitalization, equipment and other fundamental problems of commercial vegetable gardening. Students assist in the planning and operation of a typical market-gardening area. Visits are made to market-gardening and truck-gardening farms.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 76.

Drawing.

Elective Courses.

25. **I. FREE-HAND DRAWING.** — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.

26. **II. MECHANICAL DRAWING.** — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections;

isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

27. **III. MECHANICAL DRAWING.** — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Prerequisite, Drawing 26.

DIVISION OF SCIENCE.

Professor FERNALD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Botany.

Professor OSMUN, Assistant Professor CLARK, Assistant Professor McLAUGHLIN, Assistant Professor TORREY, Assistant Professor DAVIS.

A knowledge of the principles of plant life is fundamental in agricultural education. The required courses in botany are planned with this and the general educational value of the subject in view. Elective courses are of two types: (1) those which have for their chief aim the direct support of technical courses in agriculture and horticulture, and (2) those providing broader, more intensive training in the science. Courses in the second group may lead, when followed by postgraduate study, to specialization in the field. They also furnish excellent training for those specializing in other sciences and in scientific agriculture. In all undergraduate courses the relation of the science of botany to agriculture is emphasized.

The department occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. The building has two lecture rooms with seating capacity of 154 and 72, respectively; one seminar and herbarium room; large laboratories for general and special work; and smaller rooms for advanced students. A glass-enclosed laboratory for plant physiology adjoins the main building and provides unusual facilities for the study of phenomena of plant life. In addition, a greenhouse 28 by 70 feet is connected with the building. This is for experimental work in plant pathology and physiology, and for growing plants needed for instruction. The experiment station laboratories devoted to botanical research are in this building.

The laboratories and lecture rooms are of modern construction, finely lighted, and equipped with compound and dissecting microscopes, microtomes, paraffin and drying ovens, physiological and other apparatus, and a large collection of charts. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and 25,000 specimens of fungi. Facilities and equipment for the study of plant physiology and pathology are excelled in few other institutions.

Required Courses.

3. **III. INTRODUCTORY BOTANY.** — Freshmen. Presents the seed plants as plastic organisms molded by their environment. Also introduces the student to methods of identifying and classifying plants.

An herbarium, illustrative of systematic, ecological and economic features, is started in the spring, but need not be presented until fall when credit is given in Course 25. This makes it possible for the interested student to familiarize himself with the flora of the full growing season.

1 class hour.

2 2-hour laboratory periods, 4 study hours, credit, 9.

Assistant Professors TORREY and McLAUGHLIN.

25. **I. INTRODUCTORY BOTANY.** — Sophomores. The anatomy and physiology of the seed plants (Phanerogamia), with a brief summary of the lower forms of plant life. The herbarium started in connection with Botany 3 is presented as part of this course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

Prerequisite, Botany 3.

Elective Courses.

26. **II. MORPHOLOGY AND TAXONOMY OF THE LOWER PLANTS (CRYPTOGAMIA).** — Sophomores. Systematic study of typical forms of bacteria, algæ, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are required of all students who major in the subject.)

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors OSMUN and TORREY.

Prerequisite, Botany 25.

27. **III. THE VASCULAR PLANTS.** — For sophomores; juniors and seniors may elect. Continues the work of Botany 26, but deals with the higher plants, such as ferns and fernworts, gymnosperms and angiosperms. The department possesses a unique collection of lantern slides and microscopical preparations for use in this course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

Prerequisite, Botany 26.

50. **I. DISEASES OF CROPS.** — For juniors; seniors may elect. The lectures are general and are taken by all who elect the course, but in order to permit students to specialize on the diseases of crops most closely related to their majors or in which they are most interested, the course is divided for laboratory work into the following sections: (I) diseases of truck and field crops; (II) diseases of floricultural crops and ornamentals; (III) diseases of fruit crops; (IV) diseases of shade and forest trees. One, two or three laboratory sections may be taken.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisites, Botany 3 and 25.

51. **II. DISEASES OF CROPS.** — For juniors; seniors may elect. As stated under Course 50.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisite, Botany 50.

52. **I. SYSTEMATIC MYCOLOGY.** — For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 26.

53. **II. SYSTEMATIC MYCOLOGY.** — For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 52.

54. **III. SYSTEMATIC MYCOLOGY.** — For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 53.

55. **I. PLANT HISTOLOGY.** — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.

3 2-hour laboratory periods, credit, 3.

Professor OSMUN and Assistant Professor McLAUGHLIN.

Prerequisites, Botany 3 and 25.

56. **II. PLANT HISTOLOGY.** — For juniors; seniors may elect. As stated under Course 55.

3 2-hour laboratory periods, credit, 3.

Professors OSMUN and McLAUGHLIN.

Prerequisite, Botany 55.

58. **I. SYSTEMATIC BOTANY OF THE HIGHER PLANTS.** — For juniors; seniors may elect. An intensive study of gymnosperms and angiosperms. Lectures deal with the interrelations of the flowering plants and with their ecology, distribution and economic importance. Laboratory work consists of a critical study of types from the most important natural plant families. Particular emphasis is laid on the flora of Massachusetts. The department herbarium and greenhouses supply material of important tropical forms for study.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

59. **II.** For juniors; seniors may elect. As stated under Course 58.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

75. **I. PLANT PATHOLOGY.** — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and DAVIS.

Prerequisite, Botany 54.

76. **II.** PLANT PATHOLOGY. — Seniors. As stated under Course 75.
 1 class hour. 4 2-hour laboratory periods, credit, 5.
 Professors OSMUN and DAVIS.

Prerequisite, Botany 75.

77. **III.** PLANT PATHOLOGY. — Seniors. As stated under Course 75.
 1 class hour. 4 2-hour laboratory periods, credit, 5.
 Professors OSMUN and DAVIS.

Prerequisite, Botany 76.

78. **I.** PLANT PHYSIOLOGY. — Seniors. Study of the factors and conditions of (a) Plant Nutrition, including the taking up of water and mineral substances, the assimilation of carbon and nitrogen, and the release of energy due to the processes of dissimilation; (b) Plant Growth, including the influence of internal and external factors on growth, the development of reproductive and vegetative organs, and touching on plant inheritance and the origin of new varieties; (c) Plant Movements, including those due to the taking up of water, and those movements of both motile and fixed forms in response to external stimuli. Special emphasis is laid on the development of skill in the manipulation of apparatus in the laboratory; weekly conferences are held at which students report on assignments.

2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisites, Botany 26 and Chemistry 51.

79. **II.** PLANT PHYSIOLOGY. — Seniors. As stated under Course 78.
 2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisite, Botany 78.

80. **III.** PLANT PHYSIOLOGY. — Seniors. As stated under Course 78.
 2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisite, Botany 79.

82. **II.** CYTOLOGY AND EMBRYOLOGY. — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.

3 2-hour laboratory periods, credit, 3.
 Assistant Professor McLAUGHLIN.

Prerequisites, Botany 26 and 55.

83. **III.** CYTOLOGY AND EMBRYOLOGY. — Seniors. As stated under Course 82.

3 2-hour laboratory periods, credit, 3.
 Assistant Professor McLAUGHLIN.

Prerequisite, Botany 82.

86. **I.** 87. **II.** 88. **III.** SEMINAR. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.

1 class hour.

Credit, 1.

The DEPARTMENT.

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS,
Assistant Professor SEREX.

In teaching the courses in chemistry, emphasis is laid on both their educational and their vocational value. The courses in the freshman year deal with fundamental principles, and give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis and organic, physiological and physical chemistry, are for those who intend to become teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses (see Graduate School).

Those completing the undergraduate courses are fitted for positions in the agricultural industries, — fertilizer, feed and insecticide manufacture, — as well as in other lines of industry, and in the State experiment stations and in commercial laboratories. Postgraduate students are prepared for positions as teachers in high schools and colleges, and for more advanced positions in industry and in the experiment stations.

The laboratory, which for many years was used for the work of the Department of Chemistry, was burned early in September, 1922. A new laboratory, to cost \$300,000, is under construction and will be ready for occupancy about Jan. 1, 1924. The plans for the new building have been developed with the utmost care, and will provide a building amply suited for the adequate instruction of students in this subject.

Required Courses.

The freshman work consists of two distinct parts: Courses 1 and 2 contain more hours and are for those who have had no chemistry in the secondary schools, and Courses 4 and 5 are for those who have presented chemistry for entrance. Both groups of courses bring the student out at the same point. It is obviously to the advantage of the student to take a course in chemistry in high school and thus obviate the extra hours of Courses 1 and 2 in the freshman year.

1. **I. GENERAL CHEMISTRY.** — Freshmen. This course is for those students who do not present chemistry for entrance and who begin the subject in college. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds.

2 class hours.

2 2-hour laboratory periods, 6 study hours, credit, 12.

Professor PETERS.

2. **II. AGRICULTURAL CHEMISTRY.** — Freshmen. The preparation of a number of substances important in agriculture, such as superphosphate, ammonium sulfate, muriate and sulfate of potash, Paris green, arsenate of lead, Bordeaux mixture, lime-sulfur and emulsions. These materials are prepared in the laboratory and studied in detail in the classroom; some of the substances prepared may be analyzed. Particular attention will be given to

a study of the composition, properties and reactions of soils. Approximate quantitative determinations of a number of constituents of soils and fertilizers will be made.

3 class hours.

2 2-hour laboratory periods, 8 study hours, credit, 15.

Professor PETERS.

4. **I. ADVANCED GENERAL CHEMISTRY.** — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.

2 class hours.

1 2-hour laboratory period, 5 study hours, credit, 9.

Assistant Professor SEREX.

Prerequisite, Entrance Chemistry.

5. **II. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts: (a) qualitative examination of soil, plant ash and superphosphate; (b) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (c) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours.

1 2-hour laboratory period, 5 study hours, credit, 9.

Assistant Professor SEREX.

Elective Courses.

25. **I. QUALITATIVE ANALYSIS.** — *Basic.* — Sophomores. The systematic analysis of metallic salts, presented from the ionic viewpoint. A close study of the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Stieglitz's "Qualitative Analysis" and Gooch & Browning's "Qualitative Analysis" for reference. This course should be taken by all intending to follow chemistry as a vocation.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor SEREX.

Prerequisite, Chemistry 2 or 5.

26. **II. QUALITATIVE ANALYSIS.** — *Acidic.* — Sophomores. A continuation of Course 25.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor SEREX.

27. **III. QUANTITATIVE ANALYSIS.** — For sophomores; juniors and seniors may elect. Includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professors WELLINGTON and PETERS.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III. ORGANIC AGRICULTURAL CHEMISTRY.** — Elective for sophomores, juniors and seniors who have not taken Course 6. Embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar and alcohol. The treatment of the subject is general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor CHAMBERLAIN.

51. **I. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. Consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates and proteins. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and is especially planned for those majoring in chemistry or the other sciences. Those electing Course 51 are expected to elect Course 52.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 2 or 5, and Chemistry 27 for those majoring in chemistry.

52. **II. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. A continuation of Course 51, dealing principally with compounds of the benzene series.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

62. **III. ADVANCED QUANTITATIVE ANALYSIS.** — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27, together with the analysis of insecticides or the analysis of soils and fertilizers.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professors WELLINGTON and PETERS.

Prerequisite, Chemistry 27.

65. **III. PHYSICAL CHEMISTRY.** — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.

3 class hours.

1 4-hour laboratory period, credit, 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 27.

76. **I. MILK AND BUTTER ANALYSIS.** — For seniors; juniors may elect. A study of milk and butter analytically.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professor PETERS.

Prerequisite, Chemistry 27.

77. **II. CATTLE FEED, WATER AND MISCELLANEOUS ANALYSIS.** — For seniors; juniors may elect. The analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professor PETERS.

Prerequisite, Chemistry 27.

80. **I. PHYSIOLOGICAL CHEMISTRY.** — Seniors. Supplementary to Courses 51 and 52. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it gives acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor CHAMBERLAIN.

86. **II. REVIEW OF GENERAL CHEMISTRY.** — Seniors. Primarily for students majoring in chemistry; others may elect by permission from the instructor. A knowledge of physical chemistry is desirable. The review of general chemistry is largely theoretical, using Alexander Smith's "Introduction to Inorganic Chemistry" as text.

3 class hours.

Credit, 3.

Professor PETERS.

87. **III. HISTORY OF CHEMISTRY.** — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.

3 class hours.

Credit, 3.

Professor WELLINGTON.

91. **III. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS.** — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

10 laboratory hours, credit, 5.

Professor PETERS.

92. **II. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. In this course, as in Courses 91 to 95, the student may give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present

themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, dyes, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 51, 52 and 80.

93. **III. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.

Professor CHAMBERLAIN.

Prerequisite, Chemistry 92.

94. **II. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student selects one line of work and follows it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 65.

95. **III. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 94.

Entomology.

Professor FERNALD, Professor CRAMPTON, Assistant Professor ALEXANDER, Assistant Professor PHILLIPS.

The introductory Courses 26 and 27, taken together, present a comprehensive view of the relation of insects to man, particularly as crop pests. The most important pests are carefully studied, together with the methods for their control. Courses 50 and 51 are arranged for special study of the pests of any one line of agricultural or horticultural occupation, selected by the student according to his plan of future work, with the intent of making him thoroughly familiar with the pests he will meet in his selected work after graduation, and the means of controlling them. The remaining courses are for the training of men as State or experiment station entomologists; for those going into the care of trees, etc., on estates, or for cities and towns; and as entomological experts, for which the demand has been very large.

Fernald Hall provides excellent lecture rooms and laboratories for this department. The laboratories are provided with individual desks, equipped with microscopes and all needed apparatus of all kinds. Dissecting microscopes, binoculars, microtomes, photographic apparatus, glassware and reagents are available for use and electric light and gas are connected with each desk. Two laboratories, one for juniors and seniors, the other for graduate students, are thus equipped. A department library containing all the more important

works on insects, supplemented by others on the subject in the main library, and by the private libraries of the professors, make available more than 25,000 books and pamphlets on this subject. In addition, all the current magazines are received and their files are accessible to every one. A card catalogue giving references to the published articles on different insects contains about 65,000 cards, and is probably the largest index of its kind in the world. Spray pumps, nozzles and spraying appliances of all kinds are in use in various parts of the courses, and a large collection of insecticides is accessible for study. Photographic rooms are specially prepared for the photography of insects, and the greenhouses, gardens, orchards and the grounds of the college provide wide opportunities for the study, under natural conditions, of insect pests.

Elective Courses.

26. **II. GENERAL AND ECONOMIC ENTOMOLOGY.** — For sophomores; juniors and seniors may elect. For students who desire some knowledge of insects, but who cannot give more than two terms to the subject. Also serves as an introduction to the later courses for those who intend to follow entomology farther. Touches briefly upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. Lectures and recitations. Students taking this course may choose between Courses 27, **III** and 28, **III**.

3 class hours.

Credit, 3.

Professor FERNALD.

27. **III. GENERAL AND ECONOMIC ENTOMOLOGY.** — A continuation of Course 26. Lectures and recitations, completing the subject.

2 class hours.

Credit, 2.

Professor FERNALD.

Prerequisite, Entomology 26.

28. **III. ECONOMIC ENTOMOLOGY.** — A continuation of Course 26, with field work from about May 1; lectures and recitations till about May 1; two-hour field periods thereafter. In the field the work of insects will be studied and collections of insects made. Methods of collecting, mounting and preparing insects for collections will be taught. Class limited to 30 members.

2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.

Professors FERNALD, CRAMPTON, ALEXANDER.

Prerequisite, Entomology 26.

50. **I. PESTS OF SPECIAL CROPS.** — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student major-

ing in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals, household pests and man. This work may be continued in the winter term also. (See Course 51, II.)

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

Prerequisites, Entomology 26 and 27 or 28.

51. II. PESTS OF SPECIAL CROPS. — As stated in Course 50, I. For students not majoring in entomology. Those who were not able to take Entomology 50 in the fall may take it here. Those who took Entomology 50 in the fall have an opportunity to continue the work during this term also.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

52. II. INSECTICIDES AND THEIR APPLICATION. CLASSIFICATION OF INSECTS. — For juniors majoring in entomology. Lectures on the composition, preparation and methods of application of insecticides. Laboratory work on classification of insects, particularly those for which insecticides are used.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FERNALD and ALEXANDER.

Prerequisite, Entomology 53.

53. I. INSECT MORPHOLOGY. — For juniors majoring in entomology. The lectures treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor CRAMPTON.

Prerequisites, Entomology 26 and 27 or 28.

54. I. INSECT CLASSIFICATION. — For juniors majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.

3 2-hour laboratory periods, credit, 3.

Assistant Professor ALEXANDER.

Prerequisite, Entomology 53.

56. II. PESTS OF SPECIAL CROPS. — For juniors majoring in entomology. Individual laboratory work on the most important insect pests of this country, and the preparation and presentation of bulletin material on them.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

55. **III. ECONOMIC ENTOMOLOGY.** — For juniors majoring in entomology. Continuation of lectures on insecticides; laboratory work on the identification of insect pests, the relations of insects to disease.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FERNALD, CRAMPTON and ALEXANDER.

Prerequisites, Entomology 52 and 53.

75. **III. FOREST AND SHADE-TREE INSECTS.** — For juniors; seniors may elect. The lecture work deals with the principles and methods of controlling insects which attack forests and forest products, shade trees, etc. The laboratory periods are devoted to a study of the more important species, their identification, biology and specific control measures. Field work supplements laboratory study if time permits.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Assistant Professor ALEXANDER.

Prerequisites, Entomology 26 and 27 or 28; 53 and 54 desirable.

76. **I. ADVANCED ENTOMOLOGY.** — For seniors. Studies on insect bio-nomics; scale insects, their structure, habits, methods of mounting, identification, etc.; studies of the animals not insects with which entomologists are expected to deal.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professors CRAMPTON and ALEXANDER.

Prerequisite, Entomology 55.

77. **II. ADVANCED ENTOMOLOGY.** — Studies of the life history, habits and methods of control of the important insect pests of the United States; recognition tests of these pests and an examination of the literature on them; methods of bulletin preparation.

3 2-hour laboratory periods, credit, 3.

Assistant Professor ALEXANDER.

Prerequisite, Entomology 76.

78. **III. ADVANCED ENTOMOLOGY.** — Classification of insects and of their early stages; principles of classification, the use of literature on entomology and the preparation of bibliographies and indices; the enemies of insects.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Professors FERNALD, CRAMPTON and ALEXANDER.

Prerequisite, Entomology 77.

90. **II. EVOLUTION.** — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and

similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed.

3 class hours.

Credit, 3.

Professor CRAMPTON.

Courses in Beekeeping.

65. **III. INTRODUCTORY BEEKEEPING.** — For juniors. A detailed study of the normal behavior of the honey bee and the colony as a whole, followed by a study of such practical work of the apiary as is carried on in spring and summer. In so far as possible the laboratory work parallels the lecture work, and both are made to follow the seasonal processes of the colony. Spring management, swarm control and the production and care of the honey crop are covered thoroughly. The course is designed to meet the needs of the horticulturist as well as those of the honey producer, and should be followed by Course 85, I.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor PHILLIPS.

85. **I. INTRODUCTORY BEEKEEPING.** — For seniors. A continuation of Course 65 and a completion of the beekeeping year. Fall management, preparation for winter and wintering are studied in detail in lectures and laboratory work. It is highly advisable for those taking Course 65 to take Course 85, and thus complete the annual cycle of beekeeping activity.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor PHILLIPS.

86. **II. ADVANCED BEEKEEPING.** — For seniors. A study of the special problems with which the beekeeper deals. The diagnosis and control of the various bee diseases, production of wax, sources of nectar, honey, bee anatomy and physiology, and marketing of the crop are some of the principal topics discussed. The course is designed for those who intend going into honey production either as a principal occupation or as a side line.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor PHILLIPS.

Mathematics and Civil Engineering.

Professor OSTRANDER, Professor MACHMER, Assistant Professor MOORE, Mr. PORTER.

The work of the freshman year is required. It is intended to furnish the necessary drill and groundwork needed for many of the scientific and practical courses of other departments. Thoroughness and accuracy are insisted upon. The advanced work in mathematics is taught from a practical standpoint, and many of its applications to other subjects are given. The courses in surveying and civil engineering are given to furnish the groundwork for a professional career. Special emphasis is given to the subjects bearing on highway construction and maintenance.

For drawing, a room on the north side is used for the draughting. It has draughting tables, T squares, scales, etc., for twenty students. Vernier protractors, parallel rules and steel T squares are available for precise work. A small room is devoted to blue printing.

In surveying, the department has a considerable number of chains and tapes, two railroad compasses, a builder's level, two dumpy levels, two Y levels and two old levels used for teaching the adjustments. Six transits are available for student use. Two are provided with solar attachments. An omnimeter with vernier reading to ten seconds is available for geodetic work. A hand level, mining aneroid barometer, and prismatic compass are provided for reconnoissance work. A set of Gilmore's needles and a Fairbanks' machine are used for cement testing.

Required Courses.

1. **I. HIGHER ALGEBRA.** — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra."

4 class hours, 8 study hours.

Credit, 12.

Professors MACHMER, MOORE and Mr. PORTER.

2. **II. HIGHER ALGEBRA.** — As stated under Course 1. Required of all who present solid geometry for entrance.

2 class hours, 4 study hours.

Credit, 6.

Professors MACHMER, MOORE and Mr. PORTER.

3. **II. SOLID GEOMETRY.** — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.

2 class hours, 4 study hours.

Credit, 6.

Professors MACHMER, MOORE and Mr. PORTER.

4. **II. MENSURATION AND COMPUTATION.** — Freshmen. A review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.

2 class hours, 4 study hours.

Credit, 6.

Professor MACHMER and Mr. PORTER.

5. **III. PLANE TRIGONOMETRY.** — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."

3 class hours, 6 study hours.

Credit, 9.

Professors MACHMER, MOORE and Mr. PORTER.

Elective Courses.

26. **II.** PLANE SURVEYING. — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.

2 class hours.

Credit, 2.

Professors OSTRANDER and MOORE.

27. **III.** PLANE SURVEYING. — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.

3 2-hour laboratory periods, credit, 3.

Professors OSTRANDER and MOORE.

Prerequisite, Mathematics 26.

50. **I.** ANALYTIC GEOMETRY. — For juniors; seniors may elect. A discussion of the geometry of the line, the circle, conic sections, and the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."

3 class hours.

Credit, 3.

Professor MACHMER.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II.** DIFFERENTIAL AND INTEGRAL CALCULUS. — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Granville's "Differential and Integral Calculus."

5 class hours.

Credit, 5.

Assistant Professor MOORE.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III.** INTEGRAL CALCULUS. — For juniors; seniors may elect. A continuation of Course 51.

5 class hours.

Credit, 5.

Assistant Professor MOORE.

Prerequisite, Mathematics 51.

53. **II.** ELEMENTARY STRUCTURES. — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor OSTRANDER.

75. **I.** HYDRAULICS AND SANITARY ENGINEERING. — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.

5 class hours.

Credit, 5.

Professor OSTRANDER.

76. **I.** MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — For seniors; juniors may elect. Textbook and lectures.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor OSTRANDER.

77. **II. ROADS AND RAILROADS.** — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.

3 class hours.

Credit, 3.

Professor OSTRANDER.

78. **III. ROADS AND RAILROADS.** — For seniors; juniors may elect. As stated under Course 77.

3 2-hour laboratory periods, credit, 3.

Professor OSTRANDER.

Prerequisite, Mathematics 77.

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. AVERY, Miss GARVEY.

Three objectives are sought in the arrangement of the courses following: (1) Introductory courses (50 and 51) needed in the general training of every college student. (2) An introductory course followed by a specific course (as 80, 81, 82, 83), necessary to every student engaged in the Division of Agriculture, with which the specific course deals. (3) Introductory courses (50 and 51) followed by Courses 52, 75, 76 and 81, preparatory for students who are aiming to specialize in agricultural microbiology. (Courses 75, 76 and 81 are adapted to those having Courses 50 and 51 only, and are also adapted to those majoring in microbiology.)

The microbiological work is carried on in a building especially designed for it. There are 4 class laboratory rooms, 8 private laboratory rooms, 1 lecture room, 5 incubator rooms, 3 sterilizing rooms, 3 hood rooms, 3 washing rooms, 3 inoculating rooms, 3 weighing rooms, an animal room, a photographic and a dark room, a sub-basement refrigerator room, a library and 4 office rooms.

The class laboratory rooms are so arranged that individual desks are available for student use. Hot and cold water and gas connections are convenient for each desk; high-pressure steam and electric connections are also available. The building is well lighted and of sanitary construction; all the walls are of brick, and the building is fireproof.

The library is equipped with such books and current periodicals as are useful in the conduct of bacteriological work and investigations. Twenty-four scientific magazines are available regularly.

There are incubators, both electric and gas, hot-air sterilizers, ordinary steam sterilizers, autoclaves, an inspissator, blood-testing apparatus, vacuum apparatus, air-pressure apparatus, shaker, grinder, centrifugal machines, a water still of 5 gallons per hour capacity, Hoskins' combustion furnace, a balopticon, complete microphotographic equipment, microscopes, microtome, and such other apparatus, glassware and chemicals as are needed for extensive and intensive work.

25. **I. PERSONAL HYGIENE.** — For sophomores. Such subjects as the hygiene of the mouth and teeth, the gastro-intestinal tract, food, the skin, respiration apparatus, ear, eye and nervous system are reviewed. The value

of bathing, clothing, physical exercise, etc., are considered. Attention is given to emergencies, accidents of "first aid," and such other matters as usually fall within this category.

2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

In place of Military 25; fall term, sophomores.

26. **II.** For sophomore men. An extension of Course 25.
2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

In place of Military 26; winter term, sophomores.

27. **III.** SANITARY SCIENCE. — For sophomores. The usual topics of sanitary science, as ventilation, heating, plumbing, water supply, sewage disposal, food control and communicable diseases, are treated from the standpoint of individual and public health control.

2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

In place of Military 27; spring term, sophomores.

Elective Courses.

50. **I, II and III.** INTRODUCTORY AND GENERAL MICROBIOLOGY. — For juniors; seniors may elect. Aims to provide elementary basis for microbial studies and interpretation, to enable students to pursue special pertinent courses which will serve as supports in practical electives or majors, and to furnish students with such material as will be valuable in understanding public health problems.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor MARSHALL and Mr. AVERY.

51. **II and III.** MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is fundamental to all advanced and extended microbiological studies.

10 laboratory hours, credit, 5.

Mr. AVERY.

Prerequisite, Microbiology 50.

52. **III.** ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Prepares for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technique and methods of culture, together with a more extensive knowledge of micro-organisms and their functions.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

75. **II. AGRICULTURAL MICROBIOLOGY.** — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices.

10 laboratory hours, credit, 5.

Professors MARSHALL and ITANO, and Mr. AVERY.

Prerequisites, Microbiology 50 and 51.

76. **III. AGRICULTURAL MICROBIOLOGY.** — For seniors; juniors may elect. As stated under Course 75.

10 laboratory hours, credit, 5.

Professors MARSHALL and ITANO, and Mr. AVERY.

Prerequisites, Microbiology 50 and 75.

80. **II. SOIL MICROBIOLOGY.** — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

81. **I. HYGIENIC MICROBIOLOGY.** — For seniors; juniors may elect. An attempt will be made to select certain material which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antiseptis and asepsis, will be treated.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

82. **I. DAIRY MICROBIOLOGY.** — For seniors; juniors may elect. Special emphasis is placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, clarification, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology

of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisites, Microbiology 50 and 51.

83. **III. FOOD MICROBIOLOGY.**—For seniors; juniors may elect. A study of the principles of food preservation, and food preservation by means of drying, canning, refrigerating and addition of chemicals, will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased and poisonous foods, will receive consideration. Contamination of food supplies by means of water, sewage, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. Laboratory inspection of foods is now a subject of great import and is given attention.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisites, Microbiology 50 and 51.

Physics.

Professor HASBROUCK, Professor HARRINGTON, Mr. ALDERMAN.

The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry and zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.

In Courses 25, 26 and 27 the subject-matter is presented with the idea of its special application primarily in the work in agriculture and general science. The full year's work is advised for all students continuing work specifically in the Division of Science. Courses 25 and 26 are required of all students. The subject-matter is especially selected and arranged for its practical application rather than its theoretical development. Courses 50, 51 and 52 are advised for students in chemistry, general biology, microbiology and general science. The subject-matter is selected, and the courses developed, with the idea of making the student proficient in laboratory manipulation. Sufficient theory is given in connection with the work to enable the student to apply the knowledge and practice thus gained in the departments indicated above.

The department has at its command a building on the east campus, containing a general lecture room and laboratory for sophomore work, a laboratory for junior work, and in the basement one small laboratory for quantitative work in light measurement. There is also in the basement a fairly well-equipped shop for the repair and construction of apparatus used in the department work. The usual apparatus for the demonstration in the lecture room is in the possession of the department.

Required Courses.

25. **I. GENERAL PHYSICS.** — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professors HASBROUCK and HARRINGTON and Mr. ALDERMAN.

26. **II. ELECTRICITY AND MAGNETISM.** — Sophomores. Includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor HARRINGTON and Mr. ALDERMAN.

Elective Courses.

27. **III. HEAT AND LIGHT.** — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professors HASBROUCK and HARRINGTON and Mr. ALDERMAN.

50. **I.** 51. **II.** 52. **III.** **EXPERIMENTAL PHYSICS. MECHANICS, SOUND, HEAT, LIGHT, ELECTRICITY and MAGNETISM.** — For juniors; seniors may elect. This course consists of a series of physical measurements in the laboratory, accompanied by lectures. The lectures deal chiefly with the methods and principles involved in the laboratory work. High-grade instruments of precision are employed in the laboratory work, and the student is expected to acquire some ability to make accurate observations. The primary object of the course is to develop in the student scientific habits of thinking by direct personal observation of physical phenomena.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor HARRINGTON.

Prerequisite, Physics 27 or other science, subject to the approval of the Department.

55. **III. ANALYTICAL MECHANICS.** — For juniors; seniors may elect. An introduction to the application of the calculus to the mechanics of solids; statics and kinetics of rigid bodies; elasticity; vector analysis. For students who have taken or are taking Mathematics 52.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

75. **I.** 76. **II.** 77. **III.** **THEORY OF LIGHT.** — For seniors. Propagation of light, formation of optical images, photography, optical instruments, interference, diffraction, spectroscopy, optical phenomena of the atmosphere,

polarization and double refraction, magneto-optics, photo-electricity, radiation, electromagnetic waves, X-rays and crystal structure, electron theory, principle of relativity.

3 class hours.

Credit, 3.

Professor HARRINGTON.

Prerequisite, Mathematics 51.

Veterinary Science and Animal Pathology.

Professor GAGE, Assistant Professor LENTZ.

The courses in veterinary science have been arranged to meet the needs (1) of students who propose following practical agriculture; (2) of prospective students of human and veterinary medicine; and (3) of teachers and laboratory workers in the biological sciences.

The department occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science, including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Elective Courses.

50. **II. VETERINARY HYGIENE AND STABLE SANITATION.** — For juniors; seniors may elect. Familiarizes students with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

75. **I. COMPARATIVE (VETERINARY) ANATOMY.** — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals, particularly the ox. This course is essential for those students wishing to elect Course 77.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

76. **II. GENERAL VETERINARY PATHOLOGY. MATERIA MEDICA AND THERAPEUTICS.** — For seniors; juniors may elect. Such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, pre-

vention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

77. **III. APPLIED GENERAL PATHOLOGY.** — For seniors; juniors may elect. This course is a continuation of Course 76. Particular attention is given to the etiology, the pathogenesis and the prophylaxis of the communicable and non-communicable diseases of the different species of domesticated animals. Lectures and demonstrations.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

Prerequisites, Veterinary 75 or Veterinary 78, 79 and 80.

78. **I. ESSENTIALS OF GENERAL PATHOLOGY.** — For seniors; juniors may elect. Introduces students to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis are considered in the laboratory. The various chemical and biological reactions and tests are presented from the standpoint of pure science, showing applications of chemistry and biology. The course serves to educate liberally and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

79. **II. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.** — For seniors; juniors may elect. A continuation of Course 78, devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease are considered.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

Prerequisite, Veterinary 78.

80. **III. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.** — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

Prerequisite, Veterinary 79.

85. **I. AVIAN PATHOLOGY.** — For seniors; juniors may elect. A course in poultry diseases. The object is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. Consists of a systematic study of the diseases of the alimentary tract, liver and abdominal

region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites are considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

86. **II. AVIAN PATHOLOGY.** — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases are considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 85.

87. **III. AVIAN PATHOLOGY.** — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor GORDON, Mr. FOSS.

The facts and principles of the sciences of zoölogy and geology have important applications in industry and the arts, and with those of their sister sciences form a body of knowledge of value and interest with which the educated man finds it necessary to gain a close familiarity. The elective courses in this department stand as offerings to students who wish to supplement their work in other departments, or who, for any reason, wish to enlarge their knowledge in either zoölogy or geology. Students are encouraged to consult the department about any courses which may be available to them, and which might prove necessary or helpful for any line of work they may wish to follow.

The building occupied jointly by the department of entomology and the department of zoölogy and geology has for the work in zoölogy and geology laboratories equipped with gas, compound microscopes and the accessories needed for study, research and demonstration in these subjects. There are two lecture rooms used jointly by the two departments. The Zoölogical Museum has a representative collection of several thousand specimens of animals, and is drawn upon for material illustrating the various courses.

ZOÖLOGY.

Required Course.

25. **I. GENERAL PRINCIPLES AND TEACHINGS OF ZOÖLOGY.** — Sophomores. An introductory course in which some of the basic features of animal structure, functions of organs and relations of animals to each other are emphasized. In the laboratory work an attempt is made to give first-hand knowledge of animals as a means to a better understanding of some modern conceptions that have grown out of zoölogical science, and with which the lectures deal.

2 class hours.

2 2-hour laboratory periods, credit, 4.
The DEPARTMENT.

Elective Courses.

26. **II.** ELEMENTS OF MAMMALIAN ANATOMY. — Sophomores; juniors and seniors may elect. An introductory course which aims to acquaint the student with the positions, relations, names and functions of the principal organs and systems of organs of the mammalian body.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 25.

50. **I.** SYNOPTIC INVERTEBRATE ZOÖLOGY. — Juniors; seniors may elect. A course in which the student examines and compares representatives of the various phyla, classes and orders of the non-vertebrate animals.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 25.

51. **II.** SYNOPTIC INVERTEBRATE ZOÖLOGY. — Juniors; seniors may elect. Continuation of Course 50.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 50.

52. **III.** SYNOPTIC INVERTEBRATE ZOÖLOGY. — Juniors; seniors may elect. Continuation of Course 51.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 51.

54. **II.** ELEMENTS OF MICROSCOPIC TECHNIQUE AND HISTOLOGY. — Juniors; seniors may elect. The student is taught the usual methods of preparing material for microscopic examination, including embedding in paraffin and celloidin, sectioning, and differentiation by stains. Supplemented by a microscopic study of selected normal animal tissues in connection with their physiological properties.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

75. **I.** SPECIAL ZOÖLOGY. — Juniors, seniors and graduates may apply for such special work as they are qualified to undertake.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

76. **II.** SPECIAL ZOÖLOGY. — Same as Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

77. **III.** SPECIAL ZOÖLOGY. — Same as Course 75.

1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

79. **III.** ORNITHOLOGY. — A study of the taxonomic characters, distribution and habits of birds.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Geology.

27. **III.** GENERAL GEOLOGY. — Sophomores; juniors and seniors may elect. A course in the physical aspects of geology, dealing with the origin, arrangement and manifold changes of the materials composing the earth's crust. Excursions by arrangement.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GORDON.

DIVISION OF THE HUMANITIES.

Professor LEWIS.

Economics and Sociology.

Professor PARKER, Professor SIMS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.

Elective Courses.

26. II. CIVILIZATIONS, ANCIENT AND MODERN. — For sophomores; others may elect. The evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.

5 class hours.

Credit, 5.

Professor PARKER.

50. II. BUSINESS AND INDUSTRY. — For juniors and seniors. The forms, organization, administration and labor problems of business. Methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, cooperation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.

5 class hours.

Credit, 5.

Professor PARKER.

51. I. INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS. — For juniors. Definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of indi-

vidual and national resources; principles and agencies for saving, investments, banks, building associations, insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.

5 class hours.

Credit, 5.

Professor PARKER.

75. **I. SOCIAL INSTITUTIONS AND SOCIAL REFORMS.** — For seniors; juniors by permission. Social institutions, such as the family, the State, property, religions; and such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts are studied in considerable detail.

5 class hours.

Credit, 5.

Professor SIMS.

77. **III. PUBLIC FINANCE, TAXATION, MONEY AND BANKING.** — For seniors. Systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.

5 class hours.

Credit, 5.

Professor PARKER.

History and Government.

Elective Courses.

50. **III. GOVERNMENT.** — For juniors; seniors may elect. Forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control.

5 class hours.

Credit, 5.

Professor PARKER.

54. **I. MODERN EUROPEAN HISTORY.** — Juniors; seniors may elect. The modern history of the principal countries of Europe, especially the great movements and revolutions that developed the nations up to the present generation.

3 class hours.

Credit, 3.

Professor PARKER.

79. **II. EUROPEAN HISTORY SINCE 1870.** — For seniors; juniors may elect. The Franco-Prussian War and the formation of the German Empire, the unification of Italy, the Third French Republic, European Expansion in the East, the Russo-Japanese War, and the origin, events and probable results

of the War of 1914. While a continuation of Course 54, this course will be complete in itself, and may be elected by those who have had no history training. Its aim is to provide the basis for an understanding of present-day conditions, and for an intelligent participation in world affairs.

3 class hours.

Credit, 3.

Professor PARKER.

Languages and Literature.

Professor LEWIS, Professor PATTERSON, Professor MACKIMMIE, Professor ASHLEY, Assistant Professor PRINCE, Assistant Professor JULIAN, Assistant Professor RAND, Miss GOESSMANN, Mr. THISSELL, Mr. BÖGHOLT.

ENGLISH.

Required Courses.

1. **I.** 2. **II.** 3. **III.** ENGLISH. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences.

2 class hours, 4 study hours.

Credit, 6 each term.

Professors PATTERSON, PRINCE, RAND and Mr. BÖGHOLT.

25. **I.** 26. **II.** 27. **III.** ENGLISH. — Sophomores. A general reading course in English literature.

2 class hours each term.

Credit, 2 each term.

Professor PATTERSON and Miss GOESSMANN.

Elective Courses in English Language and Literature.

50. **I.** ENGLISH POETRY OF THE ROMANTIC PERIOD (1923-24). — Alternates with course 53. For juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Scott, Wordsworth, Coleridge, Byron, Keats and Shelley.

3 class hours.

Credit, 3.

Professor PATTERSON.

51. **II.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1922-23). — Alternates with Course 54. For juniors; seniors may elect. In general, this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, Clough, the Rossettis, Morris, Swinburne and others.

3 class hours.

Credit, 3.

Professor LEWIS.

57. **III.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1922-23). — Alternates with Course 58. For juniors; seniors may elect. As stated under Course 51.

3 class hours.

Credit, 3.

Professor LEWIS.

52. **III.** ENGLISH WRITERS FROM MILTON TO POPE. — For juniors; seniors may elect. A survey course that emphasizes the leading writers, literary currents and the thought of the period. Some of the writers studied are Milton, Dryden, Addison, Swift and Pope.

3 class hours.

Credit, 3.

Professor PATTERSON.

53. **I. ENGLISH PROSE OF THE ROMANTIC PERIOD (1922-23).** — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Goldsmith, Coleridge, Lamb, DeQuincey and Hazlitt.

3 class hours.

Credit, 3.

Professor PATTERSON.

54. **II. ENGLISH PROSE IN THE NINETEENTH CENTURY (1923-24).** — For juniors; seniors may elect. Parallels Course 51. Among the writers considered will be Macaulay, Carlyle, Ruskin, Newman and Arnold.

3 class hours.

Credit, 3.

Professor LEWIS.

58. **III. ENGLISH PROSE IN THE NINETEENTH CENTURY (1923-24).** — For juniors; seniors may elect. As stated under Course 54. Alternates with Course 57.

3 class hours.

Credit, 3.

Professor LEWIS.

55. **II. AMERICAN LITERATURE.** — For juniors; seniors may elect. A general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — are discussed.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

56. **III. AMERICAN LITERATURE.** — For juniors; seniors may elect. As stated under Course 55.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisite, English 55.

60. **I. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities.

3 class hours.

Credit, 3.

Miss GOESSMANN.

61. **II. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. As stated under Course 60.

3 class hours.

Credit, 3.

Miss GOESSMANN.

Prerequisite, English 60.

75. **III. PROSE FICTION.** — The short story or the novel. For seniors; juniors may elect. Readings, reports and discussions.
3 class hours or library equivalents. Credit, 3.

79. **II. THE DRAMA.** — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Two of his plays are analyzed in detail, and many others read and discussed.
3 class hours. Credit, 3.
Assistant Professor RAND.

80. **III. THE DRAMA.** — For seniors; juniors may elect. Traces the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.
3 class hours. Credit, 3.
Assistant Professor RAND.

APPLIED ENGLISH — RURAL JOURNALISM.

The courses in rural journalism have two chief aims: first, to turn the student's attention toward matters of contemporary concern; second, to provide training for students who may wish to enter journalism (especially agricultural or industrial journalism or non-urban newspaper work), or who are preparing for the numerous other vocations in which acquaintance with newspaper practices and requirements is of value. All of the courses afford constant practice in writing. So far as conditions permit, instruction is largely individual.

50. **I. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Advanced work in expository writing based upon specimens by contemporary authors and upon the personal experience of the student. Particular attention is given to organization, diction and style.
3 class hours. Credit, 3.
Assistant Professor RAND.

51. **II. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Work in journalistic and fictional narrative with supplementary reading.
3 class hours. Credit, 3.
Assistant Professor RAND.

52. **III. ADVANCED COMPOSITION.** — For juniors; seniors may elect. The preparation of theses and similar manuscripts along such lines as the students may desire. Clearness and readability are the ends to be attained.
3 class hours. Credit, 3.
Assistant Professor RAND.

53. **I.** 54. **II.** 55. **III. NEWS-GATHERING AND NEWS-WRITING.** — For juniors; seniors may elect. The foundation aims and conceptions of journalism; reporting. Courses 53, 54 and 55 are suited to students whose vocation may require the popular presentation of technical or other informa-

tion; *e.g.*, extension workers, county agents, agricultural-school instructors, experiment-station editors, survey and other social-service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers.

6 laboratory hours or class equivalents, credit, 3.

77. **I.** 78. **II.** 79. **III.** EDITORIAL MATERIALS AND METHODS. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; reading of daily papers and weekly reviews or rural-life periodicals; writing of editorial articles. Recommended to students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.

6 laboratory hours or class equivalents, credit, 3.

80. **I.** 81. **II.** 82. **III.** ADVANCED JOURNALISTIC PRACTICE. — Seniors. Preparation, editing and publication in a newspaper of a rural-life page.

8 or 10 laboratory hours, credits, 4 or 5.

PUBLIC SPEAKING.

Elective Courses.

50. **I.** ARGUMENTATION. — For juniors; seniors may elect. Presents the fundamental principles of argumentation as applied to oral and written discourse, and develops in the student power to handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. The course is recommended for those who desire to enter the intercollegiate debates.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

51. **II.** OCCASIONAL ORATORY. — For juniors; seniors may elect. A study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

French and Spanish.

Professor MACKIMMIE, Mr. THISELL.

The aim of the courses in French and Spanish is to give the student a practical knowledge of these languages for the purpose of wider reading and research, to introduce him to some of their treasures in art and science, and through the literature to acquaint him with the people. In the elementary courses as much time as possible is given to oral work, to develop a speaking, as well as a reading, knowledge of the tongue.

FRENCH.

Required Courses.

1. **I.** 2. **II.** 3. **III.** **ELEMENTARY FRENCH.** — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. Required of freshmen presenting German for entrance who do not continue that language and have not studied French.

3 class hours, 6 study hours.

Credit, 9, **I, II** term.

2 class hours, 4 study hours.

Credit, 6, **III** term.

Mr. THISSELL.

4. **I.** 5. **II.** 6. **III.** **INTERMEDIATE FRENCH.** — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.

3 class hours, 6 study hours.

Credit, 9, **I, II** term.

2 class hours, 4 study hours.

Credit, 6, **III** term.

Professor MACKIMMIE and Mr. THISSELL.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. **I.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 1, 2 and 3.

26. **II.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisite, French 25.

27. **III.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisite, French 26.

28. **I.** **ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature," readings in the library and written reports.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6.

29. **II. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 28.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6.

30. **III. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods. Outside reading.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. Meets the requirements of individual students and equips them with exact English equivalents for the French scientific terms in their particular science. Word lists of scientific terms are required, and also weekly readings and reports from scientific works in the subject in which they are majoring. Several scientific works are read.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I. FRENCH LITERATURE.** — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 deals with the drama, and plays by Augier, A. Dumas *fils*, Delavigne and other contemporary dramatists.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II. FRENCH LITERATURE.** — For seniors; juniors may elect. The novel. Works by Flaubert, the De Goncourts and Zola are read. Written reports are required on outside reading.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III.** FRENCH LITERATURE. — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries du Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Littérature Française."

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

SPANISH.

Elective Courses.

50. **I.** ELEMENTARY SPANISH. — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

51. **II.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 50.

52. **III.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 51.

75. **I.** MODERN SPANISH AUTHORS. — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 52.

76. **II.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 75.

77. **III.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 76.

German and Music.

Professor ASHLEY, Assistant Professor JULIAN.

GERMAN.

The courses in German are intended to give the student a reading knowledge of the language and to introduce to him some of the masterpieces of German literature. To the student interested in pursuing advanced reading in scientific German, opportunity is given to do corollary reading in his major subject, in collaboration with the head of that department.

Required Courses.

1. **I.** 2. **II.** 3. **III.** **ELEMENTARY GERMAN.** — Freshmen; open upon arrangement to other students. Grammar, composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.

3 class hours, 6 study hours.

Credit, 9, **I, II** term.

2 class hours, 4 study hours.

Credit, 6, **III** term.

Professors ASHLEY and JULIAN.

4. **I.** 5. **II.** 6. **III.** **INTERMEDIATE GERMAN.** — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.

3 class hours, 6 study hours.

Credit, 9, **I, II** term.

2 class hours, 4 study hours.

Credit, 6, **III** term.

Professor ASHLEY.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisites, German 1, 2 and 3.

26. **II.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisite, German 25.

27. **III.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisite, German 26.

28. **I. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literary productions.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6.

29. **II. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 28.

30. **III. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 29.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 29.

50. **I. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 50.

52. **III. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 51.

75. **I. GERMAN LITERATURE.** — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Nibelungenlied," Goethe's "Faust" and one modern typical drama.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 28, 29 and 30.

76. **II. GERMAN LITERATURE.** — Seniors. As stated under Course 75.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 75.

77. **III.** GERMAN LITERATURE. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.

Professor ASHLEY.

Prerequisite, German 76.

78. **I.** CONVERSATION AND COMPOSITION. — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II.** CONVERSATION AND COMPOSITION. — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 78.

80. **III.** CONVERSATION AND COMPOSITION. — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 79.

MUSIC.

Elective Courses.

50. **I.** HISTORY AND INTERPRETATION OF MUSIC. — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.

1 class hour.

Credit, 1.

Professor ASHLEY.

51. **II.** HISTORY AND INTERPRETATION OF MUSIC. — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.

1 class hour.

Credit, 1.

Professor ASHLEY.

52. **III.** HISTORY AND INTERPRETATION OF MUSIC. — For juniors; seniors may elect. The Modern school and Modern composers.

1 class hour.

Credit, 1.

Professor ASHLEY.

DIVISION OF RURAL SOCIAL SCIENCE.

President BUTTERFIELD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor CANCE, Assistant Professor SAWTELLE, Mr. MAGINNIS, Professor HART.

Instruction in agricultural economics is designed to show that the agricultural industry justifies its existence chiefly as a supplier of food and raw textile materials for human consumption; that agricultural success is measured by production of values rather than by production of volume of agricultural products; that the goal of the farmer is the largest net profit over a long-time period; that agricultural production includes all processes from purchase of seed and fertilizer and preparation of seedbed until the product reaches the consumer, including collection, transportation, storage, financing, packing, handling and selling; that a knowledge of the business of agriculture and agricultural commerce is to-day more necessary than a knowledge of agricultural technique.

The work of this department is conducted by means of lectures, readings and research in both library and field. A catalogue, now containing some 12,000 cards, covering the various phases of agricultural economics, is maintained. The department is also supplied with a large collection of maps, charts and statistical reports on the prices and supply of agricultural products. A goodly number of regular reports of the Bureau of Markets and other divisions of the United States Department of Agriculture are available for the use of students. Two series of bound volumes of bulletins are kept in the department offices, with duplicate series in the college library; one series already contains 12 volumes on "Co-operation in Agriculture," and the other, 15 volumes on "Marketing of Farm Products."

Required Course.

26. **II. AGRICULTURAL INDUSTRY AND RESOURCES.** — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States are studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.
4 class hours.

1 2-hour laboratory period, credit, 5.

Mr. MAGINNIS and PROFESSOR CANCE.

Elective Courses.

50. **I. ELEMENTS OF AGRICULTURAL ECONOMICS.** — For juniors; seniors may elect. Designed to accompany or follow the course in elements of economics. Deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends;

the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.

5 class hours.

Credit, 5.

Professor CANCE.

51. **III. HISTORICAL AND COMPARATIVE AGRICULTURE.** — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt is made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.

5 class hours.

Credit, 5.

Assistant Professor SAWTELLE.

52. **II. CO-OPERATION IN AGRICULTURE.** — For juniors; seniors may elect. The history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours.

Credit, 5.

Professors CANCE and SAWTELLE.

53. **III. THE AGRICULTURAL MARKET.** — For juniors; seniors and graduate students may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours.

Credit, 5.

Professor CANCE.

75. **II. RURAL AND BUSINESS LAW.** — For seniors; juniors may elect. Land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours.

Credit, 5.

Professor HART.

76. **II. TRANSPORTATION OF AGRICULTURAL PRODUCTS.** — For seniors and graduate students; juniors may elect. The development of highway, waterway and railway transportation and its relation to the agricultural development of the country; the principles governing the operation and control of transportation agencies; present-day problems relating to the shipment of farm products, rates, facilities and services; methods of reducing wastes in transportation; the economics of the good roads movement and of motor transportation. Lectures, text and field work.

5 class hours.

Credit, 5.

Professors CANCE and SAWTELLE.

77. **I. PROBLEMS IN AGRICULTURAL ECONOMICS.** — For seniors and graduate students; juniors may elect. An advanced course for those desirous of studying more intensively some of the economic problems affecting the farmer, such as: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity is given, if practicable, for field work, and students are encouraged to pursue lines of individual interest.

5 class hours.

Credit, 5.

Professor CANCE.

78. **III. AGRICULTURAL CREDIT FACILITIES.** — For seniors and juniors. Lectures, discussions and assigned readings on credit needs of farmers; the legitimate use of credit in the acquisition of land, and the production, storage and marketing of agricultural products; the development of national and State rural credit institutions and laws; the powers and methods of operation of credit institutions with reference to the supply of credit for agricultural purposes; the methods by which the individual may increase his credit standing and borrowing power; ways in which the present credit facilities may be increased.

3 class hours.

Credit, 3.

Assistant Professor SAWTELLE.

79. **I. AGRICULTURAL STATISTICS.** — For seniors, juniors and graduate students. The nature and sources of agricultural statistics, the methods of obtaining numerical facts, of analyzing and drawing conclusions from statistical data, and the methods of presenting in a true and forceful manner the statistical facts of the agricultural industry. Opportunity is given in the laboratory for practice in the use of statistical methods and processes, and to acquire experience in dealing with practical statistical problems. The application of statistics and statistical methods in the fields of agricultural economics, extension work, education, journalism and the business matters connected with farm operation is emphasized.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor SAWTELLE.

80. **I. SEMINAR.** — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted.

For the year 1922-1923, Seminars 80, 81 and 82 will be concerned, in the main, with salesmanship and advertising of agricultural products. Hours to be arranged.

1 2-hour conference period, credit, 2.
The DEPARTMENT.

81. **II.** SEMINAR. — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

82. **III.** SEMINAR. — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

85. **II.** AGRICULTURAL PRICES. — For seniors and graduate students. A study of the prices of agricultural products and other commodities which are of importance in the agricultural industry. Limited to five students.

2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

86. **III.** AGRICULTURAL PRICES. — For seniors and graduate students as stated in Course 85. Limited to five students.

2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

Agricultural Education.

Professor HART, Professor WELLES, Mr. HEALD,¹ Miss HAMLIN.

The primary aim of the department is training students for service in some form of educational work. This service may be in one or more of several fields. Teaching is the most common, and includes vocational agriculture. Students contemplating preparation for State approval should confer as early as possible with the head of the department, to the end that they may secure a proper distribution of subjects and properly utilize vacations in acquiring the necessary farm practice. This department also serves as the avenue for recommending graduates to the State Department of Education for teaching positions, including such positions as require the State teachers' certificate.

The equipment includes a combination classroom and laboratory furnished with such articles as seem advisable for the effective work of a high school department of agriculture. This room represents to teachers in training the usable things for their work in a school department. The office of the department is equipped with books and pamphlets on agricultural education properly catalogued.

CO-OPERATION BETWEEN THE STATE DEPARTMENT AND THE COLLEGE.

Under an agreement with the Division of Vocational Education of the State Department of Education, the department of agricultural education is the co-operating agency at the college for the training of teachers of agriculture and other related subjects.

¹ Representing the State Department of Education in the administration of vocational education acts.

Required Course.

26. **II.** AGRICULTURAL OPPORTUNITIES FOR WOMEN. — For sophomores. Designed to show the woman who is interested in agriculture what opportunities there are for her in that field, and how she may best take advantage of them. The types of agricultural work for which women are best adapted are discussed. A study is made of some of the special problems which confront the woman farmer, and her best ways of solving them.

2 class hours.

Credit, 2.
Miss Hamlin.

Elective Courses.

50. **I.** EDUCATIONAL PSYCHOLOGY. — A basic course for students looking forward to work in education, economics and sociology. The first part of the term is devoted to a study of the general notions of mental life and the explanation of psychological terms used in mental science; the anatomy and physiology of the nervous system and its relation to mental phenomena; and the fields of human activity in which psychology plays an important part. During the latter part of the term students are permitted to choose themes for the purpose of special study. These may be the psychology of teaching; the psychology of management; the psychology of crowds and other aspects of sociology; or the psychology of advertising, salesmanship or other phases of economics.

5 class hours.

Credit, 5.
Professor HART.

51. **I and II.** PRINCIPLES AND METHODS OF TEACHING. — For juniors; seniors may elect. Intended primarily for students expecting to teach. Others should consult the department before registering. Includes a study of the laws of learning, exhaustive inquiry into the meaning of interest, apperception, memory-images, judging and reasoning, and their applications in teaching processes; class management and the organization of lesson plans.

5 class hours.

Credit, 5.
Professor WELLES.

52. **III.** HISTORY AND PHILOSOPHY OF EDUCATION. — For juniors; seniors may elect. A study of educational history in modern times, educational movements in the United States and their bearing on national aims and ideals, with special emphasis on education for a democracy.

5 class hours.

Credit, 5.
Professor HART.

75. **II.** ORGANIZATION AND SUPERVISION OF SECONDARY EDUCATION. — For seniors; juniors may elect. School systems, courses of study, training of teachers, financial support, recent tendencies and policies in secondary and junior high schools.

3 class hours.

Credit, 3.
Professor WELLES.

76. **I and III.** SPECIAL METHODS IN TEACHING VOCATIONAL AGRICULTURE. — For seniors; juniors and others qualified may elect. Students must consult the head of the department or the professor in charge before registering for this course. Work consists of outlining lessons and projects for

the teaching of agriculture or related subjects in agricultural schools or departments; the application of principles of vocational education as embodied in the Smith-Hughes Act and other legislation relative to agricultural education; the necessary adjustments relating to the school, community and administrative officials.

3 class hours.

Credit, 3.

Professor WELLES.

77. **III. EXTENSION ORGANIZATION. EXTENSION TEACHING AND BOYS' AND GIRLS' CLUB LEADERSHIP.** — For seniors, juniors and others if after consultation they are deemed qualified. A survey of the development of the demonstration work among and by farmers and in farm homes; the growth, significance and methods of conducting Boys' and Girls' Clubs; the current organization of County, State and Federal Extension Service and Farm Bureaus. A study of the psychology of teaching, involving the theory and practice of visual instruction. Observation and study of the functions of the Extension staff, including both office and field work. Actual practice, so far as possible, in supervising club work, directing or carrying on demonstration projects. The course will be conducted jointly by members of the Extension staff and the staff of the Department of Agricultural Education.

2 class hours.

3 2-hour laboratory periods, credit, 5.

The DEPARTMENT and the EXTENSION SERVICE.

80. **I, II, III and IV. SUPERVISED TEACHING.** — For seniors and graduate students. Supervised teaching (*a*) in county agricultural schools or high school departments of agriculture under the direction of the State Department of Education and the college department of agricultural education in accordance with a joint agreement; or (*b*) under the supervision of this department only. Besides teaching, the student is required to pursue a course of professional study bearing upon the subject taught, to arrange the subject-matter for lessons, and to outline teaching projects. The number of credits depends upon the number, character and length of teaching exercises and conferences. Scheduled by arrangement.

Under certain conditions a student may absent himself from college during one term of his senior year for supervised teaching. For detailed information regarding this matter consult the department.

Credits, 1 to 5.

Professor WELLES.

90. **III. GENETIC PSYCHOLOGY.** — For seniors; juniors may elect. A study of the physical and mental growth and development of the individual from birth to maturity; a comparative study of the physiological and mental ages of children; and mental tests.

3 class hours.

Credit, 3.

Professor HART.

91. **I. RURAL EDUCATION.** — For graduates; seniors may elect. A study of the development of the rural school; its organization and administration; its function for the community and for the individual; its place in the State system; some local surveys.

3 class hours.

Credit, 3.

Professor HART.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor SIMS, Mr. NOVITSKI.¹

The courses in rural sociology are designed for two purposes: first, to give students an appreciation of the general problems of country life; second, to afford a definite training for students who wish to take up some specific form of social service. In the last ten years rural sociology has been introduced as a subject into more than 50 per cent of the agricultural schools and colleges. There is a good demand for teachers, and an increasing opportunity in other directions in this subject. The courses afford the student an opportunity to pursue graduate as well as undergraduate work. The library of the college is unusually well equipped with rural sociological material.

Required Course.

27. **III. ELEMENTS OF RURAL SOCIOLOGY.** — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, and analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

Professor SIMS.

Elective Courses.

50. **I. SOCIAL CONDITION OF RURAL PEOPLE.** — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent and causes of rural delinquency and dependency, conditions of temperance, of morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours.

Credit, 3.

Professor SIMS.

51. **II. RURAL GOVERNMENT.** — For juniors; seniors may elect. A general survey of the development of rural government in the United States, origin of the New England town, its influence upon the west, county government, the influence of the farmer in legislation, good roads movement, credit facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States

¹ On leave of absence.

and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours.

Credit, 3.

Professor SIMS.

52. **III. RURAL ORGANIZATION.** — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities. The method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

President BUTTERFIELD.

76. **I. FIELD WORK IN RURAL SOCIOLOGY.** — For seniors; juniors may elect. Designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work is carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.

Professor PHELAN.

Prerequisites, Rural Sociology 27 and 52.

77. **II. RURAL SOCIAL SURVEYS.** — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours.

Credit, 3.

Professor SIMS.

79. **I. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

80. **II. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

81. **III. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

Rural Home Life.

Miss SKINNER, Miss BARTLEY.

The Department of Rural Home Life offers elective courses for students majoring in other departments of the college. Fundamentally this training is such as will help young women to be better prepared to adjust themselves readily to their environment in the home and in the community, and to help them realize their responsibility as good homemakers and as good citizens.

The food laboratory, located in the entomology building, is fitted with individual desks (cabinet form) to hold utensils and materials for each student. Each table is equipped with gas stoves. A storage cabinet is provided with bins for supplies and cupboard space for large utensils and illustrative material. This room is well lighted and pleasant. The clothing laboratory is located in the Adams House. The equipment consists of sewing machines, cabinets, work tables, cutting tables, electric irons, dress forms and a collection of materials illustrating the production of textiles for clothing and household use.

Required Courses.

1. **I. INTRODUCTION TO HOME ECONOMICS.** — Freshmen women. Lectures on the history and evolution of the home; social customs and their value in family relationships; healthful and suitable care of the wardrobe; principles of nutrition as applied to the student's life; the student's budget, and the keeping of personal accounts.

2 class hours.

Credit, 2.

Miss SKINNER.

Elective Courses.

25. **I. 26. II. 27. III. TEXTILES AND CLOTHING.** — Sophomores. The selection and purchase of suitable materials, their character, cost and durability. Appropriateness and simplicity in dress. Practical work in hand and machine sewing, drafting and designing of patterns, the care and repair of clothing.

1 lecture.

2 2-hour laboratory periods, credit, 3.

Miss BARTLEY.

50. **I. FOODS AND COOKERY.** — Juniors. An introduction to the subject of foods in their scientific and economic aspects of selection, preparation and use.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Miss SKINNER.

51. **II. FOODS AND COOKERY.** — Juniors. A continuation of Course 50, with stress upon meal planning and serving.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Miss SKINNER.

52. **III.** ADVANCED FOOD STUDY. — Juniors. A study of food materials in their relation to the daily dietary of families under various conditions; a consideration of dietary standards as influenced by age, sex and occupation; a comparative study of the nutritive values of usual foods.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Miss SKINNER.

75. **I.** 76 **II.** HOUSEHOLD MANAGEMENT (1923-24). — Juniors and seniors. The application of the principles of scientific management to the household, and the elements of successful home making. The family income, cost of living, household accounts, the budget and its apportionment. The responsibility of the woman to her family and the community in establishing right standards of living. Given in alternate years.

2 class hours.

Credit, 2.

Miss SKINNER.

78. **III.** HOME NURSING (1923-24). — Juniors and seniors. A study of the care of the family health; simple diseases and their prevention; the care of young children and invalids; first aid to the injured. Given in alternate years.

2 class hours.

Credit, 2.

Miss SKINNER.

GENERAL DEPARTMENTS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Military Science and Tactics.

Major FREDERICK E. SHNYDER, Cavalry, U. S. A.; Major HERMAN KOBBE, Cavalry, U. S. A.; Captain JAMES V. V. SHUFFELT, Cavalry, U. S. A.; Captain THOMAS BRADY, JR., Cavalry, U. S. A.; Technical Sergeant JOHN J. LEE, U. S. A., Retired; Staff Sergeant JAMES A. WARREN, Cavalry; and a detachment of enlisted men of the United States Army.

Under act of Congress (July 2, 1862) military instruction under a regular army officer was required in this college of all able-bodied male students. Under act of Congress June 3, 1916, as amended by act of Congress Sept. 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following the World War and an act of Congress (July 9, 1918) the Reserve Officers' Training Corps is in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics.

Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a cavalry unit.

The primary object of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions, for the ultimate purpose of qualifying selected students of such institutions as reserve officers in the military forces of the United States. It is intended to attain this object during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers, by employing methods designed to fit men physically, mentally and morally for pursuits of peace as well as war.

All candidates for a degree in a four-year course must take for two years at least three hours a week of military training.

Students in their junior and senior years, who are approved by the president and the professor of military science and tactics, may take the advanced course if they so elect. The advanced course consists of at least five hours per week and a summer camp of about six weeks during the summer vacation, between the junior and senior years. Students taking this course are paid by the Federal government at a rate to be fixed by the Secretary of War, not to exceed the value of the army ration. The rate now fixed is 40 cents per day, which amounts to about \$146 per year. Students graduating in the advanced course are eligible for commissions in the Officers' Reserve Corps, *but are not required to accept such commissions if offered.*

The required uniform is of olive drab woolen cloth, and is furnished for the use of the students by the Federal government without cost. It is worn by all cadets when on military duty. New uniforms are furnished each year.

The course for cavalry units of the Reserve Officers' Training Corps includes theoretical and practical instruction in all phases of cavalry work, so distributed over the four-year college course as to qualify students at the end of the freshman year as privates of cavalry; at the end of the sophomore year as non-commissioned officers of cavalry; and upon graduation as reserve officers. The instruction in this department covers cavalry drill, cavalry weapons, —

i.e., rifle, pistol, saber, automatic rifle and machine gun, — map reading and military sketching, minor tactics, equitation, etc. The course in equitation includes cross country riding and instruction in polo. So far as season and weather permit, instruction is of a practical nature out of doors.

Required Courses.

1. **I.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

2. **II.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

3. **III.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

25. **I.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

26. **II.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

27. **III.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

Elective Courses.

50. **I.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

51. **II.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

52. **III.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

75. **I.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

76. **II.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

77. **III.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE, Mrs. HICKS, Mr. GRAYSON, Mr. COLLINS, Mr. DERBY.

The purpose of the courses offered by this department is to provide active exercise and to instruct every student how to care for his health and maintain his physical condition while carrying on his college course.

The equipment consists of the Alumni Athletic Field, which has room for two football fields, a quarter-mile cinder track with a 220 straightaway, and the baseball diamond; and also the old field for class football and baseball, two tennis courts, and the drill hall floor for basket-ball. For several years the drill hall floor was used for class work in gymnastics, but its condition has become so bad that this has been discontinued. During the winter months a hockey rink is provided on the college pond.

[All undergraduate male students are given a physical examination upon entering.]

MEN.

Required Courses.

1. **I.** HYGIENE. — Freshmen. Lectures on personal hygiene.
1 class hour. Credit, 1.
Professor HICKS.
2. **I.** RECREATION. — Freshmen. Outdoor games.
1 laboratory hour, credit, 1.
Mr. COLLINS.
3. **III.** RECREATION. — Freshmen. Outdoor games.
1 laboratory hour, credit, 1.
Mr. GRAYSON.
7. **I.** 8. **II.** 9. **III.** RECREATION. — Military substitute for fresh-
man men. 3 1-hour laboratory periods, credit, 3.
Mr. COLLINS.
25. **I.** RECREATION. — Sophomores. Outdoor games.
1 laboratory hour, credit in third term.
Mr. GRAYSON.
26. **III.** RECREATION. — Sophomores. Outdoor games.
1 laboratory hour, credit for Nos. 25 and 26, 1.
Mr. GRAYSON.
30. **I.** 31. **II.** 32. **III.** RECREATION. — Military substitute for
sophomore men. 1 2-hour laboratory period, credit, 1.
Professor HICKS.

Elective Course.

77. **III.** TRAINING COURSE. — Seniors. Election by permission only.
History of physical education and supervision of athletics.
1 class hour. Credit, 1.
Professor HICKS.

WOMEN.

Required Courses.

4. **I.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours, credit, 3
Mrs. HICKS.
5. **II.** GYMNASTICS. — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours, credit, 3.
Mrs. HICKS.
6. **III.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours, credit, 3.
Mrs. HICKS.

27. **I.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours, credit, 1.
Mrs. HICKS.
28. **II.** GYMNASTICS. — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours, credit, 1.
Mrs. HICKS.
29. **III.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours, credit, 1.
Mrs. HICKS.
- Elective Courses.*
50. **II.** GYMNASTICS. — Juniors. Dancing, Swedish games, etc.
3 laboratory hours, credit, 1.
Mrs. HICKS.
76. **II.** GYMNASTICS. — Seniors. Dancing, Swedish games, etc.
3 laboratory hours, credit, 1.
Mrs. HICKS.

THE LIBRARY.

The general college library consists of all books belonging to the college, including the library of the Experiment Station and all divisional and departmental collections of books. The main collection now occupies the entire building, which was originally intended to serve the purposes of both chapel and library. A dictionary card catalogue is intended ultimately to cover all material in the general college library, which now comprises approximately 70,000 volumes, besides much unbound or paper-bound material, pamphlets, periodicals and newspapers. The library contains also some important special collections of books, amounting to several thousand volumes, not yet catalogued. Much of the constantly increasing pamphlet and periodical material, even though it is not yet comprehended in the general catalogue, is made promptly available by means of check lists, indexes, bibliographies and other library helps. Files of important periodicals make readily accessible to readers the latest contributions to the sum of human knowledge by contemporary leaders in many fields of thought and investigation. Works dealing with the sciences related to the processes and problems of agriculture are in greatest abundance, but literature, history and sociology are also well represented in our collections of books. The reading room is well supplied with encyclopedias and other general reference books, and with current numbers of an attractive list of popular and technical magazines and periodicals.

The greater part of the library material has been recently reclassified and recatalogued in accordance with a standard system, and is thereby rendered at all times directly accessible to teachers and students as well as library workers. From time to time informal lectures on the use of the library will be given to groups of students. By seminar and laboratory methods, individual students will be taught to appreciate books as essential sources of information and culture, and will be instructed in the use of the various devices common in libraries for finding what the library contains. All members of the college community have the privilege of free access to the book stacks for reference purposes, and books not specially reserved may be loaned for extra-library use for a period of two weeks.

The library is open from 8 A.M. to 9.30 P.M. on week days, and from 9 A.M. to 1.30 P.M. on Sundays while college is in session. Shorter hours prevail during vacation.

THE GRADUATE SCHOOL



THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

GRADUATE STAFF, 1922-23.

Professor ANDERSON, Professor BEAUMONT, Professor CANCE, Professor CHAMBERLAIN, Assistant Professor CLARK, Professor CRAMPTON, Professor FERNALD, Professor GRAHAM, Professor HART, Assistant Professor ITANO, Professor LINDSEY, Professor OSMUN, Professor PETERS, Professor PHELAN, Professor SALISBURY, Professor SEARS, Professor SHAW, Professor THAYER, Professor TOMPSON, Assistant Professor TORREY, Professor WAUGH, Director MARSHALL, Dean LEWIS, President BUTTERFIELD; Mr. WATTS, Secretary.

This college has provided study of a graduate nature for many years. The need for such training became real when agriculture was recognized as an aggregate of the many sciences involved and the many practices employed. The obsolete notion that agriculture is only farming has been replaced by the notion that farming, as such, is only one element in agriculture. The ramifications and divisions of agriculture are many; most of these call for advanced study and training to meet the exigencies of the times. No apology is, therefore, required for an attempt to fathom the scientific, economic and social intricacies of such a fundamental phase of human effort as agriculture. The value of such an undertaking is, or should be, patent to every intelligent mind familiar with the situation.

Graduate work has been available to students since 1893. At that time it was possible to qualify for the degree of master of science; later, in 1898, for the degree of doctor of philosophy; in 1913, for the professional degrees of master of agriculture and doctor of agriculture; in 1916, for the specific professional degree of master of landscape architecture.

To make the graduate work more effective and distinctive in agriculture, the graduate school was established in 1908. It has become the operating agency for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment station specialists in farm management, dairying, live stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; for economists and social workers; and for numerous other positions requiring a great amount of scientific and professional agricultural knowledge, training and experience.

ORGANIZATION.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. The student is assigned to an advisory committee, composed of

the instructor in charge of his major subject as chairman, and instructor in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate council which controls the policy of the graduate school.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE, METHODS AND REQUIREMENTS OF GRADUATE WORK.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through adequate application of some phase of the major subject.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary to equip the individual professionally.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on constructive study; must be an actual contribution to knowledge; and possess real merit.

The thesis in its final form must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the copies is to be retained as an official copy by the director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

FINAL EXAMINATIONS.

For the degree of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

For the degree of master of science, master of agriculture or master of landscape architecture, a final examination upon the minor taken is given upon the completion of each course, and in the major a final examination, which may be either written or oral, or both, is given over all the work by the department concerned.

DEGREES CONFERRED.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least three years¹ to the prosecution of three subjects of study and research in residence at the college.
 2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.
 3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.
 4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.
 5. A public oral examination.
 6. The payment of all fees and college expenses required.
- The fee for the degree of master of science, master of agriculture, or master of landscape architecture is \$10, and for the degree of doctor of philosophy or doctor of agriculture, \$25.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.
2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.
3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy:—

Agricultural Economics.
Botany.
Chemistry.
Entomology.

Horticulture.
Microbiology.
Rural Sociology.

¹ All time statements refer to minimum time.

Courses available as major subjects for the degree of master of science: —

Agricultural Economics.	Entomology.
Agricultural Education.	Horticulture.
Agriculture.	Mathematics and Physics.
Agronomy.	Microbiology.
Animal Husbandry.	Poultry Science.
Botany.	Rural Sociology.
Chemistry.	Veterinary Science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy.	Animal Husbandry.	Poultry Science.
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The course in Landscape Architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects: —

Agricultural Economics.	Entomology.
Agricultural Education.	Horticulture.
Agriculture.	Landscape Architecture.
Agronomy.	Mathematics and Physics.
Animal Husbandry.	Microbiology.
Animal Pathology.	Poultry Science.
Botany.	Rural Sociology.
Chemistry.	Zoölogy.

GENERAL OUTLINE OF COURSES FOR ADVANCED DEGREES.

Agricultural Economics.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must have had the following courses or their equivalents: Economics and Sociology 51, Agricultural Economics 26 and 50.

REQUIRED WORK. — Candidates must take the following courses: Agricultural Economics 51, 52, 53 and 79. These courses, specially arranged for graduates, may be taken as Courses 120, 170, 155 and 180 for graduate credit. In addition, candidates must take Courses 110, 111, 130, 165 and 175 in Agricultural Economics; Rural Sociology 27 and 50, or equivalent courses; and Economics and Sociology 50 and 77, or equivalent courses.

Each candidate will be required to have a working knowledge of the general field of economics, the history of agricultural economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture, and prices, markets and marketing.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — The same as for the degree of doctor of philosophy, except that there is no language requirement.

GRADUATE COURSES OFFERED.

110. THEORY OF AGRICULTURAL ECONOMICS. — Readings in French, German and English on economics of agriculture. Alternate years, odd, 200 hours.
Credits, 3.
Professor CANCE.
111. CURRENT ECONOMIC PROBLEMS AND LITERATURE. — Department seminar throughout the year.
Credit, 1 each term.
120. HISTORICAL AND COMPARATIVE AGRICULTURE. — General survey. May be taken in connection with Course 51. Spring term, yearly. Credits, 3.
Assistant Professor SAWTELLE.
- 121-122. HISTORY OF AMERICAN AGRICULTURE. — Special studies in the history of agricultural institutions, practices or relations. Fall Term, even years.
Credits, 5.
ASSISTANT Professor JEFFERSON.
130. PROBLEMS OF AGRICULTURAL PRODUCTION. — The relation of the farmer to the food supply. May be taken in connection with Course 77. Fall term, yearly.
Credits, 5.
Professor Cance.
140. LAND TENURE AND THE ACQUISITION OF FARM LAND. — Readings, discussion, original exercises. Alternate years, even.
Credits, 3-5.
Professor Cance.
145. FARM LABOR. — Reading and investigation.
Credits, 3.
Professor Cance.
150. AGRICULTURAL COMMERCE, INDUSTRY AND TRADE. — A study of trade movements and commercial activities relating to agricultural products. Fall term, alternate years, odd.
Credits, 3-5.
Assistant Professor JEFFERSON.
155. THE AGRICULTURAL MARKET. — A study of the forces, methods and institutions of the market for agricultural products. Spring term, yearly.
Credits, 5.
Professor Cance.
156. SPECIFIC PROBLEMS IN MARKETING FARM PRODUCTS. — Reports and discussions. Alternate years, odd.
Credits, 3.
Professor Cance.
160. AGRICULTURAL PRICES. — Winter term, yearly.
Credits, 3.
Assistant Professor SAWTELLE.
161. AGRICULTURAL PRICES. — Spring term, yearly.
Credits, 3.
Assistant Professor SAWTELLE.
165. TRANSPORTATION OF AGRICULTURAL PRODUCTS. — Elementary discussion and report. Winter term, yearly.
Credits, 5.
Professor CANCE.

166. SPECIFIC TRANSPORTATION PROBLEMS. — Original study, reading and report on certain transportation problems related to agriculture. Alternate years, odd. Credits, 3-5.

Assistant Professor SAWTELLE.

170. CO-OPERATION IN AGRICULTURE. — Elementary problems and discussion. May be taken in connection with Course 50. Winter term, yearly. Credits, 5.

Professor CANCE.

171-172. SPECIAL PROBLEMS IN CO-OPERATION FOR ECONOMIC PURPOSES. — Study, original investigation and discussion. Every third year, beginning 1922. Credits, 3-5.

Professor CANCE.

175. AGRICULTURAL CREDIT. — Readings and reports in addition to class lectures on agricultural credit. Taken in connection with Course 78. Spring term, yearly. Credits, 3-5.

Assistant Professor SAWTELLE.

180. ELEMENTARY PRINCIPLES OF STATISTICS. — Chiefly related to agriculture. Lectures, laboratory studies and original work. Taken in connection with Course 79. Fall term, yearly. Credits, 5.

Assistant Professor SAWTELLE.

181. SPECIFIC PROBLEMS IN STATISTICS OF AGRICULTURE. — Alternate years, even. Credits, 3-5.

Assistant Professor SAWTELLE.

185. RURAL LAW. — Corresponds to Course 78. Spring term, yearly. Credits, 5.

Professor HART.

186. STUDIES IN AGRICULTURAL LEGISLATION. Credits, 3-5.

The DEPARTMENT.

190-195. INVESTIGATION OF VARIOUS PROBLEMS RELATED TO AGRICULTURAL ECONOMICS. — Credit given on basis of time spent and reports submitted.

200. THESIS. — Research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances mastery of research methods includes facility in investigation, tabulation and interpretation of results.

Agricultural Education.

MAJOR REQUIREMENTS.

For the Degree of Master of Science.

PREREQUISITE WORK. — A minimum of 25 undergraduate credits distributed among the following lines of study: philosophy, psychology, history of education, principles and methods of teaching, school organization and administration. Graduates of other than agricultural colleges who wish to take their major work in some phase of rural education will be required to

present evidence of a knowledge of rural life and rural industries both scientific and practical. This may involve the study of some undergraduate courses in agriculture or horticulture without graduate credit.

REQUIRED WORK. — In addition to the regular prescribed work at least a half year of experience in teaching or supervision is required before the candidate is recommended for a degree.

GRADUATE COURSES OFFERED.

100. HISTORY OF AGRICULTURAL EDUCATION.	Credits, 1-10. Professor HART.
105. PRINCIPLES AND METHODS OF TEACHING AGRICULTURE AND AGRICULTURAL SCIENCE.	Credits, 1-20. Professor HART.
110. RURAL EDUCATION: ITS ORGANIZATION AND ADMINISTRATION.	Credits, 1-20. Professor HART.
115. SUPERVISION AND ADMINISTRATION OF AGRICULTURAL EDUCATION.	Credits, 1-5. Professor HART.
120. THEORY OF VOCATIONAL EDUCATION.	Credits, 1-10. Professor HART.
125. PREPARATION OF TEACHERS OF AGRICULTURE.	Credits, 1-10. Professor HART.
130. GENERAL EDUCATIONAL THEORY AND PRACTICE.	Credits, 1-15. Professor HART.
135. EDUCATIONAL LITERATURE.	Credits, 1-10. Professor HART.
140. EDUCATIONAL RESEARCH.	Credits, 1-10. Professor HART.
200. THESIS.	Credits, 25. Professor HART.

MINOR REQUIREMENTS.

Minor work is offered in this department for the degrees of doctor of philosophy and master of science. Candidates must have had the equivalent of 15 undergraduate credits in agricultural education, 5 of which must have been in the history of education.

Agronomy.

MAJOR REQUIREMENTS.

For the Degree of Master of Science.

PREREQUISITE WORK. — Graduate students desirous of taking major work in agronomy should have had good training in the fundamentals of the natural sciences and should have taken undergraduate courses Agronomy 27 and 50, or their equivalents.

REQUIRED WORK. — Studies will be assigned among courses listed below. Problems may be chosen in which particular attention will be devoted to soils, fertilizers or field crops.

GRADUATE COURSES OFFERED.

151. **FIELD CROP PRODUCTION.** — (a) Varieties. Classification; adaptation to climatic and soil conditions, etc.

(b) Distribution as affected by natural and economic conditions.

(c) Cultural methods. Early and late planting of the potato seed crop, of silage corn; spacing of plants; keeping qualities as affected by time and methods of harvesting; tillage and moisture control, etc.

(d) Storage of cereals, roots and tubers as affected by aeration, temperature, humidity, previous treatment, etc. Credits, 1-25.

175. **SOIL TECHNOLOGY.** — Soil Physics. Textural relationships of soil classes; absorption phenomena; physical properties in relation to mineralogical and chemical properties; soil structure; moisture relationships; the colloidal conditions of soils, etc. Credits, 1-25.

177. **SOIL FERTILITY.** — (a) Soil Chemistry. Nitrogen fertilization, including commercial supply and gain or loss under different systems of soil management; absorption of potash and phosphoric acid; sulfur fertilization; soil acidity, etc.

(b) Soil Biology. Fixation of nitrogen by symbiotic and nonsymbiotic organisms; changes of green and animal manures in the soil; ammonification and nitrification; care and preservation of manures; humus in relation to soil fertility, etc. Credits, 1-25.

178. **CROP IMPROVEMENT.** — Involves the application of the principles of plant breeding to special crops. Credits, 1-25.

200. **THESIS.**

Credits, 15-25.

MINOR REQUIREMENTS.

Prerequisites are as stated above for major work. In addition, studies suited to the needs of the candidate will be selected from the above courses.

Animal Husbandry.

MAJOR REQUIREMENTS.

For the Degree of Master of Science or Master of Agriculture.

PREREQUISITE WORK. — Candidate must have had the following courses, or their equivalents, before he can enter graduate work in this department: Animal Husbandry 25, 26, 50, 51, 52, 53, 75 and 78. He should also be able to show evidence of experience in practical animal husbandry.

REQUIRED WORK. — At least 50 credits must be earned from the following list of courses offered by the department.

GRADUATE COURSES OFFERED.

100. **HISTORICAL STUDIES OF BREED DEVELOPMENT.** Credits, 5-20.

110. **ANIMAL NUTRITION.** Credits, 5-20.

120. PROBLEMS IN ANIMAL FEEDING.	Credits, 5-20.
130. ANIMAL GENETICS.	Credits, 5-20.
140. PROBLEMS IN ANIMAL BREEDING.	Credits, 5-20.
200. THESIS.	Credits, 15-25.

MINOR REQUIREMENTS.

Minor work in animal husbandry may include undergraduate Courses 50, 51, 53, 81 or 82, and such other work in reading and compilation of material as the instructor may outline. Written examinations will be conducted at the completion of each term's work.

Animal Pathology.

MINOR REQUIREMENTS.

Minor work in animal pathology for the degrees of doctor of philosophy and master of science consists of an especially planned course for graduate students. This is not an undergraduate course, but is arranged to meet the needs of graduate students who have not pursued a course in general pathology. It will continue throughout the year and include reviews in gross and microscopic anatomy, physiological, bacteriological, serological, biochemical and morbid anatomical phases of pathology. Written examinations will be given at the end of each term.

100. GENERAL PATHOLOGY. — As described above, fall term.	Credits, 5.
120. GENERAL PATHOLOGY. — Continuation of 100, winter term.	Credits, 5.
140. GENERAL PATHOLOGY. — Continuation of 120, spring term.	Credits, 5.
160. BIOCHEMICAL PHASES OF PATHOLOGY. — Second year, fall term.	Credits, 5.
180. PATHOLOGICAL HISTOLOGY. — Second year, winter term.	Credits, 5.

Professor GAGE.

Botany.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The equivalent of certain undergraduate courses, determined by the department in the case of each student, is prerequisite.

REQUIRED WORK. — Candidates will be required to take Courses 100 through 107, and 180, 190 and 200. Courses 150 through 155 may be taken for graduate credit in certain cases. The maximum number of major credits which may be earned in this way is thirty-two.

For the Degree of Master of Science.

PREREQUISITE WORK. — The requirements are the same as for the degree of doctor of philosophy.

REQUIRED WORK. — Candidates will take Courses 100 and 101 and all courses from 102 through 107 which are given during their term of residence, also 180, 190 and 200. In certain cases Courses 150 through 155 may be taken, but not more than 20 credits may be earned in this way.

GRADUATE COURSES OFFERED.

Courses 100 through 106 are lecture courses. They are given in rotation, except Courses 100 and 101, which come every year.

100. PLANT PHYSIOLOGY. — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants; growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements; the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks. Credits, 3.

101. PLANT PATHOLOGY. — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks. Credits, 3.

102. PLANT INHERITANCE. — This course is planned to give the student a comprehensive understanding of the principles and facts of plant inheritance. A study is made of plant variations, Mendel's law of heredity, the physical basis of heredity as established by chromosome behavior, pure lines, mutations, species and graft hybrids, etc. One lecture a week for 12 weeks. Credit, 1.

103. BIOLOGIC RELATIONS. — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments are made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks. Credit, 1.

104. THE ECOLOGY OF PLANTS. — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks. Credit, 1.

105. PHYSIOLOGICAL PLANT PATHOLOGY. — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks. Credit, 1.

106. HISTORY OF BOTANY. — A historical survey of the science; lives of noted botanists; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization; reading. One lecture a week for 24 weeks. Credits, 2.

107. METHODS IN DRAWING AND PHOTOGRAPHING FOR THESIS AND PUBLICATION. — Twelve weeks. Credits, 1-3.

108. THE COMPARATIVE ANATOMY OF GREEN PLANTS. — In the lectures an intensive study is directed to the comparative anatomy of green plants from the evolutionary standpoint. Particular emphasis is laid upon the woody forms both living and extinct. Of the latter, the department is fortunate in possessing excellent sets of micro-preparations and lantern slides. Two lectures and one laboratory period for 24 weeks. CREDITS, 6.

150. SYSTEMATIC MYCOLOGY. — See undergraduate Courses 52-54.

151. SYSTEMATIC BOTANY OF THE HIGHER PLANTS. — See undergraduate Courses 58 and 59.

152. PLANT HISTOLOGY. — See undergraduate Courses 55 and 56.

153. CYTOLOGY AND EMBRYOLOGY. — See undergraduate Courses 82 and 83.

154. PLANT PATHOLOGY. — See undergraduate Courses 75-77.

155. PLANT PHYSIOLOGY. — See undergraduate Courses 78-80.

180. SEMINAR. — A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important botanical papers are discussed. Attendance and participation are required. Credits, 3.

190. COLLATERAL READING. — Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course. Credits, 5-10.

200. THESIS. — Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture. The thesis work counts for not more than 50 per cent of the total number of major credits required for either degree.

MINOR REQUIREMENTS.

For a minor a student may take such of the work offered by the department as seems best suited to his major course. Courses 150 and 155 are primarily undergraduate work which may be taken for minor credit toward advanced degrees. In most cases no problem will be assigned.

PROFESSORS OSMUN, ANDERSON, CLARK, TORREY and DAVIS.

Chemistry.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The candidate must have taken undergraduate Courses 1 to 87, or their equivalent.

REQUIRED WORK. — The candidate will be required to take all the graduate

courses listed below. He may also be required to spend at least two terms or one semester at some other recognized institution, pursuing graduate study in chemistry. For the final examinations, questions will be selected from the entire field of chemistry, with special emphasis upon the lines of work covered by the research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as that required for the degree of doctor of philosophy.

REQUIRED WORK. — The candidate will be required to take Courses 101 and 108 through 114. In addition he will pursue the requirements of one of the following thesis subjects: —

Organic and Biochemistry. — Course 200 and either 105, 106 or 107, and 3 credits for one term selected from Courses 103 (b) or (f), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

Physical Chemistry. — Courses 200, 104, and 3 credits for one term selected from Courses 102, 103 and 105 through 107.

Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

The candidate must pass a final written and oral examination before the department upon undergraduate Courses 1 through 80, as well as upon all graduate work taken in chemistry.

GRADUATE COURSES OFFERED.

101. **INORGANIC PREPARATIONS.** — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term. Credits, 3.

Assistant Professor SEREX.

102. **ADVANCED INORGANIC PREPARATIONS.** — Laboratory. Continuation of Course 101. Any term. Credits, 3.

Assistant Professor SEREX.

103. **ADVANCED ANALYTICAL CHEMISTRY.** — Laboratory. This course may be taken in part as follows: (a) electrolytic analysis, 3 credits; (b) ultimate analysis, 3 credits; (c) special analytical work to meet the needs of the individual student, 3 credits. In addition, parts of undergraduate Courses 62, 76 and 77 may be taken, as follows: (d) fertilizers, 3 credits; (e) insecticides, 3 credits; (f) milk and butter, 3 credits. (a), (b), (c) may be taken any time; (d), (e), (f) must be taken at the time the undergraduate course is given.

Professors WELLINGTON and PETERS.

104. **ADVANCED PHYSICAL CHEMISTRY.** — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of

saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glyceric or racemic tartaric acid into its optical components. To each student separate work will be assigned. Any term. Credits, 3.
Assistant Professor SEREX.

105. ADVANCED ORGANIC PREPARATIONS. — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, Congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain & Thorpe, Gattermann, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term. Credits, 3.
Professor CHAMBERLAIN.

106. ADVANCED BIOCHEMISTRY. — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term. Credits, 3.
Professor CHAMBERLAIN.

107. INDUSTRIAL ORGANIC CHEMISTRY. — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers & Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term. Credits, 3.
Professor CHAMBERLAIN.

108. THEORETICAL CHEMISTRY. — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term. Alternates with Course 109. Credit, 1.
Professor PETERS.

109. ANALYTICAL CHEMISTRY. — Lectures. A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's "Quantitative Analysis" is used as a text. First term. Alternates with Course 108. Credit, 1.
Professor PETERS.

110. ORGANIC CHEMISTRY. Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References: Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term. Alternates with Course 111. Credit, 1.
Professor CHAMBERLAIN.

111. BIOCHEMISTRY. — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes,

fermentation, animal food and nutrition, photosynthesis. References: Monographs on biochemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term. Alternates with Course 110.
Credit, 1.

Professor CHAMBERLAIN.

112. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term. Alternates with Course 113.
Credit, 1.

Assistant Professor SEREX.

113. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term. Alternates with Course 112.
Credit, 1.

Assistant Professor SEREX.

114. SEMINAR. — Conferences, reports or lectures. Three terms, twice a month.
Credit, $\frac{1}{2}$.

Professor LINDSEY.

200. THESIS. — Research, and, in the case of a degree, the preparation of an acceptable thesis in agricultural, analytical, organic or physical chemistry, under the direction of the professor in charge of the work, provided that a candidate for the degree of doctor of philosophy shall have had the equivalent of Courses 51, 52, 65 and 86. Credit determined by work done.

MINOR REQUIREMENTS.

Work may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate may be required to pass a final written and oral examination before the department upon his entire minor work.

Entomology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Students must have had all the undergraduate courses given at this college or their equivalent. Opportunities to make up any deficiencies will be available while the graduate work is being carried on.

REQUIRED WORK. — The graduate courses consist of lectures on all, and laboratory work on a part, of the subjects given below, together with advanced readings, seminar work and original research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — A major course for the master of science degree will be about half of the courses listed below.

GRADUATE COURSES OFFERED.

100. MORPHOLOGY. — 1. Embryonic development of insects and polyembryony.
2. Metamorphosis and its interpretations.
3. Advanced external and internal anatomy.
4. Insect histology.
5. Ancestry and development of insects, including fossil insects.
6. Hermaphrodites in insects.
7. Hybrids.
8. Parthenogenesis, pedogenesis and heterogeny.
9. Chemistry and physics of insect colors.
10. Color patterns, their significance and value.
11. Luminosity.
12. Deformities.
13. Variation in insects.
120. ECOLOGY. — 1. Dimorphism and polymorphism.
2. Mimicry, including concealment, protective devices and warning coloration.
3. Architecture of insect structures.
4. Relation of insects to plant fertilization and its importance.
5. Insect products of value to man.
6. Geographical distribution and methods of distribution of insects, with a consideration of life zones, barriers, etc.
7. Insect migrations.
8. Insect behavior and experimental entomology.
9. Enemies of insects.
140. ECONOMIC ENTOMOLOGY. — 1. Control methods.
2. Insect photography and methods of preparing illustrations.
3. Field work and life history investigations with methods for keeping records.
4. Legislation about insects.
5. Studies of insecticides and their application.
160. SYSTEMATIC ENTOMOLOGY. — 1. History of entomology and of classifications.
2. Lives and works of prominent entomologists.
3. Abundance of insects.
4. Important collections, public and private; their location and their value.
5. Types of insects; their significance, importance and location.
6. Rules of nomenclature and how they are used.
7. Methods for collecting, preparing, preserving and shipping insects.
180. SEMINAR. — Readings and reports on the current literature of entomology; monthly meetings.
190. COLLATERAL READINGS. — The best articles on the various topics in entomology are assigned for collateral readings, and are included in the final examinations.

200. THESIS. — Original research on one or several topics in morphology, ecology, economic and systematic entomology. This is expected to require from one-half to three-quarters of the total working time of the student.

MINOR REQUIREMENTS.

Minor courses will cover such parts of the work outlined above as will be most likely to prove useful in connection with the majors taken by the students, or in their future work. It is not required that such men shall have had all the undergraduate work in entomology given at this college, their credit for a minor beginning where their own undergraduate training in the subject ended.

Horticulture.

Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Professor Waugh, head of the Division of Horticulture.

Landscape Architecture.

MAJOR REQUIREMENTS.

For the Degree of Master of Landscape Architecture.

PREREQUISITE WORK. — The undergraduate courses in the college known as Landscape Gardening 50, 51 and 52, Drawing 25, 26 and 27, Horticulture 27, 50 and 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student who has not passed these courses, or their equivalent, will be required to make up such work without graduate credit.

REQUIRED WORK. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college. One year must also be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Every student before receiving his master's degree in landscape architecture must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape architecture.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

While great freedom is allowed to graduate students in their plans of work, a certain portion of time will always be given to systematic courses of instruction. Courses known as Landscape Gardening 175, 176, 177, 178, 179, 180, 181 and 182 are required, and may or may not be accepted for graduate credit, at the discretion of the department.

GRADUATE COURSES OFFERED.

175. THEORY OF LANDSCAPE ART. — Same as Landscape Gardening 75.
First term. Credits, 3.
Professor WAUGH.

176. CIVIC ART. — Same as Landscape Gardening 76. Second term.
Credits, 4.
Professor WAUGH.

177. COUNTRY PLANNING. — Same as Landscape Gardening 77. Third term.
Credits, 4.
Professor WAUGH.

178. ARCHITECTURE. — Same as Landscape Gardening 78. Third term.
Given in alternate years. Credits, 3.
Assistant Professor HARRISON.

179. CONSTRUCTION. — Same as Landscape Gardening 79. Third term.
Given in alternate years. Credits, 3.
Assistant Professor HARRISON.

180. THEORY OF DESIGN. — Same as Landscape Gardening 80. First term.
Credits, 4.
Professor WAUGH.

181. ESTATE DESIGN. — Same as Landscape Gardening 81. Second term.
Credits, 4.
Assistant Professor HARRISON.

182. PARK DESIGN. — Same as Landscape Gardening 82. Third term.
Credits, 4.
Assistant Professor HARRISON.

190. THEORY. — Special studies. Credits, 2-10.
The DEPARTMENT.

191. DESIGN. — Individual problems by arrangement. Credits, 2-10.
The DEPARTMENT.

192. CONSTRUCTION. — Individual problems by arrangement.

Credits, 2-10.

The DEPARTMENT.

193. MAINTENANCE. — Special studies, experimental work or assigned problems.

Credits, 2-10.

The DEPARTMENT.

194. PRACTICE. — Professional field work under supervision. By arrangement.

Credits, 2-10.

The DEPARTMENT.

195. SEMINAR.

Credits, 1-5.

Professor WAUGH.

200. THESIS. — Each student before receiving the master's degree with a major in landscape architecture must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

- (a) Original surveys, including topography.
- (b) Block plans, showing original design.
- (c) A rendered plan or plans of the main features.
- (d) Detailed working drawings.
- (e) Estimates of cost.
- (f) Complete report and letter of transmittal.

Credits, 5-20.

MINOR REQUIREMENTS.

Any student electing a minor in landscape architecture will be directed to take such courses from the regular catalogue list as may seem most suitable to him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Microbiology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidate must have had Courses 50, 51, 52, 80, 81, 82 and 83, or their equivalents, before he can enter upon graduate work.

REQUIRED WORK. — Studies will be selected from the courses offered below. It will be the purpose of the department to distribute such studies among the courses offered in a manner to gain the greatest efficiency and a comprehensive knowledge of the entire field. The work will be conducted by prescribed readings, critical written reviews, conferences, lectures and laboratory exercises.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Courses of a basic and applied character selected from the courses offered below which will prepare the student for effective effort.

GRADUATE COURSES OFFERED.

100. HISTORY OF MICROBIOLOGY.	Credits, 5-10.
110. CYTOLOGICAL AND MORPHOLOGICAL STUDIES AND CORRESPONDING TECHNIQUE.	Credits, 5-10.
120. STUDIES IN TECHNIQUE AND METHODS.	Credits, 5-20.
130. PHYSIOLOGICAL STUDIES.	Credits, 5-20.
135. INDUSTRIAL FERMENTATIONS.	Credits, 5-10.
140. AGRICULTURAL MICROBIOLOGY — GENERAL SURVEY.	Credits, 5-20.
141. MICROBIAL STUDIES IN AGRICULTURE.	Credits, 5-10.
150. SOIL MICROBIOLOGY.	Credits, 5-20.
160. DAIRY MICROBIOLOGY.	Credits, 5-20.
170. FOOD MICROBIOLOGY.	Credits, 5-20.
180. HYGIENIC MICROBIOLOGY.	Credits, 5-20.
181. SPECIAL SANITARY OR HYGIENIC STUDIES.	Credits, 5-10.
190. LECTURES AND STUDY OF LITERATURE.	Credit, 1 each term.
200. THESIS. — Some microbiological problem related to agriculture or food. Distributed as may be most beneficial for research work. Time and credit by arrangement.	Credits, 15-50.

MINOR REQUIREMENTS.

Minor work in microbiology may consist of undergraduate Courses 50, 51, 52, and other courses designed to support the major work, from among the courses offered above. The candidate will also be required to pursue graduate Course 190, or follow a course of reading and conferences through three terms. In case the candidate has had some of these courses, he will be required to take more advanced substitute courses.

Poultry Science.

MAJOR REQUIREMENTS.

For the Degree of Master of Science or Master of Agriculture.

PREREQUISITE WORK. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 140, 150 and 160. At the

discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

REQUIRED WORK. — All the courses listed below. Practical poultry work may be required, but no credit will be given for such work.

GRADUATE COURSES OFFERED.

101. **READING.** — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

110. **SEMINAR.** — A critical review and a criticism of the more important experiments carried on at various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

120. **ANATOMY (GROSS AND HISTOLOGICAL), PHYSIOLOGY AND SURGERY.** — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

130. **BREEDING.** — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

140. **FEEDING.** — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

150. **BROODING.** — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

160. **INCUBATION AND EMBRYOLOGY.** — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature, dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

170. **POULTRY DISEASES AND SANITATION.** — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

200. THESIS.

MINOR REQUIREMENTS.

Courses 101 and 110 are designed particularly for minors.

Rural Sociology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must present satisfactory evidence of having completed at least 10 credit hours in general sociology and 10 credit hours in general economics; or take such undergraduate courses as the department may designate to satisfy this requirement.

REQUIRED WORK. — Candidates must take or pass by satisfactory examination courses offered by the department for undergraduates bearing the numbers 26, 50, 51, 52 and 75, and such courses in agricultural education and agricultural economics as may be required, not to exceed 10 credit hours in each department. Candidates will be required to select from the courses listed below as graduate courses a field for investigation and intensive study. Candidates for the doctorate must take all courses listed as graduate.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Not less than 50 credit hours will be required from the courses listed below. The department will make such selection as may best meet the interest of the individual student.

GRADUATE COURSES OFFERED.

177. FIELD WORK OF AN INVESTIGATIONAL NATURE.

178. RURAL SOCIAL SURVEYS.

179-181. SEMINAR.

182. SOCIAL CONDITIONS OF AMERICAN RURAL LIFE.

183. SOCIAL CONDITIONS OF EUROPEAN RURAL LIFE.

184. RURAL INSTITUTIONS.

185. RURAL ORGANIZATION.

186. FARMERS' ORGANIZATIONS.

187. TOWN AND VILLAGE RURAL LIFE.

188. RURAL HEALTH AND SANITATION.

189. RURAL LITERATURE.

190. RURAL GOVERNMENT AND LAW.

200. THESIS.

Veterinary Science.

Work is available in hygiene, veterinary pathology, and other special lines or divisions of the subject.

Zoölogy.

MINOR REQUIREMENTS.

Courses in zoölogy may be available as a minor for the degrees of doctor of philosophy and master of science. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field and correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science.

LIST OF STUDENTS.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

THE SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those, both young and old, who cannot come to the college for the regular college courses. They furnish the student with instruction in modern accepted methods, and are planned to help the farmer and the housewife.

The short courses include:—

- A. The Two-year Course in Practical Agriculture.
- B. The Ten Weeks' Winter School.
- C. The Summer School.
- D. The Vocational Poultry Course.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES.— Students must be at least seventeen years of age, and must furnish satisfactory evidence of good moral character. References are required. There are no entrance examinations. The sole test is ability to do the prescribed work. Students enrolling for the Two-year Course in Practical Agriculture must have at least a common school education.

EXPENSES OF SHORT COURSES.— The expense of attending any of the short courses is approximately as follows:—

Furnished rooms in private houses (per week)	. . . . .	\$3 to \$5
Board at college dining hall (per week)	. . . . .	\$7
Board with private families (per week)	. . . . .	\$6.50 to \$9
Registration fee (Ten Weeks' Winter School)	. . . . .	\$5

Tuition in all the short courses is free to residents of the Commonwealth. Small laboratory fees are charged in some of the courses.

A. TWO-YEAR COURSE IN PRACTICAL AGRICULTURE.

The Two-year Course in Practical Agriculture is offered to meet the needs of students who for one reason or another cannot take the four-year college course. It is designed to provide a large amount of practical information and training in agriculture and horticulture.

It will appeal, not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. Although the course is planned to meet the needs of those who are not graduates of high schools, the instruction is not preparatory or elementary in its nature, but is so planned that it will be of value to all. The greater amount of academic training that some of the students may possess will in a measure be offset by the fund of practical knowledge possessed by many who have completed only the elementary schools.

The course is not intended for students enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement either from the principal of the high school or from parent or guardian asking permission to be enrolled.

The Two-year Course in Practical Agriculture is arranged so as to provide specific vocational training for the particular lines of agricultural work which the students may select. When a student enrolls he is required to state the type of farming in which he expects to engage; and to select from the following courses of study the one he wishes to pursue: —

1. General agriculture, with animal husbandry as the principal subject.
2. General agriculture, with poultry as the principal subject.
3. Dairy manufactures.
4. General horticulture.
5. Pomology.
6. Floriculture.
7. Vegetable gardening.

He then pursues a specially arranged course of preparation for that type of work. This specialization does not prevent his securing a general working knowledge of other subjects in which he may be interested.

The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and young women who may not have had the opportunity of securing a high school education.

The first year consists of six months of study at the college. The term begins with the college fall term and closes with the winter term of the regular session. The same vacation periods are observed as in the regular four-year course.

At the close of six months of study, students are required to gain six months of farm experience. The college will assist students in finding positions and in placing them on farms where the experience gained will be of great advantage. Thus an effort will be made to place on a dairy farm the man expecting to take up dairying as his chief line of work, and a student of pomology on a fruit farm.

During the second year the student spends nine months in resident study, completing the subject pursued in the first year.

Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town.

CERTIFICATE. — All students will receive a certificate showing their standings in courses in which they were registered. Credits earned in the Two-year Course in Practical Agriculture or in any other of the short courses do not lead to the college degree. Students who possess college entrance requirements and who wish to take the regular college work should address the registrar of the college.

B. THE WINTER SCHOOL.

The Winter School, beginning usually about January 1 and continuing for ten weeks, was started several years ago, and has always been very popular, not only with more mature farmers and their wives, but with young men and women who control or manage farms. The courses, though short, are

very practical in their nature, and are so arranged that a student may choose such subjects as will enable him to specialize along the line of work in which he is most interested. There is a wide range in the choice of subjects, making it possible for the student to take work for several winters in succession. Many college graduates enroll for the Winter School.

SCHOLARSHIPS. — The Jewish Agricultural and Industrial Aid Society of New York has instituted a system of free scholarships to enable the children of Jewish farmers to attend the short winter course in the States in which they reside. The stipend is sufficient to pay all the expenses of the holder for the course. Such expenses usually amount to from \$100 to \$150. The following courses are offered: —

OUTLINE OF THE TEN WEEKS' WINTER SCHOOL, JANUARY 2 TO MARCH 10.

- Soil Fertility. Three lectures a week.
- Field Crops. Two lectures and one two-hour laboratory period per week.
- Types and Breeds of Livestock. Three lectures and two two-hour laboratory periods a week.
- Livestock Feeding. Three lectures per week.
- Animal Breeding. One lecture and one two-hour laboratory period per week.
- Dairying. Five lectures and five laboratory periods per week.
- Dairy Bacteriology. Two lectures and one two-hour laboratory period per week.
- Animal Diseases and Stable Sanitation. Two lectures per week.
- Poultry Husbandry. Five lectures and one two-hour laboratory period per week.
- Fruit Growing. Three lectures and one two-hour laboratory period per week.
- Market Gardening. Three lectures and two two-hour laboratory periods per week.
- Floriculture. Five lectures per week.
- Horticultural Manufactures. Two lectures and two laboratory periods per week.
- Farm Management. Two lectures a week.
- Farm Accounts. Two two-hour laboratory periods per week.
- Marketing. Two lectures a week.
- Agricultural Credit. Two lectures a week.
- Botany. Two lectures a week.
- Entomology. Three lectures per week.
- Farm Structures. Two lectures and one two-hour laboratory period per week.
- Farm Machinery. Two lectures and three two-hour laboratory periods a week.
- Rural Sanitary Science and Hygiene. Two lectures per week.
- Vocational Guidance. One lecture per week.
- Foods. One lecture and two two-hour laboratory periods per week.
- The Business of the Household. Three class hours per week.
- Home Care of the Sick. Three class hours per week.
- Principles and Methods of Vocational Agricultural Teaching. Five exercises per week.
- Special Methods in Vocational Agricultural Teaching. Five exercises per week.
- Professional Improvement Problems. Five periods per week.

C. THE SUMMER SCHOOL.

The summer school has been maintained by the college for a number of years. The experience of these years has been a value in arranging short, intensive, practical courses that will meet the needs of teachers, home makers and professional workers, who wish instruction in agriculture, agricultural education and home economics, and who can most conveniently come to the college during the summer. The instruction is given by the regular members of the college staff, assisted by outside lecturers. In previous years the term has been four weeks.

The nature of the work of the summer school is indicated by the following typical program: —

Agriculture and Horticulture: —

Poultry husbandry.
 Fruit growing.
 Flower growing.
 Vegetable gardening.
 Food preservation.
 Beekeeping.

Home economics: —

Foods and nutrition.
 Preparation and serving of meals.
 Garment making.
 Dress design and construction.
 Millinery.
 House furnishing.
 Home management.

Related subjects: —

Insect life.
 Bird life.
 Recreation.
 Dramatic presentation.
 Design and practical arts.
 Rural sociology.
 Hygiene and sanitation.

Agricultural education: —

Principles and methods of teaching.
 Special methods in vocational agricultural teaching.
 Professional improvement problems.
 Supervision and administration of agricultural education.
 Vocational education.

D. ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY.

PURPOSE. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping, and can spend only one year at college.

SCOPE. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, animal husbandry, or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from twenty-five to thirty hours per week at the plant in the care and management of poultry, for the purpose of becoming proficient in the various branches of the work.

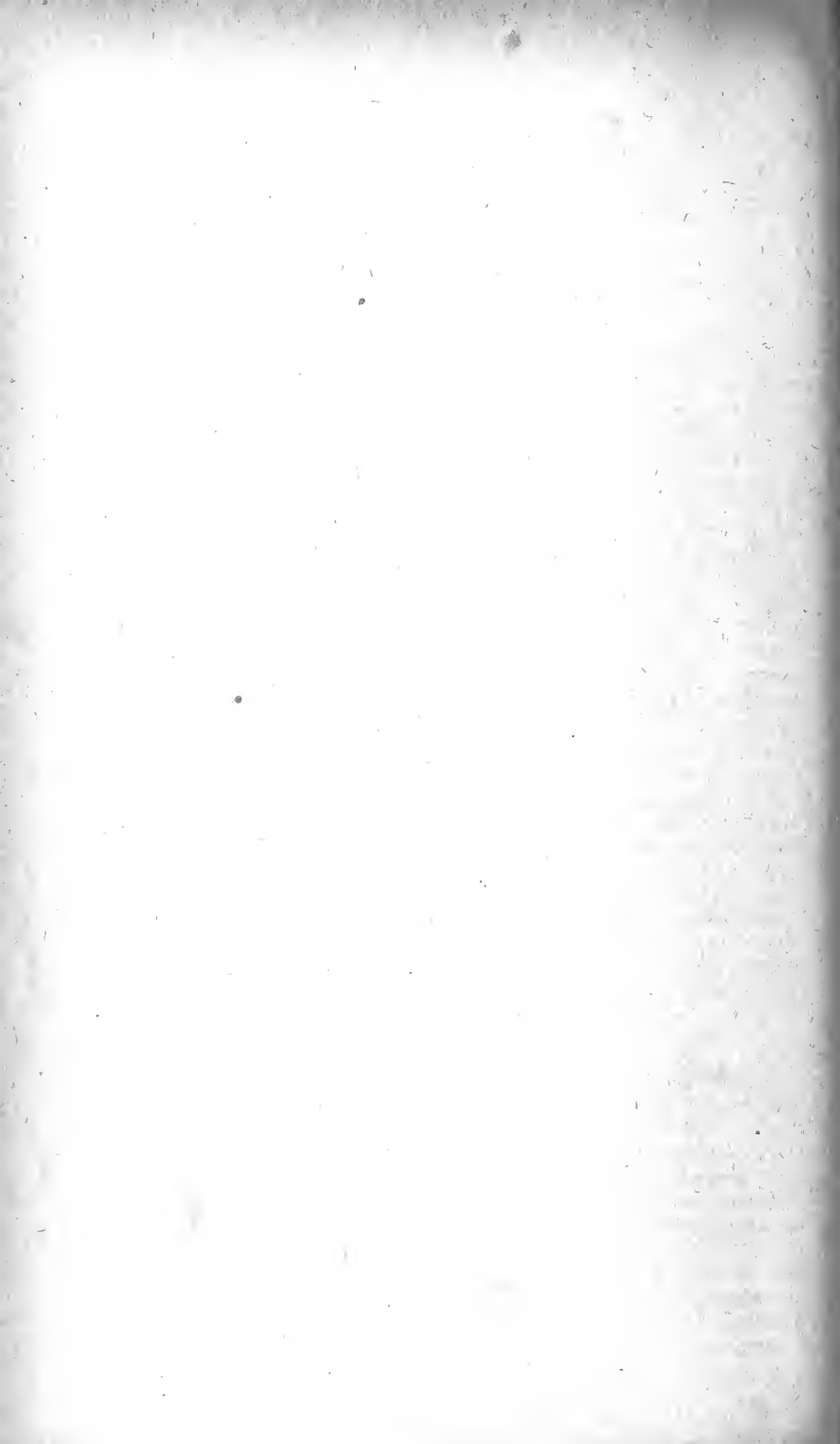
ENTRANCE REQUIREMENTS. — Applicants must be at least eighteen years of age and have a good elementary education.

FEES. — There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for both the fall and spring terms.

NOTE. — The course is limited to sixteen students. The One-year Poultry Course begins in December and continues until the following December.

Due to a strong demand for the course, it was necessary to start a second class in vocational poultry at the beginning of the winter term. Thirty students were enrolled in both classes of vocational poultry.

THE EXTENSION SERVICE



THE EXTENSION SERVICE.

The Extension Service is the organized effort of the whole Massachusetts Agricultural College in educational service to the citizens of the Commonwealth who cannot enter as resident students. Its task is to make available all the useful and practical information discovered by the efforts of the Experiment Station, reinforced by the United States Department of Agriculture and the experiment stations of other States. The Smith Lever Act defines extension work as "the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in colleges — and imparting to such persons information on said subjects through field demonstrations, publications and otherwise."

The Extension Service is a recognized part of the college organization, with a staff giving full time to extension work; yet the actual working force is much larger because many of the resident faculty and research staff give time to extension work, the specialists of the United States Department of Agriculture are frequently in the State on special problems, and the staffs of the County Extension Services, who co-operate as local representatives in the extension organization, are in direct and constant touch with the problems and the people of the State.

It is impossible to discuss the Extension Service without including these co-operating agencies, — the United States Department of Agriculture and County Extension Services. While the extension staff at the college receives its major support from the State Legislature, Federal funds are received through the Department of Agriculture, and are used, according to act of Congress, in the support of work both at the college and in the counties. In addition to these funds the County Extension Services, which are supervised by the Trustees for County Aid to Agriculture, receive from county and town appropriations still larger amounts, all of which must be applied to extension work.

PERSONNEL.

COLLEGE EXTENSION STAFF. — Extension work at the college is organized with a director in charge, and under him three State leaders who are joint employees of the State and Federal government. The State leaders are in charge of county agent work, home demonstration work and junior extension work, respectively. Extension specialists are employed in the following subject-matter fields: agronomy, animal husbandry, poultry husbandry, pomology, horticultural manufactures, marketing, farm management, clothing efficiency and nutrition. In addition, the Extension Service employs an assistant director who is a specialist in methods of extension instruction and in office and field organization; a supervising specialist in charge of extension schools, agricultural exhibits and extension courses at the college; and an extension editor who is also supervisor of correspondence courses. The State leader of

junior extension work also has three assistants, each in charge of specialized subject-matter branches.

COUNTY EXTENSION STAFFS. — In each county in the State, with the exception of Suffolk, Dukes and Nantucket, a staff of extension agents is maintained. In eight of the counties these agents are employed by a Board of Trustees for County Aid to Agriculture, and in three counties by the Trustees for the County Agricultural School of the County. In each of these eleven counties are a county agricultural agent, a county home demonstration agent and a county club agent. These are joint employees of the county, the college and the United States Department of Agriculture. Their major responsibility is to their county trustees, yet on the basis of co-operative projects they are a very important part of the total extension staff of the State. In addition to these three agents co-operatively employed in each county, there are in many of the counties assistant agents.

Because of the co-operative relation with the Federal government, it is possible to secure much assistance from the Department of Agriculture in Washington. Subject-matter specialists are employed by the States Relation Service in the major branches of agriculture and home-making. In addition, the research facilities of the Department of Agriculture, the Division of Publications, the Bureau of Markets, and many other sub-offices within the Department are constantly furnishing help in solving problems in the State, and frequently Federal staff members assist the staff members of either college or county with particular problems.

CO-OPERATION OF AGENTS. — In the extension program as now being carried out the Department of Agriculture furnishes a certain amount of finance and a great deal of supporting information resulting from the research work of the experiment stations, this being by conference with the extension specialists of the State and county, and not as a direct service to the people of the Commonwealth. It is the function of the extension specialist at the college to be what the name implies, — to be constantly up to the minute in the subject-matter of his specialty, organizing information and preparing it in proper form for the use of the county agricultural agents; to head up the development program in his subject-matter in the entire State, and thus furnish a correlation between the Department of Agriculture and its research work, the forces of the teaching and experimental faculty at the college, and the county agents who are in immediate contact with the people of the State. It is obvious that no county agent can be a specialist in all branches, and that all the county agents will need the specialist's support in many branches. The specialist has now become much less a direct teacher of farmers and home-makers, and much more a consultant and adviser with the county agents on the problems which are too deep or too intricate for solution by them. The county agents in agriculture, home economics and junior club work are at present making the real contacts with the people of the State; they study the problems at first hand, and organize the demonstrational programs. It should be noted that they are part of a national staff, over 2,000 counties in the United States employing county agricultural agents, all of whom are related in a single movement to the United States Department of Agriculture, 800 home demonstration agents and 300 junior club agents. Thus it will be seen that the extension staff from the Department of Agriculture in Washington, and including the remotest experiment station on the Pacific coast, is organized to avoid duplication of function. The tasks of each group are quite distinct.

PROJECTS AND PROGRAMS. — Because it is impossible for a staff of limited number to meet personally all the farmers and home-makers of the State relative to problems, it has been necessary to devise a system of education which would make available in the most positive form to the greatest number of people such information as it seems desirable to impart. The demonstrational methods are the ones finally accepted as most effective. Demonstrations of the best practices in agriculture and home-making are maintained by the co-operation of farmers and home-makers throughout the Commonwealth, from the tip of Cape Cod to the westernmost Berkshires. The co-operators undertake to do certain operations or conduct certain enterprises according to the approved method and in co-operation with the agents. The results of their efforts are used as a basis of teaching. Where the method is one with visible results, as in the comparison of seed potatoes or in spray control of orchard pests, the attention of farmers and home-makers in the vicinity of the demonstration is directed to it, and frequent conferences and meetings are held in order that the approved method may be understood. The time of the county agent is therefore primarily spent with the co-operating farmers and home-makers, who are known as demonstrators. A great amount of personal service is also undertaken in the form of conferences, consultations, advice and correspondence, etc. This, however, must give place to the systematic demonstrational work which endeavors to stress the most important subjects in the various branches of agriculture and home-making. In this demonstrational program the specialists work out the basis of the demonstrations, provide the informational material, and supervise the method of carrying out in regard to data and analysis of results, and the county agents arrange with the demonstrators and give personal attention to the demonstrations themselves.

PROJECTS AND PLANS OF WORK.

In order that this work may be definite it is organized on a project basis. The agronomy project, for instance, defines the needed practices or changes in practices with regard to soil fertility and crops. The most fundamental things are selected as a basis of intensive work, and each year a program of work is written jointly by the specialists and county agents defining the particular steps in the long-term program which are to be carried forward during the year. The communities of the State decide which of the various projects, and which phases of these projects, are most important in their communities, and arrange co-operation with the county agents and specialists.

It will be noted from the foregoing that the work is organized in three major lines, — agriculture, home-making and junior extension. The first two are divisions in subject-matter; the third utilizes the same subject-matter as the projects in agriculture and home economics, but adapts it to the needs of young people. It is built on the principle that boys and girls and young men and women can receive and give great benefits if they will elect productive tasks and follow them systematically. The junior clubs, so called, are built on the basis that there are many productive and interesting and worth-while tasks in agriculture and home economics. It is the task of the junior extension agent to adapt adult material to the needs of this younger clientele.

TYPES OF WORK.

DEMONSTRATIONS. — Demonstration work is of primary importance in the extension program. Demonstrations may be of various types: demonstrations of practice, as illustrated by a system of crop rotations; a demonstration of operation, as in grafting, spraying, poultry killing and culling, etc.; and comparative demonstrations, as between native and northern-grown seed potatoes, top-dressed and neglected hay land.

EXTENSION SCHOOLS. — Through the winter months the Extension Service arranges schools of one to five days' duration, which are held in various communities. At all of these schools intensive attention is given to certain selected subject-matter. The tendency of the past two seasons has been toward the one or two subject school rather than the general extension school of the past. The teaching is usually divided between the county staff, specialists from the college and co-operating demonstrators who have got notable results in agriculture and home-making.

FAIR EXHIBITS. — The college has undertaken many types of enterprise in the field of fair exhibits. At present, lack of funds will prevent any great effort in the way of transporting material exhibits. Much is being done by the County Extension Services, supported by the assistance of the college specialists, in the way of demonstrational exhibits at fairs. This type of exhibit seems to promise large development. It is hoped, also, that physical arrangement may be made whereby the college live stock can be exhibited more freely. At present this is impossible, owing to the fact that funds are not available, and premiums earned or won by the live stock must revert to the State treasury, and are therefore unavailable for defraying the expenses of such exhibits.

CONFERENCES AT THE COLLEGE. — All conferences at Amherst of two weeks' duration or less are considered extension activities. The largest of these is the summer Farmers' Week coming during the last week in July, and built upon the principles of demonstration meetings at various advantageous places on the farm, utilizing the physical equipment of the orchards, the fields and the barns as a confederal basis. In addition to this, meetings of many organizations are held at the college, as in the case of the sheep breeders, the fruit growers, the onion growers, the poultry growers, etc. Many of these are held in connection with the summer Farmers' Week, but it is advantageous to hold others during the winter time according to the needs of a particular group. It is also the policy of the Extension Service to bring to the college, not only the county staff for annual and other conferences, but to bring in the men and women of the State who are co-operating and leading, in order that they may have special training in the subject-matter of their efforts.

CORRESPONDENCE COURSES. — The Extension Service maintains a correspondence course division, and offers correspondence courses at a fee of \$5 in the following subjects: soils and fertilizers, field crops, feeding farm animals, fruit growing, — which is divided into three parts, comprising apple growing, peach and plum culture, and small fruits, — vegetable gardening, floriculture, farm management, forestry, poultry husbandry, market milk and bee keeping.

PUBLICATIONS. — The work of the Extension Service is supported by extension publications which are prepared with the intent to meet the needs of the people of the State for concise practical information. It is not the function

of the Extension Service to provide voluminous textbooks free, but rather, manuals of practice and of information which will give in the most concise and usable form the instructions necessary to the practices of agriculture and home-making. The entire literature of the Extension Service is being revised to this basis, the Extension Leaflets being small units reduced to the simplest terms and the smallest compass, telling a complete story. The series of leaflets in a subject-matter division make a larger bulletin, and the collection of all the leaflets will ultimately make a manual of practice for the average farmer or home-maker of the State. About 1,200,000 pages were printed last year. All the publications of the Extension Service are free. In addition to this it is the practice of the Extension Service to keep a large stock of publications of other colleges, experiment stations, and of the United States Department of Agriculture. These also are distributed free. Stocks of these publications are kept in the offices of the county agents, and can be obtained by application to them. Outside of these publications the Extension Service publishes monthly two small periodicals. "The Monthly Report of Extension Work for Market Gardeners" is a small pamphlet similar to the Extension Leaflets, and the "Extension Service News" is in the form of a small newspaper. These also may be had for the asking.

LECTURES. — During the course of the year a great deal of lecture work is done by the county agents and the specialists of the college. This service seems to be of diminishing value except in cases where it leads to permanent demonstration work. It is the aim of the college to meet all calls for lectures just as far as the time of the staff will allow, first of all giving preference to the demonstration type of work. Very few calls for lectures have been left unmet during the past year.

PERSONAL ADVICE. — The staffs in the counties and in the college do much in the way of answering individual queries, either personal or written. This work establishes many valuable contacts, and the college undertakes to perform just as much of it as is possible. However, much of this inquiry is diverted to the offices of the county extension services, the college handling only such phases of the work as cannot be handled in the counties.

LIBRARY EXTENSION WORK. — The college library has collections of books on specified subject-matter fields, and furnishes these free of charge to the libraries of the State as loan collections. An increasing amount of this work is being done.

DIAGNOSIS AND PRESCRIPTION. — Calls are constantly coming to the college for information which is really diagnosis. Bushels of malodorous hens, bugs of all description, diseased leaves, and fruit are constantly being received. Just as far as the college is able, the trouble is identified and remedial measures suggested. Here, again, the burden is greater than the college is able to bear at the present time with limited staff, and it is further the conviction that service which can be rendered by a professional veterinarian should be rendered by him. Every effort will be made to take care of such requests for such service as cannot be met by a professional veterinarian, although no guarantees can be given that adequate help will be available for this work.

ASSISTANCE TO STATE INSTITUTIONS. — Managers of State institution farms are constantly asking information of one sort or another from the college, and the specialists are co-operating in many problems of agriculture and landscape gardening.

LIAISON ACTIVITIES. — No small part of the work of the Extension Service, particularly the county staffs, is in bringing other agencies to the assistance of the people of the State. Those desiring systematic study are brought in touch with the vocational schools or practical arts classes in case they are unable to come to the college. Communities desiring assistance in health problems are brought in contact with some of the health agencies in the Commonwealth and voluntary health societies, such as the Red Cross, the county public health associations, etc. It is not the function of the Extension Service in any sense to replace these agencies or to compete with them; rather, to divert to them such calls for help as they are able to meet.

REAL EXTENSION. — The real extension work is done, not only by the staff, but by the best farmers and best home-makers of the State who demonstrate the best practices. The Extension Service cannot be considered without considering these co-operating demonstrators. Those who receive instruction in household management, clothing efficiency, nutrition, agronomy, pomology, poultry husbandry, etc., are the real instructors in their neighborhoods. It is the task of the Extension Service to teach the best farmers and home-makers to perfect their teaching technique, and to depend upon them for the general spread of the practice throughout the State.

Requests for information in any of these fields may be addressed to the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

GENERAL INFORMATION

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

TUITION.¹ — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$180 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts.

All students entering the college for the first time as undergraduates or two-year students are charged a matriculation fee of \$5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 men students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from \$39 to \$66 a year. The rent for furnished rooms in private houses ranges from \$1 to \$4 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is \$7 a week.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; others, \$180 per year.

	Low.	High.
Matriculation fee, first year	\$5 00	\$5 00
Room in college dormitories or in private houses	39 00	110 00
Board, \$7 per week	245 00	245 00
Laundry, 50 to 85 cents a week	18 00	30 00
Laboratory fees	5 00	25 00
Books, stationery and miscellaneous items	38 00	60 00
	<hr/>	<hr/>
	\$350 00	\$475 00

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students

¹ This statement applies to those registering as regular or two-year students.

which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

INITIAL CHARGES.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office:—

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee	\$5 00	—	—
Board (if at college dining hall) four weeks in advance	28 00	\$28 00	\$28 00
Assessment for support of Social Union	1 50	1 50	1 50
Laboratory fees	5 00	5 00	2 00-10 00
Room rent (if in college dormitory)	—	—	12 00-20 00
Student tax for support of athletics ¹	5 00	5 00	5 00
Student tax for support of nonathletic activities ¹	3 00	3 00	3 00

¹ While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

LABORATORY FEES.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows:—

Agronomy:—	Per Term.
Course 1	\$1 50
Course 27	2 00
Course 50	2 50
Course 51	2 50
Course 75	2 00
Course 77	2 50
Course 78	2 50
Animal husbandry:—	
Course 25	1 50
Course 26	1 50
Course 75	1 50
Course 78	1 00

	Per Term.
Dairying:—	
Course 50	\$3 00
Course 51	3 00
Course 75	3 00
Course 76	3 00
Course 77	3 00
Farm management:—	
Course 75	1 50
Course 76	1 50
Poultry husbandry:—	
Course 51	2 50
Course 53	3 00
Course 55	2 50
Course 76	2 00
Course 77	2 00
Rural engineering:—	
Course 25	1 50
Course 26	1 50
Course 75	1 50
Course 78	1 50
Floriculture:—	
Course 50	2 50
Course 51	2 50
Course 52	2 50
Course 53	2 50
Course 75	2 00
Course 76	2 00
Course 77	2 50
Course 55	2 50
Forestry:—	
Course 56	2 00
Course 57	3 00
Course 58	4 00
Landscape gardening:—	
Course 50	2 50
Course 51	2 50
Course 52	2 50
Course 76	3 00
Course 77	3 00
Course 80	3 00
Course 81	3 00
Course 82	3 00
Vegetable gardening:—	
Course 50	2 00
Course 51	2 00
Course 52	2 00
Course 53	2 00
Course 75	3 00
Course 76	2 00
Pomology:—	
Course 54	\$4 00
Course 75	4 00

Drawing:—		Per Term.
Course 25	. . . . .	\$3 00
Course 26	. . . . .	3 00
Course 27	. . . . .	3 00
Botany:—		
Course 3	. . . . .	1 50
Course 25	. . . . .	1 50
Course 26	. . . . .	1 50
Course 50	. . . . .	2 00
Course 51	. . . . .	2 00
Course 52	. . . . .	2 00
Course 53	. . . . .	2 00
Course 54	. . . . .	2 00
Course 55	. . . . .	3 00
Course 56	. . . . .	3 00
Course 75	. . . . .	3 00
Course 76	. . . . .	3 00
Course 77	. . . . .	3 00
Course 78	. . . . .	3 00
Course 79	. . . . .	3 00
Course 80	. . . . .	3 00
Course 82	. . . . .	3 00
Course 83	. . . . .	3 00
Entomology:—		
Course 50	. . . . .	1 00
Course 51	. . . . .	1 00
Course 53	. . . . .	1 00
Course 54	. . . . .	1 00
Course 55	. . . . .	1 00
Course 75	. . . . .	2 00
Course 76	. . . . .	3 00
Course 77	. . . . .	3 00
Course 78	. . . . .	3 00
Chemistry: ¹ —		
Course 1	. . . . .	3 00
Course 2	. . . . .	3 00
Course 4	. . . . .	3 00
Course 5	. . . . .	3 00
Course 6	. . . . .	3 00
Course 25	. . . . .	4 00
Course 26	. . . . .	4 00
Course 27	. . . . .	5 00
Course 51	. . . . .	5 00
Course 52	. . . . .	5 00
Course 62	. . . . .	5 00
Course 65	. . . . .	4 00
Course 76	. . . . .	5 00
Course 77	. . . . .	5 00
Course 80	. . . . .	4 00
Course 86	. . . . .	5 00
Course 91	. . . . .	5 00
Course 92	. . . . .	5 00
Course 93	. . . . .	5 00
Course 94	. . . . .	5 00
Course 95	. . . . .	5 00

¹ An additional deposit of \$1 for Courses 1 to 6, inclusive, and \$2 for Courses 25 to 95, will be required to cover individual breakage. In case the laboratory breakage does not equal the deposit, the balance will be refunded.

Mathematics and engineering:—	Per Term.
Course 27	\$1 50
Course 78	1 50
Microbiology:—	
Course 1	3 00
Course 3	2 00
Course 50	5 00
Course 51	5 00
Course 52	5 00
Course 75	5 00
Course 76	5 00
Course 80	5 00
Course 81	5 00
Course 82	5 00
Course 83	5 00
Physics:—	
Course 27	3 00
Course 50	3 00
Course 51	3 00
Course 52	3 00
Veterinary science:—	
Course 78	2 00
Course 79	2 00
Course 80	2 00
Course 85	2 00
Course 86	2 00
Course 87	2 00
Zoology:—	
Course 25	3 00
Course 26	3 00
Course 50	3 00
Course 51	3 00
Course 52	3 00
Course 54	2 00
Course 75	3 00
Course 76	3 00
Course 77	3 00
Course 79	2 00
Rural journalism:—	
Course 53	2 00
Course 54	2 00
Course 55	2 00
Course 77	2 00
Course 78	2 00
Course 79	2 00
Course 80	2 00
Course 81	2 00
Course 82	2 00
Music (each course)	3 00
Rural home life:—	
Courses 25, 26, 27	1 50
Courses 50, 51, 52	4 00

Rooms.

Students are expected, as far as possible, to occupy rooms in the college dormitories. Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the dean. The inspection of student quarters is in charge of the commandant. At the end of each college year all unoccupied rooms will be thrown open for selection, and will be assigned to students according to classes.

Living Accommodations for Women Students.

Women students attending the college live in a dormitory provided for them, and take their meals at Draper Hall, which is located a short distance from the women's dormitory. The women's dormitory accommodates 98 girls, and is furnished. The present charge for room and board for women students is \$120 per term.

Student Aid.

SELF HELP. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least \$150 and preferably \$250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and forty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Students whose department or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of

employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Memorial Hall.

Soon after the close of the World War the alumni, students, faculty and friends of the college subscribed \$150,000 for the erection of a soldier memorial building to be placed on the college campus. This building was completed in the summer of 1921. It is designed to serve as headquarters for the student activities, and as the center of the social life of the institution.

In the basement are bowling alleys, pool tables, a store, post office and barber shop. On the main floor are eight offices for leaders of various student activities, a large reading room, and a beautiful memorial room in which is found the tablet bearing the names of the sons of the college who gave their lives in the great war. On the second floor is an auditorium seating 350 persons. This room is also used for college dances.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Honor Council.

All tests and examinations are conducted under the honor system, which is administered by an Honor Council chosen by the students. Recommendations for discipline are made to the president of the college by the Honor Council.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under

which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

MANAGEMENT OF THE INFIRMARY.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall, who is designated as Supervisor of the Infirmary. Miss Grace Charman, the resident nurse, with Miss Marguerite Davis as assistant resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient:—

(a) *Nurses.*— In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service.*— If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies.*— Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry.*— Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.**General Exercises.**

Chapel exercises are held two mornings each week. On Thursday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established in 1907. All students become members of the union by paying a small fee. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

Intercollegiate and intermural athletic contests are held throughout the year in the leading sports, including football, baseball, track, hockey and basketball. The athletic board, composed of alumni, faculty and students, has charge of finances, schedules, and general policies governing athletics.

The musical clubs include an orchestra and a glee club. These give about a dozen concerts, usually followed by dancing, during the year, both in Amherst and on tour. A dramatic club, The Roister Doisters, present annually a revue and two plays, one in connection with the promenade and the other at commencement. There are, besides the declamation and oratorical prize contests, both underclass and intercollegiate debates. The college is a member of a triangular league with Rhode Island and Connecticut. The college publications are the "Massachusetts Collegian," the weekly newspaper; "The Index," the year book; "The Squib," a comic magazine; and "The Alumni Bulletin," issued from the office of the alumni secretary. The Academic Activities Board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the various clubs and publications.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is \$5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of \$10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest tenth of the senior class who have attained an average grade of at least 85 per cent during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1921 were:—

AGRICULTURE. — The Grinnell prizes, given by Hon. William Claffin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, \$25, \$15, \$10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years.

BOTANY. — The Hills prizes, given by Henry F. Hills of Amherst, amount to \$35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, \$20; for the second best herbarium, \$15. No collection deemed unworthy of a prize will be considered.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, \$15 and \$10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, \$30 and \$15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and \$15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Awards and Prizes, 1922.

GRINNELL PRIZES. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, Richmond Edmund Field.

Second prize, Francis Sample Tucker.

Third prize, William Henry Peck.

PUBLIC SPEAKING. — The Burnham prizes were awarded to the students delivering the best and second best declamations, as follows: —

First prize, Alfred Porter Staebner, 1924.

Second prize, James Batal, 1925.

FLINT PRIZES. — The Flint prize was awarded to the student delivering the best oration, as follows: —

First prize, James Batal, 1925.

Second prize, Belding Francis Jackson, 1922.

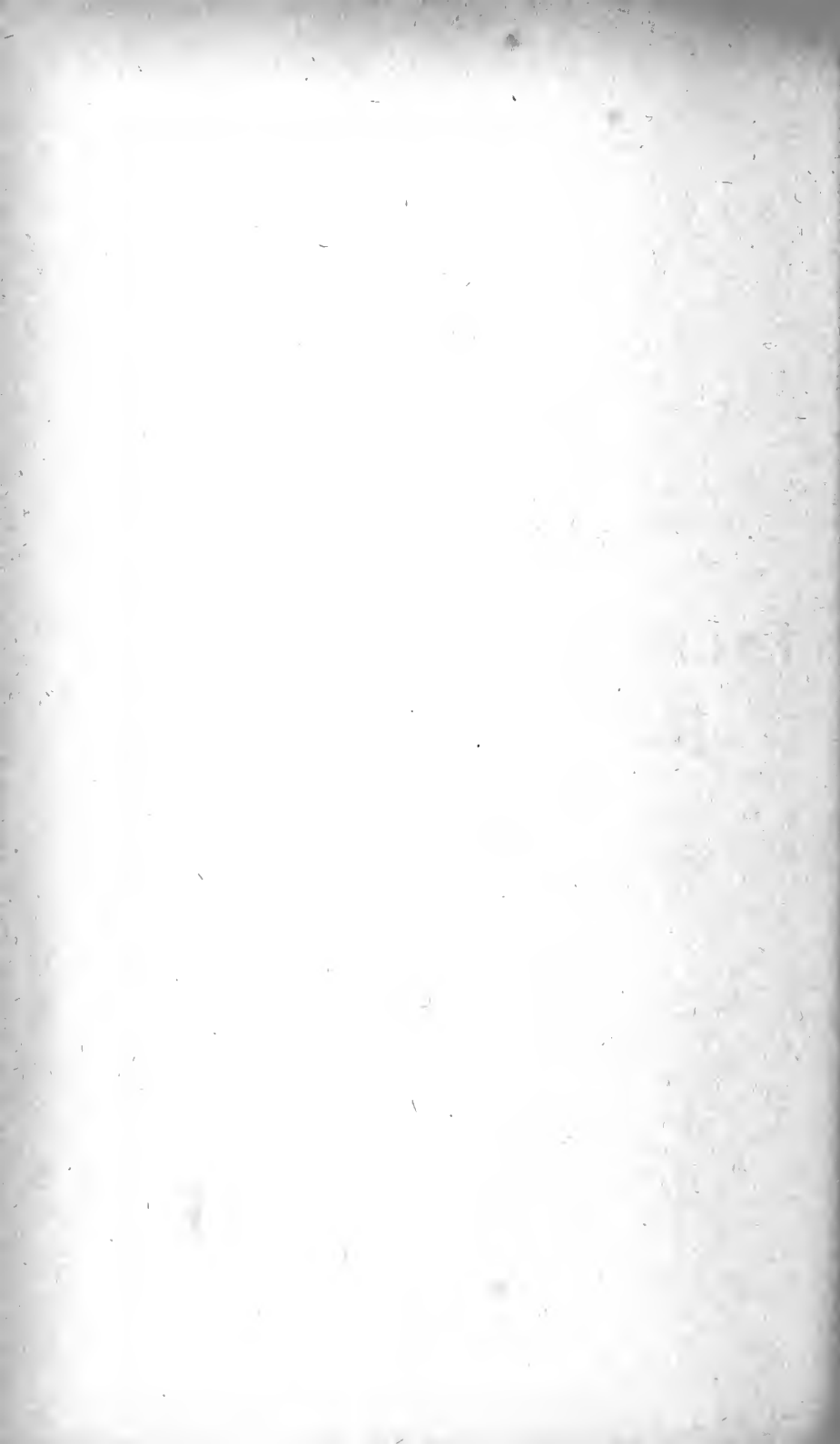
HILLS PRIZES. — The Hills prizes for the best herbaria were awarded as follows: —

First prize, Danitza Arangelovitch, 1924.

Second prize, Samuel Henry White, 1924.

SOUTHERN ALUMNI BASEBALL CUP. — For the best all-round baseball player during the season of 1921 the Southern Alumni baseball cup was awarded to Julius Kroeck, Jr., 1922.

ALLEN LEON POND MEMORIAL MEDAL, FOR EXCELLENCE IN FOOTBALL. — The Allen Leon Pond memorial medal for general excellence in football was awarded to John Neptumcen Lewandowski, 1922. This medal is in memory of Allen Leon Pond of the class of 1920, who died Feb. 26, 1920.



DEGREES CONFERRED AND
ROLL OF STUDENTS

DEGREES CONFERRED — 1922.

MASTER OF SCIENCE (M.Sc.).

Avery, Roy Crowdy, B.Sc., Connecticut Agricultural College . . .	New York City.
Clark, Dorothy Porter, A.B., Wellesley College . . .	Newton.
French, Rowland Barnes, B.Sc., Dartmouth College . . .	Haverhill.
Nirody, Bhavani Sankarrao, B.A., University of Madras . . .	Madras, India.

DOCTOR OF PHILOSOPHY (Ph.D.).

Hood, Egerton Gibson, B.S.A., Ontario Agricultural College (Toronto University)	Macdonald College, Quebec, Can.
Neill, James Maffett, B.Sc., Allegheny College	Clarion, Pa.

BACHELOR OF SCIENCE (B.Sc.).

Acheson, Roger Melvin	New Bedford.
Andrews, John Hollis	Vineyard Haven.
Bainton, Hubert Judson	Hyde Park.
Baker, George Louis	Amherst.
Barnard, Kenneth Allen	Shelburne.
Beckwith, Robert Henry	Pittsfield.
Bent, Leslie Dana	Medfield.
Blakely, Roger Wolcott	Medford.
Blanchard, Raymond Stanwood	Wollaston.
Bromley, Stanley Willard	Southbridge.
Buck, Charles Alfred	Mansfield.
Burnett, Paul Lapham	Leicester.
Burnham, Edwin Graham	Springfield.
Calhoun, Salteau Frederick	Brookline.
Carey, Edmund Thomas	Springfield.
Chapin, Ellis Warren, Jr.	Chicopee Falls.
Chase, Eleanor Frances	Amesbury.
Clark, Clarence Frederick	Sunderland.
Collins, Herbert Laurence	Arlington.
Conant, Luman Binney	Waltham.
Cotton, George Asa	Woburn.
Crawford, Alexander George	Waverley.
Davis, Harold Sanborn	Belchertown.
Degener, Otto	New York, N. Y.
Dwyer, James Edward	Sunderland.
Erysian, Harry Adrian	Chelsea.
Field, Richard Edmund	Shelburne Falls.
Freeman, Stanley Leonard	Needham.
Gilbert, Frank Albert, Jr.	Brandon, Vt.
Gore, Jane Isabel Pollard	North Adams.
Gowdy, Carlyle Hale	Westfield.
Haskins, Philip Hall	North Amherst.
Higgin, Albert Snyder	Baltimore, Md.
Hodgson, Robert Moore	Boston.
Holman, Reginald Newton	Somerville.
Hooper, Francis Edwards	Revere.
Hurder, Ruth Wasson	Milton.

Hussey, Francis William	Whitinsville.
Jackson, Belding Francis	Belchertown.
Jordan, Raymond Douglas	Springfield.
Kemp, George Austin	North Andover.
Knapp, Irving Robinson	Seekonk.
Kokoski, Frank Joseph	Amherst.
Krasker, Abraham	Revere.
Kroeck, Julius, Jr.	Huntington, L. I., N. Y.
Lacroix, Donald Sewall	Rowley.
Lal, Prem Chand	India.
Law, Hervey Fuller	Longmeadow.
Lawrence, Robert Parker	East Greenwich, R. I.
Leland, James Freeman, Jr.	Sherborn.
Leonard, Earle Stanley	Hyde Park.
Lewandowski, John Neptumcen	Easthampton.
Lindquist, Harry Gotfred	Holden.
Lovering, Everett Waldron	Northampton.
Lovering, Rolland Frederick	Northampton.
Lowery, John Gordon	Malden.
Lyons, Edgar Albion	Methuen.
Lyons, John Joseph, Jr.	Arlington.
MacArdle, Herbert Aloysius	Worcester.
Main, Stuart DeGross	Maplewood, N. J.
Martin, Edward William	Amherst.
McGuinn, Albert Francis	Worcester.
McNulty, Raymond Henry	North Brookfield.
Moody, Kenneth Watts	Brookline.
Moseley, Henry Samson	Glastonbury, Conn.
Murdock, Matthew John	Medford.
Murray, Harry Athol, Jr.	Arlington.
Murray, Myron George	Bradford.
Nigro, Henry	Revere.
Packer, George Blanchard	Woodbury, Conn.
Peck, William Henry	Stow.
Perry, Helen Margaret	Waltham.
Pickup, Ezra Alden	Holyoke.
Randall, Kenneth Charles	Springfield.
Reed, Paul Malcolm	Baldwinville.
Richardson, Marjory	Millis.
Rollins, Walter Jessie	Leominster.
Roser, Conrad Herman	Glastonbury, Conn.
Russell, Ralph	Worcester.
Shaughnessy, Howard John	Amherst.
Smith, Albert William	Easthampton.
Smith, Rowland Piper	North Amherst.
Spring, Hobart Wadsworth	Braintree.
Stevens, Ralph Shattuck	Arlington.
Sullivan, Joseph Timothy	Lawrence.
Swift, Arthur Lawrence	North Amherst.
Talmage, Harry John	Springfield.
Tanner, Willis	Worcester.
Task, Mortimer	West Stoughton.
Thompson, George Henry, Jr.	Lenox.
Tucker, Francis Sample	Arlington.
Vinten, Charles Raymond	Roxbury.
Walker, Philip Duane	Hardwick.
Warren, Edwin Herbert	Chelmsford.
Waugh, Frederick Vail	Amherst.
Weber, Harold Richard	Brooklyn, N. Y.
Wentsch, Harold Earle	Worcester.
Whitaker, Carl Fales	Hadley.
White, George Edwin	Worcester.
Wood, Clarence Milton	West Somerville.

REGISTRATION, 1922-23.

AS OF NOVEMBER 1, 1922.

Graduate Students.

Ali, Mehmed	Smyrna, Asia Minor.
B.A., International College, Smyrna.	
Archibald, John G.	Amherst.
B.S.A., Ontario Agricultural College, Toronto University.	
Avery, Roy C.	Amherst.
B.Sc., Connecticut Agricultural College.	
Bonnell, Anna V.	Elizabeth, N. J.
A.B., Mount Holyoke College.	
Brase, Herman H.	Longmeadow.
B.A., New York University.	
Bromley, Stanley W.	Southbridge.
B.Sc., Massachusetts Agricultural College.	
Buchanan, Walter G.	Bernardston.
B.Sc., Massachusetts Agricultural College.	
Campbell, Walter J.	Springfield.
A.B., M.A., Princeton University.	
Chao, Chung-ting	Nanking, China.
B.Sc., College of Agriculture, University of Nanking.	
Chase, Eleanor F.	Amesbury.
B.Sc., Massachusetts Agricultural College.	
Dickinson, Lawrence S.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Dooley, Thomas P.	Dorchester.
B.Sc., Massachusetts Agricultural College.	
Epstein, Nathan I.	Salem.
B.Sc., Massachusetts Institute of Technology.	
Flikkema, Renzy E.	Morrison, Ill.
A.B., Hope College.	
Flint, Oliver S.	Amherst.
B.S., Massachusetts Agricultural College.	
Frellick, Ralph S.	Everett.
B.Sc., Franklin College.	
French, Arthur P.	Amherst.
B.Sc., Ohio State University.	
Garvey, Mary E. M.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Glover, Theodore W.	North Easton.
B.Sc., Massachusetts Agricultural College.	
Godbout, J. Adelard	Ste. Anne de la Pocatiere, P. Q., Can.
B.Sc., B.S.A., École d'Agriculture de Ste. Anne de la Pocatiere.	
Hall, Merwin P.	Brookline.
A.B., Amherst College.	
Harris, Roy D.	Amherst.
B.Sc., Middlebury College.	
Higgin, Albert S.	Passaic, N. J.
B.Sc., Massachusetts Agricultural College.	
Hodgdon, Julia P.	Hannibal, Mo.
B.A., Smith College.	

Johnson, John F.	Mount Airy, N. C.
B.S., North Carolina State College.	
Julian, Arthur N.	Amherst.
B.A., Northwestern University.	
Lanphear, Marshall O.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Lowe, C. Hiram	Chinwangtao, North China.
B.A., Pekin University.	
B.Sc., University of Illinois.	
Mack, Warren B.	Amherst.
Ph.B., Lafayette College.	
McCrimmon, John G.	Williamstown, Ontario, Can.
B.S.A., Ontario Agricultural College, Toronto University.	
Merritt, L. A.	Williamsburg.
B.Sc., Trinity College.	
Meserve, Charles A.	Livermore Falls, Me.
B.Sc., Massachusetts Institute of Technology.	
Ph.D., University of Erlangen, Bavaria.	
Mooney, Raymond A.	Plattsburg, N. Y.
B.Sc., Massachusetts Agricultural College.	
Morgan, Ezra L.	Columbia, Mo.
A.B., McKendree College.	
M.A., University of Wisconsin.	
Morin, Adrien	St. Celestin, P. Q., Can.
B.S.A., École d'Agriculture de Ste. Anne de la Pocatiere.	
Muller, Richard T.	Amherst.
B.S., Cornell University.	
M.S., University of Maine.	
O'Brien, Daniel W.	Natick.
B.Sc., Massachusetts Agricultural College.	
Parker, J. R.	St. Paul, Minn.
B.Sc., Massachusetts Agricultural College.	
Potter, David	Concord.
B.Sc., Massachusetts Agricultural College.	
Rice, Victor A.	Amherst.
B.Sc., North Carolina State College.	
Robertson, William F.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Rogers, Roland W.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Sanborn, Joseph R.	North Amherst.
B.Sc., Massachusetts Agricultural College.	
Serex, Paul, Jr.	Amherst.
B.Sc., M.Sc., Massachusetts Agricultural College.	
Snyder, Grant B.	Amherst.
B.S.A., Ontario Agricultural College, Toronto University.	
Thelin, Guy	Amherst.
B.Sc., South Dakota State College.	
Tietz, Harrison M.	Richmond Hill, N. Y.
B.Sc., Massachusetts Agricultural College.	
Tipple, Esther W.	Valparaiso, Ind.
B.S., Teachers College, Columbia University.	
Verder, Bessie C.	Lyndon Center, Vt.
B.S., Middlebury College.	
M.A., Brown University.	
Vinten, Charles Raymond	Amherst.
B.Sc., Massachusetts Agricultural College.	
West, Guy C.	Amesbury.
B.Sc., Massachusetts Agricultural College.	
Willard, John D.	Amherst.
B.A., Amherst College.	
Worthley, Harlan N.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Yount, Hubert W.	Toledo, Ohio.
B.Sc.Agr., Ohio State University.	

REGISTERED AFTER THE CATALOGUE FOR 1921 WAS PUBLISHED.

Conant, Luman B.	Waltham.
B.Sc., Massachusetts Agricultural College.	
Dickinson, Lawrence S.	Amherst.
B.Sc., Massachusetts Agricultural College.	
French, Willard K.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Gore, Jane Pollard	Amherst.
B.Sc., Massachusetts Agricultural College.	
Haskins, Harold A.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Lanphear, Marshall O.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Lindsey, Joseph B., Jr.	Amherst.
A.B., Dartmouth College.	
Mack, Warren B.	Amherst.
Ph.B., Lafayette College.	
Maginnis, John J.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Muller, Richard T.	Amherst.
B.S., Cornell University.	
M.S., University of Maine.	
Perry, Helen Margaret	Waltham.
B.Sc., Massachusetts Agricultural College.	
Richardson, Marjory	Millis.
B.Sc., Massachusetts Agricultural College.	
Robinson, Philip L.	South Dartmouth.
B.Sc., Massachusetts Agricultural College.	
Sawtelle, Donald W.	Amherst.
B.S., University of Maine.	
Stowell, Harold T.	Hathorne.
B.Sc., Massachusetts Agricultural College.	
Tanner, Willis	Worcester.
B.Sc., Massachusetts Agricultural College.	
Von Mechow, Herbert L.	Bellmore, N. Y.
B.S.A., Syracuse University.	
Wallace, Anna M.	Amherst.
A.B., Smith College.	
A.M., Yale Graduate School.	
Waugh, Frederick V.	Amherst.
B.Sc., Massachusetts Agricultural College.	
West, Guy C.	Amesbury.
B.Sc., Massachusetts Agricultural College.	
Willard, John D.	Amherst.
B.A., Amherst College.	

Class of 1923.

Abele, Trescott Tupper	Quincy	Theta Chi.
Alexander, Donald Briggs	Boston	Sigma Phi Epsilon.
Alger, Mason Williams	West Bridgewater	Alpha Gamma Rho.
Arrington, Luther Bailey	Florence	Alpha Gamma Rho.
Baker, Howard	Marshfield	Sigma Phi Epsilon.
Bateman, Eleanor Willard	Arlington Heights	Abigail Adams House.
Bates, Howard	Cohasset	Kappa Gamma Phi.
Bates, Robert Brooks	West Springfield	Alpha Gamma Rho.
Beal, James Allen	Abington	Kappa Sigma.
Bennett, James Stanley	South Meriden, Conn.	Alpha Gamma Rho.
Boles, Inza Almena	Dorchester	Abigail Adams House.
Borgeson, Melvin Benjamin	Auburn	Kappa Gamma Phi.
Brewer, Gardner Hunter	Upton	Kappa Epsilon.
Broderick, Lawrence Francis	Hyde Park	17 North College.
Buckley, Francis Edward	Natick	Kappa Sigma.
Burbeck, Joseph Howard	Peabody	Sigma Phi Epsilon.

Burke, Edmund William	Watertown	Kappa Epsilon.
Cohen, Solomon	Dorchester	15 North College.
Collins, Donald Keith	Rockland	Theta Chi.
Cook, Frederick Belcher	Niantic, Conn.	Kappa Epsilon.
Corash, Paul	Worcester	14 South College.
Dickinson, Lewis Everett, Jr.	Holyoke	Kappa Epsilon.
Dowden, Philip Berry	Sandwich	Sigma Phi Epsilon.
Faneuf, John Benedict	West Warren	Kappa Epsilon.
Fitzpatrick, Leo Joseph	Brockton	North College.
Folsom, Owen Eugene	Roslindale	Phi Sigma Kappa.
Friend, Roger Boynton	Dorchester	Alpha Gamma Rho.
Fuller, Robert Donald	Woburn	Q. T. V.
Gamzue, Benjamin	Holyoke	13 South College.
Gerry, Bertram Irving	Peabody	Alpha Gamma Rho.
Gildemeister, Mary Katherine	Belchertown	Abigail Adams House.
Giles, Clifton Forrest	Newtonville	Sigma Phi Epsilon.
Gold, Philip	Lynn	13 South College.
Goldstein, Joseph	Lynn	14 South College.
Gordon, Howard Reynolds	Ipswich	Lambda Chi Alpha.
Graves, George	Granville, Ohio	Theta Chi.
Grayson, Raymond Henry	Milford	Alpha Sigma Phi.
Hale, John Stancliff	South Glastonbury, Conn.	Phi Sigma Kappa.
Hallett, Melvin Bernard	Rockland	Theta Chi.
Harrington, Robert John	Holyoke	Alpha Sigma Phi.
Heath, Allan Jay	Newfane, Vt.	Kappa Epsilon.
Hilyard, Norman Douglas	Beverly	Q. T. V.
Hodsdon, Marshall Sinclair	Melrose Highlands	Phi Sigma Kappa.
Holley, George Gilbert	Fiskdale	Lambda Chi Alpha.
Hollis, Frederick Allen	Charlton	French Hall.
Hunter, Henry Leander, Jr.	Pleasantville, N. Y.	Theta Chi.
Irish, Gilbert Henry	Turner, Me.	Lambda Chi Alpha.
Johnson, Cleon Bancroft	Ipswich	Kappa Epsilon.
Johnson, Eyrle Gray	Mattapan	Lambda Chi Alpha.
Lewis, Molly LeBaron	Jamaica Plain	Abigail Adams House.
Lindskog, Gustaf Elmer Richard	Roxbury	Clark Hall.
Luddington, Frank Dennison	Hamden, Conn.	17 North College.
MacCready, Donald Eugene	Elizabeth, N. J.	Phi Sigma Kappa.
Marshall, Alexander Borea	Greenwich, Conn.	Theta Chi.
Marshman, Wilbur Horace	Springfield	Kappa Sigma.
Martin, Frances Barbara	Amherst	5 Phillips Street.
Martin, Robert Fitz-Randolph	Amherst	Amherst House.
Mather, Edna	Amherst	5 Allen Street.
Minor, John Bacon, Jr.	Amherst	70 Lincoln Avenue.
Mohamedi, Sageer	India	14 North College.
Mohor, Robert deSales	Newton Center	Phi Sigma Kappa.
Mudgett, Vernon Downer	Brookline	Lambda Chi Alpha.
Newell, Richard Carl	West Springfield	Alpha Gamma Rho.
Noreross, Harry Cecil	Brimfield	16 South College.
Nowers, Donald Gilford	Danvers	Lambda Chi Alpha.
Paddock, Wallace Earl	Worcester	Farmhouse.
Picard, Charles Francis	Plymouth	17 North College.
Putnam, Ernest Taylor	Greenfield	Kappa Epsilon.
Richardson, Mark Morton	West Brookfield	11 South College.
Roberts, Arthur William	Hyde Park	Theta Chi.
Russell, Charles Francis	Winchendon	46 Pleasant Street.
Sandow, Alexander	Pittsfield	13 South College.
Sargent, Richmond Holmes	Winthrop, Me.	Kappa Sigma.
Sears, Fred Grant, Jr.	Dalton	Phi Sigma Kappa.
Sharpe, Charles Gertner	Amherst	13 Paige Street.
Shea, Thomas Francis	Holyoke	Kappa Gamma Phi.
Slade, Irving Woodman	Chelsea	Kappa Sigma.
Smith, Jeffrey Poole	West Roxbury	North College.
Snow, Thomas Lathrop	Greenfield	Alpha Gamma Rho.
Tanner, Edwin	Worcester	North College.

Tarr, James Gordon	Gloucester	Sigma Phi Epsilon.
Tisdale, Edward Norman	Medfield	Lambda Chi Alpha.
Towne, Carroll Alden	Auburndale	Q. T. V.
Towne, Warren Hannaford	Cambridge	Kappa Epsilon.
Tumey, Malcomb Edward	Deerfield	Q. T. V.
Turner, Dorothy VanHoven	Washington, D. C. . . .	Abigail Adams House.
Wendell, Richard Goodwin	Belmont	Phi Sigma Kappa.
Whittaker, Holden	Newton Highlands	The Davenport.
Whittier, John McKey	Brookline	Kappa Sigma.
Williams, Forrest Earl	Sunderland	Q. T. V.
Wirth, Conrad Louis	Minneapolis, Minn. . . .	Kappa Sigma.

Class of 1924.

Barrows, Robert Arthur	Quincy	Lambda Chi Alpha.
Bartlett, Frederick Sheldon	Westfield	Sigma Phi Epsilon.
Bartlett, Perry Goodell	Holyoke	Lambda Chi Alpha.
Bartlett, Warren Leslie	Boston	Phi Sigma Kappa.
Belden, Clifford Luce	Bradstreet	Kappa Sigma.
Bike, Edward Louis	Westfield	Sigma Phi Epsilon.
Bittinger, Richard	Northfield	Sunset Avenue, care of Professor Banta.
Bowes, Charles Atwell	Worcester	Q. T. V.
Brunner, Fred, Jr. . . .	New York, N. Y. . . .	Phi Sigma Kappa.
Cahalane, Victor Harrison	Charlestown, N. H. . . .	83 Pleasant Street.
Carpenter, Earle Stanton	Rehoboth	Alpha Sigma Phi.
Chase, Theodore Martin	Livermore Falls, Me. . . .	Phi Sigma Kappa.
Cromack, Earl Augustus	Shelburne Falls	Theta Chi.
Darling, Robert Martin	Cambridge	Q. T. V.
Davis, Howard Halsey	Brockton	Lambda Chi Alpha.
Deuel, Charles Frederick, 2d	Amherst	Q. T. V.
Dimock, Walter Lewis	Oxford	11 South College.
Dresser, Allen Lucius	Amherst	Q. T. V.
Elliott, James Alexander	Summit, N. J. . . .	Care of Geo. Cooley, Sunderland.
Emery, George Edward	Marlborough	Sigma Phi Epsilon.
Epps, Martha Belle Scott	Winchendon	Abigail Adams House.
Fenton, John Michael	Amherst	108 Pleasant Street.
Fernald, Leland Hoyt	Arlington	Lambda Chi Alpha.
Flint, Ruth Guild	Allston	Abigail Adams House.
Foley, Mary Joanna	Worcester	Abigail Adams House.
Frost, Sherman Clark	Cambridge	Sigma Phi Epsilon.
Frost, Willard Chamberlain	Milford	Theta Chi.
Gadsby, James Herbert	North Adams	Q. T. V.
Garretson, Alfred Corwin	Bound Brook, N. J. . . .	Phi Sigma Kappa.
Gay, Alfred Fullick	Groton	Theta Chi.
Geiger, Aimee Suzanne	Pepperell	Abigail Adams House.
Gifford, Richard Smith	South Westport	Sigma Phi Epsilon.
Goldsmith, Eliot Gray	Brookline	Kappa Sigma.
Grieve, Alexander Watson	Dorchester	Alpha Gamma Rho.
Gryzwacz, Patrick Louis	Ware	The Davenport.
Haskell, Malcolm Rawson	Amherst	Kappa Sigma.
Hayden, Luther Leonard, Jr. . . .	Brookville	Stockbridge Hall.
Hill, Carroll Victor	Worcester	1 Allen Street.
Holway, Clarence Warren	Putney, Vt. . . .	12 South College.
Hubbard, Doris	Newton	Abigail Adams House.
Isaac, Carl Frederick	Brighton	Alpha Gamma Rho.
James, Locke LeBaron	West Bridgewater	Alpha Gamma Rho.
Kane, Edward Anthony	Westfield	Q. T. V.
Keith, Clifford Woodworth	Providence, R. I. . . .	Theta Chi.
Kennedy, Lowell Francis	Cambridge	Q. T. V.
King, Rosewell Howard	Millville	Alpha Sigma Phi.
Lamb, Eric Franklin	Waban	Theta Chi.
Lane, Wilfred Craig	Fitchburg	Kappa Gamma Phi.

Leland, Allen Sanford	East Bridgewater	40 Sunset Avenue.
Loring, Kenneth Stockwell	Melrose Highlands	Lambda Chi Alpha.
Miller, Edwin Clark	Northampton	354 Bridge Street, Northampton.
Morris, Walter Markley	Amherst	44 Triangle Street.
Myrick, Sterling	Longmeadow	16 South College.
Nelson, Carl Olaf	Gloucester	Alpha Gamma Rho.
Nicoll, Arthur Chester	Quincy	Lambda Chi Alpha.
Norwood, Howard Lester	Boston	101 Butterfield Terrace.
Noyes, Russell	Newton Centre	Theta Chi.
Pearson, John Cleary	Cambridge	116 Pleasant Street.
Percival, Gordon Pittinger	Medfield	3 North College.
Perry, Chauncy Valentine	Waltham	Theta Chi.
Pierce, Arthur Edwin	Newton	Phi Sigma Kappa.
Porges, Nandor	Hyde Park	9 South College.
Pratt, Wallace Francis	Rockland	Alpha Gamma Rho.
Read, John Gammons	Springfield	Alpha Sigma Phi.
Regan, Leon Ashley ¹	Walpole	7 North College.
Reynolds, Joseph Sagar	Attleboro	Experiment Station Barn.
Rhodes, Winthrop Gordon	Waban	Theta Chi.
Ricker, Chester Sewall	Worcester	Alpha Sigma Phi.
Rowell, Elwyn Joseph	Amherst	44 Triangle Street.
Salman, Kenneth Allen	Needham	Aggie Inn.
Schaffer, Carlton Hill	Ashfield	3 North College.
Sellers, Wendell Folsom	Melrose	Alpha Gamma Rho.
Shepard, Harold Henry	South Royalston	Physics Building.
Sims, Kenneth Wallace	South Boston	Alpha Gamma Rho.
Smith, Richard Burr	Greenfield	Phi Sigma Kappa.
Staebner, Alfred Porter	Willimantic, Conn. . . .	Kappa Sigma.
Steele, Charles Wasser	Marblehead	Lambda Chi Alpha.
Steere, Robert Ernest	Chepachet, R. I. . . .	103 Pleasant Street.
Stevenson, Harold Dudley	Camden, Me. . . .	Alpha Gamma Rho.
Tewhill, Charles James	Florence	Alpha Gamma Rho.
Thornton, Clarence Percy	Pelham	Amherst, R. F. D. 2.
Tobey, Charles Sylvester	Belmont	Phi Sigma Kappa.
Varnum, Thomas, Jr. . . .	Lowell	Phi Sigma Kappa.
Walker, Judson Newcombe	Marlboro, N. H. . . .	31 East Pleasant Street.
Waugh, Albert Edmund	Amherst	Kappa Sigma.
Weatherwax, Howard Erle	Greenfield	Theta Chi.
White, Samuel Henry	Orange	Lambda Chi Alpha.
Whitman, Chester Edgerly	Milton, N. H. . . .	Phi Sigma Kappa.
Whitney, Richard Augustine	Brooklyn, N. Y. . . .	Kappa Sigma.
Whitney, Will Alvah	Taunton	3 North College.
Williams, James Lowell	Sunderland	Q. T. V.
Witt, Earl Maynard	Belchertown	Alpha Gamma Rho.
Wood, Ruth Millicent	North Andover	Abigail Adams House.
Wood, William Wilson	Barre Plains	51 Amity Street.
Woodworth, Robert Hugo	Newton	Phi Sigma Kappa.

Class of 1925.

Armstrong, Bradford	Kensington, Md. . . .	Q. T. V.
Atkins, Harold Kent	Wollaston	Sigma Phi Epsilon.
Barnes, Adrian Douglas	South Weymouth	Q. T. V.
Batal, James	Lawrence	President's House.
Bean, Francis Irving	Bradford	35 East Pleasant Street.
Benoit, Helen Anna	Amherst	16 Belchertown Road.
Binner, Roger Stokehill	Amherst	29 Northampton Road.
Blanchet, Earl Oliver	Northampton	34 Fruit Street, Northampton.
Bray, Ralph Hastings	Framingham	Sigma Phi Epsilon.
Burhoe, Sumner Othniel	Ashland	21 Fearing Street.

¹ Special junior.

Cahill, Carl Winfield	Newburyport	Kappa Sigma.
Casey, Alice Rita	Fall River	Abigail Adams House.
Cassano, Joseph ¹	Groveland	Q. T. V.
Church, George Lyle	Dorchester	5 Farview Way.
Cleaves, Leighton Greenwood	Gardner	Phi Sigma Kappa.
Cooke, Robert Gordon	Richmond	Alpha Sigma Phi.
Corwin, Emil Joseph	East Boston	6 Phillips Street.
Crosby, John Samuel	Arlington	Phi Sigma Kappa.
Currier, Leland Little	Marblehead	Alpha Gamma Rho.
Davis, Osborne Ozro	Belchertown	20 South College.
Dean, Lecil Wallace	West Palm Beach, Fla.	16 North College.
DeVito, Dominic	Roxbury	Kappa Epsilon.
Duffy, Leo Francis ²	Springfield	Kappa Epsilon.
Farrington, Linwood Henry	Chelmsford	13 Phillips Street.
Ferranti, Edmund Tony	West Bridgewater	Lambda Chi Alpha.
Fish, Donald Otis	Amherst	12 Hallock Street.
Gilbert, Chauncey McLean ²	North Amherst	North Amherst.
Gleason, Harold Albert	Chester	Care of Mr. Everson.
Gordon, Solomon	Boston	9 South College.
Grout, Helen Myra	Gill	7 Allen Street.
Grover, Walter Champion	Bernardston	Phi Sigma Kappa.
Guterman, Carl Edward Frederick	Springfield	Kappa Sigma.
Haeussler, Gilbert Julius	Springfield	Kappa Sigma.
Hale, Laurence Newton	South Glastonbury, Conn.	Phi Sigma Kappa.
Hanscombe, George Wilmont	North Attleborough	2 North College.
Harris, Clarence Albert	Utica, N. Y.	3 McClellan Street.
Hopkins, David	Amherst	17 Phillips Street.
Hurley, Everett Henry	Northampton	Sigma Phi Epsilon.
Hyde, John Worthington	Amherst	55 Pleasant Street.
Ingraham, Edward Forster	Millis	Sigma Phi Epsilon.
Jack, Melvin Clifton	Amherst	16 Hallock Street.
Kakavas, James Christo	Lowell	9 Fearing Street.
Keith, Lewis Hayden	Bridgewater	Kappa Sigma.
Kilbourn, James Sheldon	Pittsfield	Sigma Phi Epsilon.
Lacey, John Sebastian	Holyoke	13 Elm Street, Holyoke.
Lavallee, Louis Palmer	Worcester	5 Nutting Avenue.
Lewis, Donald Walter	Stow	10 South College.
Logan, Hazel Wayne	Brockton	Care of Mrs. Chamberlain, Mount Pleasant.
Lord, John Frederic	Methuen	Alpha Sigma Phi.
Love, Andrew Wyllie	Auburn	11 North College.
Lunt, Samuel Wilde	West Falmouth, Me.	Kappa Sigma.
MacAfee, Norman Hoar	Cambridge	Alpha Gamma Rho.
Mahoney, Walter Francis	Millville	Alpha Sigma Phi.
Marx, Herbert John	Holyoke	10 South College.
McGeoch, Charles Ryerson	Providence, R. I.	North College.
McGrath, Thomas Edmund	Holyoke	Baker Place.
Meserve, George Donald	Hudson	Lambda Chi Alpha.
Mouradian, Garabed Kevork	Bridgewater	Q. T. V.
Moxon, David	Holyoke	10 South College.
Nelson, Paul Redfield	Holyoke	84 Pleasant Street.
O'Connor, Arthur Maxwell	Amherst	Mount Pleasant.
Oliver, Charles Frank, Jr.	Brockton	2 North College.
Parker, Donald Llewellyn	North Adams	Sigma Phi Epsilon.
Parsons, James Gilbert	Melrose Highlands	Baker Place.
Peirce, Veasey	Dorchester	Phi Sigma Kappa.
Peltier, Xavier Paul	Spencer	West Experiment Station.
Perry, John Tuttle	Waltham	25 Gray Street.
Poey, Frederick	Boston	Alpha Sigma Phi.
Root, Frank Edson	Bernardston	Alpha Gamma Rho.
Ross, Charles Frederick	Lee	Sigma Phi Epsilon.
Ross, Donald Ernest	Amherst	23 Woodside Avenue.

¹ Special sophomore.² Probation entrance.

Rowley, Harold Frederick . . .	West Wareham . . .	15 Hallock Street.
Samuels, Samuel Bernhard . . .	Bronx, N. Y. . . .	14 South College.
Sazama, Robert Francis . . .	Northampton . . .	19 Arlington Street, North- ampton.
Seaver, Russell Bradford . . .	South Hanson . . .	M. A. C. Bungalow.
Sheridan, Irwin Scott . . .	Mansfield . . .	Alpha Gamma Rho.
Shumway, George Francis . . .	Monson . . .	21 Fearing Street.
Simmons, Carl Lafayette . . .	Kingston . . .	West Experiment Station.
Simpson, Gilbert . . .	Holyoke . . .	8 Allen Street.
Slowen, William Arnold . . .	Shelburne Falls . . .	13 Phillips Street.
Smith, Emily Greenwood . . .	Lee . . .	Abigail Adams House.
Sprague, Dudley deRochemont . . .	Melrose . . .	16 South College.
Stephan, Edith Helen . . .	Lawrence . . .	16 Pleasant Street.
Stone, George Leroy . . .	Montello . . .	Clark Hall.
Taube, Gustave . . .	New York, N. Y. . . .	9 South College.
Taylor, Milton Wight . . .	Chatham . . .	Kappa Sigma.
Templeton, Robert James . . .	Boston . . .	2 North College.
Tufts, Robert Warner . . .	North Weymouth . . .	Kappa Gamma Phi.
Ward, Gordon Hugh . . .	Englewood, N. J. . . .	Farmhouse.
White, Earl Martin . . .	Abington . . .	Kappa Sigma.
Whittum, Walter Willard . . .	Springfield . . .	Kappa Gamma Phi.
Wilcox, Stanley Dewey . . .	Springfield . . .	Kappa Gamma Phi.
Wilder, Frank Harris . . .	Sterling . . .	Phi Sigma Kappa.
Wilhelm, George Henry . . .	Holyoke . . .	Alpha Sigma Phi.
Woodbury, Samuel Lawrence . . .	Springfield . . .	Alpha Gamma Rho.
Wright, Horace Alfred . . .	Dayton, Ohio . . .	66 Pleasant Street.
Zwisler, Frederick Fisher . . .	Holyoke . . .	16 North College.

Class of 1926.

Adams, Kathleen Poland . . .	Worcester . . .	Abigail Adams House.
Aguilera, Leopoldo Sanchez . . .	Havana, Cuba . . .	Amherst Tavern.
Albertini, Paul Flanders . . .	Billerica . . .	6 Nutting Avenue.
Aldrich, George Sidney . . .	Millville . . .	Alpha Sigma Phi.
Ames, Winthrop Ashley . . .	Vineyard Haven . . .	32 North Prospect Street.
Amsden, Festus Gilbert . . .	Athol . . .	3 Allen Street.
Amsden, Theodore Maxwell ¹ . . .	Athol . . .	3 Allen Street.
Anderson, Leslie Clayton . . .	East Bridgewater . . .	Farmhouse.
Anthony, Stewart Holmes . . .	Manchester, N. H. . . .	81 Pleasant Street.
Ashe, Thomas Edmond . . .	Holyoke . . .	12 North College.
Avery, Clifford Walter ² . . .	Colrain . . .	53 Lincoln Avenue.
Backus, Hiram Heyworth . . .	Centerville . . .	6 Nutting Avenue.
Baker, Francis Everett . . .	Hopkinton . . .	Care of Mr. Everson.
Baker, Frederic Allen . . .	Springfield . . .	6 Nutting Avenue.
Barber, Elmer Everett . . .	Jamaica Plain . . .	27 Fearing Street.
Barnes, Russell Norris . . .	Wallingford, Conn. . . .	9 Mount Pleasant.
Bartlett, Herbert Franklin . . .	West Springfield . . .	30 North Prospect Street.
Beem, Merrill Adelbert . . .	Portland, Me. . . .	10 Woodside Avenue.
Belmore, George Alfred . . .	Bridgewater . . .	116 Pleasant Street.
Berry, George Robert . . .	Northampton . . .	33 Northampton Road.
Block, Harry William . . .	Arlington . . .	56 Pleasant Street.
Bosworth, Marguerite Rose . . .	Holyoke . . .	Abigail Adams House.
Bosworth, Maude Elinor . . .	Holyoke . . .	Abigail Adams House.
Bower, James, Jr. . . .	Holyoke . . .	5 North College.
Boyd, Mary Turk . . .	Jacksonville, Fla. . . .	Abigail Adams House.
Brougham, Earl Gordon . . .	Holyoke . . .	9 North College.
Brownell, Abbott Francis . . .	New York, N. Y. . . .	6 Allen Street.
Bruorton, Earle Wallace . . .	Reading . . .	9 Phillips Street.
Buckhout, Robert Cushman . . .	South Hadley . . .	83 Pleasant Street.
Buckley, Arthur Vincent . . .	Natick . . .	35 North Prospect Street.
Budge, William Karl . . .	Mattapan . . .	7 North College.

¹ Admitted on probation, entrance record incomplete.² Special freshman.

Burnham, James Erastus ¹	Springfield	84 Pleasant Street.
Burrell, Robert Wallace	Abington	3 Allen Street.
Burt, Oren Clark, Jr.	Easthampton	Alpha Sigma Phi.
Burt, Stanley Lyman	Easthampton	4 Nutting Avenue.
Carlson, Oscar Ernest ¹	Amherst	66 Pleasant Street.
Cassidy, Marion Stewart	East Boston	Abigail Adams House.
Clarke, Lawrence Gahn	Stoneham	McClure Street.
Clarke, Russell James	Stoneham	McClure Street.
Clough, Harry Elias	Ashburnham	31 North Prospect Street.
Collier, William Wellington	Hopedale	83 Pleasant Street.
Cook, Wendell Burnham	Townsend	31 East Pleasant Street.
Cooke, Helen Beatrice	Richmond	Abigail Adams House.
Cormier, Francis Joseph ¹	Newtonville	8 Allen Street.
Couhig, Philip Henry	Beverly	Q. T. V.
Cromack, Aaron Field	Shelburne Falls	Experiment Station.
Cutler, Samuel	Springfield	75 Pleasant Street.
Davenport, Preston Julian ²	Shelburne Falls	53 Lincoln Avenue.
Davis, Evelyn Louise	Springfield	Abigail Adams House.
Dick, Ernest Albert	Lawrence	29 Lincoln Avenue.
Dimock, Harold Edgar	Oxford	15 South College.
Dodge, Eliot Perkins	Beverly	12 Chestnut Street.
Donoghue, Claire Eileen	Holyoke	Abigail Adams House.
Doolittle, Alden Hartwell	Northfield	116 Pleasant Street.
Douglass, Earle Lawrence	Springfield	15 Phillips Street.
Dow, Philip Norman	Bolton	Farmhouse.
Ducharme, Lucien Henry	Holyoke	7 Nutting Avenue.
Eldredge, Stuart	Winchester	Kappa Sigma.
Estabrook, William Warren	Brimfield	4 Nutting Avenue.
Fairbanks, Sumner Cushman	Norwood	1 North College.
Farley, Elizabeth	Amherst	61 Amity Street.
Fessenden, Richard William	Middleborough	Mount Pleasant.
Fitzgerald, Lillian Alice	Holyoke	Abigail Adams House.
Flynn, Alan Foster	Newton	North College.
Ford, William Warner	Dalton	9 Phillips Street.
Fraser, Carl Arthur	Westborough	3 Nutting Avenue.
Fraser, Harry Edward	Jamaica Plain	7 North College.
Fuller, George Leonard	Haydenville	33 Northampton Road.
Gaskill, Peter Carl	Worcester	7 Nutting Avenue.
Gavin, Linus Arthur	Natick	35 North Prospect Street.
Goodwin, Frederick Tucker	Westfield	15 Phillips Street.
Goodwin, Marvin Warren	Reading	6 Nutting Avenue.
Gordon, Samuel Francis	Ipswich	Lambda Chi Alpha.
Goren, Louis	Chelsea	56 Pleasant Street.
Gould, Ralph Otis	Topsfield	17 Kellogg Avenue.
Grant, Theodore James	Auburndale	11 South College.
Grayson, Herbert	Milford	83 Pleasant Street.
Greenwood, Elliott Kelton	Hubbardston	Farmhouse.
Griswold, Hugh Tower	Griswoldville	53 Lincoln Avenue.
Guild, Everett Joseph	Melrose Highlands	10 North College.
Gustafson, Alton Herman	Brockton	18 Nutting Avenue.
Harris, Stephen Fitch	Brookline	5 Fearing Street.
Hart, Ralph Norwood	Dorchester	5 Farview Way.
Hatch, Harold Curtis ¹	Melrose	8 Kellogg Avenue.
Haynes, Walter Lincoln	Springfield	53 Lincoln Avenue.
Heald, Theodore Boyd	Amherst	73 Northampton Road.
Henneberry, Thomas Vincent	Manchester	8 North College.
Hines, Oliver Clayton ¹	Everett	47 Pleasant Street.
Holbrook, Lester Morse	Fairhaven	16 South College.
Hollingworth, Duncalf Wright	Providence, R. I.	66 Pleasant Street.
Hopkinson, Howard	Holyoke	Amherst Tavern.
Horner, David James	Montpelier, Ohio	29½ Lincoln Avenue.

¹ Admitted on probation, entrance record incomplete.

² Special freshman.

Howes, Stanley Edward ¹	Brimfield	4 Nutting Avenue.
Huke, Barbara Allen	South Hadley	Abigail Adams House.
Hutchins, Maurice Cressey	Auburndale	Theta Chi.
Hyde, Alvin Manning	East Brimfield	35 East Pleasant Street.
Jack, Ronald Augustus	Amherst	16 Hallock Street.
Jameson, Matthew	Everett	27 Fearing Street.
Jensen, Harold Stery	Westfield	15 Phillips Street.
Johnson, Philip Gordon	Amherst	West Street.
Jones, Alvah Wesley	Salisbury	70 Lincoln Avenue.
Jones, Lawrence Lakin	Brockton	18 Nutting Avenue.
Kafanian, Sarkis Petros ¹	Kars, Armenia	11 North College.
Kelso, George	Reading	7 Phillips Street.
Lambert, John Ford	Gleasondale	9 Phillips Street.
Lane, Arthur Amidon	North Brookfield	12 Chestnut Street.
Langenbacher, Robert Frederick	New Rochelle, N. Y.	Kappa Sigma.
Langshaw, Hatton, Jr.	Fairhaven	6 Nutting Avenue.
Leedes, Joseph	Worcester	13 South College.
Lindskog, Herbert Alf	Roxbury	10 South College.
Lord, Roger Alexander	Methuen	Alpha Sigma Phi.
MacKay, Alfred Stewart	South Deerfield	44 McClellan Street.
MacMasters, Majel Margaret	Ashburnham	Abigail Adams House.
Mann, Albert Irving	Dalton	9 Phillips Street.
McCabe, Edith Mary	Holyoke	Abigail Adams House.
McGlenen, Edward Webster, Jr. ¹	Dorchester	84 Pleasant Street.
McNamara, Charles Henry	Stoughton	53 Lincoln Avenue.
Miller, Paul	Springfield	75 Pleasant Street.
Moberg, Herbert Elof	Campello	18 Nutting Avenue.
Moran, John	Amherst	61 Amity Street.
Moriarty, John Edward	Ware	7 Phillips Street.
Murphy, Edward Thomas	Hyannis	6 Nutting Avenue.
Needham, Basil Arthur	Taunton	Sigma Phi Epsilon.
Nickerson, Elsie Elizabeth	East Boston	Abigail Adams House.
Nichols, Chester Willard	Natick	32 North Prospect Street.
Norcross, Roy Ellis	Brimfield	4 Nutting Avenue.
Novick, Leo Altschuler	Amherst	56 Pleasant Street.
Noyes, Eliza Margaret	Greenfield	Abigail Adams House.
Nylen, John Herbert	East Boston	Kappa Sigma.
Otto, Raymond Herman	Lawrence	29 Lincoln Avenue.
Palmer, Cary Davis	Grafton, Vt.	31 East Pleasant Street.
Parsons, Sidney Wing	Conway	83 Pleasant Street.
Peckham, Carlisle Houghton	Melrose Highlands	6 Nutting Avenue.
Perry, George Nelson	Waltham	15 South College.
Pomeroy, Elisabeth Clark	Longmeadow	Abigail Adams House.
Potter, Royal Wesley	Providence, R. I.	3 McClure Street.
Pray, Frederick Carrol	Cambridge	1 North College.
Putnam, Ruth Evelyn	Greenfield	Abigail Adams House.
Reed, Charles Porter	West Bridgewater	18 Nutting Avenue.
Richards, James Marsh	Springfield	10 North College.
Richardson, Henry Howe	Millis	31 East Pleasant Street.
Rivnay, Ezekiel ¹	Holyoke	17 Pleasant Street.
Roberts, Verne Edward ¹	Worcester	Amherst Tavern.
Rogers, John	Cambridge	27 Fearing Street.
Rogers, Oscar Bailey	Hampden	52 Pleasant Street.
Rowen, Edward Joseph	Westfield	31 East Pleasant Street.
Sargent, Carmeta Elizabeth	Shrewsbury	Abigail Adams House.
Sawyer, Roland Damon, Jr.	Ware	18 Nutting Avenue.
Shea, Margaret Catherine	Holyoke	Abigail Adams House.
Shedd, Wendell Phillips	Arlington	10 North College.
Simonds, Henry Erving	Winchester	9 Phillips Street.
Smiley, Ray Guild	Worcester	Alpha Sigma Phi.
Smith, Albert Charles	Springfield	8 North College.
Smith, Margaret Park	Taunton	Abigail Adams House.
Smith, Raymond Ellingwood	Manchester	20 Lessey Street.

¹ Admitted on probation, entrance record incomplete.

Sniffen, Fillow Loren	Westport, Conn.	84 Pleasant Street.
Snyder, Allan	Holyoke	12 North College.
Spooner, Raymond Hildreth	Brimfield	22 North Prospect Street.
Staniford, Duncan Mooar	Reading	15 Fearing Street.
Stevens, Alvin Gay	Needham	3 Nutting Avenue.
Stopford, William Turner	Newtonville	15 South College.
Stowell, Walter Henry	Grafton, Vt.	31 East Pleasant Street.
Sturtevant, George Stanley	Ware	North College.
Sullivan, Charles Noyes	Fall River	3 Nutting Avenue.
Sullivan, Donald Clifford	Amherst	25 Gray Street.
Sullivan, Edward Francis	Warren	5 North College.
Sweetland, Augustus Francis	Stoneham	83 Pleasant Street.
Temple, John Burrington	Shelburne Falls	53 Lincoln Avenue.
Thompson, Gerald Thayer	Shelburne Falls	6 Nutting Avenue.
Thurlow, George Harold	West Newbury	70 Lincoln Avenue.
Tripp, Kenneth Bliss	Spencer	4 North College.
Tucker, Edwin Locke	Baldwinsville	75 Pleasant Street.
Tulenko, John	Sunderland	Sunderland.
Turner, Charles Edgar	Springfield	Care of Mr. Green, Mount Pleasant.
Vaughan, Elliott Stephens ¹	Pelham	Pelham.
Wade, Windsor Burt	Andover	70 Lincoln Avenue.
Wagnet, William Reinhold	Sunderland	Care of Mrs. Geo. Cooley, Sunderland.
Waite, Clifton Brooks	Orange	53 Lincoln Avenue.
Walsh, Phillip Baker	Amherst	35 East Pleasant Street.
Warren, Francis Walter	Stow	Farmhouse.
Wheeler, Ellsworth Haines	Bolton	Care of Mr. Everson.
White, Montague	West Hartford, Conn.	17 Fearing Street.
Whited, Francis Marshall	Bernardston	7 Nutting Avenue.
Williams, Donald Reed	Northfield	116 Pleasant Street.
Williams, James Rufus	Glastonbury, Conn.	83 Pleasant Street.
Worssam, Horace Herbert	Deerfield	59 Sunset Avenue.
Zinn, Arnold Stanhope	New York, N. Y.	81 Pleasant Street.

Special Students.

Brennan, Joseph Edward	Woonsocket, R. I.	8 Allen Street.
Chapman, Lena	Amherst	77 South Pleasant Street.
Clevenger, Leander Stanley	Westmont, N. J.	21 Fearing Street.
Coveney, John Joseph	Amherst	North Amherst.
Delaney, Rose Margaret	Holyoke	Draper Hall
Hescock, Robert Eddy	Amherst	31 East Pleasant Street.
Loring, Frank Sumner, Jr.	Gloucester	35 North Prospect Street.
Mercier, Marie	Northampton	Draper Hall.
Miller, Johnetta Isabel	North Adams	Abigail Adams House.
Smith, Myron Newton	Worcester	13 North College.
Stillwell, Albert Clifton	Brooklyn, N. Y.	25 Pleasant Street.
Takevchi, Denchi	Springfield	21 Fearing Street.
Viets, Paul Winthrop	Amherst	5 Kendrick Place.

REGISTERED AFTER THE CATALOGUE FOR 1921 WAS PUBLISHED.

1925.

Aiken, Howard William	Holyoke.
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Specials.

Davidson, Clarence Herbert	Amherst.
Thayer, Charles Hiram	Amherst.

¹ Admitted on probation, entrance record incomplete.

Geographical Summary.

Massachusetts	461
New York	12
Connecticut	11
Maine	7
New Jersey	7
Rhode Island	6
Vermont	5
New Hampshire	4
Ohio	4
Florida	2
Indiana	2
Minnesota	2
Missouri	2
District of Columbia	1
Illinois	1
Maryland	1
North Carolina	1
Canada	3
Cuba	1
China	2
Armenia	1
Asia Minor	1
Total	537

Summary by Classes.

CLASS.	Men.	Women.	Total.
Graduate school	48	6	54
Class of 1923	84	7	91
Class of 1924	89	6	95
Class of 1925	91	6	97
Class of 1926	167	20	187
Specials	9	4	13
Totals	488	49	537

SHORT COURSE ENROLLMENT.

Two-year Graduates, 1922.

Adair, Eldred	Roslindale.
Adams, John	Cambridge.
Axtman, John Louis	Chestnut Hill.
Barney, Ernest Wellman	Corinna, Me.
Bartholomew, Francis Michael	Amherst.
Belcher, Edgar Estes	East Weymouth.
Betterley, Guy William	Brattleboro, Vt.
Bosworth, Earl Kenneth	Orange.
Breen, Arthur Joseph	Granby.
Brown, Milton Shumway	Templeton.
Campbell, Lewis Harold	Leominster.
Chamberlain, Bert Neverson	Hudson.
Clifford, Lura Marion	Greenfield.
Cluff, Victor Newton	Lowell.
Coles, Howard Finlay	Tarrytown, N. Y.
Condon, Thomas Casey	Medford.
Considine, Francis Anthony	Watertown.
Cushman, John Kenneth	Springfield.
David, James Vernon	Amherst.
DeLano, Wilbert Kilbourne	New York, N. Y.
Diebner, Louis Theodore, Jr.	Gloucester.
Donnellan, Arthur Lindsay	Cobalt, Conn.
Dunbar, Albert Jarvis	Greenwood, R. I.
Erickson, Karl Henrick	Somerville.
Etzel, George Frank	Amherst.
Fisher, William Smith	North Attleborough.
Flagg, Nolan Randolph	Worcester.
Gavett, George Billings	South Portland, Me.
Gifford, Franklin Maynard	Middleborough.
Gokey, Emery	Rutland, Vt.
Green, George Alexander	Cambridge.
Gustafson, Gustaf Albert	Sweden.
Hagan, Patrick	Ireland.
Harrison, Nicholas Peter	England.
Harrington, William John	Rutland, Vt.
Haskins, Gerald Everard	Easthampton.
Headberg, A. Edward	Somerville.
Heald, Edwin Tracy	Ashburnham.
Hibbard, Perley	Dedham.
Humphrey, Lawrence Edmund	Wareham.
Hurd, Merton Bartlett	Spencer.
Igo, Bernard James	Somerville.
Jacomb, Constance Lucy	Groton.
Jaekle, Matthew Lawrence	Nantucket.
Johnson, Carl Eugene	Gloucester.
Keirstead, Ralph Ramsay	Worcester.
Keith, George Robert	Worcester.
Kesseli, Howard Maxwell	Worcester.
Knightly, George Thomas	Amherst.
Knowles, Frank	Dorchester.

Kohlrausch, George Edwin	Chelsea.
Leavitt, Dorothy Wilmer	Whitman.
Markham, Albert Gallitin, Jr.	Springfield.
MacKnight, Harry Murchie	Orange.
Nettleton, Francis Irving	Shelton, Conn.
Norrington, Henry	Neponset.
Norton, Frances Cicse	Salisbury, Conn.
Packard, Marjory Emma	Ashfield.
Parsons, Howard Jcel	Conway.
Paquett, Arthur Leon	Malden.
Powell, Katharine Leslie	Newton Center.
Ramsdell, Kenneth Hammond	Southville.
Rhodes, Charles Ernest	Amherst.
Rhodes, Paul Griggs	Lynn.
Ripley, David Hamilton	Blandford.
Ritchie, Harry Ellsworth	Rutland, Vt.
Robinson, George Sutherland	Lynn.
Robinson, Leo Victor	Athol.
Ross, Ian Hamilton	New York, N. Y.
Sanford, Paul Reed	North Adams.
Sawyer, John Henry	North Brookfield.
Sherwood, Joseph Morgan	Huntington.
Slate, Herbert Taylor	Bernardston.
Smith, Willard Stevenson	Holden.
Standley, Wallace	Cambridge.
Sullivan, Joseph Stephen	Holyoke.
Thouin, Faina Gladys	Easthampton.
Wadman, Loran Wood	Medford.
Warner, Harry Freeman	Wollaston.
Whitcomb, Harold Adams	Concord Junction.
White, Donald Mitchell	Brooklyn, N. Y.
Wilson, Frank Edward	Warren.
Wilson, Harold Elton	Barre, Vt.
Woodworth, Ralph Merrill	Rowley.
Worthley, James Everett	Greenwood.

Vocational Poultry Graduates.

DECEMBER, 1921.

Bobb, Lynn	Blandford.
Coupard, Louis	Lexington.
Gaudette, Claude	Somerville.
Igo, Bernard James	Somerville.
MacMillan, Murray	Medford.
McKenna, Philip	Hyde Park.
Moore, Lloyd	Worcester.
Morse, Herbert Edgar	Foxborough.
Talbot, William	Quincy.
Wilson, Harvey	Boston.

JUNE, 1922.

Bardwell, George Arthur	Boston.
Beyea, Elmer Roland	Wakefield.
Convery, Edward Francis	Amherst.
Daisy, Walter Edward	Roslindale.
Earl, John Joseph	Amherst.
Graumann, Lewis Matthew	Roxbury.
Rodwaye, George Wildemere	Amherst.
Stillwell, Albert	Brooklyn, N. Y.
Walsh, Paul Bernard	Worcester.
Walsh, William Harold	Jamaica Plain.
Warner, Harry	Boston.

Two-year Course, 1922-23.

SECOND YEAR.

Adams, Alton Wales	Brattleboro, Vt.	36 North Prospect Street.
Albee, Frank Smith	Lee	15 Hallock Street.
Allen, Milton Clifford	North Dartmouth	Kolony Klub.
Ambrose, Earle Clifford	Amherst	6 Phillips Street.
Armstrong, John Shepard	Attleboro	23 East Pleasant Street.
Austin, Eunice Marie	Fall River	Abigail Adams House.
Bacon, Harold Northrup	Welfare Island, N. Y.	Kolony Klub.
Bangs, Walter Albert	Somerville	10 McClellan Street.
Barnicle, Edward Joseph	Waltham	17 Kellogg Avenue.
Barrett, Avery Herbert	Brattleboro, Vt.	36 North Prospect Street.
Beekman, Warren Amerman	Clover Hill, N. J.	15 Hallock Street.
Beley, Robert Arsene	Newtonville	36 North Prospect Street.
Benson, John Melvell	Mount Desert, Me.	44 Pleasant Street.
Blake, Roger Clarence	East Bridgewater	Middle Street.
Bligh, Norman Francis	West Willington, Conn.	29 East Pleasant Street.
Booth, Sarah Elizabeth	Springfield	Abigail Adams House.
Breivogel, Henry Adam	Amherst	13 Amity Street.
Brown, Herbert Ellsworth	Holden	Pine Street.
Burrington, Frederick William	Heath	15 Hallock Street.
Carlson, Carl Albert	Beverly	3 McClellan Street.
Caron, Albert Francis	Orleans, Vt.	16 Nutting Avenue.
Carroll, Charles Raymond	Amherst	24 South East Street.
Carver, Richard Constance	Dwight	Dwight, Box 44.
Case, Richard Scofield	Winchester	73 Pleasant Street.
Chisholm, Roy Bedford	Dorchester	27 Fearing Street.
Cox, Henry Jarus	Melrose	Care of W. H. Howes, North Amherst.
Crandall, Alfred Arthur	Montpelier, Vt.	73 Pleasant Street.
Cutler, Walter Leon	Springfield, Vt.	Kolony Klub.
Daw, Elwyn Hudson	Amherst	8 Kellogg Avenue.
DeNyse, Arthur William	North Amherst	North Amherst.
Diebner, Louis Theodore	Amherst	8 North Prospect Street.
Edminster, Allen W.	Brooklyn, N.Y.	Care of F. C. Kenney, Mount Pleasant.
Elliott, William James, Jr.	Brookline	15 Hallock Street.
Emerson, Theodore Waldo	Chelmsford	13 Phillips Street.
Fairman, Frederick Donald	Amherst	Amherst, R. F. D. No. 1.
Feeney, Charles Joseph	North Amherst	North Amherst.
Foster, Henry Cope	Centerville, R. I.	20 Lessey Street.
Gallison, Winfield Hancock	Amherst	Cowles Lane.
Gammon, Walter Elmer	Whitinsville	20 Spring Street.
Grayson, Donald Dean	South Milford	Hatfield.
Harvey, William Moody	Waltham	17 Kellogg Avenue.
Hastings, Edward Henry	Worcester	Kolony Klub.
Haugland, John Richard	Somerville	3 McClellan Street.
Hayward, Lester Burton	Amherst	West Street.
Hazard, James Joseph	Providence, R. I.	18 Spring Street.
Healey, Martin Joseph	Amherst	11 Salem Street.
Henry, Carl Blaney	Westborough	45 Pleasant Street.
Hersome, Clyde Elwood	Lowell	Baker's Place.
Hesse, Fred August	Hasbrouck Heights, N. J.	20 Lessey Street.
Hesse, Louis August	Hasbrouck Heights, N. J.	20 Lessey Street.
Johnson, Harold Webster	Melrose Highlands	15 Fearing Street.
Jones, Lindsey Luther	Amherst	R. F. D. No. 2.
Kavanaugh, John Fordey	Amherst	Pelham Road.
Kelley, Edward Bernard	South Hadley Falls	44 McClellan Street.
Kelly, S. Schofield	Blackstone	17 Kellogg Avenue.
Kenison, Ralph Milton	Saugus	37 Cottage Street.
Kitchell, Wilfred Harold	Winthrop	40 Amity Street.
Kleyla, Beatrice Barbara	South Deerfield	Abigail Adams House.

Kruk, John Alexander	South Deerfield	South Deerfield.
Kuppers, John Leonard	Worcester	20 Lessey Place.
Legare, Roy Roosevelt	Petersham	South Amherst.
Legro, Chester James	Lynn	27 Fearing Street.
Leitch, Fredonna	Amherst	9 College Avenue.
LeMoult, Everett Joseph	New York, N. Y.	75 Pleasant Street.
Luther, Bradford Wheeler	Fairhaven	18 Spring Street.
Marshall, Frederick William	Altona, N. Y.	9 High Street.
Mattimore, James Francis	Worcester	10 Kellogg Avenue.
McKinstry, John Percy	Southbridge	94 Pleasant Street.
McNamara, Francis Joseph	Boston	116 Pleasant Street.
Merrifield, Raiph Addison	Athol	North Amherst.
O'Donnell, Joseph Charles	East Boston	21 Pleasant Street.
Outhuse, Donald Stedman	Littleton	84 Pleasant Street.
Packard, Edward Albert	Dorchester	116 Pleasant Street.
Park, William Hamlin	Newtonville	9 Fearing Street.
Peirce, Elisha Nye	Waltham	35 East Pleasant Street.
Perry, Udell Thurston	Santuit	44 Pleasant Street.
Phinney, Henry	West Roxbury	18 Spring Street.
Potter, Raymond Terry	Great Barrington	83 Pleasant Street.
Rambo, Samuel Everett	Grafton	Sunderland.
Rand, Arden Wilfred	Amherst	12 Beston Street.
Rand, George Lester	North Weymouth	18 Nutting Avenue.
Ravinski, Albert John	Dover	Leverett Road.
Rawson, Floyd Stuart	East Douglas	24 Lessey Street.
Richardson, Milton C.	West Brookfield	84 Pleasant Street.
Sahlin, Harry Sixten	Dorchester	20 Lessey Street.
Sayles, Arthur Updike	Providence, R. I.	Baker Place.
Schnitzer, Harold Edward	Newport, R. I.	36 North Prospect Street.
Scribner, Harry Verne	Waltham	Sunderland.
Shepherd, Owen	Bronxville, N. Y.	81 Pleasant Street.
Slattery, John Thomas	Hatfield	32 High Street.
Smith, Charles Emerson	Westfield, N. J.	75 Pleasant Street.
Smith, William	Whitinsville	35 North Prospect Street.
Spengler, Robert	Springfield	3 Nutting Avenue.
Spooner, Edward Howland	Brimfield	22 North Prospect Street.
Springer, Harry Brooke	Amherst	North Amherst.
Stever, Clifton Baird	Yarmouth Port	23 East Pleasant Street.
Stickney, Burton Marsh	Chester, Vt.	Kolony Klub.
Sullivan, Frank Leo	North Andover	35 North Prospect Street.
Sullivan, John Michael	Cambridge	36 North Prospect Street.
Sunbury, Kenneth Arthur	Lowell	Colonial Inn.
Swanson, Paul Fredolf	Chelmsford	42 McClellan Street.
Swenbeck, Herman Robert	Boston	116 Pleasant Street.
Taft, George Kenneth	Mendon	Colonial Inn.
Thomas, Leon Chessman	South Weymouth	18 Nutting Avenue.
Trull, Benjamin Franklin	Lowell	84 Pleasant Street.
Tufts, William Harold	North Easton	North Amherst.
Walker, Wallace Hayward	Ashby	Stockbridge Hall.
Wales, Forrest Martin	Stoughton	70 Lincoln Avenue.
Ward, Nelson Erwin	Buckland	94 Pleasant Street.
Watson, Grant Mack	Amherst	R. F. D. No. 3, Box 72.
Weagle, Dennis William Scot	Marlborough	75 Pleasant Street.
Webster, Phyllis M.	Cambridge	Abigail Adams House.
Weed, Theodore Henry	Lenox	9 Fearing Street.
Wells, Alphonsus	Brighton	Colonial Inn.
Wentworth, Wesley John	Amherst	R. F. D. No. 1.
Westervelt, Harold Eric	Tenafly, N. J.	23 East Pleasant Street.
Wheeler, Charles Paine	Brimfield	Kolony Klub.
Wiedenmayer, George B.	Glen Ridge, N. J.	Sunset Avenue.
Wilson, Henry James	Boston	Apiary.
Woodward, Everett Brigham	Hubbardston	Experiment Station Barn.
Wydeen, Albert Ferdinand	Amherst	R. F. D. No. 1.

FIRST YEAR.

Adelt, Joseph Francis	Adams	Baker Place.
Aiken, Howard William	South Hadley	22 Amity Street.
Alander, John Alfred	Kingston	30 North Prospect Street.
Aldrich, James Arin	Belchertown	17 Phillips Street.
Baker, Herbert Kingsbury	Wellesley	20 Lessey Street.
Baker, Ralph Holabird	Cambridge	7 McClellan Street.
Billings, Samuel Thurston	Ashland	Colonial Inn.
Bisbee, John Carroll, Jr. . . .	Moretown, Vt. . . .	35 East Pleasant Street.
Blanchard, Lawrence Newell	Leominster	Care of Professor Sears.
Blue, James Reuben	Stone Point, Va. . . .	35 East Pleasant Street.
Booth, George Wellesley	Everett	29 East Pleasant Street.
Bowden, Leon Melvin	West Roxbury	Meadow Street.
Brewster, Malcolm Leslie	Waltham	8 South Prospect Street.
Briggs, Arthur Clenton	Falmouth	Colonial Inn.
Bryant, Berton Davis	Lowell	101 Pleasant Street.
Caless, Thomas Winfred	Belmont	Amherst Tavern
Carageorgis, Andrew Stefanon	New Bedford	Apiary.
Carter, William Bradley	Tewksbury	101 Pleasant Street.
Cassidy, Francis P. . . .	Plainville, Conn. . . .	3 Nutting Avenue.
Chaisson, Joseph Daniel	Worcester	Amherst Tavern.
Clarkson, Arnold	Reading	Colonial Inn.
Clune, Arthur John	Springfield	7 McClellan Street.
Cole, Albert Bradley	Millbrook, N. Y. . . .	29 Lincoln Avenue.
Conklin, Lester Martin	Patchogue, N. Y. . . .	29 Lincoln Avenue.
Coombs, Marjorie Donelson	Shelburne Falls	Abigail Adams House.
Craig, Kenneth	Boston	28 Northampton Road.
Creeron, Hugh Joseph	Worcester	36 North Prospect Street.
Cromack, Edwin Baldwin	Colrain	6 Nutting Avenue.
Cutler, Samuel Austin	Boylston	8 South Prospect Street.
Darling, Walter	Franklin	12 South Prospect Street.
Dawson, Robert Entwistle	Saxonville	17 Phillips Street.
Dennen, Charles Otis	East Pepperell	31 North Prospect St.
Dennison, Leon Henry	Atlantic	83 Pleasant Street.
Densmore, Theodore Calder	Natick	Colonial Inn.
Eastwood, Wilfred	North Adams	79 King Street, Northamp- ton.
Eaton, Wallace Freeman	Springfield	Amherst Tavern.
Emery, Edward Conant	Weymouth Heights	Care of Geo. Cooley, Sunderland.
Emery, Russell Louis	Needham	35 East Pleasant Street.
English, Sherman Clements	Mattapan	101 Pleasant Street.
Falconer, Robert Norris	Hyde Park	17 Kellogg Avenue.
Field, Brierly	Scarsdale, N. Y. . . .	6 Phillips Street.
Files, Arthur Dysart	Wilbraham	30 North Prospect Street.
Finney, John Taft	Brookfield	17 Kellogg Avenue.
Fitts, Harry Bucklin	Orange	36 North Prospect Street.
Fortune, Battie Holmes	Boston	Abigail Adams House.
Freeman, Hayden	Winthrop	7 Nutting Avenue.
Garrett, Wallace Frederick	Milton	Colonial Inn.
Gates, Mary Ellen	Amherst	50 Amity Street.
Gibbs, Karl Everett	Cochituate	75 Pleasant Street.
Giessler, Carl Donald	New York, N. Y. . . .	81 Pleasant Street.
Glencross, John Donald	Amherst	15 Hallock Street.
Goode, Frank Arthur	Boston	Colonial Inn.
Goodnow, Alice Marguerite	Athol	Abigail Adams House.
Griffith, Harold Winthrop	Amherst	18 Nutting Avenue.
Haffermehl, Forrest Wendell	Newton Center	Colonial Inn.
Harris, George Mitchell	Lynn	8 South Prospect Street.
Haskell, Dorothy Edith	Holyoke	Abigail Adams House.
Haynes, Joseph Dwight	Keene, N. H. . . .	Care of Professor Banta, Sunset Avenue.
Hazen, Stanley Luther	Longmeadow	Pine Street.

Hernance, Warren Edwin . . .	Boston . . .	North College.
Higgins, Leonard Martin . . .	Fall River . . .	3 Nutting Avenue.
Hillman, Nelson Bennett . . .	Fairhaven . . .	15 Hallock Street.
Hoar, Richard Edwin . . .	Winchendon . . .	30 North Prospect Street.
Howe, Wesley Mason . . .	Millbury . . .	6 North College.
Hulbert, Jewett William . . .	Dorchester . . .	30 North Prospect Street.
Hull, Amy Harriet . . .	Agawam . . .	Abigail Adams House.
Huntley, Ernest John, Jr. . .	Springfield . . .	28 Amity Street.
Jackson, John Windfield, Jr. .	Belchertown . . .	17 Phillips Street.
Jennings, Thomas Joseph . . .	New Bedford . . .	7 McClellan Street.
Johnstone, Allerton . . .	Hamilton . . .	83 Pleasant Street.
Jones, Charles K. . . .	Waitsfield, Vt. . .	18 Nutting Avenue.
Jones, Wendell Albert . . .	Roslindale . . .	7 McClellan Street.
Joslin, Ralph Herbert . . .	Waitsfield, Vt. . .	35 East Pleasant Street.
Kelley, Malachi Mitchell . . .	Northbridge . . .	Amherst Tavern.
Kenney, William Francis . . .	Dorchester . . .	35 East Pleasant Street.
Kinder, Lawrence Philip . . .	Framingham . . .	17 Phillips Street.
Kozanis, George Nicholas . . .	New Bedford . . .	Apiary.
Lacombe, Albert George . . .	Beverly . . .	12 South Prospect Street.
Lalumiere, William . . .	Haverhill . . .	15 Fearing Street.
Lane, Maynard Wallace . . .	Gloucester . . .	23 East Pleasant Street.
Lauterbach, Louis Jacob . . .	Roslindale . . .	5 Spring Street.
Longley, Lawrence Stanley . . .	Greene, Me. . .	29 North Prospect Street.
Lowe, Dwight Mansfield . . .	Watertown . . .	8 Allen Street.
MacFadyen, Alfred Wellington .	Wellesley . . .	20 Lessey Street.
MacLeod, Everett William . . .	Reading . . .	Colonial Inn.
Macuen, Harvey Andrew . . .	Newton . . .	8 Kellogg Avenue.
Malouf, Elias S. . . .	Boston . . .	Amherst Tavern.
Martin, Emilio Elenterie . . .	Buenos Aires, Argentina . . .	3 McClellan Street.
Martyn, Roland Fowler . . .	West Suffield, Conn. . .	3 Nutting Avenue.
Maxson, Willis Henry . . .	Berkeley, Cal. . .	28 Northampton Road.
McGrath, Matthew . . .	Dedham . . .	17 Phillips Street.
Merchant, Percy Albert . . .	Gloucester . . .	23 East Pleasant Street.
Miller, Everett Woodman . . .	Fairhaven . . .	15 Hallock Street.
Morrissey, John Francis . . .	Brooklyn, N. Y. . .	Amherst Tavern.
Murphy, Mortimer Vincent . . .	Norwood . . .	66 Pleasant Street.
Norell, John . . .	Sunderland . . .	Sunderland.
O'Connor, Harold Francis . . .	Weymouth . . .	101 Pleasant Street.
O'Connor, Joseph Francis . . .	Lynn . . .	Amherst Tavern.
O'Doherty, John Edward . . .	Woburn . . .	Amherst Tavern.
O'Hara, Francis Edward . . .	Worcester . . .	36 North Prospect Street.
Olsen, Harold Bailey . . .	Pepperell . . .	31 North Prospect Street.
Paddock, Franklin Selby . . .	Worcester . . .	Farmhouse.
Palmer, Albert Tresnon . . .	Everett . . .	13 South Prospect Street.
Patterson, Millard James . . .	Ipswich . . .	37 Cottage Street.
Paulson, Rudolph Bror . . .	Somerville . . .	8 South Prospect Street.
Peaslee, George Raymond . . .	Pittsfield . . .	20 Lessey Street.
Peck, John Wesley . . .	Seekonk . . .	116 Pleasant Street.
Pekleris, Spircs Antony . . .	Lowell . . .	Meadow Street.
Prentiss, Arthur Palmer . . .	Danvers . . .	22 Sunset Avenue.
Price, Clifford Abel . . .	Medford . . .	29 North Prospect Street.
Rambo, Mildred Evelyn . . .	Sunderland . . .	Sunderland.
Ramsbottom, Thomas . . .	Lowell . . .	15 Phillips Street.
Ray, Gordon Horace . . .	West Newbury . . .	12 South College.
Rodeen, William . . .	Ludlow . . .	69 Main Street.
Rooks, Roger Franklin . . .	Somerville . . .	3 McClellan Street.
Sahlin, Carl Evert . . .	Somerville . . .	31 East Pleasant Street.
Sargent, Stanley Morse . . .	Amherst . . .	6 Nutting Avenue.
Scotland, Gordon Lionel . . .	Saxonsville . . .	17 Phillips Street.
Scribner, Esther Helen . . .	Sunderland . . .	Sunderland.
Smith, Harold Earle . . .	Springfield . . .	17 Phillips Street.
Smith, William John . . .	Charlestown . . .	Amherst Tavern.
Solomon, Maurice . . .	Melrose . . .	56 Pleasant Street.
Sprague, Gordon Charles . . .	Boston . . .	The Davenport.

Stevens, Glenn William	Waverley	61 Amity Street.
Stover, Walter Edward	Wellesley Hills	20 Lessey Street.
Taylor, Henry Pease	Westfield	83 Pleasant Street.
Tobin, Michael Francis	Adams	28 Amity Street.
Thompson, George Howard	Worcester	One Acre.
Tirrell, Philip	Quincy	7 McClellan Street.
Tucker, Clarence Murray	Waitsfield, Vt.	35 East Pleasant Street.
Turfs, Clarence Joseph	Worcester	Kolony Klub.
Walker, Franklin Perry	Westborough	3 Nutting Avenue.
Wentworth, Frederick Henry	Jamaica Plain	Colonial Inn.
White, Laurence Schaffner	Dover	31 North Prospect Street.
White, Newell Dudley	Bristol, Conn.	Pelham Road.
Young, Francis Arthur	Northampton	121 Florida Avenue, North- ampton.

Vocational Poultry Course, 1922-23.

Binner, Lawrence Howard	Amherst	29 Northampton Road.
Cannon, Timothy Francis	Roxbury	15 Fearing Street.
Knight, Henry Elbridge	Amherst	71 Main Street.
Lowd, Henry Lewis	Amherst	15 Spring Street.
Mailloux, Conrad	Woonsocket, R. I.	75 Pleasant Street.
O'Brien, James Laurence	Dorchester	6 Phillips Street.
Putnam, Ethel Davis	Worcester	Abigail Adams House.
Shulver, Arthur	Amherst	North Amherst.
Thibault, Arthur Joseph	Lowell	116 Pleasant Street.

Winter School, 1922.

Applegate, Russell	Rhinebeck, N. Y.
Bailer, John J.	New York, N. Y.
Balch, Merrill L.	Manchester, Conn.
Barnes, Leon D.	Southwick.
Barnes, Marion D.	Southwick.
Barney, Laurence H., Jr.	New Bedford.
Bartley, Francis J.	Falmouth.
Beckley, Park A.	Harrisburg, Pa.
Beem, Guy O.	Los Angeles, Cal.
Benson, Doris	North Carver.
Berg, Henry	Chelmsford.
Beveridge, Henry L., Jr.	Indianapolis, Ind.
Bins, Rudolph	Guilderland, N. Y.
Boman, Lauri	Ashburnham.
Bray, Russell S.	Framingham.
Brickman, Anna L.	Great Barrington.
Brown, Frederick Davis	Webster.
Buczala, Stefan	Northampton.
Carter, Frederick M.	Tewksbury.
Cobb, Robert	Newton Highlands.
Cummings, Edwin P.	Danvers.
Dickinson, Charles A.	North Amherst.
Diehl, Mary E.	Marwin, Pa.
Edlmann, Violet F.	Albany, N. Y.
Falconer, Robert N.	Hyde Park.
Felton, Nellie K.	Amherst.
Feronetti, James	Bedford.
Fiske, Helen S.	Fairhaven.
Fortescue, Crawford E.	Wellesley Farms.
Garfield, Henry G.	Saxtonville.
Garmon, Roland E.	Lexington.
Gates, Lucinda	Allston.
Gavett, Mary M.	Amherst.
Gay, Albert D.	Greenfield.
Glover, Benjamin F.	Roslindale.
Goldthwaite, Willard J.	Dunstable.

Goller, Joseph L.	West Hatfield.
Goodwin, Charles G.	Springvale.
Goold, George G.	Sussex, N. B.
Grove, Gilbert P.	Milton.
Haigh, Alfred J.	Newton Upper Falls.
Hall, Everett L.	Dover.
Hamilton, Ralph E.	Rowe.
Hamilton, Sarah C.	Newton Center.
Hansen, Charles E.	North Granby, Conn.
Harris, Homer B.	Middlebury, Vt.
Hemphill, James A.	Westerly, R. I.
Heurlin, Victor H.	South Braintree.
Hill, Arthur	Littleton, N. H.
Hilton, Guy W.	Marblehead.
Howarth, Marion L.	Scranton, Pa.
Howe, James S.	Brookline.
Jaques, Paul	Randolph.
Jonasson, Victoria M.	Gloucester.
Josselyn, David A.	Weymouth Heights.
Kendall, Edward D.	Holden.
Kerachsky, Harry L.	Leonard Bridge, Conn.
Larsen, Anna C.	East Northfield.
Lauterbach, Louis J.	Roslindale.
Law, David U.	Lynnfield.
MacColbert, Murry	Northampton.
McElligott, Bernard	Westfield.
McElligott, Francis	Westfield.
Mitchell, Donald	Billerica.
Mullen, George P.	Bridgeport, Conn.
Norton, Margaret Sedgwick	Salisbury, Conn.
Olds, Elmer O.	North Chester.
Patriquin, Harvey	Rockport.
Pomfrey, Gordon S.	Marlboro, Vt.
Putnam, Howard A.	Springfield.
Rambo, Mildred E.	Amherst.
Reed, MacMinn N.	East Brewster.
Rice, Ellen C.	Lancaster.
Rogers, George W.	Brooklyn, N. Y.
Ruud, Alfred	Newtonville.
Scott, Everett W.	Pepperell.
Scribner, Esther H.	Waltham.
Slack, Howard E.	Brookline.
Smiddy, Earl R.	Fayville.
Smith, Nathan	Waltham.
Solomon, Hyman S.	Colchester, Conn.
Somes, Ronald K.	North Edgecomb, Me.
Stacy, Charles F.	Pepperell.
Stranger, Walter F.	West Newbury.
Strong, Harvey G.	Amherst.
Taylor, Henry P.	Westfield.
Thompson, Eugene L.	Florence.
Thompson, Frank A.	Roxbury.
Turner, George	Newton.
Unwin, Vera E.	Amherst.
Vanderhoop, William D.	Gay Head.
Walker, Edwin H.	East Pepperell.
Watres, Mrs. Harold A.	Wellesley.
Welchans, William H.	Waltham.
Wetherbee, Royal	West Acton.
Williamson, Alton W.	Norton.
Yale, Margaret	Utica, N. Y.

Course for Country Clergymen, April 17 to 21, 1922.

Allen, George E.	Plainfield.
Anderson, William B.	Montague.
Barker, G. A.	New Salem.
Blackmer, E. F.	Belchertown.
Brown, William Channing	Boston.
Coffin, George H.	Shelburne.
Crowell, Preston R.	Stow.
Dilts, Asa R.	Amherst.
Emrich, F. E.	Boston.
Ferrin, Allan C.	Chester.
Ferrin, Mrs. A. C.	Chester.
Foxall, Thomas	Sunderland.
Godfrey, W. H.	Williamsburg.
Goodrich, L. B.	Taunton.
Hawley, John A.	Amherst.
Hilliard, D. L.	Erving.
Jacobson, Henry	Conway.
Jones, Newton I.	Worthington.
Kerr, Archibald	South Amherst.
Luther, Clair F.	Amherst.
MacArthur, Kenneth C.	Cambridge.
Miner, Dr. Harold E.	Springfield.
Oxnard, Henry E.	Rehoboth.
Peterson, H. M.	Medfield.
Plumb, Albert	Gill.
Pyke, F. M.	Goshen.
Root, E. Tallmadge	Boston.
Smith, Caleb E.	Prescott.
Smith, Charles H.	Granby.
Stevens, Charles L.	South Deerfield.
Watson, Albert P.	Hatfield.
Wightman, John C.	Northampton.
Wightman, Mrs. J. C.	Northampton.

Summer School, 1922.

Aldrin, Andrew C.	Worcester.
Allen, Ralph C.	Walpole.
Alvord, Alice W.	Easthampton.
Balboni, Eva	Bridgewater.
Barnes, Lincoln W.	Amherst.
Barnwell, Benjamin B.	Frogmore, S. C.
Barry, Anna	Erie, Pa.
Beahan, Ann L.	Boston.
Beahan, Mary T.	Boston.
Beals, Carrie B.	Hulls Cove.
Belcher, D. Webster	North Easton.
Bennett, Mabel	Amherst.
Binner, Lawrence H.	Amherst.
Binner, Theresa C.	Amherst.
Bittinger, Joseph F.	Northfield.
Bolingbroke, Isobel	Roxbury.
Booth, Sarah E.	Longmeadow.
Bowman, Marion	Amherst.
Brennan, Frances A.	Avon.
Brown, Leslie M.	Hudson.
Buchanan, Walter G.	Amherst.
Burr, Alice E.	North Cohasset.
Butterworth, Caroline E.	Amherst.
Canavan, Anna Marie	Amherst.
Carlton, Louise E.	Worcester.
Carter, Clara A.	Bradstreet.

Cauley, Mary W.	Dorchester.
Cauley, Sarah L.	Dorchester.
Chandler, Georgine A.	North Amherst.
Chapin, Marion	Holyoke.
Childs, Gertrude	Amherst.
Churchill, Edith	Amherst.
Churchill, Hildegard E.	Amherst.
Clark, Mary H.	Amherst.
Clarke, Miriam K.	Amherst.
Cole, Anna M.	Hampton, N. H.
Collins, Dorothy F.	Concord.
Corey, Isabel	Southbridge.
Crafts, Frances	Mattapan.
Daly, Katherine M.	Holyoke.
Davenport, Aris E.	Jamaica Plain.
Davidson, Joseph J.	North Stratford, N. H.
Davis, Edna M.	North Cohasset.
Davis, Elise	Amherst.
Dean, Clara R.	Revere.
Deegan, Hylde M.	Boston.
Devine, Mary R.	Amherst.
Dowd, Josephine K.	Chicopee Falls.
Dower, Catherine I.	Easthampton.
Dower, Dorothea E.	Easthampton.
Doyle, Loretta E.	Ludlow.
Estes, Lora A.	Woonsocket, R. I.
Fairbanks, Nettie L.	South Bellingham.
Fairman, Myrtle B.	Amherst.
Fentem, Alice E.	West Chester, Pa.
Fentem, Beth	West Chester, Pa.
Fenton, Alice E.	Holyoke.
Fisher, Lawrence B.	Petersham.
Fitman, Anna G.	Worcester.
Flaherty, Vera K.	Boston.
Flanagan, Anna M.	Readville.
Foley, Helen T.	Amherst.
Foster, Clara L.	Rochester, N. Y.
Frye, Florence M.	South Hadley.
Gahan, Edith F.	Amherst.
Gallagher, Frances I.	Charlestown.
Garrison, Inez	Amherst.
Gay, Merle H.	Belchertown.
Getchell, Elsa	Amherst.
Gibbons, Mrs. J. O.	Holyoke.
Gill, Anna E.	Brooklyn, N. Y.
Glasheen, Mary E.	Holyoke.
Gorman, Anna	Holyoke.
Gorman, Jane	Dorchester.
Green, Mrs. Henry S.	Amherst.
Greene, Mrs. L. V.	Amherst.
Greenwood, Helen E.	Worcester.
Harrington, Mrs. J. C.	Boston.
Higgins, Grace E.	Worcester.
Ho, Tsen	Cambridge.
Holmes, Margaret G.	Norwich, Conn.
Honney, Margaret T.	Amherst.
Hoyt, Willis H.	Needham.
Hubbard, Mrs. G. A.	Suffield, Conn.
Hulford, Ella E.	Methuen.
Hyde, Phyllis E.	Southbridge.
James, Katherine A.	Bridgewater.
Jansen, Esther C.	Amherst.
Jenks, Mildred F.	Amherst.
Jones, Ethel M.	Boston.

Keefe, Virginia M.	Amherst.
Keenan, Mary E.	Pawtucket, R. I.
Keith, Julia M.	Amherst.
Keith, Sarah P.	Amherst.
Kennedy, Irene M.	Worcester.
Kinney, Joseph	Brooklyn, N. Y.
Kinney, Lydia I.	Brooklyn, N. Y.
Kinney, Nina I.	Brooklyn, N. Y.
Knight, Elizabeth I.	Gardner.
Knightly, Mary A.	Amherst.
Lane, Mary E.	Hampton, Va.
Lanou, Irene B.	Pittsfield.
Leavitt, Dorothy W.	Whitman.
Leduc, Marguerite C.	Northampton.
Lewis, Gwendolyn	Amherst.
Loring, William R.	Hadley.
Lynch, Grace V.	Roxbury.
Lynch, Mary A.	Holyoke.
Lyons, Emma A.	Malden.
Magill, Camilla	Amherst.
Mahoney, Anna	Easthampton.
Mahoney, Ida M.	Easthampton.
Mahoney, Margaret R.	Easthampton.
Martin, Lucille A.	Amherst.
Mathews, Etta M.	Worcester.
Maxson, Willis H.	Amherst.
Mayo, William I.	Northampton.
Meehan, Lillian A.	Worcester.
Mercier, Marie	Northampton.
Miller, Gladys B.	Taunton.
Miller, Johnetta I.	North Adams.
Miller, Mary M.	Easthampton.
Mostrom, Harold A.	South Middleborough.
Murphy, Josephine	Chicopee Falls.
McCarthy, Dorothy R.	Mattapan.
McDermott, Mary E.	Fall River.
McKernon, Alice G.	Pittsfield.
McKernon, Florence D.	Pittsfield.
McNellis, M. Frances	Cambridge.
O'Brien, Katherine M.	Dorchester.
Page, Marion D.	Amherst.
Petty, Willis T.	North Dartmouth.
Phillips, Ruth L.	Amherst.
Pushee, Mrs. G. F.	North Amherst.
Ramage, Elizabeth E.	Turners Falls.
Randall, Helen	Wakefield.
Reardon, Helen E.	Hadley.
Rile, Mary E.	Plainfield, N. J.
Rogers, Katherine	New York, N. Y.
Rosen, Lena	East Dedham.
Rowell, Homer R.	Groveland.
Salmon, Mary A.	Revere.
Salter, James	Danvers.
Sawyer, Helen	Boston.
See, Anna P.	Amherst.
Sharpe, Charles G.	Amherst.
Sharpe, Helen C.	Amherst.
Shea, Gertrude A.	Dorchester.
Smith, Edith L.	Chicopee.
Smith, Emily D.	Amherst.
Smith, Wendell F.	Waltham.
Spinney, Marion F.	North Acton.
Sullivan, Julia E.	Fall River.
Sullivan, Mary G.	Roslindale.

Thompson, Mrs. Joseph O.	Amherst.
Thompson, Lulu B.	Somerville.
Topliff, Anna E.	Easthampton.
Uschmann, May E.	Holyoke.
Vance, Ruth	Norwood.
Walker, Lillian B.	Amherst.
Ward, Frances W.	Framingham.
Ward, Helen G.	Framingham.
Waugh, Dorothy	Amherst.
Waugh, Esther	Amherst.
Whitman, Kennetha	Hancock.
Winslow, Caroline S.	Brighton.
Wight, Florence B.	Leeds.
Wilcox, Harold E.	South Milford.
Wiley, Minnie C.	Amherst.
Young, Euna L.	Campello.

School of Town and Country Home Life, July 17 to 22, 1922.

Blanchard, Miss Ruth	Lowell.
Blanchard, Mrs. Bertha	Lowell.
Bowker, Mrs. C. H.	Northampton.
Brigham, Mrs. George E.	Shrewsbury.
Brigham, Mrs. Angie L.	Shrewsbury.
Burnham, Mrs. H. A.	Newtonville.
Currier, Miss Mary	Wilmington.
Currier, Mrs. Walter H.	Wilmington.
Lane, Mrs. Helen D.	Worcester.
Lawrence, Mrs. Elmer	Westborough.
Lawrence, Mrs. G. C.	Westborough.
Spear, Miss Mabel G.	North Amherst.
Miller, Mrs. Mary B.	Fitchburg.
Tibbetts, Mrs. L. H.	North Wilmington.
Vaughan, Mrs. Janet	Fitchburg.
Wenzel, Mrs. Ethel M.	Fitchburg.

Students Registered after the Catalogue for 1921 was published.

TWO-YEAR COURSE.

Second Year.

Hart, Adrian Putnam	Cambridge.
---------------------	------------

First Year.

Cahill, Thomas Joseph	Medfield.
Keene, Herbert Porter	North Weymouth.
Malloy, Walter John	Roxbury.
Mann, Eliot Jennings Bryan	Medford.
Maynard, Joseph Francis	Worcester.
McGarrath, Walter	Brookline.
McLaughlin, Bernard Joseph	Dorchester.
Murphy, Gerard Francis	Amherst.
Pennoyer, Hugh Raymond	West Chester, Pa.
Philbrook, Harry Robinson	Chester.
Sullivan, Daniel George	Worcester.

UNIT COURSE.

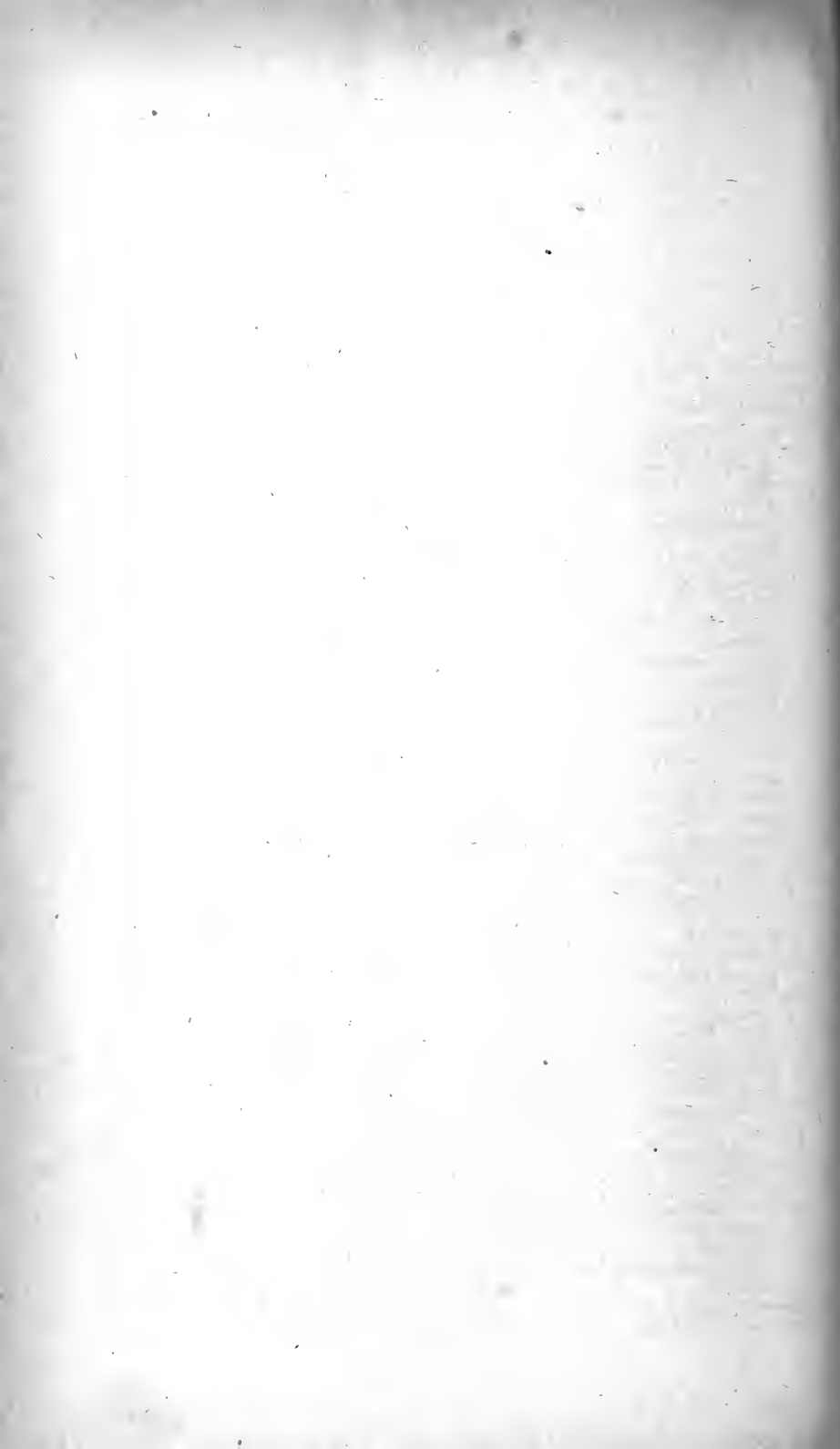
Bennett, Herbert Thomas	Hyde Park.
Day, Fred Lord	Lynn.
Finick, John Joseph	South Hadley.
Larner, Roger James	Boston.
Rainer, Albert Joseph	Adams.
Sears, George Joseph	Needham.

VOCATIONAL POULTRY COURSE.

Castlenovo, Edward Joseph Boston.
 Loring, Frank Sumner Gloucester.

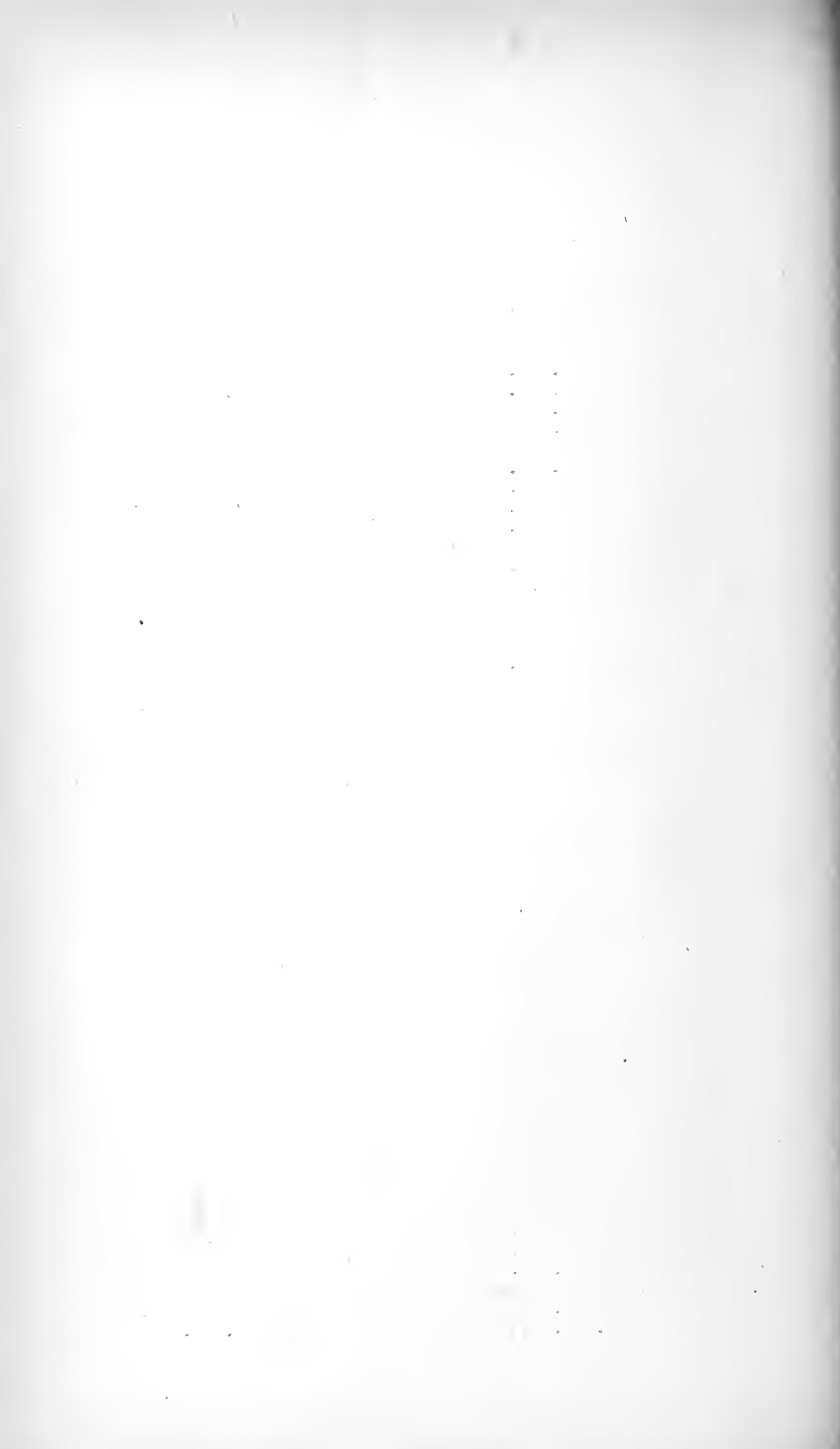
Summary of Short-course Enrollment.

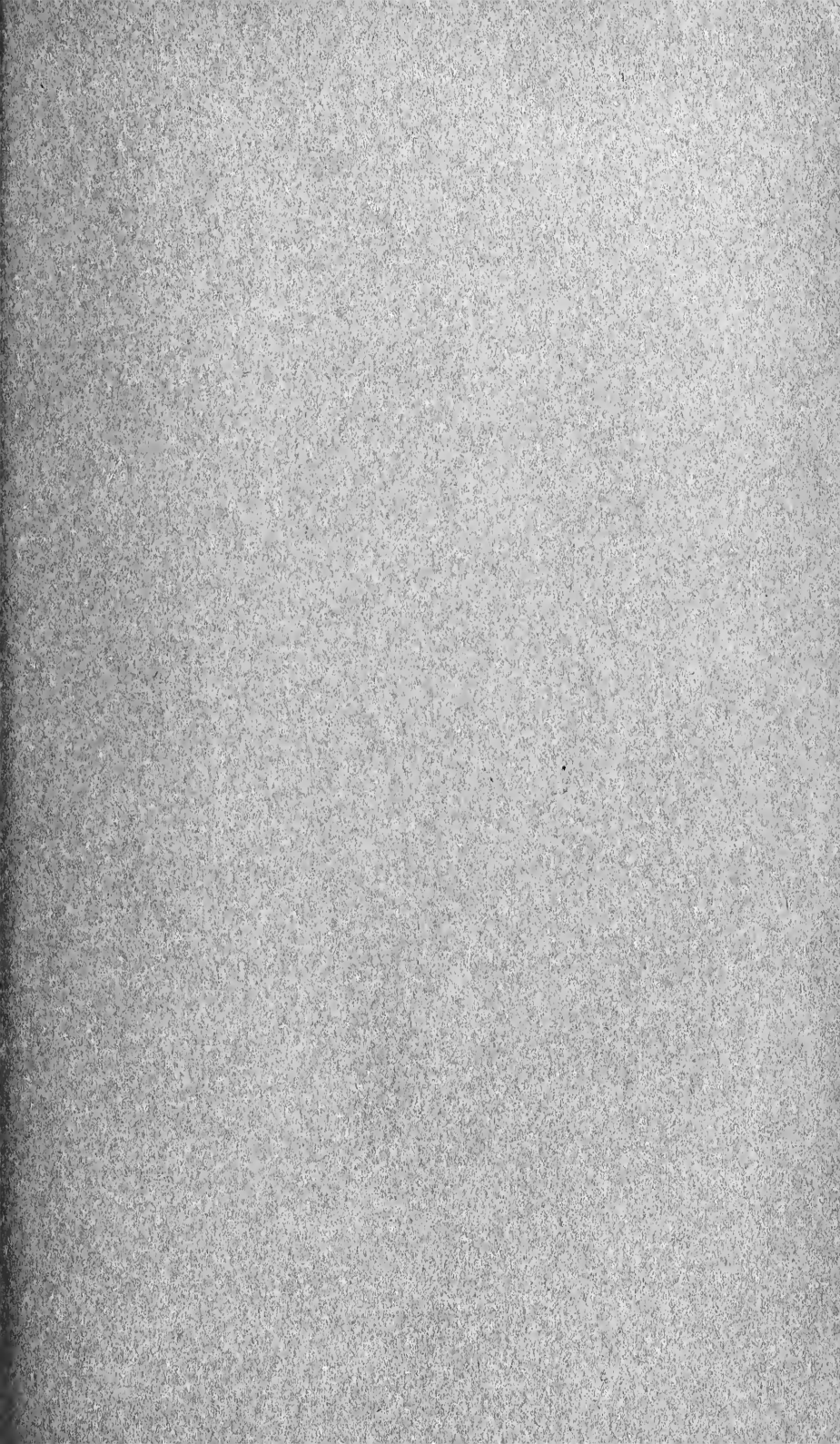
	Men.	Women.	Total.
Two-year Course, second year	116	5	121
Two-year Course, first year	128	8	136
Vocational Poultry Course	8	1	9
Winter School, 1922	77	20	97
Course for Country Clergymen	31	2	33
Summer School, 1922	23	147	170
School of Rural Home Life	-	16	16
Totals	383	199	582
Counted twice	2	2	4
Totals	381	197	578



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YOUR STATE COLLEGE

FACTS FOR HIGH SCHOOL
STUDENTS

1923



MASSACHUSETTS
AGRICULTURAL COLLEGE



THE M. A. C. BULLETIN
AMHERST, MASSACHUSETTS

VOLUME XV FEBRUARY, 1923 NUMBER 2

PUBLISHED EIGHT TIMES A YEAR BY THE MASSACHUSETTS
AGRICULTURAL COLLEGE: JAN., FEB., MARCH, MAY,
JUNE, SEPT., OCT., NOV. ENTERED AT THE POST
OFFICE, AMHERST, MASS., AS SECOND CLASS MATTER

CATALOGUE OF THE COLLEGE
FOR 1922-1923

(Abridged and Illustrated)



PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
COMMISSION ON ADMINISTRATION AND FINANCE

THE COLLEGE PURPOSE.

“ To be at home in all lands and all ages; to count nature a familiar acquaintance, and art an intimate friend; to gain a standard for the appreciation of other men’s work and the criticism of one’s own; to carry the keys of the world’s library in one’s pocket, and feel its resources behind one in whatever task he undertakes; to make hosts of friends among the men of one’s own age who are to be leaders in all walks of life; to lose one’s self in generous enthusiasms, and co-operate with others for common ends; to learn manners from students who are gentlemen, and form character under professors who are Christians; — these are the returns of a college for the best four years of one’s life.” — Former President Hyde of Bowdoin College.

The endowment provided by Congress is for “ the 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 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 of life.” — Act of Congress, July 2, 1862.

CALENDAR.

1922-1923-1924.

REGULAR AND TWO-YEAR COURSES.

1922.

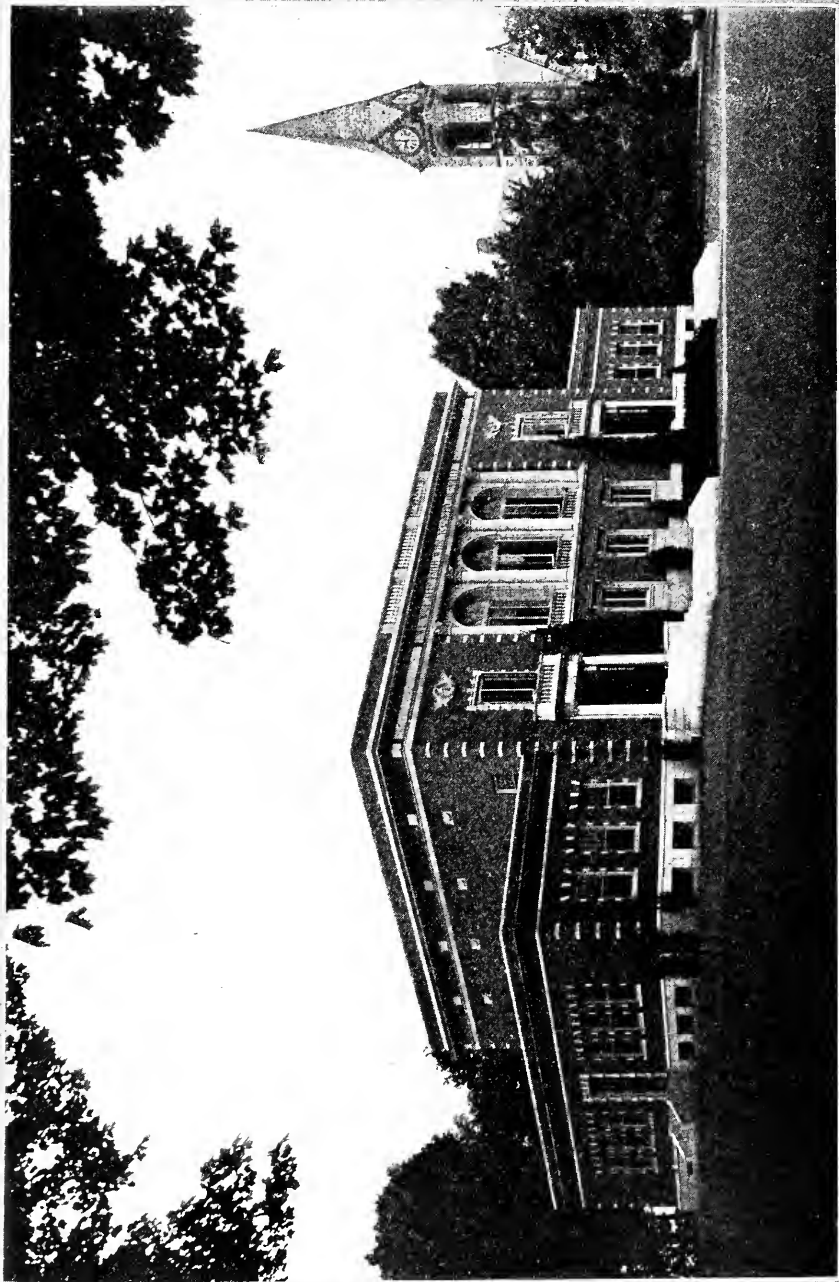
September 27, Wednesday, 1.30 P.M.	Fall term begins; assembly.
October 12, Thursday	Holiday, Columbus Day.
November 29-December 4, Wednesday, 12 M.-Monday, 7.30 A.M.	Thanksgiving recess.
December 22, Friday, 5 P.M.	Fall term ends.

1923.

January 2, Tuesday, 7.30 A.M.	Winter term begins.
February 22, Thursday	Holiday, Washington's Birthday.
March 23, Friday, 5 P.M.	Winter term ends.
March 26, Monday, 1 P.M.	Spring term begins.
April 19, Thursday	Holiday, Patriots' Day.
May 30, Wednesday	Holiday, Memorial Day.
June 9-11, Saturday-Monday	Commencement.
June 14-16, Thursday-Saturday	Entrance examinations.
September 19-22, Wednesday-Saturday	Entrance examinations.
September 26, Wednesday, 1.30 P.M.	Fall term begins; assembly.
October 12, Friday	Holiday, Columbus Day.
November 28-December 3, Wednesday, 12 M.-Monday, 7.30 A.M.	Thanksgiving recess.
December 21, Friday, 5 P.M.	Fall term ends.

1924.

January 2, Wednesday, 7.30 A.M.	Winter term begins; assembly.
February 22, Friday	Holiday, Washington's Birthday.
March 14, Friday, 5 P.M.	Winter term ends.
March 18, Tuesday, 7.30 A.M.	Spring term begins; assembly.
April 19, Saturday	Holiday, Patriots' Day.
May 30, Friday	Holiday, Memorial Day.
June 7-9, Saturday-Monday	Commencement.
June 19-21, Thursday-Saturday	Entrance examinations.
September 17-20, Wednesday-Saturday	Entrance examinations.
September 24, Wednesday, 1.30 P.M.	Fall term begins; assembly.



MEMORIAL HALL

Erected in memory of the Gold Star men of the Massachusetts Agricultural College, and presented to the College by alumni and friends. Corner stone laid June 20, 1920. Dedicated June 12, 1921

FACTS FOR HIGH SCHOOL STUDENTS.

A BRIEF HISTORY OF THE MASSACHUSETTS AGRICULTURAL COLLEGE.

The Morrill Act, passed by Congress on July 2, 1862, and signed by President Lincoln, provided for the donation of public lands to endow a college of agriculture and mechanic arts in each State of the Union.

Massachusetts received as her allotment 360,000 acres of land, and the moneys realized from the sale of this were divided between the Massachusetts Institute of Technology and a new independent college of agriculture to be controlled and supported by the State. This college was named the Massachusetts Agricultural College.

After prolonged discussion the new college was located at Amherst, "in the most picturesque portion of the renowned Connecticut Valley, — the garden spot of New England, — with scenery unsurpassed in beauty and cultivation in this or any other country."

By the time the first class entered, four buildings had been erected on the 310 acres composing the college campus. These buildings were a boarding house, a botanic museum, a dormitory containing several classrooms, and a chemical laboratory accommodating the gymnasium as well. This last-named building was only recently destroyed by fire, having been used as a chemical laboratory for fifty-five years.

The doors of the college were finally opened on October 2, 1867, to a freshman class of 47 members, the class of 1871, commonly known as the "Pioneer Class." In 1871 twenty-seven members of this class received degrees from the college.

One of the most momentous events of the early history was the Intercollegiate Regatta of American Colleges, held at Ingleside, on the Connecticut River, July 21, 1871. Harvard, Brown, and M. A. C. participated in the race, and to the surprise of many, M. A. C. won by a dozen lengths at least, setting a new record for intercollegiate rowing. The M. A. C. crew finished one minute and forty-three and one-half seconds before the Harvard crew. Brown finished third.

From the event of the entrance of the pioneer class until the present time, the college has had both prosperous and dark days, but has steadily gained in strength. The entering classes have grown as the years have passed by, more substantial buildings have been erected, and the State appropriations have constantly increased.

From the "Faculty of Four" — Pres. William S. Clark, Levi Stockbridge, Ebenezer Snell, and Henry H. Goodell — of the early days the staff has increased until it now numbers in its personnel 12 officers of general administration, 95 teachers, 45 Experiment Station and Control Service workers, 25 Extension Service administrators, 6 library officials, and 21 other officers.

In 1867 the curriculum allowed but little variation from a fixed course of study; to-day a student is offered the choice of specialization in one of sixteen different departments. In 1867 courses in agriculture were of an elementary nature; to-day they are highly technical and specialized. Fifty

years ago the study of agriculture was new and untried; to-day it demands the services of highly trained specialists. M. A. C. has trained many of the prominent agricultural leaders of the day.

No history of the college would be complete without a brief mention, at least, of the war period. The college campus and equipment were transferred into a training camp for the Students' Army Training Corps. The faculty devoted their efforts to food production, distribution, and conservation. Students, alumni, and faculty enlisted in the military and naval service and in other war work. One thousand three hundred and four were engaged in military and naval service, 446 served as commissioned officers, 454 went overseas, and 51 made the supreme sacrifice.



A Campus Scene

LOCATION AND EQUIPMENT.

One mile north of the center of the town of Amherst are located the 650 acres of land that compose the M. A. C. estate. Six miles farther north on Mount Toby is a demonstration forest of 755 acres.

The estate is roughly divided into the farm, the Experiment Station grounds, the orchards, the poultry plant, and the campus, which includes the site of the instruction buildings, dormitories, and the athletic field.

There are 23 substantial buildings, including 11 used for instruction purposes, 1 dormitory for women students and 2 for men, dining hall, Memorial Hall, library, infirmary buildings, Experiment Station buildings, the power plant, and the stock barns. There are fully as many frame buildings, making the total number about 50.

The Landscape Gardening Department has control of the landscape architecture of the grounds, and under its guidance the campus has been made a beauty spot which will compare favorably with any college campus.

The surrounding country affords opportunity for tramping and fishing, and for winter sports. The Holyoke Range, Mount Warner, Mount Toby, Mount Sugar Loaf, and the wide open stretch of the valley, with the beautiful Con-

necticut River winding its way along, make impressions that do not easily nor quickly pass from one's mind.

Amherst is 97 miles west of Boston, and may be reached by the Central Massachusetts Division of the Boston & Maine Railroad, or by the Central Vermont and Boston & Albany Railroads. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.



A Campus Roadway

WHY GO TO COLLEGE?

The statement has been made that the strength of our Nation lies in the fact that every boy aspires to rise above the station of his father, and by virtue of our democratic opportunity is able to do so. Most boys and girls avail themselves of the opportunities offered by the public schools, but comparatively few young men and women continue on into college work. This is due largely to the allurements of positions in the commercial world. For a time it seems that the high school graduate who goes directly into business or industry has an advantage over the college-trained man or woman, but in the end the college graduate advances faster and farther than does one without a college training.

"An education is the safest investment; pays the highest interest; is the most readily converted into cash; never depreciates in value; never suffers from taxation; is never in danger from thieves; never ends in a lawsuit; is a gain for all eternity." A college training affords an opportunity, not only for the acquirement of knowledge, but also for the matching of that knowledge against real problems. Definite good is derived from new adjustments. A college man gets out of himself into the lives of others. The college brings together ideas and actions.

The values of a college training are varied but enriching. A graduate from the Colorado School of Mines claims he got "a vision of life work instead of a job." Another from the University of Louisiana maintains that he was brought to "a realization that I was worth as much as the average man." A Boston University alumnus makes this statement: "When I entered I regarded it [college education] as a process of instilling facts in a young per-

son's mind; when I graduated I knew this was a very small part, merely a means to an end, — the development of personality." From the University of Georgia comes this confession: "A self-unfoldment; a diversity of interests in life; a growth of ideals, of purposes and of judgment; strong convictions and friendships."

"If a college man has used the opportunities offered by the faculty, he has acquired a wide knowledge of history and a broad view of public affairs (as well as the technical knowledge he has obtained). If he has utilized the opportunities offered by his fellow students, he has acquired the democratic spirit, has gotten a grip on public opinion, and has had considerable experience in dealing with a large variety of men. All these things give him an advantage in the race, and statistics show that he is making good use of them."

The Massachusetts Agricultural College presents an opportunity for ambitious young men and women, on the completion of their high school work, to acquire at moderate cost a good education for those vocations which are connected with agriculture.



Draper Hall — Dining Hall

AGRICULTURAL VOCATIONS.

The principal agricultural vocations for which the Massachusetts Agricultural College educates men and women are here listed.

1. **PRODUCERS.** — Foremen, managers, or owners of general farms, dairy farms, stock farms, poultry farms, fruit farms, market gardens, or other specialized farms.

2. **OTHER PRACTICAL PURSUITS.** — As superintendents of public parks and private estates, practical landscape gardeners, city foresters, florists.

3. **RESEARCH AND OTHER SCIENTIFIC EXPERTS.** — Chemists, entomologists, botanists, and specialists in marketing and other agricultural subjects employed by Federal, State, or municipal governments, as well as by private business.

4. **AGRICULTURAL COLLEGE AND SCHOOL TEACHERS.** — Teachers and administrators of agricultural colleges, county agricultural schools, and departments of agriculture in high schools.

5. **AGRICULTURAL ADVISERS.** — In connection with Federal, State, and county Extension work, administrators and specialists are required in agriculture, home economics, and boys' and girls' club work.

6. **COMMERCIAL WORK IN AGRICULTURE.** — Agricultural experts associated with railroads, banks, the fertilizer, feed and farm machinery industries, managers of milk plants, canning factories, etc.

7. **MISCELLANEOUS VOCATIONS.** — Agricultural journalism, social service work in rural communities, work in connection with food preservation and distribution.



The Stock Barns

SUMMARY OF THE VOCATIONS OF M. A. C. GRADUATES OF THE CLASSES OF 1905 TO 1920, INCLUSIVE, KNOWN TO BE ENGAGED IN AGRICULTURAL PURSUITS.

July 1, 1921.

In practical agriculture:		
General farming		180
Vegetable gardening		9
Floriculture		2
Professional agricultural pursuits:		
In public employ:		
Teaching:		
Agricultural colleges		91
Agricultural schools		34
Extension Service:		
County agents, etc.		20
Experts, directors, etc.		8
Research — Experiment Stations		16
State Departments of Agriculture		20
United States Department of Agriculture:		
Bureau of Markets		7
Others		30
Foreign agriculturalists		3
Commercial operations:		
Landscape gardeners		40
Foresters		18
Chemists		19
Other technical agricultural experts		13
In agricultural business		68
In miscellaneous agricultural pursuits		15
Total		593

Total number of graduates of the classes of 1905 to 1920, inclusive, whose vocations were known 848

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of character, which, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before the date of the examination. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

CERTIFICATES. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present in the prescribed and restrictive elective groups at least three of the necessary fourteen and one-half credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June Amherst, Department of Physics building.
Massachusetts Institute of Technology,
Cambridge, Mass.
Worcester, Horticultural Hall.

In September Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 14-16, inclusive, 1923. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.¹
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Second Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Third Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1923, the examinations will be given September 19-22, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M. Registration.¹
1.15-5.00 P.M. Greek, elementary and intermediate.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Third Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Fourth Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year.

¹ Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Fourteen and one-half units must be offered for admission in accordance with the entrance requirements as stated below. Entrance credits gained either by certificate or by examination will hold good for one year.

Entrance Requirements.

1. *Prescribed.* — The following units are prescribed: —

English 1	1½
English 2	1½
A foreign language	2
Algebra	1½
Plane geometry	1
	7½

2. *Restricted Electives.* — Three units to be selected from —

Science	1, 2 or 3
History (American history and civics included)	1, 2 or 3
A second foreign language	2 or 3
Additional work in first foreign language	1 or 2

3. *Free Margin.* — Free margin of four units to consist of any substantial work (including agriculture,¹ general science and a fourth year of English) for which credit of not less than one-half unit earned in one year is given toward a secondary school diploma.

Units presented in the free margin group are not to be offered by examination or by certificate, but presented by submitting a principal's statement to the effect that such units have been earned in a secondary school, and have been credited toward a diploma issued by such a school.

4. One unit of history must be offered in either the restricted electives or the free margin.

5. If elementary algebra and plane geometry are counted as three units, the total requirement will be fifteen units.

6. Both the credits under the prescribed group and the restricted elective group must be presented either by certificate from an approved school or by examination, or by a combination of both.

The following is a list of subjects in which the entrance credits must be offered in the prescribed and restricted elective groups: —

Mathematics and Science.

Botany ²	½ or 1
Chemistry ²	1
Algebra	1½
Plane geometry	1
Solid geometry	½
Trigonometry	½
Physics ²	1
Geology	½
Physical geography	½
Physiology	½
Zoölogy ²	½

¹ See page 13 for details.

² Note-book required as part of the preparation will be credited as part of the examination.

<i>History.</i>	
Ancient	1
Medieval and modern	1
English	1
General	1
United States and civics	1

<i>English.</i>	
English 1	1½
English 2	1½

<i>Foreign Language.</i>	
Elementary French	2
Elementary German	2
Elementary Spanish	2
Elementary Latin	2
Elementary Greek ¹	2
Intermediate French	1
Intermediate German	1
Intermediate Spanish	1
Intermediate Latin	1
Intermediate Greek ¹	1
Advanced French	1
Advanced German	1
Advanced Spanish	1
Advanced Latin	1

No applicant deficient in both algebra and plane geometry will be admitted.

PRESENTATION OF NOTE-BOOKS.—The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2 on page 12).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Entrance credit in agriculture is granted on the following basis:—

I. The Massachusetts Agricultural College accepts a maximum of four credits in agriculture from any secondary or county agricultural high school in Massachusetts offering work in that subject, provided evidence of such work having been done is submitted on a principal's statement, as is indicated in the "free margin" group.

II. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, one credit is granted for each full year of work performed under the following plan:—

Work of the Winter Term.—(a) The study of textbooks such as are suitable for secondary school instruction in agriculture.

(b) Course of Study: A general outline of suggested topics for study.

(c) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

¹ Examination in September only.

(d) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (a) An exhibit of work.

(b) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is four.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary textbook study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens' "Introduction to Botany" and Bergen & Davis' "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from any standard textbook, with laboratory work on the properties of the common elements and their simpler compounds. No particular work is prescribed. The keeping of a note-book is required.

Students who do not take chemistry in the preparatory school begin the subject in college, and are required to do extra work during the first two terms, as outlined under chemistry, courses 1 and 2.

MATHEMATICS. — (a) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(b) *Elective*. — Solid Geometry: The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Textbook of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOÖLOGY, PHYSICAL GEOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, textbooks entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Textbook in General Zoölogy." For geology, A. P. Brigham's "A Textbook of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good textbooks, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — The study of English in school has two main objects, which should be considered of equal importance: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation, and the development of the habit of reading good literature with enjoyment.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. *Books for Reading*. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

The books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except that for any book in Group I a book from any other may be substituted.

GROUP I. CLASSICS IN TRANSLATION.

The "Old Testament," at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther.

The "Odyssey," with the omission, if desired, of Books I-V, XV and XVI.

The "Æneid."

The "Odyssey" and the "Æneid" should be read in English translations of recognized literary excellence.

GROUP II. DRAMA.

Shakespeare: "Merchant of Venice," "As You Like It," "Julius Cæsar."

GROUP III. PROSE FICTION.

Dickens: "A Tale of Two Cities."
 George Eliot: "Silas Marner."
 Scott: "Quentin Durward."
 Hawthorne: "The House of the Seven Gables."

GROUP IV. ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: "The Sir Roger de Coverley Papers."
 Irving: "The Sketch Book," selections covering about 175 pages.
 Macaulay: "Lord Clive."
 Parkman: "The Oregon Trail."

GROUP V. POETRY.

Tennyson: "The Coming of Arthur," "Gareth and Lynette," "Lancelot and Elaine," "The Passing of Arthur."
 Browning: "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus."
 Scott: "The Lady of the Lake."
 Coleridge: "The Ancient Mariner."
 Arnold: "Sohrab and Rustum."

B. Books for Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. DRAMA.

Shakespeare: "Macbeth," "Hamlet."

GROUP II. POETRY.

Milton: "L'Allegro," "Il Penseroso," "Comus."
 Book IV of Palgrave's "Golden Treasury" (first series), with special attention to Wordsworth, Keats and Shelley.

GROUP III. ORATORY.

Burke: "Speech on Conciliation with America."
 Washington's "Farewell Address," Webster's "First Bunker Hill Oration," and Lincoln's "Gettysburg Address."

GROUP IV. ESSAYS.

Macaulay: "Life of Johnson."
 Carlyle: "Essay on Burns," with a brief selection from Burns' poems.

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a

sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include:—

(a) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(b) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

FRENCH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

GERMAN. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

SPANISH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary Spanish recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year Spanish (elective subjects for admission). — For a third credit unit in Spanish as an elective subject for entrance, the work here-

tofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in Spanish will be given unless the candidate has presented elementary Spanish on certificate, or has written the examination in elementary Spanish.

No examination for a fourth credit in Spanish will be given unless the candidate has presented both elementary and intermediate Spanish upon certificate, or has written the examination in both elementary and intermediate Spanish.

GREEK. — *Elementary.* — Greek grammar and composition: Translation into Greek of short sentences illustrating common principles of syntax.

The examination in grammar and prose composition will be based on the first four books of Xenophon's "Anabasis."

Intermediate. — Homer's "Iliad," Books I and II (omitting Book II, 494 to end), and the Homeric forms, constructions, idioms and prosody.

Prose composition, consisting of continuous prose based on Xenophon, and other Attic prose of similar difficulty.

Translation of passages of Homer at sight.

The examinations in Greek, elementary and intermediate, will be given in September only.

LATIN. — *Elementary.* — Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (b) the translation of passages of Latin prose at sight.

Intermediate. — Cicero (third oration "Against Catiline" and the orations "For Archias" and "For Marcellus") and sight translation of prose.

Advanced. — Vergil (*Æneid*, II, III and VI) and sight translation of poetry.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.

2. A statement or certificate of his entrance record.

3. A statement from the proper officer showing a complete record of his work while in attendance.

4. A marked catalogue showing the courses pursued.

5. A statement from the proper officer, giving the total number of credits required for graduation by the institution from which the applicant is transferring, and, of this total, the number that the applicant has satisfactorily completed at the time of transfer.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. To matriculate, candidates must offer twelve and one-half of the fourteen and one-half units required for admission, and will be conditioned in those subjects not passed. At least five and one-half credits must be in the prescribed group. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of \$5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses, write to the Director of Short Courses, M. A. C., Amherst, Mass.

9. Application for admission as a "Special Student" should be made to the Dean.



Freshman-Sophomore Sixty Man Rope Pull

COURSES OF INSTRUCTION.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours per week. Freshman credit is computed on the basis of total clock hours per week spent in classroom and study.]

FRESHMAN YEAR.

First Term.

[All work required.]

SUBJECT.	Courses and Numbers.	Credit in Clock Hours per Week.
Agriculture	Agronomy 1	6
Algebra	Mathematics 1	12
Chemistry	Chemistry 1 or 4	12 or 9
English	English 1	6
Language	French or German 1 or 4	9
Military (for men)	Military 1	3
Recreation (military substitute for women).	Physical Education 4	3
Physical Education (military substitute for men).	Physical Education 7	3
Hygiene (for men)	Physical Education 1	1
Recreation (for men)	Physical Education 2	1
Rural Home Life (for women)	Rural Home Life 1	2
Total credits (clock hours per week).	. . . . .	47 or 50

College life (attendance without credit).

Second Term.

Agriculture	Agriculture 2	6
Algebra	Mathematics 2	6
or Solid Geometry	Mathematics 3	6
Mensuration	Mathematics 4	6
Chemistry	Chemistry 2 or 5	15 or 9
English	English 2	6
Language	French or German 2 or 5	9

FRESHMAN YEAR — *Concluded.**Second Term* — *Concluded.*

SUBJECT.	Courses and Numbers.	Credit in Clock Hours per Week.
Military (for men)	Military 2	3
Recreation (military substitute for women).	Physical Education 5	3
Physical Education (military substitute for men).	Physical Education 8	3
Total credits (clock hours per week).	. . . . .	45 or 51

College life (attendance without credit).

Third Term.

Agriculture	Agriculture 3	12
Trigonometry	Mathematics 5	9
Botany	Botany 3	9
English	English 3	6
Language	French or German 3 or 6	6
Military (for men)	Military 3	3
Recreation (military substitute for women).	Physical Education 6	4
Physical Education (military substitute for men).	Physical Education 9	3
Recreation (for men)	Physical Education 3	1
Total credits (clock hours per week).	. . . . .	46

SOPHOMORE YEAR.

First Term.

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Botany	25	1	4	3
English	25	2	-	2
Physics	25	3	2	4
Zoölogy	25	2	4	4
Military (for men)	25	3	-	3
Microbiology (military substitute for men and women).	25	2	-	2
Physical Education (military substitute for men).	30	-	2	1
Physical Education (military substitute for women).	27	-	3	1
Physical Education (for men) . . .	25	-	1	-1
Total required	-	-	-	16
<i>Elective.</i>				
Animal Husbandry	25	2	2	3
Chemistry	25	1	4	3
Drawing	25	-	6	3
French	25 or 28	3	-	3
German	25 or 28	3	-	3
Rural Engineering	25	-	4	2
Rural Home Life (for women) . . .	25	1	4	3

Minimum credit for first term, 18.

Maximum credit for first term, 22.

¹ Credit given in spring term.

SOPHOMORE YEAR — *Continued.**Second Term.*

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Agricultural Economics	26	5	-	5
English	26	2	-	2
Physics	26	3	2	4
Military (for men)	26	3	-	3
Microbiology (military substitute for men)	26	2	-	2
Physical Education (military substitute for men).	31	-	2	1
Agricultural Education (military substitute for women).	26	2	-	2
Physical Education (military substitute for women).	28	-	3	1
Total required	-	-	-	14
<i>Elective.</i>				
Animal Husbandry	26	2	2	3
Botany	26	1	4	3
Chemistry	26	1	4	3
Drawing	26	-	6	3
Economic Sociology	26	5	-	5
Entomology	26	3	-	3
French	26 or 29	3	-	3
German	26 or 29	3	-	3
Mathematics	26	2	-	2
Rural Home Life (for women)	26	1	4	3
Zoölogy	26	1	4	3

Minimum credit for second term, 18.

Maximum credit for second term, 22.

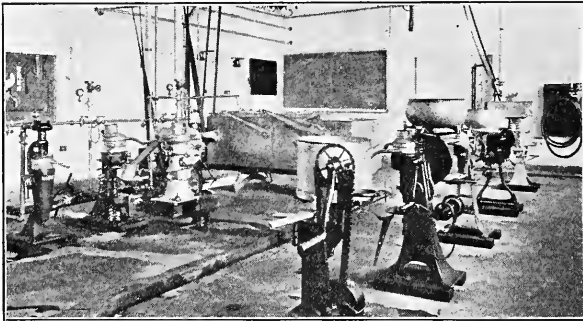
SOPHOMORE YEAR — *Concluded.**Third Term.*

SUBJECT.	Course Number.	Class Hours.	Laboratory Hours.	Credit Hours per Week.
<i>Required.</i>				
Agronomy	27	4	2	5
English	27	2	-	2
Rural Sociology	27	3	-	3
Military (for men)	27	3	-	3
Microbiology (military substitute for men and women).	27	2	-	2
Physical Education (military substitute for men).	32	-	2	1
Physical Education (military substitute for women).	29	-	3	1
Physical Education (for men)	26	-	1	1 ¹
Total required	-	-	-	13 or 14
<i>Elective.</i>				
Botany	27	1	4	3
Chemistry	27	1	8	5
Chemistry	30	3	4	5
Drawing	27	-	6	3
Entomology	27	2	-	2
Entomology	28	-	4	2
French	27 or 30	3	-	3
Geology	27	3	4	5
German	27 or 30	3	-	3
Horticulture	27	2	2	3
Mathematics	27	-	6	3
Physics	27	3	2	4
Rural Engineering	26	-	4	2
Rural Home Life (for women)	27	1	4	3

Minimum credit for third term, 18.

Maximum credit for third term, 22.

¹ Credit for Physical Education 25 and 26 given in third term.



Interior of a Dairy Laboratory

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, which is arranged by the student and his adviser.

RULES GOVERNING MAJORS.

RULE 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student elects his major. The adviser has full authority to prescribe the student's work up to 45 hours. He will, however, so far as practicable, recognize the individual needs of the student. It is also expected that students will seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

RULE 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the Schedule Room five weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his major, his class and the name and address of parent or guardian. When the major courses have been entered on this card, and the hours of free elections added by the student, the card, accompanied by one hour plan, must be returned to the Schedule Room two weeks before the beginning of the final examination period.

RULE 8. *Change of Major.* — Applications for change of major may be made to the dean in writing at any time; when approved by both major advisers concerned and by the dean and the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

MAJOR SUBJECTS.

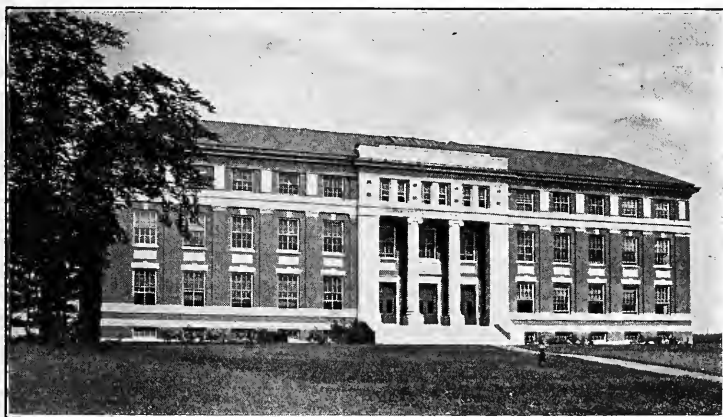
Agronomy.
Animal husbandry.
Dairying.
Farm management.
Poultry husbandry.
Floriculture.
Forestry.
Landscape gardening.
Pomology.

Vegetable gardening.
Economic botany.
Agricultural chemistry.
Entomology.
Microbiology.
Agricultural economics.
Agricultural education.
Rural sociology.

SUPPORTING SUBJECTS.

Rural engineering.
Mathematics and civil engineering.
Veterinary science.
Language and literature.

Horticultural subjects.
Physics.
Zoölogy and geology.
Rural home life (for women).



Stockbridge Hall—Agricultural Building

DESCRIPTION OF COURSES.

DIVISION OF AGRICULTURE.

Professor FOORD.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Freshman Agriculture.

A survey course, continuing throughout the year, intended to put the student in touch with agriculture in all its major aspects, dealing primarily with the problems of Massachusetts farms, but not excluding the agriculture of the United States.

1. **I.** 2. **II.** 3. **III.** As stated above.

Agronomy.

Professor BEAUMONT, Assistant Professor MICHELS, Mr. THELIN, Mr. THAYER,
Mr. LANPHEAR.

The courses in agronomy are designed to present the fundamental knowledge concerning the soil and the principal products of the field. The basic course in soils is required of all students. The electives purpose to meet the needs of those specializing in soils and field crops and other specialized fields, including both pure and applied science.

The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are conveniently near the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders and the like.

The crops' laboratories include one for seed study, with lockers for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, and collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar and two store-rooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn, grasses, clovers, etc., are grown for demonstration purposes, and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

Required Courses.

1. I.	Agronomy, elementary	Freshmen
27. III.	Soils and Fertilizers	Sophomores

Elective Courses.

50. I.	Field and Forage Crops	Juniors
51. III.	Advanced Field Crops	Juniors
75. I.	Advanced Soils	Seniors
77. II.	Manures and Fertilizers	Seniors
78. II.	Breeding of Field Crops	Seniors

Animal Husbandry.

Professor SALISBURY, Assistant Professor RICE, Assistant Professor GLATFELTER, Mr. THAYER.

It is the purpose of this department to present comprehensive information on the subject of animal husbandry. The first courses are studies of the breeds, types and market classes of live stock. These are followed by courses in judging, breeding and management.

The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180. The equipment for classroom instruction includes upwards of 125 head of dairy cattle which are superior representatives of Jersey, Guernsey, Ayrshire and Holstein breeds; considerable numbers of Berkshire and Chester White pigs; pure-bred Percherons; and several work teams of various types. The department has a collection of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine; and a set of over 250 lantern slides portraying the leading prize-winning producing and breeding animals of the principal breeds of horses, cattle, sheep and swine. There is also a collection of the different foodstuffs available for the use of New England farmers. All this equipment is being added to from time to time as funds are available.

Elective Courses.

25. I.	26. II.	Types and Breeds of Live Stock	Sophomores
50. I.	51. II.	Feeds and Feeding	Juniors
52. III.		Advanced Stock Judging	Juniors
53. III.		Principles of Breeding	Juniors
75. I.		Beef and Swine Production	Seniors
78. II.		Horse and Sheep Production	Seniors
79. III.		Dairy Cattle and Milk Production	Seniors
81. II.	82. III.	Dairy and Animal Husbandry, Seminar	Seniors

Dairying.

Professor JUDKINS, Assistant Professor YAXIS, Mr. PENDLETON, Mr. SMITH.

The dairy manufactures building is new, well lighted and of sanitary construction. It is designed and equipped especially for teaching dairy manufactures. The equipment includes all kinds of machinery that are considered essential to the proper handling of milk and the making of cream, butter, ice cream and soft cheeses.

Course 77 is for students who desire a general idea of dairy work and manufacturing processes. Part of the courses are arranged to give instruction in general dairy work as associated with Massachusetts agriculture, part are arranged to give to a smaller group of students more complete work in dairy manufactures. Those majoring in dairy manufactures should have at least one summer's experience in a commercial plant before graduation.

Elective Courses.

50. I.	Milk and Milk Composition	Juniors
51. III.	Market Milk	Juniors
52. II.	Judging Dairy Products	Juniors
75. II.	Butter Making	Seniors
76. III.	Milk Products	Seniors
77. III.	Dairying — General	Seniors

Farm Management.

Professor FOORD, Assistant Professor ABELL.

The purpose of the courses in this department is to present various considerations of farming as a business. This involves a knowledge of the cost of production and the profit from the different enterprises such as dairy, poultry or orchard; a study of the enterprises, and the relative amounts of each that will give the best use of labor and equipment on the farm under consideration.

The college farm of 250 acres is under the general supervision of the Department of Farm Management, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Elective Courses.

75. II.	Farm Accounts and Cost Accounting	Seniors
76. I.	Farm Management	Seniors
77. III.	Farm Management	Seniors
78. II. 79. III.	Seminar	Seniors

Poultry Husbandry.

Professor GRAHAM, Professor SANCTUARY, Assistant Professor BANTA, Mr. TAYLOR.

The introductory courses (50, 51, 52) give a knowledge of the general routine of elementary poultry keeping. The advanced studies prepare men for the successful operation of poultry plants, either as owners or managers. Graduate work, preparation for further teaching, extension or investigation.

The poultry plant consists of 8 acres of land sloping gently to the west. The buildings consist of three incubator cellars equipped with a number of lamp incubators and two mammoth machines with a total capacity of 9,000 eggs; a pipe brooder house (open pipe system) and 40 colony brooder houses

which give a brooding capacity for 7,000 chicks, the equipment for these houses including a large variety of coal-stove brooders and kerosene hovers; a long laying house 14 by 180 feet, which accommodates 500 layers, furnishing facilities for student work in pen management, utility and fancy judging, etc.; and a laboratory 14 by 80, for killing, picking, drawing, trussing, packing, crate fattening and cramming. The fattening equipment consists of a modern sanitary all-steel battery with 16 compartments and 10 wooden crates, accommodating, altogether, 350 birds. There are also a storage building, 28 by 64 feet, for root cellar, poultry carpentry, poultry mechanics, feed room, and storage; an experimental breeding house, 18 by 60; a combination laying, testing, and breeding house, 18 by 72, for experimental purposes; a model laying house, 18 by 30, for 100 hens, and a house 20 by 40, for 200 hens. The six old experiment-station houses, each 12 by 18 feet, are used as special mating and overflow pens. The total capacity for laying hens is 1,600. A manure shed 14 by 18 feet, an oil and tool house 10 by 12, an incinerator 10 by 10, and two backyard model poultry houses 8 by 10 and 8 by 8 give a total of 76 buildings, not including a pheasant run, 16 roosting sheds 10 by 10, and numerous small coops for natural incubation and brooding.

Elective Courses.

50. I.	Poultry Feeds and Feeding	Juniors
51. II.	Poultry Housing and Sanitation	Juniors
52. III.	Incubation, Brooding, and Growing	Juniors
75. I.	Judging and Culling	Seniors
76. I.	Market Poultry and Poultry Products	Seniors
77. II.	Poultry Breeding	Seniors
78. III.	Farm Poultry	Seniors
79. III.	Poultry Farm Organization	Seniors

Rural Engineering.

Professor GUNNESS, Assistant Professor STRAHAN, Mr. PUSHEE, Mr. NEWLON.

The courses in rural engineering are planned to give a working knowledge of those phases of engineering which apply directly to the farm. It is expected that the student will acquire a clear understanding of modern farm practice as it relates to permanent improvements of the farm and the farmstead, and in the selection and use of farm equipment.

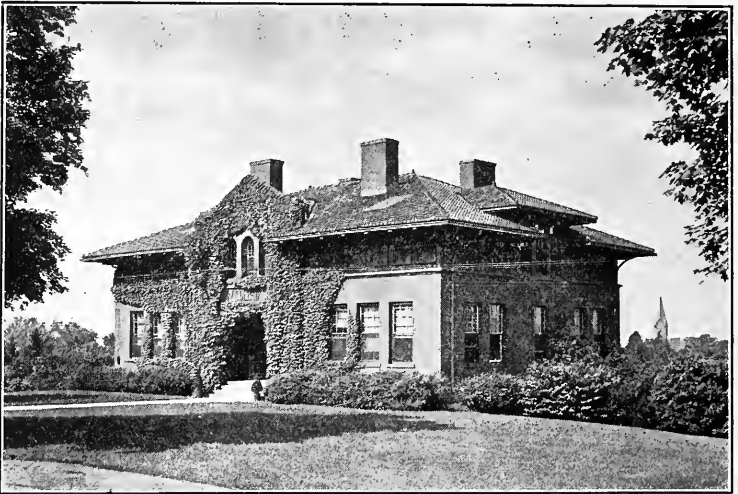
This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. The general repair shop is equipped with forges, benches, a drill press, and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines, tractors, and pumps. A complete assortment of engine accessories, consisting of carburetors, magnetos, etc., is available for thorough instruction in gas engines. A small dynamo and switchboard are used in the study of farm-

lighting systems. The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Elective Courses.

25. I.	Carpentry	Sophomores
26. III.	Repair of Farm Equipment	Sophomores
52. III.	Farm Engineering	Juniors
75. I.	Farm Structures	Seniors
78. II. and III.	Farm Machinery	Seniors
79. III.	Drainage and Irrigation Engineering	Seniors
81. III.	Dairy Mechanics	Seniors



Wilder Hall -- Pomology Building

DIVISION OF HORTICULTURE.

Professor WAUGH.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Floriculture.

Professor THAYER, Assistant Professor MULLER.

The courses in floriculture are intended to present a general knowledge of all phases of greenhouse design, construction, heating and management, the culture of florists' crops (under glass and in the field), floral decoration and arrangement. The department aims to train students so that they may take up commercial floriculture (either in the growing or retail business) and the management of conservatories on private estates, in parks, and cemeteries.

The department is especially well equipped for the teaching work, probably being surpassed in no other agricultural college. French Hall, with its laboratories, classrooms and offices, furnishes excellent facilities for the purposes of instruction. The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall range of 7,200 square feet, a durable, practical, commercial range composed of palm and fern, violet, carnation, rose and students' houses; the old Durfee range of 7,400 square feet, devoted to the growing of decorative, conservatory, and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This also includes a small garden of about 4,700 square feet devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained and is being enlarged from year to year; at the present time the collection consists of several hundred species and varieties, and provides an excellent opportunity for the study of garden flowers.

Elective Courses.

50. I.	Greenhouse Management	.	.	.	.	.	Juniors
51. II.	Greenhouse Management	.	.	.	.	.	Juniors
52. III.	Floral Arrangement	.	.	.	.	.	Juniors
53. I.	Greenhouse Construction and Heating	.	.	.	.	.	Juniors
55. III.	Garden Flowers and Bedding Plants	.	.	.	.	.	Juniors
75. I.	Commercial Floriculture	.	.	.	.	.	Seniors
76. II.	Commercial Floriculture	.	.	.	.	.	Seniors
77. III.	Commercial Floriculture	.	.	.	.	.	Seniors
79. II.	Conservatory Plants	.	.	.	.	.	Seniors
80. III.	Seminar	.	.	.	.	.	Seniors

Forestry.

Professor GROSE.

The forestry courses are intended primarily for prospective owners or managers of farm woodlots, and the field work is focused on typical New England problems. These courses are broad enough, however, to furnish valuable preparation for students planning to study forestry in graduate schools.

The department has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; and a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is on the college farm. Forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing a large number of trees not native to New England. The Mount Toby Demonstration Forest has an area of approximately 750 acres, and contains the various types of forest growth found throughout the State.

It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings, cuttings for utilization, and forest plantings are conducted by the department.

Elective Courses.

55. **I.** Woodlot Forestry: Estimating and Business Management . Juniors
 56. **II.** Woodlot Forestry: Logging, Milling and Marketing . Juniors
 57. **III.** Woodlot Forestry: Timber-raising Juniors
 58. **IV.** Woodlot Forestry: Brief Survey Juniors

Horticultural Manufactures.

Professor CHENOWETH, Mr. ROBERTSON.

The courses aim to give a practical knowledge of the problems connected with food preservation. Emphasis is placed upon the conservation of the cheaper grades of fruits and vegetables, to the end that the whole crop may be marketed at a profit and that wholesome food products may result from what would otherwise be lost. The social and economic values of this work are constantly emphasized.

The department occupies three laboratory rooms in Flint Laboratory, two in Fisher Laboratory, with offices in Wilder Hall and French Hall. The general equipment of the department, both for the use of students and for manufacturing purposes, may be grouped under the following heads:—

1. *Canning.*—A modern canning outfit, including both steam-pressure cookers and hot-water baths, hand and power can sealers, peeling and slicing machines, a string-bean cutter, heat-penetration thermometers, electric incubator, and a large assortment of all types of home canning equipment.

2. *Evaporation.*—Two small orchard evaporators, a tunnel drier, peeling machines, slicers, and a general assortment of driers adapted to home evaporation.

3. *Fruit Juices, Butters, etc.*—A hand cider mill, a motor-driven hydraulic press, a steam-jacketed kettle, an apple-butter cooker, and cider and vinegar testing apparatus.

Elective Courses.

75. **I.** and **III.** 76. **II.** 77. **III.** Horticultural Manufactures . . . Seniors, Graduates

Horticulture.

Professor WAUGH, Assistant Professor THOMPSON, Assistant Professor ROGERS.

The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and vegetable gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.

Elective Courses (General).

27. **III.** Nursery Practice Sophomores
 50. **I.** 51. **III.** Plant Materials Juniors

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

The purposes of the courses are: (1) To train men for the profession in all its branches. As a rule graduates should first enter the employ of established landscape architects, nurserymen, or park superintendents, and after an apprenticeship of several years those who have the requisite technical and business ability may set up for themselves. (2) To train men for public-service work in national, State, and municipal parks and forests. (3) To train men for country planning, this function being exercised through various public institutions and organizations. (4) To train teachers and extension workers in lines of landscape gardening and civic improvement. (5) To give a broad and liberal general education, stressing the fundamental principles of art.

The department has large, well-lighted drafting rooms, with necessary equipment, such as planimeters, eidograph, pantograph, blue-printing outfit, etc.; and a complete outfit of surveying instruments, including transits, levels, plane tables, prismatic compasses, hand levels, etc. The college campus presents an unusually good collection of the plant materials used in landscape gardening.

Elective Courses.

50. I.	Mapping and Topography	Juniors
51. II.	Elements of Landscape Gardening	Juniors
52. III.	General Design	Juniors
75. I.	Theory of Landscape Art	Seniors, Graduates
76. I.	Civic Art	Seniors
77. III.	Country Planning	Seniors
78. II.	Architecture	Juniors, Seniors
79. II.	Construction and Maintenance	Juniors, Seniors
80. I.	Theory of Design	Juniors
81. II.	Estate Design	Seniors
82. III.	Park Design	Seniors

Pomology.

Professor SEARS, Assistant Professor DRAIN, Assistant Professor FRENCH, Assistant Professor GOULD, Mr. MACK.

The object of the courses is to give a training which shall be thoroughly practical and yet scientific. This will fit the men to enter the field of practical fruit-growing, or it will furnish an excellent foundation for further study.

The department has 50 acres in fruit plantations. The apple orchards comprise about 35 acres, and there are blocks of pears, peaches, plums, and cherries. In small fruits there are plantings of strawberries, raspberries, blackberries, currants, and gooseberries. There are three vineyards, with a total area of 5 acres, in which the leading varieties and the principal types of pruning and training are represented. In these plantations are 50 varieties of grapes, representing three native American species and many hybrids; 20 varieties of peaches; 20 varieties of pears; 25 of plums, including five species and many hybrids; and 100 varieties of apples.

The department has an excellent equipment of spraying and dusting ma-

chinery, including various styles and sizes of power sprayers, and many types of barrel pumps and smaller sprayers. There is also an excellent assortment of orchard tools, including plows, harrows, fertilizer sowers, etc.

Fisher Laboratory is one of the best planned and equipped packing and storage plants in the United States. It includes six refrigerated rooms; four storage rooms not refrigerated; one large laboratory room and one classroom, besides ample storage room for fruit packages and equipment. The equipment for the building itself includes four types of apple sizers, packing tables and box and barrel presses of various types, besides all kinds of packages and the smaller equipment necessary for thoroughly modern work in grading and packing fruit. The department is equipped with lockers and with pruning and other tools for the use of students in laboratory work, which is made a leading feature in all the courses in pomology.

Elective Courses.

50. I.	51. II.	76. II.	Practical Pomology	Juniors
52. III.			Small Fruits	Juniors
54. II.	75. I.		Systematic Pomology	Seniors
77. I.			Commercial Pomology	Seniors
78. III.			Spraying	Seniors
79. II.			General Pomology	Seniors
80. I.	81. II.	82. III.	Seminar	Seniors

Vegetable Gardening.

Professor TOMPSON, Assistant Professor HARRIS, Mr. SNYDER.

The courses cover the principles and practices of the commercial production of vegetables in the open, and the forcing of vegetables in cold frames, hotbeds and greenhouses. They are designed for students who wish to engage in the business for themselves or for others, or who wish to become teachers or investigators in the more technical phases of the subject.

The department has 12 acres of land, greenhouses, hotbeds and cold frames, with modern equipment devoted to the production of a wide variety of crops. These afford excellent subject-matter for study, and opportunity for close contact with the actual problems of the business.

Elective Courses.

50. III.		General Vegetable Gardening	Juniors
52. II.	53. III.	Practical Vegetable Gardening	Juniors
75. I.		Systematic Vegetable Gardening	Seniors
76. II.		Greenhouse Construction and Vegetable Forcing	Seniors
77. III.		Commercial Vegetable Growing	Seniors

Drawing.

Elective Courses.

25. I.		Free-hand Drawing	Sophomores
26. II.	27. III.	Mechanical Drawing	Sophomores



Fernald Hall—Entomological Building

DIVISION OF SCIENCE.

Professor FERNALD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Botany.

Professor OSMUN, Assistant Professor CLARK, Assistant Professor McLAUGHLIN, Assistant Professor TORREY, Assistant Professor DAVIS.

A knowledge of the principles of plant life is fundamental in agricultural education. The required courses in botany are planned with this and the general educational value of the subject in view. Elective courses are of two types: (1) those which have for their chief aim the direct support of technical courses in agriculture and horticulture, and (2) those providing broader, more intensive training in the science. Courses in the second group may lead, when followed by postgraduate study, to specialization in the field. They also furnish excellent training for those specializing in other sciences and in scientific agriculture. In all undergraduate courses the relation of the science of botany to agriculture is emphasized.

The department occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. The building has two lecture rooms, with seating capacity of 154 and 72, respectively; one seminar and herbarium room; large laboratories for general and special work; and smaller rooms for advanced students. A glass-enclosed laboratory for plant physiology adjoins the main building and provides unusual facilities for the study of phenomena of plant life. In addition, a greenhouse 28 by 70 feet is connected with the building. This is for experimental work in plant pathology and

physiology, and for growing plants needed for instruction. The experiment station laboratories devoted to botanical research are in this building.

The laboratories and lecture rooms are of modern construction, finely lighted, and equipped with compound and dissecting microscopes, microtomes, paraffin and drying ovens, physiological and other apparatus, and a large collection of charts. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and 25,000 specimens of fungi. Facilities and equipment for the study of plant physiology and pathology are excelled in few other institutions.

Required Courses.

3. III.	Introductory Botany, elementary	Freshmen
25. I.	Introductory Botany . . .	Sophomores

Elective Courses.

26. II.	Morphology and Taxonomy of the Lower Plants (Cryptogamia) .	Sophomores .
27. III.	The Vascular Plants . . .	Sophomores
50. I. 51. II.	Diseases of Crops . . .	Juniors
52. I. 53. II. 54. III.	Systematic Mycology . . .	Juniors
55. I. 56. II.	Plant Histology . . .	Juniors
58. I. 59. II.	Systematic Botany of the Higher Plants	Juniors
75. I. 76. II. 77. III.	Plant Pathology	Seniors
78. I. 79. II. 80. III.	Plant Physiology	Seniors
82. II. 83. III.	Cytology and Embryology . . .	Seniors
86. I. 87. II. 88. III.	Seminar	Seniors, Graduates

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS,
Assistant Professor SEREX.

In teaching the courses in chemistry, emphasis is laid on both their educational and their vocational value. The courses in the freshman year deal with fundamental principles, and give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis and organic, physiological, and physical chemistry, are for those who intend to become teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses.

Those completing the undergraduate courses are fitted for positions in the agricultural industries, — fertilizer, feed, and insecticide manufacture, — as well as in other lines of industry, and in the State experiment stations and in commercial laboratories. Postgraduate students are prepared for positions as teachers in high schools and colleges, and for more advanced positions in industry and in the experiment stations.

The laboratory, which for many years was used for the work of the Department of Chemistry, was burned early in September, 1922. A new laboratory, to cost \$300,000, is under construction and will be ready for occupancy about January 1, 1924. The plans for the new building have been developed with

the utmost care, and will provide a building amply suited for the adequate instruction of students in this subject.

Meanwhile the chemistry courses will be conducted as usual, temporary lecture and laboratory facilities having been secured in other buildings.

Required Courses.

1. I.	General Chemistry, elementary	Freshmen
2. II.	Agricultural Chemistry	Freshmen
4. I.	Advanced General Chemistry	Freshmen
5. II.	Inorganic Agricultural Chemistry	Freshmen

Elective Courses.

25. I.	Qualitative Analysis (basic)	Sophomores
26. II.	Qualitative Analysis (acidic)	Sophomores
27. III.	Quantitative Analysis	Sophomores
30. III.	Organic Agricultural Chemistry	Sophomores
51. I. 52. II.	Organic Chemistry	Juniors
62. III.	Advanced Quantitative Analysis	Juniors
65. III.	Physical Chemistry	Juniors
76. I.	Milk and Butter Analysis	Seniors
77. II.	Cattle Feed, Water and Miscellaneous Analysis	Seniors
80. I.	Physiological Chemistry	Seniors
86. II.	Review of General Chemistry	Seniors
87. III.	History of Chemistry	Seniors
91. III.	Special Work in Agricultural Chemical Analysis	Seniors
92. II. 93. III.	Special Work in Physiological and Organic Agricultural Chemistry	Seniors
94. II. 95. III.	Special Work in Physical Chemistry	Seniors

Entomology.

PROFESSOR FERNALD, PROFESSOR CRAMPTON, ASSISTANT PROFESSOR ALEXANDER, ASSISTANT PROFESSOR CASSIDY.

The introductory Courses 26 and 27, taken together, present a comprehensive view of the relation of insects to man, particularly as crop pests. The most important pests are carefully studied, together with the methods for their control. Courses 50 and 51 are arranged for special study of the pests of any one line of agricultural or horticultural occupation, selected by the student according to his plan of future work, with the intent of making him thoroughly familiar with the pests he will meet in his selected work after graduation, and the means of controlling them. The remaining courses are for the training of men as State or experiment station entomologists; for those going into the care of trees, etc., on estates, or for cities and towns; and as entomological experts, for which the demand has been very large.

Fernald Hall provides excellent lecture rooms and laboratories for this department. The laboratories are provided with individual desks, equipped with microscopes and all needed apparatus of all kinds. Dissecting microscopes, binoculars, microtomes, photographic apparatus, glassware, and reagents are available for use, and electric light and gas are connected with each desk. Two laboratories, one for juniors and seniors, the other for graduate students, are thus equipped. A department library containing all the more important

works on insects, supplemented by others on the subject in the main library, and by the private libraries of the professors, make available more than 25,000 books and pamphlets on this subject. In addition, all the current magazines are received and their files are accessible to every one. A card catalogue giving references to the published articles on different insects contains about 65,000 cards, and is probably the largest index of its kind in the world. Spray pumps, nozzles, and spraying appliances of all kinds are in use in various parts of the courses, and a large collection of insecticides is accessible for study. Photographic rooms are specially prepared for the photography of insects, and the greenhouses, gardens, orchards, and the grounds of the college provide wide opportunities for the study, under natural conditions, of insect pests.

Elective Courses.

26. II.	27. III.	General and Economic Entomology .	Sophomores	
28. III.		Economic Entomology	Sophomores	
50. I.	51. II.	Pests of Special Crops	Juniors	
52. II.		Insecticides and their Application, Classification of Insects	Juniors	
53. I.		Insect Morphology	Juniors	
54. I.		Insect Classification	Juniors	
56. II.		Pests of Special Crops	Juniors	
55. III.		Economic Entomology	Juniors	
75. III.		Forest and Shade-tree Insects	Juniors	
76. I.	77. II.	78. III.	Advanced Entomology	Seniors
90. II.		Evolution	Juniors	

Beekeeping.

Elective Courses.

65. III.	85. I.	Introductory Beekeeping	Juniors, Seniors
86. II.		Advanced Beekeeping	Seniors

Mathematics and Civil Engineering.

Professor OSTRANDER, Professor MACHMER, Assistant Professor MOORE, Mr. PORTER.

The work of the freshman year is required. It is intended to furnish the necessary drill and groundwork needed for many of the scientific and practical courses of other departments. Thoroughness and accuracy are insisted upon. The advanced work in mathematics is taught from a practical standpoint, and many of its applications to other subjects are given. The courses in surveying and civil engineering are given to furnish the groundwork for a professional career. Special emphasis is given to the subjects bearing on highway construction and maintenance.

For drawing, a room on the north side is used for the drafting. It has drafting tables, T squares, scales, etc., for twenty students. Vernier protractors, parallel rules and steel T squares are available for precise work. A small room is devoted to blue printing.

In surveying, the department has a considerable number of chains and tapes, two railroad compasses, a builder's level, two dumpy levels, two Y levels, and two old levels used for teaching the adjustments. Six transits are

available for student use. Two are provided with solar attachments. An omnimeter with vernier reading to ten seconds is available for geodetic work. A hand level, mining aneroid barometer, and prismatic compass are provided for reconnaissance work. A set of Gilmore's needles and a Fairbanks' machine are used for cement testing.

Required Courses.

1. I.	2. II.	Higher Algebra	Freshmen
3. II.		Solid Geometry	Freshmen
5. III.		Plane Trigonometry	Freshmen
4. II.		Mensuration and Computation	Freshmen

Elective Courses.

26. II.	27. III.	Plane Surveying	Sophomores
50. I.		Analytic Geometry	Juniors
51. II.		Differential and Integral Calculus	Juniors
52. III.		Integral Calculus	Juniors
53. II.		Elementary Structures	Juniors
75. I.		Hydraulics and Sanitary Engineering	Seniors
76. I.		Materials of Construction, Foundations and Masonry Construction	Seniors
77. II.	78. III.	Roads and Railroads	Seniors

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. AVERY, Miss GARVEY.

Three objectives are sought in the arrangement of the courses following: (1) Introductory courses (50 and 51) needed in the general training of every college student. (2) An introductory course followed by a specific course (as 80, 81, 82, 83), necessary to every student engaged in the Division of Agriculture, with which the specific course deals. (3) Introductory courses (50 and 51) followed by Courses 52, 75, 76 and 81, preparatory for students who are aiming to specialize in agricultural microbiology. (Courses 75, 76 and 81 are adapted to those having Courses 50 and 51 only, and are also adapted to those majoring in microbiology.)

The microbiological work is carried on in a building especially designed for it. There are 4 class laboratory rooms, 8 private laboratory rooms, 1 lecture room, 5 incubator rooms, 3 sterilizing rooms, 3 hood rooms, 3 washing rooms, 3 inoculating rooms, 3 weighing rooms, an animal room, a photographic and a dark room, a sub-basement refrigerator room, a library and 4 office rooms.

The class laboratory rooms are so arranged that individual desks are available for student use. Hot and cold water and gas connections are convenient for each desk; high-pressure steam and electric connections are also available. The building is well lighted and of sanitary construction; all the walls are of brick, and the building is fireproof.

The library is equipped with such books and current periodicals as are useful in the conduct of bacteriological work and investigations. Twenty-four scientific magazines are available regularly.

There are incubators, both electric and gas, hot-air sterilizers, ordinary steam sterilizers, autoclaves, an inspissator, blood-testing apparatus, vacuum

apparatus, air-pressure apparatus, shaker, grinder, centrifugal machines, a water still of 5 gallons per hour capacity, Hoskins' combustion furnace, a balopticon, complete microphotographic equipment, microscopes, microtome, and such other apparatus, glassware and chemicals as are needed for extensive and intensive work.

Elective Courses.

25. I.	26. II.	Personal Hygiene	Sophomores
27. III.		Sanitary Science	Sophomores
50. I, II and III.		Introductory and General Microbiology .	Juniors
51. II and III.		Morphological, Cultural and Physiological Microbiology	Juniors
52. III.		Advanced Morphological, Cultural and Physiological Microbiology	Juniors
75. II.	76. III.	Agricultural Microbiology	Seniors
80. II.		Soil Microbiology	Seniors
81. I.		Hygienic Microbiology	Seniors
82. I.		Dairy Microbiology	Seniors
83. III.		Food Microbiology	Seniors

Special courses for women:

1. I.	3. III.	Elementary Microbiology	Freshmen
25. I.		Personal Hygiene	Sophomores
27. III.		Sanitary Science	Sophomores

Physics.

Professor HASBROUCK, Professor HARRINGTON, Mr. ALDERMAN.

The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry and zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.

In Courses 25, 26 and 27 the subject-matter is presented with the idea of its special application primarily in the work in agriculture and general science. The full year's work is advised for all students continuing work specifically in the Division of Science. Courses 25 and 26 are required of all students. The subject-matter is especially selected and arranged for its practical application rather than its theoretical development. Courses 50, 51 and 52 are advised for students in chemistry, general biology, microbiology and general science. The subject-matter is selected, and the courses developed, with the idea of making the student proficient in laboratory manipulation. Sufficient theory is given in connection with the work to enable the student to apply the knowledge and practice thus gained in the departments indicated above.

The department has at its command a building on the east campus, containing a general lecture room and laboratory for sophomore work, a laboratory for junior work, and in the basement one small laboratory for quantitative work in light measurement. There is also in the basement a fairly well-equipped shop for the repair and construction of apparatus used in the de-

partment work. The usual apparatus for the demonstration in the lecture room is in the possession of the department.

Required Courses.

25. I.	General Physics	Sophomores
26. II.	Electricity and Magnetism .	Sophomores

Elective Courses.

27. III.	Heat and Light	Sophomores
50. I. 51. II. 52. III.	Experimental Physics. Me- chanics, Sound, Heat, Light, Electricity, and Magnetism	Juniors
55. III.	Analytical Mechanics . . .	Juniors
75. I. 76. II. 77. III.	Theory of Light	Seniors, Graduates

Veterinary Science and Animal Pathology.

Professor GAGE, Assistant Professor LENTZ.

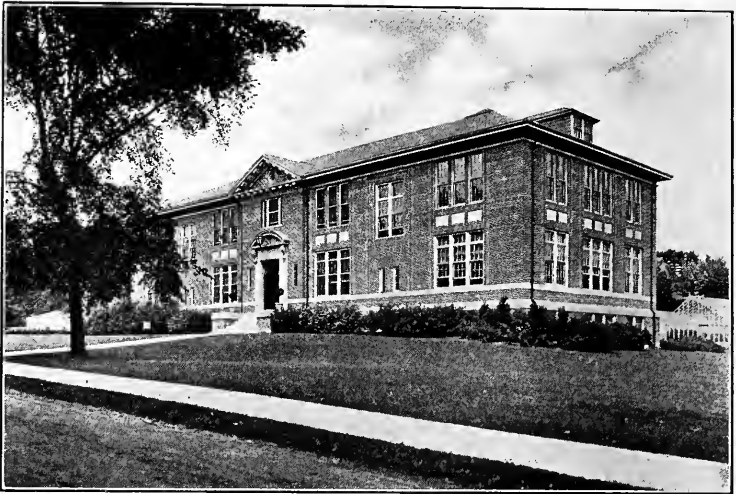
The courses in veterinary science have been arranged to meet the needs (1) of students who propose following practical agriculture; (2) of prospective students of human and veterinary medicine; and (3) of teachers and laboratory workers in the biological sciences.

The department occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science, including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Elective Courses.

50. II.	Veterinary Hygiene and Stable Sanitation	Juniors
75. I.	Comparative (Veterinary) Anatomy .	Seniors
76. II.	General Veterinary Pathology, Materia Medica and Therapeutics	Seniors
77. III.	Applied General Pathology	Seniors
78. I.	Essentials of General Pathology . . .	Seniors
79. II. 80. III.	Essentials of General Animal Pathology	Seniors
85. I. 86. II. 87. III.	Avian Pathology	Seniors



French Hall — Vegetable Gardening, Floriculture, and Forestry Building

Zoölogy and Geology.

Professor GORDON, Mr. FOSS.

The facts and principles of the sciences of zoölogy and geology have important applications in industry and the arts, and with those of their sister sciences form a body of knowledge of value and interest with which the educated man finds it necessary to gain a close familiarity. The elective courses in this department stand as offerings to students who wish to supplement their work in other departments, or who, for any reason, wish to enlarge their knowledge in either zoölogy or geology. Students are encouraged to consult the department about any courses which may be available to them, and which might prove necessary or helpful for any line of work they may wish to follow.

The building occupied jointly by the department of entomology and the department of zoölogy and geology has for the work in zoölogy and geology laboratories equipped with gas, compound microscopes and the accessories needed for study, research and demonstration in these subjects. There are two lecture rooms used jointly by the two departments. The Zoölogical Museum has a representative collection of several thousand specimens of animals, and is drawn upon for material illustrating the various courses.

ZÖOLOGY.

Required Course.

25. I.

General Principles and Teach-
ings of Zoölogy . . . Sophomores

Elective Courses.

26. II.		Elements of Mammalian Anatomy	Sophomores
50. I.	51. II.	52. III.	Synoptic Invertebrate Zoölogy Juniors
54. II.		Elements of Microscopic Technique	Juniors
75. I.	76. II.	77. III.	Special Zoölogy Juniors
79. III.		Ornithology	Seniors, Graduates

GEOLOGY.

Elective Course.

27. III.	General Geology	Sophomores
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DIVISION OF THE HUMANITIES.

Professor LEWIS.

Economics and Sociology.

Professor PARKER, Professor SIMS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.

Elective Courses.

26. II.	Civilizations, Ancient and Modern	Sophomores
50. II.	Business and Industry	Juniors, Seniors
51. I.	Introduction to Economic Principles and Problems	Juniors
75. I.	Social Institutions and Social Reforms	Seniors
77. III.	Public Finance, Taxation, Money, and Banking	Seniors

History and Government.*Elective Courses.*

50. III.	Government	Juniors
54. I.	Modern European History	Juniors
79. II.	European History since 1870	Seniors

Languages and Literature.

Professor LEWIS, Professor PATTERSON, Professor MACKIMMIE, Professor ASHLEY, Assistant Professor PRINCE, Assistant Professor JULIAN, Assistant Professor RAND, Miss GOESSMANN, Mr. THISELL, Mr. BÖGHOLT.

ENGLISH.

Required Courses.

1. I.	2. II.	3. III.	English Composition	Freshmen
25. I.	26. II.	27. III.	English Literature	Sophomores

Elective Courses.

50. I.	English Poetry of the Romantic Period	Juniors
51. II. 57. III.	English Poetry in the Nineteenth Century	Juniors
52. III.	English Writers from Milton to Pope	Juniors
53. I.	English Prose of the Romantic Period	Juniors
54. II. 58. III.	English Prose in the Nineteenth Century	Juniors
55. II. 56. III.	American Literature	Juniors
60. I. 61. II.	The Literature of Rural Life	Juniors
75. III.	Prose Fiction	Seniors
79. II. 80. III.	The Drama	Seniors

APPLIED ENGLISH — RURAL JOURNALISM.

The courses in rural journalism have two chief aims: first, to turn the student's attention toward matters of contemporary concern; second, to provide training for students who may wish to enter journalism (especially agricultural or industrial journalism or non-urban newspaper work), or who are preparing for the numerous other vocations in which acquaintance with newspaper practices and requirements is of value. All of the courses afford constant practice in writing. So far as conditions permit, instruction is largely individual.

Elective Courses.

50. I.	51. II.	52. III.	Advanced Compositions	Juniors
53. I.	54. II.	55. III.	News-gathering and News-writing	Juniors
77. I.	78. II.	79. III.	Editorial Materials and Methods	Seniors
80. I.	81. II.	82. III.	Advanced Journalistic Practice	Seniors

PUBLIC SPEAKING.

Elective Courses.

50. I.	Argumentation	Juniors
51. II.	Occasional Oratory	Juniors

French and Spanish.

PROFESSOR MACKIMMIE, MR. THISSELL.

The aim of the courses in French and Spanish is to give the student a practical knowledge of these languages for the purpose of wider reading and research, to introduce him to some of their treasures in art and science, and through the literature to acquaint him with the people. In the elementary courses as much time as possible is given to oral work, to develop a speaking, as well as a reading, knowledge of the tongue.

FRENCH.

Required Courses.

1. I.	2. II.	3. III.	Elementary French	Freshmen
4. I.	5. II.	6. III.	Intermediate French	Freshmen

Elective Courses.

25. I.	26. II.	27. III.	Intermediate French . . .	Sophomores
28. I.	29. II.	30. III.	Advanced French . . .	Sophomores
50. I.	51. II.	52. III.	Scientific French . . .	Juniors
75. I.	76. II.	77. III.	French Literature . . .	Seniors

SPANISH.

Elective Courses.

50. I.	51. II.	52. III.	Elementary Spanish . . .	Juniors
75. I.	76. II.	77. III.	Modern Spanish Authors . . .	Seniors



A Class in Floriculture

German and Music.

Professor ASHLEY, Assistant Professor JULIAN.

GERMAN.

The courses in German are intended to give the student a reading knowledge of the language and to introduce to him some of the masterpieces of German literature. To the student interested in pursuing advanced reading in scientific German, opportunity is given to do corollary reading in his major subject, in collaboration with the head of that department.

Required Courses.

1. I.	2. II.	3. III.	Elementary German . . .	Freshmen
4. I.	5. II.	6. III.	Intermediate German . . .	Freshmen

Elective Courses.

25. I.	26. II.	27. III.	Intermediate German	Sophomores
28. I.	29. II.	30. III.	Advanced German	Sophomores
50. I.	51. II.	52. III.	Scientific German	Juniors
75. I.	76. II.	77. III.	German Literature	Seniors
78. I.	79. II.	80. III.	Conversation and Composition	Seniors

MUSIC.

Elective Course.

50. I.	51. II.	52. III.	History and Interpretation of Music	Juniors
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DIVISION OF RURAL SOCIAL SCIENCE.

President BUTTERFIELD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49 inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor CANCE, Assistant Professor SAWTELLE, Mr. MAGINNIS, Professor HART.

Instruction in agricultural economics is designed to show that the agricultural industry justifies its existence chiefly as a supplier of food and raw textile materials for human consumption; that agricultural success is measured by production of values rather than by production of volume of agricultural products; that the goal of the farmer is the largest net profit over a long-time period; that agricultural production includes all processes from purchase of seed and fertilizer and preparation of seedbed until the product reaches the consumer, including collection, transportation, storage, financing, packing, handling and selling; that a knowledge of the business of agriculture and agricultural commerce is to-day more necessary than a knowledge of agricultural technique.

The work of this department is conducted by means of lectures, readings and research in both library and field. A catalogue, now containing some 12,000 cards, covering the various phases of agricultural economics, is maintained. The department is also supplied with a large collection of maps, charts and statistical reports on the prices and supply of agricultural products. A goodly number of regular reports of the Bureau of Markets and other divisions of the United States Department of Agriculture are available for the use of students. Two series of bound volumes of bulletins are kept in the department offices, with duplicate series in the college library; one series already contains 12 volumes on "Co-operation in Agriculture," and the other, 15 volumes on "Marketing of Farm Products."

Required Course.

26. II.	Agricultural Industry and Resources	Sophomores
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Elective Courses.

50. I.	Elements of Agricultural Economics .	Juniors
51. III.	Historical and Comparative Agriculture	Juniors
52. II.	Co-operation in Agriculture	Juniors
53. III.	The Agricultural Market	Juniors
75. II.	Rural and Business Law	Seniors
76. II.	Transportation of Agricultural Products	Seniors, Graduates
77. I.	Problems in Agricultural Economics	Seniors, Graduates
78. III.	Agricultural Credit Facilities	Seniors, Juniors
79. I.	Agricultural Statistics	Seniors, Juniors, Graduates
80. I. 81. II. 82. III.	Seminar	Seniors, Graduates
85. II. 86. III.	Agricultural Prices	Seniors, Graduates

Agricultural Education.

Professor HART, Professor WELLES, Mr. HEALD,¹ Miss HAMLIN.

The primary aim of the department is training students for service in some form of educational work. This service may be in one or more of several fields. Teaching is the most common, and includes vocational agriculture. Students contemplating preparation for State approval should confer as early as possible with the head of the department, to the end that they may secure a proper distribution of subjects and properly utilize vacations in acquiring the necessary farm practice. This department also serves as the avenue for recommending graduates to the State Department of Education for teaching positions, including such positions as require the State teachers' certificate.

The equipment includes a combination classroom and laboratory furnished with such articles as seem advisable for the effective work of a high school department of agriculture. This room represents to teachers in training the usable things for their work in a school department. The office of the department is equipped with books and pamphlets on agricultural education properly catalogued.

CO-OPERATION BETWEEN THE STATE DEPARTMENT AND THE COLLEGE.

Under an agreement with the Division of Vocational Education of the State Department of Education, the department of agricultural education is the co-operating agency at the college for the training of teachers of agriculture and other related subjects.

¹ Representing the State Department of Education in the administration of vocational education acts.

Required Course.

26. II.	Agricultural Opportunities for Women	Sophomores
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Elective Courses.

50. I.	Educational Psychology	Juniors
51. I and II.	Principles and Methods of Teaching	Juniors
52. III.	History and Philosophy of Education	Juniors
75. II.	Organization and Supervision of Secondary Education	Seniors
76. I and III.	Special Methods in Teaching Vocational Agriculture	Seniors
77. III.	Extension Organization. Extension Teaching and Boy's and Girl's Club Leadership	Seniors
80. I, II, III and IV.	Supervised Teaching	Seniors, Graduates
90. III.	Genetic Psychology	Seniors
91. I.	Rural Education	Graduates

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor SIMS, Mr. NOVITSKI.¹

The courses in rural sociology are designed for two purposes: first, to give students an appreciation of the general problems of country life; second, to afford a definite training for students who wish to take up some specific form of social service. In the last ten years rural sociology has been introduced as a subject into more than 50 per cent of the agricultural schools and colleges. There is a good demand for teachers, and an increasing opportunity in other directions in this subject. The courses afford the student an opportunity to pursue graduate as well as undergraduate work. The library of the college is unusually well equipped with rural sociological material.

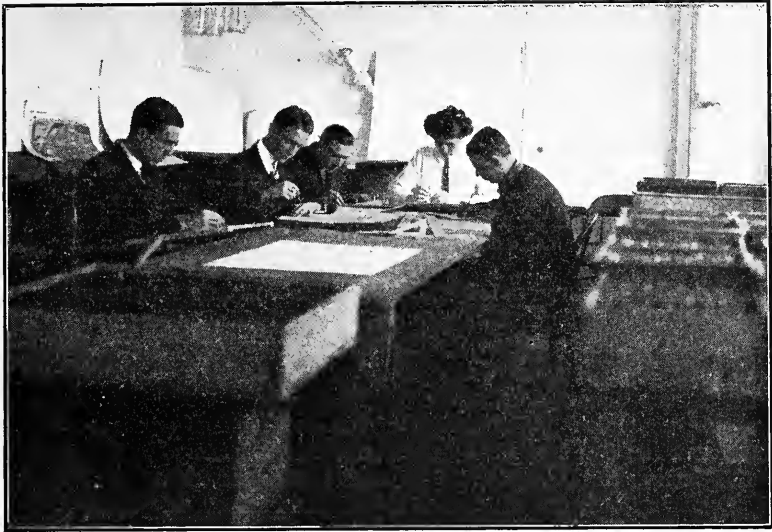
Required Course.

27. III.	Elements of Rural Sociology	Sophomores
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Elective Courses.

50. I.	Social Condition of Rural People	Juniors
51. II.	Rural Government	Juniors
52. III.	Rural Organization	Juniors
76. I.	Field Work in Rural Sociology	Seniors
77. II.	Rural Social Surveys	Seniors
79. I. 80. II. 81. III.	Seminar	Seniors

¹ On leave of absence.



A Class in Agricultural Education

Rural Home Life.

MISS SKINNER, MISS BARTLEY.

The Department of Rural Home Life offers elective courses for students majoring in other departments of the college. Fundamentally this training is such as will help young women to be better prepared to adjust themselves readily to their environment in the home and in the community, and to help them realize their responsibility as good homemakers and as good citizens.

The food laboratory, located in the entomology building, is fitted with individual desks (cabinet form) to hold utensils and materials for each student. Each table is equipped with gas stoves. A storage cabinet is provided with bins for supplies and cupboard space for large utensils and illustrative material. This room is well lighted and pleasant. The clothing laboratory is located in the Adams House. The equipment consists of sewing machines, cabinets, worktables, cutting tables, electric irons, dress forms and a collection of materials illustrating the production of textiles for clothing and household use.

Required Course.

1. I. Introduction to Home Economics . Freshmen

Elective Courses.

- | | | | | |
|----------|---------|----------|-----------------------------|------------|
| 25. I. | 26. II. | 27. III. | Textiles and Clothing . . . | Sophomores |
| 50. I. | 51. II. | | Foods and Cookery . . . | Juniors |
| 52. III. | | | Advanced Food Study . . . | Juniors |
| 75. I. | 76. II. | | Household Management . . . | Seniors |
| 78. III. | | | Home Nursing . . . | Seniors |

GENERAL DEPARTMENTS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Military Science and Tactics.

Major FREDERICK E. SHNYDER, Cavalry, U. S. A.; Major HERMAN KOBBE, Cavalry, U. S. A.; Captain JAMES V. V. SHUFELT, Cavalry, U. S. A.; Captain THOMAS BRADY, Jr., Cavalry, U. S. A.; Technical Sergeant JOHN J. LEE, U. S. A., Retired; Staff Sergeant JAMES A. WARREN, Cavalry; and a detachment of enlisted men of the United States Army.

Under act of Congress (July 2, 1862) military instruction under a regular army officer was required in this college of all able-bodied male students. Under act of Congress June 3, 1916, as amended by act of Congress Sept. 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following the World War and an act of Congress (July 9, 1918), the Reserve Officers' Training Corps is in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics.

Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a cavalry unit.

The primary object of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions, for the ultimate purpose of qualifying selected students of such institutions as reserve officers in the military forces of the United States. It is intended to attain this object during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers, by employing methods designed to fit men physically, mentally and morally for pursuits of peace as well as war.

All candidates for a degree in a four-year course must take for two years at least three hours a week of military training.

Students in their junior and senior years, who are approved by the president and the professor of military science and tactics, may take the advanced course if they so elect. The advanced course consists of at least five hours per week and a summer camp of about six weeks during the summer vacation, between the junior and senior years. Students taking this course are paid by the Federal government at a rate to be fixed by the Secretary of War, not to exceed the value of the army ration. The rate now fixed is 40 cents per day, which amounts to about \$146 per year. Students graduating in the advanced course are eligible for commissions in the Officers' Reserve Corps, *but are not required to accept such commissions if offered.*

The required uniform is of olive drab woolen cloth, and is furnished for the use of the students by the Federal government without cost. It is worn by all cadets when on military duty. New uniforms are furnished each year.

The course for cavalry units of the Reserve Officers' Training Corps includes theoretical and practical instruction in all phases of cavalry work, so distributed over the four-year college course as to qualify students at the end of the freshman year as privates of cavalry; at the end of the sophomore year as non-commissioned officers of cavalry; and upon graduation as reserve officers. The instruction in this department covers cavalry drill, cavalry weapons, — i.e., rifle, pistol, saber, automatic rifle and machine gun, — map reading and

military sketching, minor tactics, equitation, etc. The course in equitation includes cross country riding and instruction in polo. So far as season and weather permit, instruction is of a practical nature out of doors.

Required Courses.

1. I.	2. II.	3. III.	Military Science and Tactics	.	Freshmen
25. I.	26. II.	27. III.	.	.	Sophomores

Elective Courses.

50. I.	51. II.	52. III.	.	.	.	Juniors
75. I.	76. II.	77. III.	.	.	.	Seniors



Polo Team

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE, Mrs. HICKS, Mr. GRAYSON, Mr. COLLINS, Mr. DERBY.

The purpose of the courses offered by this department is to provide active exercise and to instruct every student how to care for his health and maintain his physical condition while carrying on his college course.

The equipment consists of the Alumni Athletic Field, which has room for two football fields, a quarter-mile cinder track with a 220 straightaway, and the baseball diamond; and also the old field for class football and baseball, two tennis courts, and the drill hall floor for basket ball. For several years the drill hall floor was used for class work in gymnastics, but its condition has become so bad that this has been discontinued. During the winter months a hockey rink is provided on the college pond.

MEN.

[All undergraduate male students are given a physical examination upon entering.]

Required Courses.

1. I.	Hygiene	Freshmen
2. I. 3. III.	Recreation	Freshmen
7. I. 8. II. 9. III.	Recreation	Freshmen
25. I. 26. III.	Recreation	Sophomores
30. I. 31. II. 32. III.	Recreation	Sophomores

Elective Course.

77. III.	Training Course	Seniors
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WOMEN.

Required Courses.

4. I.	Recreation	Freshmen
5. II.	Gymnastics	Freshmen
6. III.	Recreation	Freshmen
27. I.	Recreation	Sophomores
28. II.	Gymnastics	Sophomores
29. III.	Recreation	Sophomores

Elective Courses.

50. II.	Gymnastics	Juniors
76. II.	Gymnastics	Seniors

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

TUITION.¹— Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$180 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts.

All students entering the college for the first time as undergraduates or two-year students are charged a matriculation fee of \$5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD.— The college has dormitory accommodations for about 62 men students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from \$39 to \$66 a year. The rent for furnished rooms in private houses ranges from \$1 to \$4 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is \$7 a week.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; others, \$180 per year.

	Low.	High.
Matriculation fee, first year	\$5 00	\$5 00
Room in college dormitories or in private houses	39 00	110 00
Board, \$7 per week	245 00	245 00
Laundry, 50 to 85 cents a week	18 00	30 00
Laboratory fees	5 00	25 00
Books, stationery and miscellaneous items	38 00	60 00
	\$350 00	\$475 00

OTHER EXPENSES.— Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students

¹ This statement applies to those registering as regular or two-year students.

which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe-keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

INITIAL CHARGES.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office:—

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee	\$5 00	—	—
Board (if at college dining hall) four weeks in advance	28 00	\$28 00	\$28 00
Assessment for support of Social Union	1 50	1 50	1 50
Laboratory fees	5 00	5 00	2 00-10 00
Room rent (if in college dormitory)	—	—	12 00-20 00
Student tax for support of athletics ¹	5 00	5 00	5 00
Student tax for support of academic activities ¹	3 00	3 00	3 00

¹ While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

LABORATORY FEES.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage.

Student Aid.

SELF-HELP.— Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least \$150 and preferably \$250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand

that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and forty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Students whose department or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student department.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under

which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

MANAGEMENT OF THE INFIRMARY.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall, who is designated as Supervisor of the Infirmary. Miss Grace Charman, the resident nurse, with Miss Marguerite Davis as assistant resident nurse, is in *immediate charge* of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(a) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

Living Accommodations for Women Students.

Women students attending the college live in a dormitory provided for them, and take their meals at Draper Hall, which is located a short distance from the women's dormitory. The women's dormitory accommodates 98 girls, and is furnished. The present charge for room and board for women students is \$120 per term.



The Campus Pond

B. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is \$5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of \$10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest tenth of the senior class who have attained an average grade of at least 85 per cent during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1921 were:—

AGRICULTURE.— The Grinnell prizes, given by Hon. William Clafin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, \$25, \$15, \$10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years.

BOTANY.— The Hills prizes, given by Henry F. Hills of Amherst, amount to \$35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, \$20; for the second best herbarium, \$15. No collection deemed unworthy of a prize will be considered.

PUBLIC SPEAKING.— The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, \$15 and \$10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, \$30 and \$15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and \$15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

The Library.

The general college library consists of all books belonging to the college, including the library of the Experiment Station and all divisional and departmental collections of books. The main collection now occupies the entire building, which was originally intended to serve the purposes of both chapel

and library. A dictionary card catalogue is intended ultimately to cover all material in the general college library, which now comprises approximately 70,000 volumes, besides much unbound or paper-bound material, pamphlets, periodicals and newspapers. The library contains also some important special collections of books, amounting to several thousand volumes, not yet catalogued. Much of the constantly increasing pamphlet and periodical material, even though it is not yet comprehended in the general catalogue, is made promptly available by means of check lists, indexes, bibliographies and other library helps. Files of important periodicals make readily accessible to readers the latest contributions to the sum of human knowledge by contemporary leaders in many fields of thought and investigation. Works dealing with the sciences related to the processes and problems of agriculture are in greatest abundance, but literature, history and sociology are also well represented in our collections of books. The reading room is well supplied with encyclopedias and other general reference books, and with current numbers of an attractive list of popular and technical magazines and periodicals.

The greater part of the library material has been recently reclassified and recatalogued in accordance with a standard system, and is thereby rendered at all times directly accessible to teachers and students as well as library workers. From time to time informal lectures on the use of the library will be given to groups of students. By seminar and laboratory methods, individual students will be taught to appreciate books as essential sources of information and culture, and will be instructed in the use of the various devices common in libraries for finding what the library contains. All members of the college community have the privilege of free access to the book stacks for reference purposes, and books not specially reserved may be loaned for extra-library use for a period of two weeks.

The library is open from 8 A.M. to 9.30 P.M. on week days, and from 9 A.M. to 1.30 P.M. on Sundays while college is in session. Shorter hours prevail during vacation.

C. STUDENT ACTIVITIES.

Student government is vested in the College Senate, composed of elected representatives of the junior and senior classes. The Senate serves as a general director of undergraduate conduct, regulates interclass and other college activities, and represents, before the faculty, the interests of the student body.

All examinations are conducted under the honor system, which is administered by the student Honor Council. Like the Senate, this council is a popularly elected body, with representatives from the senior, junior, and sophomore classes.

The Social Union Committee is appointed by the Senate, has a Senate chairman, and supervises the entertainments that are given throughout the year for faculty and students. All students become members of the union by paying a small fee at the time of registration.

The Informal Committee — likewise a Senate committee — has direction of the informal college dances held frequently throughout the year.

The Young Men's Christian Association, Catholic Club, and Menorah Society are active religiously.

Various departments have organized clubs. At the regular meetings, addresses are made by men prominent in the particular line of work represented by the club, and discussion is carried on. Frequently two of the clubs have an open debate. The clubs now organized are agricultural eco-

nomics, pomology, poultry, chemistry, animal husbandry, floriculture, and landscape gardening.

Judging teams are supported by several of these clubs. The teams now representing the college are fruit, stock, and poultry judging. In recent years several members of the stock-judging teams have received scholarships for their excellent work, and the teams have ranked well with other colleges. The fruit-judging team of 1921-22 won the New England championship at Concord, N. H., and the national championship at the National Fruit Show in Toledo. Activities of this nature have an educational value to the student.

Memorial Hall.

Soon after the close of the World War the alumni, students, faculty and friends of the college subscribed \$150,000 for the erection of a soldier memorial building to be placed on the college campus. This building was completed in the summer of 1921. It is designed to serve as headquarters for the student activities, and as the center of the social life of the institution.

In the basement are bowling alleys, pool tables, a store, post office and barber shop. On the main floor are eight offices for leaders of various student activities, a large reading room, and a beautiful memorial room in which is found the tablet bearing the names of the sons of the college who gave their lives in the great war. On the second floor is an auditorium seating 350 persons. This room is also used for college dances.



1922 Hockey Team — Conquerors of Yale, Amherst, Bates, West Point, and St. Nicholas

Athletics.

College spirit is built largely around intercollegiate activities. Athletics, representing these relationships, are not only beneficial to the college, but are also of value to the participants. They are a part of the training of a college man. On the athletic field the student learns to take knocks, to think and to act quickly, and to work with other men.

At M. A. C. the varsity sports are football, baseball, hockey, basket ball, and track. Under the system of management the general governing body is a board composed of faculty, alumni, and student representatives. A head coach supervises all sports, and personally coaches football, basket ball, and baseball.

Besides these major sports a polo team, indoor and outdoor rifle teams, and a pistol team are conducted by the Military Department.

The pistol team's first season in 1921 resulted in victories over Alabama Institute of Technology, Norwich, and Harvard, with no defeats. The polo team has been organized only recently. The indoor and outdoor rifle teams hold enviable records in the intercollegiate long-time matches, having secured three legs on the indoor trophy, tying with Michigan Agricultural College, and four legs on the outdoor trophy, no other college having won more than one.

Interclass athletics are carried on in all major sports and in tennis and indoor rifle shooting. Every student at M. A. C. is encouraged by the Physical Education Department to participate in some athletic sport, either on varsity, class, fraternity, or other group teams.



Cast of the Historical Play "John Epps"

Academic Activities.

Every student is expected to take some part in student activities. For those literarily inclined there are three student publications which afford adequate opportunity for the expression of their abilities. The "Collegian" is a weekly newspaper devoted to campus news. The "Index" is a college annual published each year by the junior class. The "Squib" is a humorous periodical issued by the "wits" among the student body.

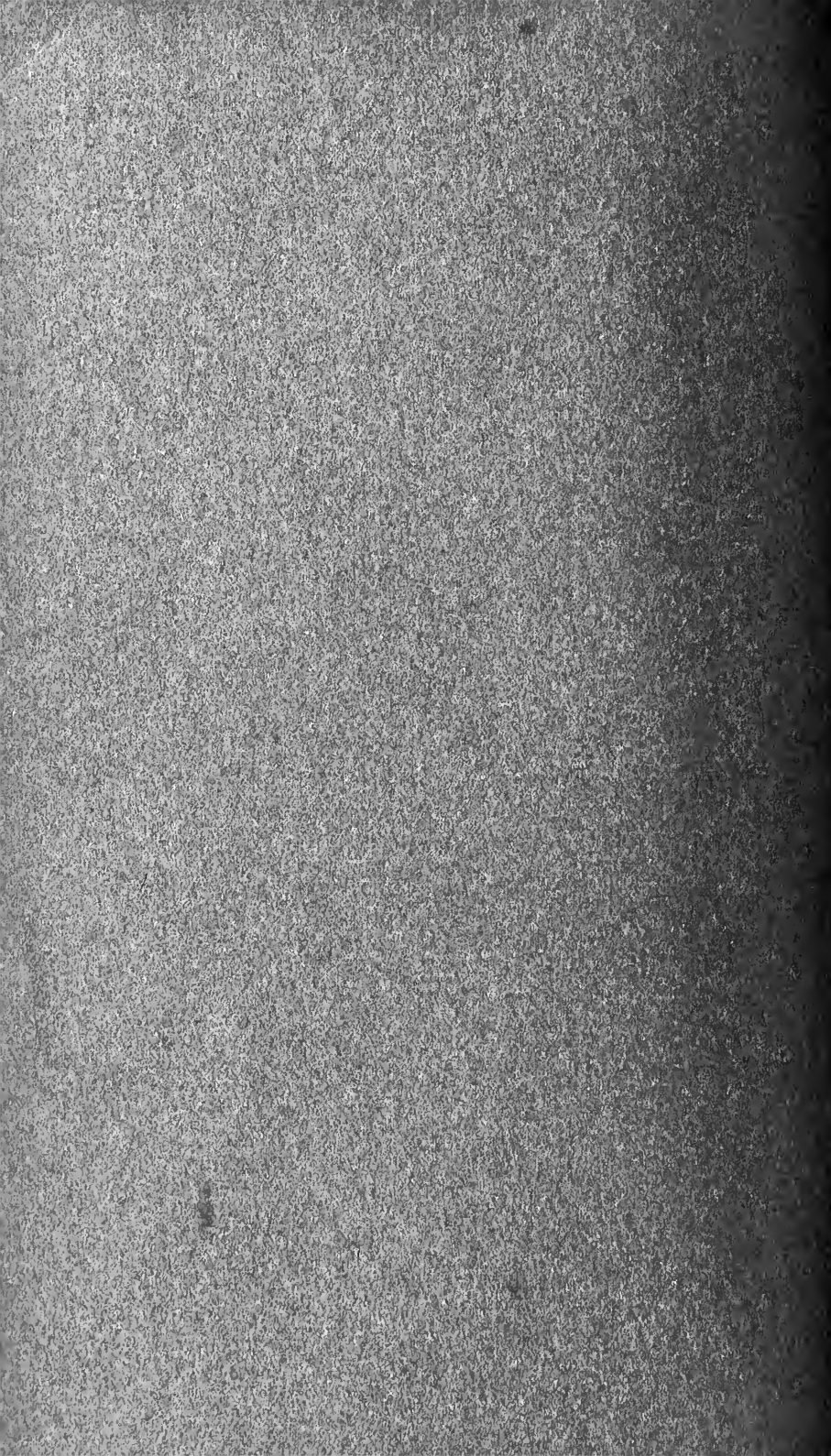
Of course there are other students who are musical by nature, and their talents are well expressed in the Glee Club and orchestra. These organizations not only furnish music at college affairs, but give concerts at various places throughout the State. Annually, on a trip to Boston and vicinity, an alumni concert and dance is held in Boston, and concerts are given in neighboring localities. A band is organized in connection with the Military Department.

Actors of ability constitute the Roister Doister Dramatic Association. Several plays, including original productions of the students, are staged each year by this society. The association also assumes direction of student sketches and class plays. Under its guidance plays of superior quality have been produced.

Opportunity is also found for oratory and debating. Varsity debates are held with various colleges, and a freshman-sophomore interclass debate is an annual affair. The annual Burnham declamation contest is open to members of the two lower classes. The Flint oratorical contest, likewise an annual event, is open to all members of the student body. Oratory and debating are under the management of the Public Speaking Council, composed of representatives of the three upper classes, together with the student and faculty managers.

These activities are all governed by the Academic Activities Board, a council composed of faculty, alumni, and student representatives.





MASSACHUSETTS
AGRICULTURAL COLLEGE

ANNOUNCEMENT

OF

THE GRADUATE SCHOOL



1923



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ANNOUNCEMENT OF THE GRADUATE SCHOOL

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MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was organized under the national land grant act of 1862. This legislation is also known as the Morrill act, the original bill having been framed by Justin Smith Morrill, Senator from Vermont, and its final enactment secured under his leadership. It provided that public lands be assigned to the several States and territories, the funds from the sale of which were to be used to establish and maintain colleges of agriculture and mechanic arts. The Massachusetts Agricultural College was among the first of these institutions established. When this act was passed the Massachusetts Institute of Technology was already organized, and the State of Massachusetts definitely decided that the instruction in the mechanic arts should be at the institute, and that the new institution should confine its work to agriculture. On this account the Massachusetts Agricultural College has the unique distinction of being the only separate agricultural college in the country.

In 1863 the State of Massachusetts accepted the provisions of the Morrill act and incorporated the Agricultural College. The location at Amherst was decided only after long and careful study by the original Board of Trustees. The college was formally opened to students on the 2d of October, 1867, with a faculty of four teachers and with four wooden buildings.

The Massachusetts Legislature has granted money for the erection of practically all of the buildings now on the grounds. In view of the fact that the annual income from the original endowment has been only a few thousand dollars, it has been necessary for the State to assume responsibility for the current expenses of the institution.

ORGANIZATION. — The college is a State institution, and as such is subject to the laws governing and the rules applying to all State departments and institutions. The work of the college is directed by a board of eighteen trustees. Four of these are ex-officio members, — the Governor of the State, the Commissioner of Education, the Commissioner of Agriculture and the president of the college. The other fourteen members are appointed by the Governor for terms of seven years each, or two each year. The immediate control of the institution is vested in the president of the college. The administrative officers, having supervision of the various departments of activity, are directly responsible to the president.

In carrying out its purpose the college has organized three distinct yet correlated types of work, — namely, research, resident instruction and extension service.

RESEARCH. — Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established and supported as a department of the college.

For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the Federal government. In 1906 the Federal government largely increased its support on condition that the money thus provided should be used only for research. The station now receives about three-fourths of its support from the State.

The station is under the direct supervision of the Board of Trustees; the chief officer is the director, who is responsible to the president. It is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of these departments are heads of corresponding departments in the college. The station publishes numerous bulletins and two annual reports, one scientific, the other popular. These publications are free and circulate extensively.

RESIDENT INSTRUCTION. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The chief aim of the institution, through its resident instruction, is to prepare men and women for the agricultural vocations. The term "agricultural vocations" is here used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, floriculture, landscape gardening and forestry. Students are also trained for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for scientific work in chemistry, entomology, botany and microbiology.

Though training for the agricultural vocations is thus the chief concern of the college, students should find the course one that trains them admirably for pursuits in which the sciences are an essential preparation. The course of study aims also to combine an adequate general education with specialized technical and practical training.

FOUR-YEAR COURSES. — Twenty-nine teaching departments offer instruction in agriculture, horticulture, sciences, the humanities, rural social science and rural home making. A system of major courses permits the student to elect major work in one of eighteen departments, and to specialize in it and allied subjects for a period of two years. The degree of bachelor of science is granted on the satisfactory completion of the four years' work of collegiate grade.

SHORT COURSES. — In order to extend the advantages of the institution to those men and women who cannot or do not care to take advantage of the four-year course, various short courses are offered. Chief among these are a two-year course in practical agriculture, a summer school of agriculture and country life, and a winter school of agriculture.

GRADUATE SCHOOL. — The graduate school is organized to provide the necessary training for scientific leadership in agriculture and allied sciences. The degrees of master of agriculture, master of landscape architecture, master of science, doctor of agriculture and doctor of philosophy may be earned upon the completion of satisfactory study, research and thesis.

THE EXTENSION SERVICE. — The extension service is an organized effort

to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, for various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose sole business it is to present the instruction of the college to individuals and various organizations throughout the State.

LOCATION AND EQUIPMENT. — The Agricultural College is located in the town of Amherst. The grounds comprise more than 650 acres, lying about a mile north of the village center. The college has also a demonstration forest of 755 acres, located 6 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is 97 miles from Boston, and may be reached by the Central Massachusetts division of the Boston & Maine Railroad, or by the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

MILITARY DRILL. — By Federal law military drill is required of all regular students attending the Massachusetts Agricultural College.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

HISTORY AND AIMS.

This college has provided study of a graduate nature for many years. The need for such training became real when agriculture was recognized as an aggregate of the many sciences involved and the many practices employed. The obsolete notion that agriculture is only farming has been replaced by the notion that farming, as such, is only one element in agriculture. The ramifications and divisions of agriculture are many; most of these call for advanced study and training to meet the exigencies of the times. No apology is, therefore, required for an attempt to fathom the scientific, economic and social intricacies of such a fundamental phase of human effort as agriculture. The value of such an undertaking is, or should be, patent to every intelligent mind familiar with the situation.

Graduate work has been available to students since 1893. At that time it was possible to qualify for the degree of master of science; later, in 1898, for the degree of doctor of philosophy; in 1913, for the professional degrees of master of agriculture and doctor of agriculture; in 1916, for the specific professional degree of master of landscape architecture.

To make the graduate work more effective and distinctive in agriculture, the graduate school was established in 1908. It has become the operating agency for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment station specialists in farm management, dairying, live stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; for economists and social workers; and for numerous other positions requiring a great amount of scientific and professional agricultural knowledge, training and experience.

ORGANIZATION.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. The student is assigned to an advisory committee, composed of

the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

ADMISSION.

Admission to the graduate school will be granted:—

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE, METHODS AND REQUIREMENTS OF GRADUATE WORK.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary to equip the individual professionally.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on constructive study; must be an actual contribution to knowledge; and possess real merit.

The thesis in its final form must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the copies is to be retained as an official copy by the director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

FINAL EXAMINATIONS.

For the degree of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

For the degree of master of science, master of agriculture or master of landscape architecture, a final examination upon the minor taken is given upon the completion of each course, and in the major a final examination, which may be either written or oral, or both, is given over all the work by the department concerned.

DEGREES CONFERRED.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least three years¹ to the prosecution of three subjects of study and research in residence at the college.
2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.
3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.
4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.
5. A public oral examination.
6. The payment of all fees and college expenses required.

The fee for the degree of master of science, master of agriculture, or master of landscape architecture is \$10, and for the degree of doctor of philosophy or doctor of agriculture, \$25.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.
2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.
3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy:—

Agricultural Economics.
Botany.
Chemistry.
Entomology.

Horticulture.
Microbiology.
Rural Sociology.

¹ All time statements refer to minimum time.

Courses available as major subjects for the degree of master of science: —

Agricultural Economics.	Entomology.
Agricultural Education.	Horticulture.
Agriculture.	Mathematics and Physics.
Agronomy.	Microbiology.
Animal Husbandry.	Poultry Science.
Botany.	Rural Sociology.
Chemistry.	Veterinary Science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy.	Animal Husbandry.	Poultry Science.
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The course in Landscape Architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects: —

Agricultural Economics.	Entomology.
Agricultural Education.	Horticulture.
Agriculture.	Landscape Architecture.
Agronomy.	Mathematics and Physics.
Animal Husbandry.	Microbiology.
Animal Pathology.	Poultry Science.
Botany.	Rural Sociology.
Chemistry.	Zoölogy.

GENERAL OUTLINE OF COURSES FOR ADVANCED DEGREES.

Agricultural Economics.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must have had the following courses or their equivalents: Economics and Sociology 51, Agricultural Economics 26 and 50.

REQUIRED WORK. — Candidates must take the following courses: Agricultural Economics 51, 52, 53 and 79. These courses, specially arranged for graduates, may be taken as Courses 120, 170, 155 and 180 for graduate credit. In addition, candidates must take Courses 110, 111, 130, 165 and 175 in Agricultural Economics; Rural Sociology 27 and 50, or equivalent courses; and Economics and Sociology 50 and 77, or equivalent courses.

Each candidate will be required to have a working knowledge of the general field of economics, the history of agricultural economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture, and prices, markets and marketing.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — The same as for the degree of doctor of philosophy, except that there is no language requirement.

GRADUATE COURSES OFFERED.

110. THEORY OF AGRICULTURAL ECONOMICS. — Readings in French, German and English on economics of agriculture. Alternate years, odd, 200 hours.
Credits, 3.
Professor CANCE.
111. CURRENT ECONOMIC PROBLEMS AND LITERATURE. — Department seminar throughout the year.
Credit, 1 each term.
120. HISTORICAL AND COMPARATIVE AGRICULTURE. — General survey. May be taken in connection with Course 51. Spring term, yearly. Credits, 3.
Assistant Professor SAWTELLE.
- 121-122. HISTORY OF AMERICAN AGRICULTURE. — Special studies in the history of agricultural institutions, practices or relations. Fall term, even years.
Credits, 5.
Assistant Professor JEFFERSON.
130. PROBLEMS OF AGRICULTURAL PRODUCTION. — The relation of the farmer to the food supply. May be taken in connection with Course 77. Fall term, yearly.
Credits, 5.
Professor CANCE.
140. LAND TENURE AND THE ACQUISITION OF FARM LAND. — Readings, discussion, original exercises. Alternate years, even.
Credits, 3-5.
Professor CANCE.
145. FARM LABOR. — Reading and investigation.
Credits, 3.
Professor CANCE.
150. AGRICULTURAL COMMERCE, INDUSTRY AND TRADE. — A study of trade movements and commercial activities relating to agricultural products. Fall term, alternate years, odd.
Credits, 3-5.
Assistant Professor JEFFERSON.
155. THE AGRICULTURAL MARKET. — A study of the forces, methods and institutions of the market for agricultural products. Spring term, yearly.
Credits, 5.
Professor CANCE.
156. SPECIFIC PROBLEMS IN MARKETING FARM PRODUCTS. — Reports and discussions. Alternate years, odd.
Credits, 3.
Professor CANCE.
160. AGRICULTURAL PRICES. — Winter term, yearly.
Credits, 3.
Assistant Professor SAWTELLE.
161. AGRICULTURAL PRICES. — Spring term, yearly.
Credits, 3.
Assistant Professor SAWTELLE.
165. TRANSPORTATION OF AGRICULTURAL PRODUCTS. — Elementary discussion and report. Winter term, yearly.
Credits, 5.
Professor CANCE.

166. SPECIFIC TRANSPORTATION PROBLEMS. — Original study, reading and report on certain transportation problems related to agriculture. Alternate years, odd. Credits, 3-5.

Assistant Professor SAWTELLE.

170. CO-OPERATION IN AGRICULTURE. — Elementary problems and discussion. May be taken in connection with Course 50. Winter term, yearly. Credits, 5.

Professor CANCE.

171-172. SPECIAL PROBLEMS IN CO-OPERATION FOR ECONOMIC PURPOSES. — Study, original investigation and discussion. Every third year, beginning 1922. Credits, 3-5.

Professor CANCE.

175. AGRICULTURAL CREDIT. — Readings and reports in addition to class lectures on agricultural credit. Taken in connection with Course 78. Spring term, yearly. Credits, 3-5.

Assistant Professor SAWTELLE.

180. ELEMENTARY PRINCIPLES OF STATISTICS. — Chiefly related to agriculture. Lectures, laboratory studies and original work. Taken in connection with Course 79. Fall term, yearly. Credits, 5.

Assistant Professor SAWTELLE.

181. SPECIFIC PROBLEMS IN STATISTICS OF AGRICULTURE. — Alternate years, even. Credits, 3-5.

Assistant Professor SAWTELLE.

185. RURAL LAW. — Corresponds to Course 78. Spring term, yearly. Credits, 5.

Professor HART.

186. STUDIES IN AGRICULTURAL LEGISLATION. Credits, 3-5.

The DEPARTMENT.

190-195. INVESTIGATION OF VARIOUS PROBLEMS RELATED TO AGRICULTURAL ECONOMICS. — Credit given on basis of time spent and reports submitted.

200. THESIS. — Research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances mastery of research methods includes facility in investigation, tabulation and interpretation of results.

Agricultural Education.

MAJOR REQUIREMENTS.

For the Degree of Master of Science.

PREREQUISITE WORK. — A minimum of 25 undergraduate credits distributed among the following lines of study: philosophy, psychology, history of education, principles and methods of teaching, school organization and administration. Graduates of other than agricultural colleges who wish to take their major work in some phase of rural education will be required to

present evidence of a knowledge of rural life and rural industries both scientific and practical. This may involve the study of some undergraduate courses in agriculture or horticulture without graduate credit.

REQUIRED WORK. — In addition to the regular prescribed work at least a half year of experience in teaching or supervision is required before the candidate is recommended for a degree.

GRADUATE COURSES OFFERED.

100. HISTORY OF AGRICULTURAL EDUCATION.	Credits, 1-10. Professor HART.
105. PRINCIPLES AND METHODS OF TEACHING AGRICULTURE AND AGRICULTURAL SCIENCE.	Credits, 1-20. Professor HART.
110. RURAL EDUCATION: ITS ORGANIZATION AND ADMINISTRATION.	Credits, 1-20. Professor HART.
115. SUPERVISION AND ADMINISTRATION OF AGRICULTURAL EDUCATION.	Credits, 1-5. Professor HART.
120. THEORY OF VOCATIONAL EDUCATION.	Credits, 1-10. Professor HART.
125. PREPARATION OF TEACHERS OF AGRICULTURE.	Credits, 1-10. Professor HART.
130. GENERAL EDUCATIONAL THEORY AND PRACTICE.	Credits, 1-15. Professor HART.
135. EDUCATIONAL LITERATURE.	Credits, 1-10. Professor HART.
140. EDUCATIONAL RESEARCH.	Credits, 1-10. Professor HART.
200. THESIS.	Credits, 25. Professor HART.

MINOR REQUIREMENTS.

Minor work is offered in this department for the degrees of doctor of philosophy and master of science. Candidates must have had the equivalent of 15 undergraduate credits in agricultural education, 5 of which must have been in the history of education.

Agronomy.

MAJOR REQUIREMENTS.

For the Degree of Master of Science.

PREREQUISITE WORK. — Graduate students desirous of taking major work in agronomy should have had good training in the fundamentals of the natural sciences and should have taken undergraduate courses Agronomy 27 and 50, or their equivalents.

REQUIRED WORK. — Studies will be assigned among courses listed below. Problems may be chosen in which particular attention will be devoted to soils, fertilizers or field crops.

GRADUATE COURSES OFFERED.

151. FIELD CROP PRODUCTION. — (a) Varieties. Classification; adaptation to climatic and soil conditions, etc.

(b) Distribution as affected by natural and economic conditions.

(c) Cultural methods. Early and late planting of the potato seed crop, of silage corn; spacing of plants; keeping qualities as affected by time and methods of harvesting; tillage and moisture control, etc.

(d) Storage of cereals, roots and tubers as affected by aeration, temperature, humidity, previous treatment, etc. Credits, 1-25.

175. SOIL TECHNOLOGY. — Soil Physics. Textural relationships of soil classes; absorption phenomena; physical properties in relation to mineralogical and chemical properties; soil structure; moisture relationships; the colloid conditions of soils, etc. Credits, 1-25.

177. SOIL FERTILITY. — (a) Soil Chemistry. Nitrogen fertilization, including commercial supply and gain or loss under different systems of soil management; absorption of potash and phosphoric acid; sulfur fertilization; soil acidity, etc.

(b) Soil Biology. Fixation of nitrogen by symbiotic and nonsymbiotic organisms; changes of green and animal manures in the soil; ammonification and nitrification; care and preservation of manures; humus in relation to soil fertility, etc. Credits, 1-25.

178. CROP IMPROVEMENT. — Involves the application of the principles of plant breeding to special crops. Credits, 1-25.

200. THESIS.

Credits, 15-25.

MINOR REQUIREMENTS.

Prerequisites are as stated above for major work. In addition, studies suited to the needs of the candidate will be selected from the above courses.

Animal Husbandry.

MAJOR REQUIREMENTS.

For the Degree of Master of Science or Master of Agriculture.

PREREQUISITE WORK. — Candidate must have had the following courses, or their equivalents, before he can enter graduate work in this department: Animal Husbandry 25, 26, 50, 51, 52, 53, 75 and 78. He should also be able to show evidence of experience in practical animal husbandry.

REQUIRED WORK. — At least 50 credits must be earned from the following list of courses offered by the department.

GRADUATE COURSES OFFERED.

100. HISTORICAL STUDIES OF BREED DEVELOPMENT. Credits, 5-20.

110. ANIMAL NUTRITION. Credits, 5-20.

120. PROBLEMS IN ANIMAL FEEDING.	Credits, 5-20.
130. ANIMAL GENETICS.	Credits, 5-20.
140. PROBLEMS IN ANIMAL BREEDING.	Credits, 5-20.
200. THESIS.	Credits, 15-25.

MINOR REQUIREMENTS.

Minor work in animal husbandry may include undergraduate Courses 50, 51, 53, 81 or 82, and such other work in reading and compilation of material as the instructor may outline. Written examinations will be conducted at the completion of each term's work.

Animal Pathology.

MINOR REQUIREMENTS.

Minor work in animal pathology for the degrees of doctor of philosophy and master of science consists of an especially planned course for graduate students. This is not an undergraduate course, but is arranged to meet the needs of graduate students who have not pursued a course in general pathology. It will continue throughout the year and include reviews in gross and microscopic anatomy, physiological, bacteriological, serological, biochemical and morbid anatomical phases of pathology. Written examinations will be given at the end of each term.

100. GENERAL PATHOLOGY. — As described above, fall term. Credits, 5.
 120. GENERAL PATHOLOGY. — Continuation of 100, winter term. Credits, 5.
 140. GENERAL PATHOLOGY. — Continuation of 120, spring term. Credits, 5.
 160. BIOCHEMICAL PHASES OF PATHOLOGY. — Second year, fall term. Credits, 5.
 180. PATHOLOGICAL HISTOLOGY. — Second year, winter term. Credits, 5.
 PROFESSOR GAGE.

Botany.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The equivalent of certain undergraduate courses, determined by the department in the case of each student, is prerequisite.

REQUIRED WORK. — Candidates will be required to take Courses 100 through 107, and 180, 190 and 200. Courses 150 through 155 may be taken for graduate credit in certain cases. The maximum number of major credits which may be earned in this way is thirty-two.

For the Degree of Master of Science.

PREREQUISITE WORK. — The requirements are the same as for the degree of doctor of philosophy.

REQUIRED WORK. — Candidates will take Courses 100 and 101 and all courses from 102 through 107 which are given during their term of residence, also 180, 190 and 200. In certain cases Courses 150 through 155 may be taken, but not more than 20 credits may be earned in this way.

GRADUATE COURSES OFFERED.

Courses 100 through 106 are lecture courses. They are given in rotation, except Courses 100 and 101, which come every year.

100. PLANT PHYSIOLOGY. — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants; growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements; the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks. Credits, 3.

101. PLANT PATHOLOGY. — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks. Credits, 3.

102. PLANT INHERITANCE. — This course is planned to give the student a comprehensive understanding of the principles and facts of plant inheritance. A study is made of plant variations, Mendel's law of heredity, the physical basis of heredity as established by chromosome behavior, pure lines, mutations, species and graft hybrids, etc. One lecture a week for 12 weeks. Credit, 1.

103. BIOLOGIC RELATIONS. — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments are made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks. Credit, 1.

104. THE ECOLOGY OF PLANTS. — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks. Credit, 1.

105. PHYSIOLOGICAL PLANT PATHOLOGY. — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks. Credit, 1.

106. HISTORY OF BOTANY. — A historical survey of the science; lives of noted botanists; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization; reading. One lecture a week for 24 weeks. Credits, 2.

107. METHODS IN DRAWING AND PHOTOGRAPHING FOR THESIS AND PUBLICATION. — Twelve weeks. Credits, 1-3.

108. THE COMPARATIVE ANATOMY OF GREEN PLANTS. — In the lectures an intensive study is directed to the comparative anatomy of green plants from the evolutionary standpoint. Particular emphasis is laid upon the woody forms both living and extinct. Of the latter, the department is fortunate in possessing excellent sets of micro-preparations and lantern slides. Two lectures and one laboratory period for 24 weeks. Credits, 6.

150. SYSTEMATIC MYCOLOGY. — See undergraduate Courses 52-54.

151. SYSTEMATIC BOTANY OF THE HIGHER PLANTS. — See undergraduate Courses 58 and 59.

152. PLANT HISTOLOGY. — See undergraduate Courses 55 and 56.

153. CYTOLOGY AND EMBRYOLOGY. — See undergraduate Courses 82 and 83.

154. PLANT PATHOLOGY. — See undergraduate Courses 75-77.

155. PLANT PHYSIOLOGY. — See undergraduate Courses 78-80.

180. SEMINAR. — A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important botanical papers are discussed. Attendance and participation are required. Credits, 3.

190. COLLATERAL READING. — Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course. Credits, 5-10.

200. THESIS. — Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture. The thesis work counts for not more than 50 per cent of the total number of major credits required for either degree.

MINOR REQUIREMENTS.

For a minor a student may take such of the work offered by the department as seems best suited to his major course. Courses 150 and 155 are primarily undergraduate work which may be taken for minor credit toward advanced degrees. In most cases no problem will be assigned.

PROFESSORS OSMUN, ANDERSON, CLARK, TORREY and DAVIS.

Chemistry.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The candidate must have taken undergraduate Courses 1 to 87, or their equivalent.

REQUIRED WORK. — The candidate will be required to take all the graduate

courses listed below. He may also be required to spend at least two terms or one semester at some other recognized institution, pursuing graduate study in chemistry. For the final examinations, questions will be selected from the entire field of chemistry, with special emphasis upon the lines of work covered by the research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as that required for the degree of doctor of philosophy.

REQUIRED WORK. — The candidate will be required to take Courses 101 and 108 through 114. In addition he will pursue the requirements of one of the following thesis subjects: —

Organic and Biochemistry. — Course 200 and either 105, 106 or 107, and 3 credits for one term selected from Courses 103 (b) or (f), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

Physical Chemistry. — Courses 200, 104, and 3 credits for one term selected from Courses 102, 103 and 105 through 107.

Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

The candidate must pass a final written and oral examination before the department upon undergraduate Courses 1 through 80, as well as upon all graduate work taken in chemistry.

GRADUATE COURSES OFFERED.

101. **INORGANIC PREPARATIONS.** — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term. Credits, 3.

Assistant Professor SEREX.

102. **ADVANCED INORGANIC PREPARATIONS.** — Laboratory. Continuation of Course 101. Any term. Credits, 3.

Assistant Professor SEREX.

103. **ADVANCED ANALYTICAL CHEMISTRY.** — Laboratory. This course may be taken in part as follows: (a) electrolytic analysis, 3 credits; (b) ultimate analysis, 3 credits; (c) special analytical work to meet the needs of the individual student, 3 credits. In addition, parts of undergraduate Courses 62, 76 and 77 may be taken, as follows: (d) fertilizers, 3 credits; (e) insecticides, 3 credits; (f) milk and butter, 3 credits. (a), (b), (c) may be taken any time; (d), (e), (f) must be taken at the time the undergraduate course is given.

Professors WELLINGTON and PETERS.

104. **ADVANCED PHYSICAL CHEMISTRY.** — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of

saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glyceric or racemic tartaric acid into its optical components. To each student separate work will be assigned. Any term. Credits, 3.

Assistant Professor SEREX.

105. ADVANCED ORGANIC PREPARATIONS. — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, Congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain & Thorpe, Gattermann, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term. Credits, 3.

Professor CHAMBERLAIN.

106. ADVANCED BIOCHEMISTRY. — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term. Credits, 3.

Professor CHAMBERLAIN.

107. INDUSTRIAL ORGANIC CHEMISTRY. — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers & Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term. Credits, 3.

Professor CHAMBERLAIN.

108. THEORETICAL CHEMISTRY. — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term. Alternates with Course 109.

Credit, 1.

Professor PETERS.

109. ANALYTICAL CHEMISTRY. — Lectures. A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's "Quantitative Analysis" is used as a text. First term. Alternates with Course 108.

Credit, 1.

Professor PETERS.

110. ORGANIC CHEMISTRY. — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References: Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term. Alternates with Course 111.

Credit, 1.

Professor CHAMBERLAIN.

111. BIOCHEMISTRY. — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes,

fermentation, animal food and nutrition, photosynthesis. References: Monographs on biochemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term. Alternates with Course 110.
Credit, 1.

Professor CHAMBERLAIN.

112. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term. Alternates with Course 113.
Credit, 1.

Assistant Professor SEREX.

113. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term. Alternates with Course 112.
Credit, 1.

Assistant Professor SEREX.

114. SEMINAR. — Conferences, reports or lectures. Three terms, twice a month.
Credit, $\frac{1}{2}$.

Professor LINDSEY.

200. THESIS. — Research, and, in the case of a degree, the preparation of an acceptable thesis in agricultural, analytical, organic or physical chemistry, under the direction of the professor in charge of the work, provided that a candidate for the degree of doctor of philosophy shall have had the equivalent of Courses 51, 52, 65 and 86. Credit determined by work done.

MINOR REQUIREMENTS.

Work may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate may be required to pass a final written and oral examination before the department upon his entire minor work.

Entomology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Students must have had all the undergraduate courses given at this college or their equivalent. Opportunities to make up any deficiencies will be available while the graduate work is being carried on.

REQUIRED WORK. — The graduate courses consist of lectures on all, and laboratory work on a part, of the subjects given below, together with advanced readings, seminar work and original research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — A major course for the master of science degree will be about half of the courses listed below.

GRADUATE COURSES OFFERED.

100. MORPHOLOGY. — 1. Embryonic development of insects and polyembryony.

2. Metamorphosis and its interpretations.
3. Advanced external and internal anatomy.
4. Insect histology.
5. Ancestry and development of insects, including fossil insects.
6. Hermaphrodites in insects.
7. Hybrids.
8. Parthenogenesis, pedogenesis and heterogeny.
9. Chemistry and physics of insect colors.
10. Color patterns, their significance and value.
11. Luminosity.
12. Deformities.
13. Variation in insects.

120. ECOLOGY. — 1. Dimorphism and polymorphism.

2. Mimicry, including concealment, protective devices and warning coloration.

3. Architecture of insect structures.
4. Relation of insects to plant fertilization and its importance.
5. Insect products of value to man.
6. Geographical distribution and methods of distribution of insects, with a consideration of life zones, barriers, etc.
7. Insect migrations.
8. Insect behavior and experimental entomology.
9. Enemies of insects.

140. ECONOMIC ENTOMOLOGY. — 1. Control methods.

2. Insect photography and methods of preparing illustrations.
3. Field work and life history investigations with methods for keeping records.
4. Legislation about insects.
5. Studies of insecticides and their application.

160. SYSTEMATIC ENTOMOLOGY. — 1. History of entomology and of classifications.

2. Lives and works of prominent entomologists.
3. Abundance of insects.
4. Important collections, public and private; their location and their value.
5. Types of insects; their significance, importance and location.
6. Rules of nomenclature and how they are used.
7. Methods for collecting, preparing, preserving and shipping insects.

180. SEMINAR. — Readings and reports on the current literature of entomology; monthly meetings.

190. COLLATERAL READINGS. — The best articles on the various topics in entomology are assigned for collateral readings, and are included in the final examinations.

200. **THESIS.** — Original research on one or several topics in morphology, ecology, economic and systematic entomology. This is expected to require from one-half to three-quarters of the total working time of the student.

MINOR REQUIREMENTS.

Minor courses will cover such parts of the work outlined above as will be most likely to prove useful in connection with the majors taken by the students, or in their future work. It is not required that such men shall have had all the undergraduate work in entomology given at this college, their credit for a minor beginning where their own undergraduate training in the subject ended.

Horticulture.

Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Professor Waugh, head of the Division of Horticulture.

Landscape Architecture.

MAJOR REQUIREMENTS.

For the Degree of Master of Landscape Architecture.

PREREQUISITE WORK. — The undergraduate courses in the college known as Landscape Gardening 50, 51 and 52, Drawing 25, 26 and 27, Horticulture 27, 50 and 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student who has not passed these courses, or their equivalent, will be required to make up such work without graduate credit.

REQUIRED WORK. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college. One year must also be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Every student before receiving his master's degree in landscape architecture must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape architecture.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

While great freedom is allowed to graduate students in their plans of work, a certain portion of time will always be given to systematic courses of instruction. Courses known as Landscape Gardening 175, 176, 177, 178, 179, 180, 181 and 182 are required, and may or may not be accepted for graduate credit, at the discretion of the department.

GRADUATE COURSES OFFERED.

175. THEORY OF LANDSCAPE ART. — Same as Landscape Gardening 75. First term. Credits, 3.
Professor WAUGH.
176. CIVIC ART. — Same as Landscape Gardening 76. Second term. Credits, 4.
Professor WAUGH.
177. COUNTRY PLANNING. — Same as Landscape Gardening 77. Third term. Credits, 4.
Professor WAUGH.
178. ARCHITECTURE. — Same as Landscape Gardening 78. Third term. Given in alternate years. Credits, 3.
Assistant Professor HARRISON.
179. CONSTRUCTION. — Same as Landscape Gardening 79. Third term. Given in alternate years. Credits, 3.
Assistant Professor HARRISON.
180. THEORY OF DESIGN. — Same as Landscape Gardening 80. First term. Credits, 4.
Professor WAUGH.
181. ESTATE DESIGN. — Same as Landscape Gardening 81. Second term. Credits, 4.
Assistant Professor HARRISON.
182. PARK DESIGN. — Same as Landscape Gardening 82. Third term. Credits, 4.
Assistant Professor HARRISON.
190. THEORY. — Special studies. Credits, 2-10.
The DEPARTMENT.
191. DESIGN. — Individual problems by arrangement. Credits, 2-10.
The DEPARTMENT.

192. CONSTRUCTION. — Individual problems by arrangement.

Credits, 2-10.

The DEPARTMENT.

193. MAINTENANCE. — Special studies, experimental work or assigned problems.

Credits, 2-10.

The DEPARTMENT.

194. PRACTICE. — Professional field work under supervision. By arrangement.

Credits, 2-10.

The DEPARTMENT.

195. SEMINAR.

Credits, 1-5.

Professor WAUGH.

200. THESIS. — Each student before receiving the master's degree with a major in landscape architecture must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

- (a) Original surveys, including topography.
- (b) Block plans, showing original design.
- (c) A rendered plan or plans of the main features.
- (d) Detailed working drawings.
- (e) Estimates of cost.
- (f) Complete report and letter of transmittal.

Credits, 5-20.

MINOR REQUIREMENTS.

Any student electing a minor in landscape architecture will be directed to take such courses from the regular catalogue list as may seem most suitable to him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Microbiology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidate must have had Courses 50, 51, 52, 80, 81, 82 and 83, or their equivalents, before he can enter upon graduate work.

REQUIRED WORK. — Studies will be selected from the courses offered below. It will be the purpose of the department to distribute such studies among the courses offered in a manner to gain the greatest efficiency and a comprehensive knowledge of the entire field. The work will be conducted by prescribed readings, critical written reviews, conferences, lectures and laboratory exercises.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Courses of a basic and applied character selected from the courses offered below which will prepare the student for effective effort.

GRADUATE COURSES OFFERED.

100. HISTORY OF MICROBIOLOGY.	Credits, 5-10.
110. CYTOLOGICAL AND MORPHOLOGICAL STUDIES AND CORRESPONDING TECHNIQUE.	Credits, 5-10.
120. STUDIES IN TECHNIQUE AND METHODS.	Credits, 5-20.
130. PHYSIOLOGICAL STUDIES.	Credits, 5-20.
135. INDUSTRIAL FERMENTATIONS.	Credits, 5-10.
140. AGRICULTURAL MICROBIOLOGY — GENERAL SURVEY.	Credits, 5-20.
141. MICROBIAL STUDIES IN AGRICULTURE.	Credits, 5-10.
150. SOIL MICROBIOLOGY.	Credits, 5-20.
160. DAIRY MICROBIOLOGY.	Credits, 5-20.
170. FOOD MICROBIOLOGY.	Credits, 5-20.
180. HYGIENIC MICROBIOLOGY.	Credits, 5-20.
181. SPECIAL SANITARY OR HYGIENIC STUDIES.	Credits, 5-10.
190. LECTURES AND STUDY OF LITERATURE.	Credit, 1 each term.
200. THESIS. — Some microbiological problem related to agriculture or food. Distributed as may be most beneficial for research work. Time and credit by arrangement.	Credits, 15-50.

MINOR REQUIREMENTS.

Minor work in microbiology may consist of undergraduate Courses 50, 51, 52, and other courses designed to support the major work, from among the courses offered above. The candidate will also be required to pursue graduate Course 190, or follow a course of reading and conferences through three terms. In case the candidate has had some of these courses, he will be required to take more advanced substitute courses.

Poultry Science.

MAJOR REQUIREMENTS.

For the Degree of Master of Science or Master of Agriculture.

PREREQUISITE WORK. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 140, 150 and 160. At the

discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

REQUIRED WORK. — All the courses listed below. Practical poultry work may be required, but no credit will be given for such work.

GRADUATE COURSES OFFERED.

101. READING. — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

110. SEMINAR. — A critical review and a criticism of the more important experiments carried on at various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

120. ANATOMY (GROSS AND HISTOLOGICAL), PHYSIOLOGY AND SURGERY. — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

130. BREEDING. — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

140. FEEDING. — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

150. BROODING. — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

160. INCUBATION AND EMBRYOLOGY. — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature, dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

170. POULTRY DISEASES AND SANITATION. — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

200. THESIS.

MINOR REQUIREMENTS.

Courses 101 and 110 are designed particularly for minors.

Rural Sociology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must present satisfactory evidence of having completed at least 10 credit hours in general sociology and 10 credit hours in general economics; or take such undergraduate courses as the department may designate to satisfy this requirement.

REQUIRED WORK. — Candidates must take or pass by satisfactory examination courses offered by the department for undergraduates bearing the numbers 26, 50, 51, 52 and 75, and such courses in agricultural education and agricultural economics as may be required, not to exceed 10 credit hours in each department. Candidates will be required to select from the courses listed below as graduate courses a field for investigation and intensive study. Candidates for the doctorate must take all courses listed as graduate.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Not less than 50 credit hours will be required from the courses listed below. The department will make such selection as may best meet the interest of the individual student.

GRADUATE COURSES OFFERED.

177. FIELD WORK OF AN INVESTIGATIONAL NATURE.

178. RURAL SOCIAL SURVEYS.

179-181. SEMINAR.

182. SOCIAL CONDITIONS OF AMERICAN RURAL LIFE.

183. SOCIAL CONDITIONS OF EUROPEAN RURAL LIFE.

184. RURAL INSTITUTIONS.

185. RURAL ORGANIZATION.

186. FARMERS' ORGANIZATIONS.

187. TOWN AND VILLAGE RURAL LIFE.

188. RURAL HEALTH AND SANITATION.

189. RURAL LITERATURE.

190. RURAL GOVERNMENT AND LAW.

200. THESIS.

Veterinary Science.

Work is available in hygiene, veterinary pathology, and other special lines or divisions of the subject.

Zoölogy.

MINOR REQUIREMENTS.

Courses in zoölogy may be available as a minor for the degrees of doctor of philosophy and master of science. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field and correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science.

GENERAL INFORMATION.

TUITION. — There is no charge for tuition and no matriculation fee for members of the graduate school. No laboratory fees are charged except for undergraduate courses.

DORMITORIES AND BOARD. — Rent for furnished rooms in private houses ranges from \$2 to \$4 a week for each occupant. Board ranges from \$6 to \$10 a week. Board at the college dining hall is \$7 a week. Cafeteria service is also maintained.

Women graduate students may be accommodated at the Abigail Adams dormitory. The charge for room with board at the college dining hall close by is \$120 a term.

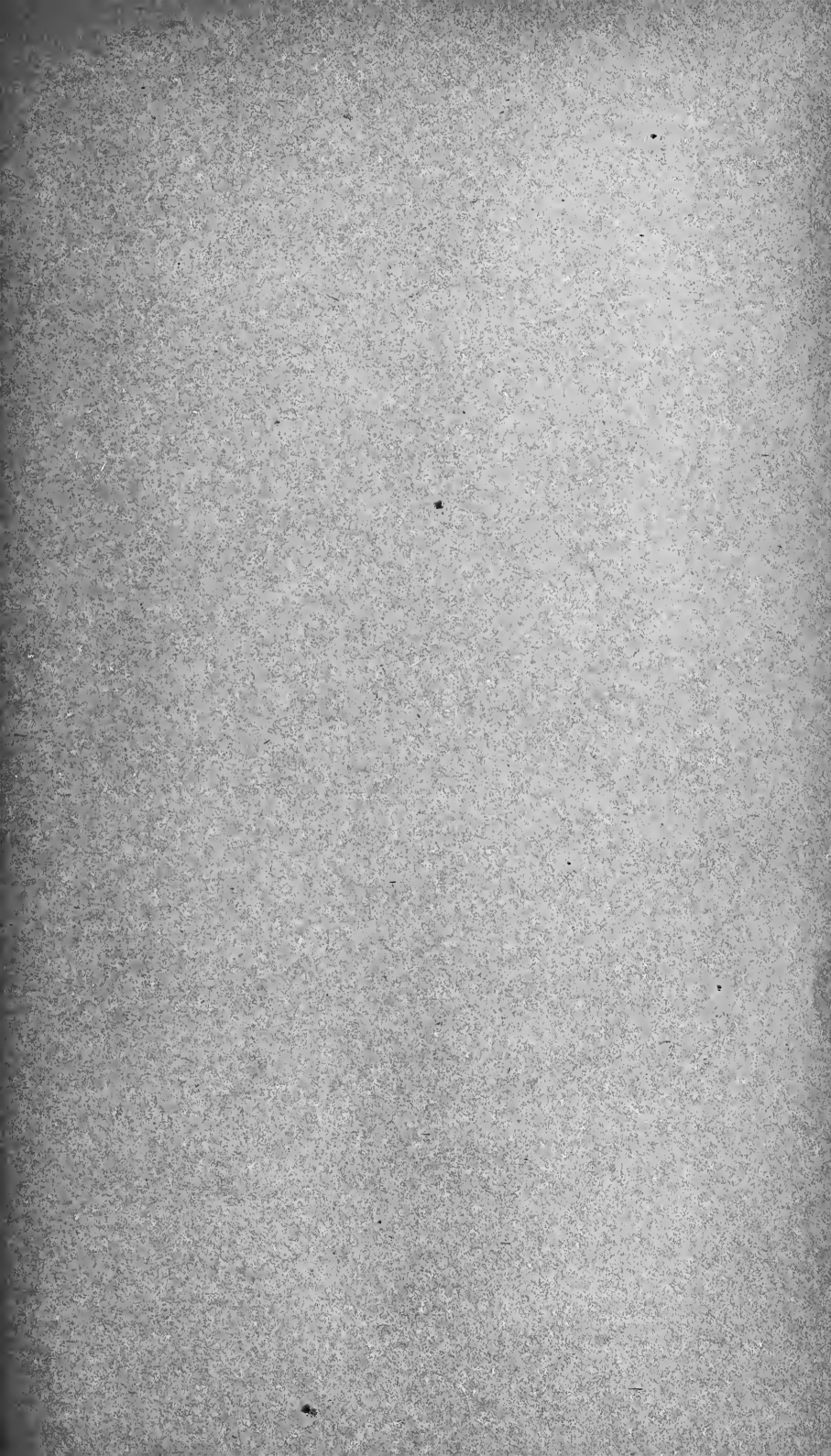
STUDENT RELATIONS. — The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

INFIRMARY. — The college maintains an infirmary for the care of sick or injured students. The infirmary fee is \$2 a day.

THE GRADUATE CLUB. — An active Graduate Club holds frequent meetings during the year and contributes much to the social life of the graduate school.

ASSISTANTSHIPS. — To encourage graduates of this college and of other similar and approved institutions to continue their studies and to undertake advanced work leading to the higher degrees, a number of half-time assistantships have been established.

SPECIAL INFORMATION. — The director of the graduate school will be glad at any time to answer questions on matters not covered by this catalogue. General questions of enrollment and applications for assistantships should be addressed to him. For detailed information in regard to the work of special courses, address the head of the department involved.



MASSACHUSETTS
AGRICULTURAL COLLEGE

ANNOUNCEMENT

OF THE

SUMMER SCHOOL

1923



July 2 to July 27

AMHERST, MASSACHUSETTS

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DEPARTMENT OF EDUCATION

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RALPH A. VAN METER, B.Sc. <i>Assistant Professor of Pomology</i>	Pomology
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_____	House Furnishing
MRS. ALICE DRESSER, A.B. <i>Consultant, Household Administration</i>	Home Management

SUMMER SCHOOL

SPECIAL ONE-WEEK COURSE FOR FLORISTS

A special one-week course for men and women who have already had practical floricultural experience will be offered by the College, June 25 to June 30. These courses will be limited only to those who have already had practical experience. The entire day will be given over to lectures, laboratory work, and round-table discussions on practical questions. The work will be conducted in an informal manner so that students may feel free to ask questions and contribute from their own experience. All the members of the Department of Floriculture will participate in these courses so that the groups may be kept small and no effort spared to give each student as much individual help as time permits.

ANNOUNCEMENT

Registration. — The sixteenth session of the Summer School of the Massachusetts Agricultural College will begin Monday, July 2, and will close on Friday, July 27. No one will be allowed to register for full-time work after Monday, July 9. Classes and laboratory work will begin Tuesday, July 3. The registration of students will be held in the Social Union Room, from 9 A.M. until 5 P.M., Monday, July 2.

The Summer School was originally planned for teachers. As now organized, it offers courses of interest to teachers, home makers, teachers of agriculture, farmers, and others who wish practical, intensive courses in agriculture, horticulture, home economics, and agricultural education. The instruction in the Summer School is given by the regular members of the College staff assisted by specialists engaged for summer work only. Well-known specialists are employed, and no effort is spared to make the work of the Summer School of the greatest advantage to all. A special feature of the Summer School will be the Course for Practical Florists, described above.

The courses offered in the Summer School are open to all students seventeen years of age or over who can do and profit by the work elected. Every student must furnish the names of two references from whom the college will ask a statement as to the candidate's moral character.

Election of courses should be made at the time of registration. All courses elected must be carried by the student in a manner satisfactory to the instructor. Regular attendance will be required in each course, and every election is subject to the approval of the director and the instructor whose course is elected. Students who complete at least three courses, fifteen hours, in a satisfactory manner, and who have practically a perfect attendance, will be granted a certificate at the close of the term. Classes are held in each course five times a week.

Board and Room. — Rooms will be provided for students in the College dormitory and in private homes near the College grounds. The new women's dormitory will be available for women students. There are thirty double and thirty-eight single rooms. A uniform rate of \$3 per week will be charged each student. Each one will be expected to supply her own blankets, sheets, pillow cases, etc. Convenient arrangements for laundry work may be made in Amherst. Students taking rooms in the dormitory have to conform to all dormitory regulations. A copy of these rules may be had from the matron.

All requests for dormitory rooms must be made to the Treasurer of the College. A deposit of \$2 is required in order to secure a reservation in the dormitory. Students will be notified by the Treasurer, upon receipt of the fees, as to the location of the room. In case any change is desired, the request should be made immediately. Deposits will not be refunded after the beginning of the summer session. The deposit is applied to the payment for the room. Rooms outside the College vary considerably in their accommodations and somewhat in price, the charge ranging from \$2.50 to \$4 a week for each person. A list of rooms available in the village will be furnished to Summer School students at the time of registration. Every effort will be made by those in charge to see that every one has comfortable accommodations. A few furnished houses at reasonable rentals are usually available in Amherst during July and August.

The College will maintain a cafeteria on the self-service plan in Draper Hall, on the College grounds. Board may be had at from \$6 to \$8 per week. Good boarding places can also be secured outside of the College if desired.

Tuition, Fees, and Expenses. — Tuition is free for the summer session. There are no laboratory or incidental fees in connection with any course.

Rules and Regulations. — As a guide to those who come to the College for the first time, the following extracts are taken from the regular rules of the College: —

The customary high standard of college men and women in honor, manliness, self-respect, and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the College, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend but also to name conditions under which students may remain in the institution.

It is the custom of the College that all parties, gatherings, and other social events should first have the approval of some recognized College authority.

The College. — The College campus occupies an attractive site three-quarters of a mile north of Amherst center. It is connected with the town and the railway station by electric car service. The College has over 700 acres of land, most of which is in a high state of cultivation, and illustrates most of the leading agricultural industries of Massachusetts. There is a large range of greenhouses of the most modern and approved type; there is a modern dairy barn with dairy cattle; there are good horses, pure-bred swine, sheep, and poultry; there are fields of corn, potatoes, clover, and grass in season; orchards of apple, peach, plum, and pear trees; tracts of good forest land, nurseries, and market gardens. There are also considerable tracts devoted to experiments, many of which are of unusual interest. Then there are well-equipped departments of botany, entomology, and chemistry, dealing in the most thorough manner with these special sciences. The advantages of the plant, equipment, and teaching staff are made available to Summer School students.

The Library. — The College library occupies the entire Chapel-Library building. It contains more than 65,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

Summer School students should be able to find excellent material for their line of College work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

The library hours are from 8 A.M. to 12 M., and 1 P.M. to 5 P.M. every week day.

AGRICULTURE, HORTICULTURE AND RELATED SUBJECTS

Poultry Husbandry. — This course includes a study of breeds and varieties, according to their standard and utility classification; incubation and brooding; housing; feeds and feeding; marketing eggs and poultry; and management of the flock. The laboratory exercises consist entirely of practical work. This includes a careful study of all the characters involved in selecting hens for high and low egg production; killing and dry picking, drawing, trussing, disjointing, and caponizing; a comparative study of scratch feed mashes, dairy, and slaughter-house by-products. Four lectures and one laboratory period a week; four weeks.

Professor Graham

Fruit Growing. — A study of modern methods of propagating, planting, cultivating, pruning, fertilizing, and spraying fruit trees; planning and managing orchards; selling fruit. Lectures, demonstrations, and field exercises. Five exercises a week; four weeks.

Professor Van Meter

Floral Arrangement. — A study of the principles underlying the arrangement and use of cut flowers and plants; basket and vase arrangements, table decorations, home, church, and other interior decorations; some time will be devoted to funeral designs; a study of color as applied to such work. Two lectures and three two-hour laboratory periods per week; four weeks.

Professor C. L. Thayer

Vegetable Gardening. — To-day there is more scientific interest in the value of vegetables in the diet than ever before. Fresh vegetables are most desirable in this respect. This course will bring out the value of vegetables in the diet, and principles underlying the successful production of a constant and continuous supply of those vegetables most desired and required by the family. These principles will apply to the home, school, community, or factory garden. Actual work in application of these principles will be carried out in the College gardens, in the open air, and at the time of year most desirable for gardening. The Department of Vegetable Gardening has about ten acres devoted to the production of vegetables. The type and variety garden provides opportunity for one to become acquainted with over 250 types and varieties of vegetables. Three class hours and two two-hour laboratory periods a week; four weeks.

Assistant Professor Harris

Food Preservation I. — This course aims to place before the student the latest and best methods in canning, evaporating, and the making of fruit and vegetable products, together with a study of the most approved types of equipment.

Fruits and vegetables will be canned in both tin and glass, using the hot-water bath, the water-seal canners, steam-pressure canners, and steam pasteurizer. Special attention will be given to the preservation of fruits and fruit juices for culinary purposes. Both home and commercial types of evaporators will be used for evaporating such fruits and vegetables as are available.

The manufacture of various fruit products, such as jams, jellies, preserves, butters, pastes, and leathers will occupy about one-half the course. The home manufacture of vinegar, sauerkraut, hominy, and other commonly used products will be studied if time permits.

Special attention will be given to the utilization of the surplus and cheap grades of fruits and vegetables so frequently a source of loss to the grower.

The course is planned primarily for the housewife and the teacher, but much of the work may be adapted to the community center of the small home factory. This course is a practical one, in that all theories and principles discussed in lectures will be applied by the student in the laboratory work.

Two lectures and three two-hour laboratory periods per week; four weeks. Class limited to fifteen students.

Mr. Robertson

Food Preservation II. — This course is offered for those who cannot devote the full four weeks to this type of work. Either the canning and drying or the manufacturing of fruit and vegetable products as outlined above will be studied, as the class may elect. Two lectures and three two-hour laboratory periods; last two weeks. Class limited to fifteen students.

Mr. Robertson

Beekeeping. — This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand practical experience with bees, to the end of enabling their proper maintenance for any purpose, — horticultural, educational, or agricultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus, and in the manipulation of bees. Three class hours and two two-hour laboratory periods a week; four weeks.

Assistant Professor Cassidy

Insect Life. — This is an introductory course arranged with particular reference to the needs of teachers in grade schools and high schools who are expected to teach about insects, either as a part of nature study or in their relation to agriculture. The course is also planned to be a useful one for persons not teachers who desire a general knowledge of insects and methods for their control. Familiarity with the most common insects, particularly the injurious ones, a general knowledge of how they live and how and when they may best be attacked, are the main topics included in the lecture work. Field exercises, examining living insects, their habits, and the injuries they cause will be arranged for in addition to the regularly scheduled hours for those who may desire them. Five exercises a week; four weeks.

Assistant Professor Alexander

Bird Life. — A first-hand study of the local bird fauna, conducted largely in the field. Special attention is given to economic relations of the birds and to nesting habits. In addition to daily lectures on birds, walks will be taken each afternoon for field observation and study of songs, habits, etc. Five exercises a week; four weeks.

Dramatic Presentation. — The great field for the drama in the rural communities as an aid to scientific methods in agriculture, high standards in rural life, and for self-development and delight, makes some knowledge of the interpretation of plays, of the stage and its parts, of its effective use and of the art of acting, very desirable. The members of this class will be rehearsed in several plays. Each member will appear in one or more plays. One or two of the best plays will be given a final presentation before the school. Five hours a week; four weeks.

Professor Patterson

Design and Practical Arts. — Lectures and laboratory work developing the value of design, color, and handwork as a rural school asset. Work in binding and its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, and rural dyeing; also other phases of rural prevocational subject-matter; also rural community craft-work. Those taking this work should bring 9 by 12 inch drawing paper, carbon paper, scissors, ruler, eraser, knife, and pencils. Five exercises a week; four weeks.

Mr. Ried and Miss Helen Allan

Elements of Rural Sociology. — A study of the religious, educational, and social ideals prevailing in rural communities; a consideration of rural institutions,

school, church, local government, and rural organization. The course is designed for those who wish a good general working knowledge of the subject-matter of rural sociology. Five periods a week; four weeks.

Professor Phelan

Hygiene and Sanitation. — The course will treat the following subjects: (1) the human body in health and disease; (2) micro-organisms of disease; (3) products of micro-organisms and disease production; (4) channels of infection; (5) air and health; (6) water supply; (7) sewage disposal; (8) milk supply; (9) food poisonings; (10) food infections; (11) reciprocal relation of body and causal agent of disease; (12) factors of resistance; (13) vaccines; (14) use of sera, etc.; (15) infectious diseases; (16) infectious diseases; (17) isolation and disinfection; (18) principles of personal hygiene; (19) public health organization; (20) health,—a private and public asset. This course is especially designed to meet the needs of public schools. Demonstrations and lectures. Five hours per week; four weeks.

Professor Marshall

Elemental Protoplasmic Studies (Microbiological). — A physical, chemical, vital interpretation of protoplasm, based upon the simplest forms of life. — unicellular forms, — for the purpose of establishing a rational basis in the understanding of the higher forms, especially man. This course will be approached from the scientific and philosophic nature of the problems, with the intention of having them reach into the issues of life. Five hours per week; four weeks.

Professor Marshall

HOME ECONOMICS

Foods I. Foods and Nutrition. — Fundamental knowledge of foods. A study of foods, their comparative composition, cost and economic value. Underlying principles of good nutrition, fuel requirements of the body under varying conditions according to age, weight, etc., in health and in sickness. Infant feeding and feeding of children. Planning of diets. Practice in selection and preparation of typical foods. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Hall

Foods II. Preparation and Serving of Meals. — Foods and Nutrition, or its equivalent in home experience in plain cookery, is a prerequisite for preparation and serving of meals. It is assumed that students know the technique of cookery before entering this course. This course includes a study of food combinations and menu making. There will be practical work in the preparation and serving of meals for the family with relation to the cost and nutritive value of the food and the time and labor involved in the preparation and service. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Hall

Clothing I. Garment Making. — This course is planned for those who have had little or no training in sewing. It aims to give knowledge of the technique and uses of various stitches and finishes ordinarily employed in the making of garments. It also includes operation of the sewing machine, a study of suitable materials, and the making of simple patterns, together with their practical application. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Grizzle

Clothing II. Dress Design and Construction. — Clothing I, or its equivalent, required for enrollment in this course. A study of the principles of design, line, color, and form as applied to the planning and making of dresses and the use of decorations. Individual types of figures and colorings will be studied with a

view to a becoming and tasteful expression of the personality of the wearer. Selection of materials and use of patterns will be considered in connection with the laboratory work. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Grizzle

Clothing III. Millinery. — The selection of color and form as related to the individual, the wardrobe, the occasion, and the season will be given careful attention. Laboratory work will include the making and covering of hat frames; trimmings, bows, pleatings, hand-made flowers, together with remodeling and renovating hats. Two lectures and three two-hour laboratory periods a week; four weeks. two sections.

Miss Bolingbroke

House Furnishing. — This course aims to develop good judgment and right standards in the selection and arrangement of home furnishings that they may express themselves in their environment. A well-arranged, attractive home contributes largely towards a contented happy home life. There will be discussions of color combinations, good spacing, also the treatment of floors, walls, and wood-work, and practical problems in the choice and arrangement of furnishing from a sanitary, economic, and artistic standpoint. Use will be made of illustrative material. Five lectures a week; four weeks.

Home Management. — Since women are largely responsible for all expenditures connected with the home, an important consideration in this course is the study of the family income and its equivalent in productive labor within the household, family expenditures and their regulations, and the budget as a measure of standards of living. Equally important is the standardization of household tasks, the study of special methods of work, the selection and care of equipment, and the use of time and labor saving devices. Five lectures a week; four weeks.

Mrs. Alice Dresser

INSTITUTE FOR ADVANCED STUDY IN AGRICULTURAL EDUCATION

This is the fourth session of the Institute for Advanced Study in Agricultural Education. Interest in the study and numbers in attendance have increased in each successive year. The experience of these years has proven the value of the institute as a clearing house of ideas in agricultural education; also in that time the plans for the work have clarified to the end of making it more helpful and stimulating. Time strengthens the conviction that the teacher of agriculture must know how the work of related fields is planned and carried out. Consequently some of the courses offered are directly agricultural method courses, and some have an indirect agricultural bearing. This applies to such matters as the supervision of agricultural teaching and the broader fields of vocational education as represented in Courses 104 and 108.

The Department of Agricultural Education and the Vocational Division of the State Department of Education, co-operating, offer the following courses at the College. They are planned to set out as clearly as possible many of those things which the teacher, director, supervisor, educational manager, or teacher-trainer should know and do in order to produce the most successful results. They are also of especial value to high school teachers and school superintendents who contemplate making agriculture an integral part of their school work. These courses are full of the experience and best judgment of men who have made good in the positions named above. The studies, lectures, and discussions cover the problems, relations, and possibilities of these lines of work. The student will probably find these courses so arranged on the schedule that he may employ practically all of his time in the study of methods if he so desires. It is expected that Mr. R. W.

Stimson, State Supervisor of Agricultural Education, will be here and carry the work in two of the courses for a week. Mr. R. O. Small, Director of Vocational Education in Massachusetts, will be here one week during Summer School.

51. Principles and Methods of Teaching.— This course covers many important phases of the general work of the teacher, illustrated by concrete cases of conditions met and a study of methods to be employed to benefit the learner. Project method, illustration, demonstration, field trip, question, lesson plan, etc., are the points discussed. Duplication in consecutive years is avoided. Five hours per week; four weeks.

Professor Welles

76. Special Methods in Agricultural Teaching.— Covers important items that make for success in this work as a special field. The case method is that generally used, drawing cases from the experience of those in the group, with an analysis of the case and study of method used to help the student to success. Duplication in consecutive years is avoided. Five hours per week; four weeks.

Professor Welles

103. Professional Improvement Problems.— The name of this course indicates its adaptation to special needs of the particular people in the group. The subject matter varies from one season to another. It is a seminar course primarily for employed teachers and directors of vocational agriculture (prospective candidates admitted). It deals with the Massachusetts system as it is and the problems confronting the instructor. It includes plans for the coming season and campaigns for improved methods based on experiments of men in service. It may include such topics as "Measurement of Results of Teaching," "Correlated and Related Study," "The Home-Project Basis of Teaching," "Summer Teaching," and "Individual Differences." Duplication in consecutive years is avoided.

In case a sufficient number of both experienced and untrained men apply for this course, the group may be divided into two sections. Five double periods each week for the first two weeks; five single periods each week for the remainder of the term.

Mr. Heald

104. Supervision and Administration of Agricultural Education.— This course covers the problems of agricultural teaching as seen by educational managers, State directors, and supervisors of agricultural education in maintaining the efficiency of this work in the State. It deals with the interrelations of the work of teachers and administrators. This course is conducted on the three-year rotation plan, obviating the difficulty of duplication in consecutive years. Five hours per week; four weeks.

Mr. Stimson, Mr. Heald, and Professor Welles

108. General Field of Vocational Education.— Considers the general scheme of organization of vocational education with its legal basis and general application; also a study of what other States are doing in vocational education and how the work is done. This course is conducted on the three-year rotation plan, obviating the difficulty of duplication in consecutive years. Five hours per week; four weeks.

Mr. Stimson, Mr. Heald, and Professor Welles

Graduate Seminar in Agricultural Education.— A graduate seminar will be conducted for students already enrolled in this department, as well as others qualified to matriculate in the Graduate School of the Massachusetts Agricultural College. This work may be done with or without reference to securing an advanced degree. Credit will be given in accordance with the amount and character of work done. Time and topics for study will be arranged to suit individual needs.

Professor Welles

SHORT COURSES AT MASSACHUSETTS AGRICULTURAL COLLEGE

THE WINTER SCHOOL

The dates of this school are approximately from January 1 to March 10. The following subjects are offered: general agriculture, including agronomy, types and breeds, live-stock feeding, animal breeding, dairying, animal diseases, poultry husbandry, fruit growing, vegetable gardening, floriculture, horticulture, farm management, botany, entomology, sanitation and hygiene, farm structures, etc.; home-making, including foods, clothing, business of the household, and home care of the sick; professional improvement problems and agricultural education. The Winter School appeals to practical farmers and all who wish short, intensive, yet thorough courses suited to the practical man.

TWO-YEAR COURSE

The Two-Year Course is divided into seven sections, — dairying, animal husbandry, poultry, floriculture, horticulture, pomology, and vegetable gardening.

The first year consists of six months' study at the College and six months of required farm placement training, under the supervision of the College. During the placement period the student is expected to learn much of the practical side of of his particular vocation. He is recommended to a position. These positions are on farms, in dairies, greenhouses, poultry plants. The nature of the position depends on the student's particular interest.

The second year consists of nine months' study at the College. On the completion of the course a certificate is granted. Tuition is free to residents of the Commonwealth.

ONE-YEAR VOCATIONAL POULTRY COURSE

This course is limited to 12 students. It begins January 1 of each year. Students are required to do a large amount of practical work at the College plant. It provides excellent training for the man who wishes to go into poultry as a business. In the past it has been one of the most popular of the Short Courses.

THE COURSE FOR COUNTRY CLERGYMEN

The program for this course is arranged each year to meet the needs of the clergymen in small communities. A copy of the program may be had by writing to the College.

APPLICATION FOR ENROLLMENT

IN THE

SUMMER SCHOOL

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

Name

Date of application

Post office.....Street.....State.....

Present occupation.....

Previous education.....

Name and address of person to whom word may be sent in case of illness or accident:

.....

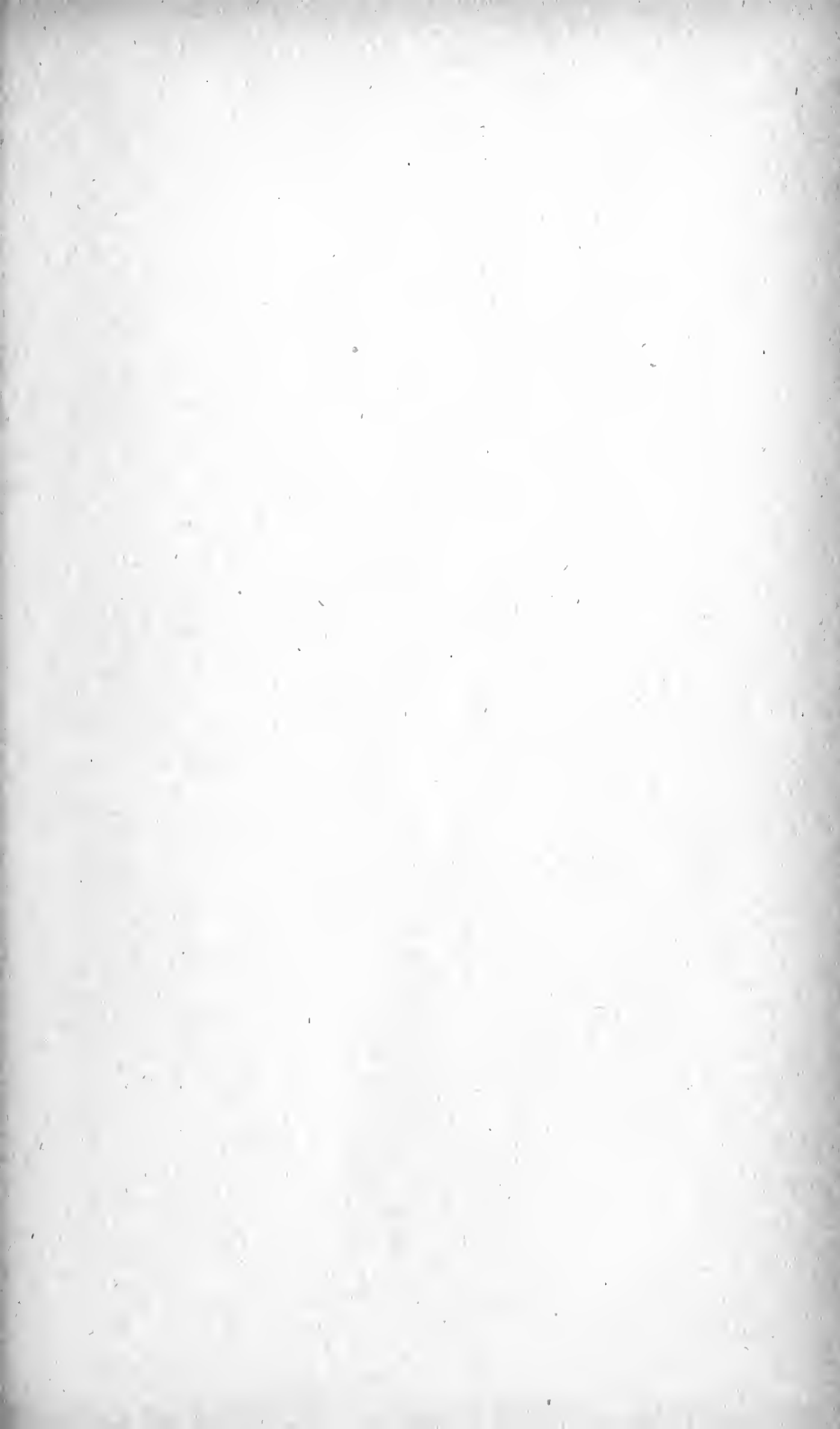
Kindly give us the names and addresses of two persons to whom we may refer for a statement of character.

1.....

2.....

Mail this blank to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College.





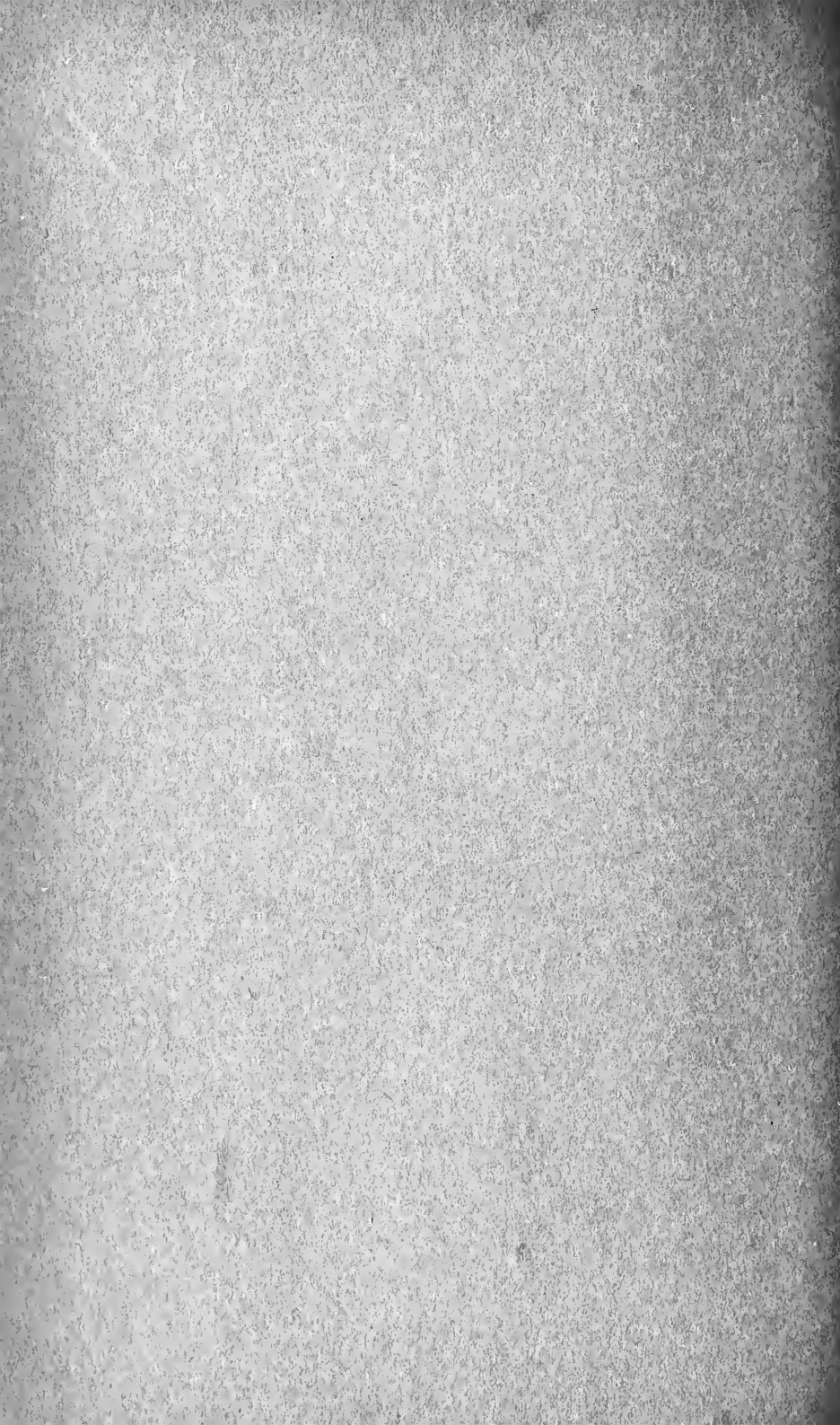


MASSACHUSETTS
AGRICULTURAL COLLEGE

REPORT OF THE PRESIDENT
AND OTHER OFFICERS OF
ADMINISTRATION



1922



THE M. A. C. BULLETIN
AMHERST, MASSACHUSETTS

VOLUME XV JUNE, 1923 NUMBER 5

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THE SIXTIETH ANNUAL REPORT OF THE
MASSACHUSETTS AGRICULTURAL COLLEGE

PART I.—THE REPORT OF THE PRESIDENT
AND OTHER OFFICERS OF ADMINISTRATION
FOR THE FISCAL YEAR ENDED NOV. 30, 1922



PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
COMMISSION ON ADMINISTRATION AND FINANCE

DEPARTMENT OF EDUCATION
THE COMMONWEALTH OF MASSACHUSETTS

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION, Boston, February 6, 1923.

To the Honorable Senate and House of Representatives.

GENTLEMEN: — In accordance with the provisions of section 32 of chapter 30 of the General Laws, I transmit to you herewith, for the use of the General Court, the annual report of the Massachusetts Agricultural College for the year ending November 30, 1922.

Respectfully yours,

PAYSON SMITH,
Commissioner of Education.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Nov. 29, 1922.

To the Commissioner of Education.

SIR: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to submit herewith Part I of the sixtieth annual report of the trustees, for the fiscal year ended November 30, 1922, this being the report of the president of the college and other officers of administration to the corporation.

Respectfully yours,

KENYON L. BUTTERFIELD,
President.

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Members of Advisory Board of Education

Ex officio THE COMMISSIONER OF EDUCATION, *Chairman*

Term expires

1923.	SARAH LOUISE ARNOLD	Riverbank Court, Cambridge
1923.	Mrs. ELLA LYMAN CABOT	1 Marlborough Street, Boston
1924.	WALTER V. McDUFFEE	Central High School, Springfield
1924.	ARTHUR H. LOWE	Fitchburg
1925.	A. LINCOLN FILENE	426 Washington Street, Boston
1925.	THOMAS H. SULLIVAN	Slater Building, Worcester

Massachusetts Agricultural College

KENYON L. BUTTERFIELD, *President*

TRUSTEES

Ex officio HIS EXCELLENCY CHANNING H. COX

Ex officio PAYSON SMITH, *Commissioner of Education*

Ex officio ARTHUR W. GILBERT, *Commissioner of Agriculture*

Ex officio KENYON L. BUTTERFIELD, *President of the College*

Term expires

1924.	HAROLD L. FROST	Arlington
1924.	FRANK GERRETT	Greenfield
1925.	CHARLES H. PRESTON	Danvers
1925.	CARLTON D. RICHARDSON	West Brookfield
1926.	DAVIS R. DEWEY	Cambridge
1926.	JOHN F. GANNON	Pittsfield
1927.	ARTHUR G. POLLARD	Lowell
1927.	GEORGE H. ELLIS	Newton
1928.	ELMER D. HOWE	Marlborough
1928.	ATHERTON CLARK	Newton
1929.	NATHANIEL I. BOWDITCH	Framingham
1929.	WILLIAM WHEELER	Concord
1930.	CHARLES A. GLEASON	North Brookfield
1930.	JAMES F. BACON	Boston

OFFICERS OF THE TRUSTEES

HIS EXCELLENCY CHANNING H. COX, *President*

CHARLES A. GLEASON of North Brookfield, *Vice-President*

RALPH J. WATTS of Amherst, *Secretary*

FRED C. KENNEY of Amherst, *Treasurer*

CHARLES A. GLEASON of North Brookfield, *Auditor*

Department of Education

- Division of Elementary and Secondary Education and Normal Schools
- Division of Vocational Education
- Division of University Extension
- Division of Education of Aliens
- Division of Public Libraries
- Division of the Blind
- Teachers' Retirement Board
- Massachusetts Nautical School
- Massachusetts Agricultural College
- Bradford Durfee Textile School, Fall River
- Lowell Textile School
- New Bedford Textile School

REPORT OF THE PRESIDENT OF THE COLLEGE.

Gentlemen of the Corporation.

REVIEW OF THE YEAR.

Death of Dr. James B. Paige.

After a leave of absence of nearly one and a half years on account of illness, Dr. James B. Paige died October 5, 1922. Dr. Paige was a graduate of the Massachusetts Agricultural College in the class of 1882; subsequently he pursued the study of Veterinary Science at Montreal Veterinary College, McGill University, and in the Thierartzlichen Hochschule, Munich, Germany. He joined our teaching staff in 1890 as professor of Veterinary Science and subsequently became Head of the Department. In this capacity he directed not only the teaching but also the research of the Department, and in later years had charge of the work developed under the poultry disease elimination law. From 1909 to 1911, he served as Dean of the College in the absence of Dean George F. Mills. In the passing of Dr. Paige, the College lost an efficient teacher and a faithful servant. The following tribute was accepted by the faculty at a recent meeting:

To the memory of James Breckenridge Paige, D. V. S., member of the class of 1882 and of the faculty of the Massachusetts Agricultural College.

In the death of James Breckenridge Paige, the Massachusetts Agricultural College has lost a distinguished alumnus, teacher and friend. His connection with the college covered a period of over forty years. He served the college with distinguished success as a teacher, investigator, and administrator; he also gave valuable service to the Commonwealth as a member of the General Court.

In the discharge of these responsibilities he served his country and college with staunch integrity. He was a man of high ideals and firm principles, manifested both in his relations with his fellow teachers and students and in his devotion to the search for truth. His principles were the result of long and conscientious thought, and once determined were courageously supported in the face of every difficulty. We hold him in grateful memory as a patriotic citizen, a loyal colleague, a close personal friend.

Reorganization of the Department of Veterinary Science.

Following the retirement of Dr. Paige, the Department of Veterinary Science was reorganized as the Department of Veterinary Science and Animal Pathology with Dr. George E. Gage as Professor and Head of the Department. Dr. Gage joined our staff in 1911 and, with the exception of an absence for war service, has been in the employ of this institution since that date. He is a graduate of Clark University with the class of 1906, and pursued graduate study at Yale University from which he received the degree of M.A. in 1907 and of Ph.D. in 1909. During the war he served as captain in the Sanitary Corps of the army and spent several months in France.

Retirement of Major Frederick E. Shnyder.

As a result of the policy of the War Department to reduce materially its number of commissioned officers, Major Frederick E. Shnyder was in November placed upon the retired list. In 1920-21 Major Shnyder served as Assistant Professor of Military Science and Tactics in our institution with Col. Richard W. Walker, and upon the transfer of the latter to another post, Major Shnyder was in 1921 made Commandant. Under his direction the standard of excellence in military

drill has been constantly elevated. He was respected and liked by the students and his retirement was cause for sincere regret by students and faculty alike.

Major Herman Kobbé, who has been Assistant Professor of Military Science and Tactics since 1921, succeeds Major Shnyder as Commandant. Being thoroughly familiar with the development of the military work at this institution and having the confidence of the faculty and students, Major Kobbé will doubtless continue to maintain a high standard for the military work here.

Our good fortune in having a cavalry unit assigned to the college — one of but a half dozen in the United States — is exemplified in the increasing popularity of the military drill. We now have sixty horses from the War Department with a liberal complement of soldiers and supplies. A major and two captains are assigned for instruction service. That the students are responding to the opportunity is shown by an enrollment in the advanced course of 9 seniors and 16 juniors. The Reserve Officers Training Corps is thoroughly justifying itself so far as this College is concerned, both from the standpoint of enabling the students to get the maximum educational value from the military discipline and in the training of reserve officers for the army.

Withdrawal of Professor Lockwood.

Professor W. P. B. Lockwood, upon his request, has been relieved of his duties as Professor of Dairying and Head of the Department. This position he had held since 1909; during this period of service he rendered conspicuous service not only to the College but to the dairy interests of the state as well. Under his direction Flint Laboratory was built and equipped, and the "major" in dairying organized. Professor Lockwood is a man of unusual administrative ability and was constantly called upon to work out problems not immediately connected with his department. For example, he organized the class schedule on a permanent and satisfactory basis; this task was a difficult one due to the constantly increasing number of courses which were being placed in the curriculum as well as to the development of the major system of studies. During the war, Professor Lockwood was one of our most valuable men in organizing various types of public safety work. More recently he gave considerable attention to the work of vocational counselling of students. After the close of the war, Professor Lockwood became interested in the promotion of a more extended use of milk and other dairy products on a New England basis; and for two and one-half years before his retirement from the Head of the Department gave largely of his time to this educational promotion work. Professor Lockwood is still retained on part time pay as Professor of Extension Dairying. Professor H. F. Judkins is serving as acting Head of the Department of Dairying.

Resignations.

During the year there were fewer resignations from the professional and clerical staffs than in any of the preceding five years. There were twelve resignations from the professional staff, nineteen from the clerical and secretarial staff, and two from other salaried positions. The list of resignations does not include any department head. It appears that for the present at least the serious over-turn of staff due to inadequate salaries has been partially checked. We still fail, however, to pay our men in the more responsible positions salaries which compare favorably with those paid men holding similar positions elsewhere.

Commencement.

The usual commencement exercises were held June 23 to 27, the commencement address on June 27 being given by Bishop Francis J. McConnell of Pittsburgh, Pennsylvania. The degree of B.Sc. was conferred upon 94 men and 5 women; the degree of M.Sc. conferred upon 3 men and 1 woman; the degree of Ph.D. upon 2 men.

Burning of the Chemistry Laboratory.

Early in the morning of September 6, the old chemistry laboratory was completely destroyed by fire. The building was valued in the college inventory at about \$8,000 but its replacement value was several times that amount. In spite of considerable salvaging the loss on equipment is estimated at about \$18,000. The College immediately requested the State Department of Public Safety to make an investigation as to the cause of the fire. In its judgment the fire was caused by the breaking and consequent leaking of nitric acid on to the wood work of a shelf and partition. While this building was a sort of "standing joke" and had even been characterized by an investigating committee as "a disgrace to the Commonwealth", its passing not only caused considerable inconvenience and loss, but is to be regretted as a matter of sentiment. It was the first of the College buildings to be erected for class purposes; it had been used by probably every four-year student throughout the history of the institution; and it was in this building where one of the great teachers of the College, Dr. Goessmann, did his work and where he trained some of the ablest and most useful of the alumni of the College.

Fire Protection.

Beginning some fifteen years ago there was instituted a system of fire protection at the College which it was hoped would prevent serious fires. Two night watchmen each make three or four rounds of the entire property each night; hand fire extinguishers are found on every floor of every building; the College itself possesses some 1050 feet of hose and two hose carts, one of which has a forty-gallon chemical tank. When the town of Amherst purchased its fire truck some eight or ten years ago, the College contributed a thousand dollars on condition that the truck should be equipped with a pump, the fear being that for some of the buildings the existing water pressure is not sufficient. Curiously enough the first test of this pump after it was purchased, was made on the chemistry building itself and the stream was thrown many feet above the roof from the lowest point surrounding the building. In addition to these precautions one of the best fire chiefs in western Massachusetts inspected the institution and made a number of suggestions concerning protection. After the chemistry fire the Department of Public Safety was asked to make still another survey and the State Fire Marshal himself as well as one of his deputies has gone over the institution. The final recommendations from this Department are not yet at hand but will be submitted as soon as they come to our hands.

Legislative Appropriation in 1922.

The legislature of 1922 provided special appropriations for the undertaking of three major projects, namely, the construction of a new chemistry laboratory, improvements at the power plant, and the purchase of the "Brooks Farm."

The new chemistry building is in process of erection and it is hoped it will be ready for occupancy by the beginning of the next fall term. The reduction of the requested appropriation by \$50,000 necessitated a severe cut in equipment and some changes in the building. We are to have at last, however, a thoroughly modern and well built chemistry building, substantially fire proof, well arranged, and planned for expansion. When the building is completed a full description will be recorded.

The main improvements at the Power Plant made possible by the Legislative appropriation of \$63,000 are: 2 405 horse power Heine boilers with equipment, including stokers, feed pump, and water heater; 1 300 kilowatt generator and turbine.

The acquisition of the Brooks Farm is particularly fortunate at this time. Owing to the erection of Stockbridge Hall, Flint Laboratory, Abigail Adams House and

the chemistry laboratory, serious encroachments in recent years have been made upon the test plots of the Experiment Station; furthermore the institution has not had suitable land which it could devote to experimental work in tobacco and onion problems, which have in recent years brought serious losses to farmers in the Connecticut Valley. The Brooks farm has been designated by the Trustees as the "William P. Brooks Experimental Farm" and will be used primarily for the purpose of research.

Gifts to the College.

During the past year three bequests of note have been made to the College as follows:

- I. "Massachusetts Agricultural Society Loan Fund" of \$500.
The purpose of this loan is to assist students, with preference for those planning to pursue agricultural work, to pay their college expenses.
- II. Gift of \$10,000 from the Bay State Agricultural Society, on the following terms:
"The Bay State Agricultural Society gives to the Trustees of the Massachusetts Agricultural College the sum of \$10,000 and some \$500 accumulated interest, to be held by them and to be known as the J. D. W. French Fund.
"It is our desire, as Mr. French was especially interested in Dairying and Forestry, that the Trustees use the income from this fund, so that in their judgment it will do the greatest good to students in dairying and its allies, also Forestry, either as scholarships, loans, or prizes. We should prefer, however, that when it seems most advisable, the income be used to help pay the expenses of a judging team to go from the Massachusetts Agricultural College to the National Dairy Show or National Live Stock Show."
- III. Land from the Cornelia Warren estate at Waltham, including approximately 54 acres and certain farm buildings. Because of the advantageous location of this land as well as its adaptability for experimental work, and after careful consideration by the Trustees the conclusion has been reached that the interests of the market gardeners will be better served by disposing of the present Market Garden Field Station and equipment at North Lexington and re-establishing the Station at Waltham. Consequently a bill has been submitted for consideration by the forthcoming legislature authorizing the Trustees to dispose of the Market Garden Field Station at North Lexington with the understanding that the work will be re-established at Waltham.

Enrollment of Students.

In courses of Collegiate Grade: This autumn the registration of students in work of collegiate grade is 537, approximately the same as in 1921. The entering class numbers 187 as compared with 162 of a year ago and 135 of two years ago. Owing to the large number of last year's freshman class who failed in their studies, the present sophomore class is unusually small. The number of graduate students is approximately the same as last year, as is also the number of special students. The total number of women students is 49, twenty of whom are entered with the freshman class. Of the 32 girls who were enrolled in the four year course of a year ago but 19 returned this autumn. Of the remainder some failed in their college work, but the majority transferred to other institutions in order to secure training in departments of work not offered at this institution.

In the Two-Year Course: There is a decrease in the enrollment of Two-Year students. In 1920 the enrollment numbered 277, in 1921, 293, and in 1922, 257. Instruction in "unit" courses to Federal Board students has been discontinued, it now being the policy of the Federal government to centralize instruction of this character in fewer institutions, each caring for a larger number of students than formerly.

In the Summer School and Other Short Courses: The Summer School of 1922 had an enrollment of 186 students. This was smaller than in the preceding two years, due to the fact that the Summer Training Courses organized by the Department of Education were this year given at the North Adams Normal School.

Total Enrollment: The total enrollment this autumn is 803, of whom 537 are enrolled in work of degree grade and 266 in the various short courses. During the year the total number of students registering at the College, including the classes graduated in June from the Two-Year and Four-Year Courses, has been approximately 1,300. (For details see pages 30, 31.)

Attendance at Agricultural Colleges.

Recently statistics have been gathered listing the attendance at the agricultural colleges of the country during the past three or four years. It was well known, of course, that the war practically closed our colleges for all real college work. But since the war there has been a tremendous influx of students into many of our colleges. However, nearly every agricultural college in the country shows a decrease of attendance during the past three years, in some cases amounting to a loss of a third. Our own College has just held its own during this period with respect to four year students, and inasmuch as each freshman class has been larger than the preceding one, it would appear that we are again on the upward curve. Probably the agricultural depression in New England is felt somewhat less than it is in the great agricultural areas where conditions are such as to discourage young men training themselves for practical agricultural pursuits.

Review of the Year in Academic Departments.

In June there was submitted to the faculty and alumni a report on the course of study made by a committee appointed for this purpose by the Associate Alumni; the chairman of this committee was Herbert J. Baker, 1911, Director of Extension Service in Connecticut. The committee consumed nearly a year in its investigation and made a careful inquiry among alumni and former students as well as the faculty and undergraduates. The report was one of the most comprehensive studies which has been made of our curriculum problems and called to the attention of the faculty and alumni many fundamental problems which confront not only our institution but probably every institution as well. The report met with general favor among the faculty and as rapidly as possible the principal recommendations will be put into operation.

The work of the freshman year was modified for the class entering this autumn. Beginning with this class also the so-called M. I. T. system of evaluating credits was adopted. It is proposed to make this plan of evaluating credits applicable to all future classes entering the College; also to gradually revise the course of study as the class entering in 1922 advances toward graduation; such a procedure will avoid a general reorganization of the curriculum and the confusion attendant thereon.

During the year, Dr. Alexander E. Cance, Head of the Department of Agricultural Economics, spent considerable time in Washington at the request of the Secretary of Agriculture to assist in the Agricultural Conference called by President Harding and to advise relative to the organization of research work in the Federal Bureau of Markets.

From an address recently made by Professor H. B. Dorner, Head of the Department of Floriculture at the University of Illinois it appears that the Department of Floriculture at this institution is the oldest separate Department of Floriculture in the United States; that it ranks third in the amount of glass used in floricultural work, being surpassed by the University of Illinois and Iowa State College; and that it ranks third in amount of funds appropriated for floricultural work, being exceeded by Cornell University and the University of Illinois.

The laboratory space available for the Department of Horticultural Manufactures is so restricted that this last year it became necessary to place a limit upon the number of students electing courses in this Department. The relief which will be secured by a laboratory for this Department is greatly desired both by students and members of the Department.

The Infirmary.

Dr. Marshall, who has charge of the infirmary, again calls attention to the present inadequate facilities afforded by the present infirmary accommodations and says in part:

The quarters are inadequate. I sincerely and fervently hope some way may be found to provide the main hospital. The number of patients in sickness other than communicable is growing, each year making a continuous demand upon our facilities. Further, these wards we now have or cottages designed for infectious diseases were never intended for permanent dwellings for nurses or living quarters.

The coming of young ladies to the institution has brought new difficulties, for the two sexes cannot be handled together with economy and satisfaction in the present cottages. When some drastic epidemic, as the influenza, comes, I dread to think of what may happen. If death occurs to a sick student lodged at Draper Hall or elsewhere we are likely to be blamed for years after. *Some action is very much needed.*

SOME IMMEDIATE PROBLEMS.

For some while it has been my custom to treat in this annual report some one outstanding theme concerning College policy or need. This year there is no one subject that seems to call for major discussion; on the other hand we are facing a number of questions of considerable consequence. As briefly as possible, I wish to call some of these to your attention.

Administrative Relations.

You will recall that I appeared in August, 1921, before the Commission on State Administration and Expenditures and made a frank statement concerning the operations of the present laws as they affect the College. We all hoped that the Commission would make recommendations which, if enacted into law, would give us substantial relief, and it was a matter of great regret that this did not happen. The present plan of control, as applied to an educational institution, is based on a fundamental fallacy, namely, that centralized control of expenditures secures greatest efficiency. We do not ask to be relieved of overhead restraint. We have never even suggested that we be free from responsibility to the Legislature. We do ask for a set of laws and regulations that will give us complete responsibility of management, under such audits, reviews, inspections, or checks as are thought necessary both to the public good and to our own effectiveness.

"A State University."

The State Commission on Technical and Higher Education visited the college on November 15, spending the entire day here. We outlined to the Commission the present agricultural work of the College, indicated the importance of developing the institution more completely as a "food-supply college", and stressed the wisdom of conserving and promoting these two aims of the College even if enlargement of scope in other fields might eventually seem wise. We cannot, of course, anticipate the report of the Commission, but it is obvious that if there is to be in Massachusetts any increase in facilities for higher education at public expense, the policy and probably the scope of the College will be markedly if not profoundly affected.

Scholarship and Student Activities.

A committee of the Alumni, a committee of the Faculty, and a committee of students considered last year the whole problem of "student activities", and their report is now under consideration by the Faculty with reference to the possibility of definite changes in some of our plans. Most teachers probably have a feeling

that athletics and other student activities are overstressed in these days. Possibly the truth is not that too much time and thought are given to these matters, but that not enough time and enthusiasm are given to scholarship. With most students there is probably a good deal of time now wholly wasted, going neither to the activities on the one hand nor to the studies on the other.

Interchurch Student Secretary.

We all admit the importance of religious education, and yet we find it difficult to agree upon a plan which will be effective and still not offend religious beliefs or differences. This, of course, is especially true in a state institution. For many years now our system of morning chapels, weekly assemblies, and the plan of Sunday chapels for a part of the year voted by the student body, seems to have worked very well. A student is excused from all of these exercises if his request is based upon religious scruples. However, it has long been felt that this system was not enough, and various efforts have been made to provide more fully both religious education and counsel. Many students these days are puzzled concerning religious questions, and they need a friendly, wise man whose business it is to try to help them. Various national church boards finally agreed to assist financially, provided funds could be raised from other private sources, such as students, alumni, and friends of the College. This has been done and the Advisory Board employed Rev. John B. Hanna to become the Interchurch Student Secretary. Mr. Hanna entered into his task with great enthusiasm and the plan gives promise of being a great success. It involves the College in no expense.

Course of Study.

Already, in the review of the year, reference has been made to the report of the Alumni Committee on course of study and as indicated steps have already been taken to carry out some of the recommendations. It is slow work revising a course of study. It must be done cautiously. There are many practical details to reconcile as well as fundamental considerations to be agreed upon, particularly at the time when educational principles are under sharp discussion with wide divergence of views, is it important to make haste slowly.

It is sometimes thought that State supported institutions may well have lower standards of scholarship than endowed institutions. I do not agree. It should be the policy of a State supported institution to give as wide an opportunity as possible for students to enter, but the standards of work within the institution itself should be high, if not exacting. At any rate, the diploma and degree from a State institution should certify quite as much in the way of thoroughness and quality of work as a similar degree from any other institution. In connection with this problem of course of study, I may say that personally that I have had a growing conviction that the first year of attendance in the four-year course should be made a thoroughly effective year of testing for the student. The course should be required in all particulars and it should be a time of adjustment for the student in order that he may make up deficiencies, choose his major line of study, learn how to master his lessons, to make and maintain his personal program and schedule, and in other ways to orient himself. He should have the best of teaching and sufficient personal counsel and guidance to lead him, if possible, to "find himself". No student should be admitted to work in the upper three years unless he gives promise of reasonably successful prosecution of the work there required.

Graduate School Problems.

A special committee on the work of the Graduate School was appointed last spring, and the graduate staff has accepted their report. No radical changes are made. One of the two principal recommendations looked toward the broadening and liberalizing of the course of study for graduate degrees, thus preventing too narrow specialization; and the other accepted a policy of granting special degrees

for rather specialized professional work: we already give, for example, the degree of "Master of Landscape Gardening." It is proposed to offer these special professional degrees only as there seems to be a rather clearly developed recognition of what is essentially a new profession.

Alumni Endowment Committee.

Before the war a committee of alumni was appointed to consider the question of private gifts to the institution. The committee has recently been reconstituted with Professor C. S. Plumb '82 as chairman, and plans are under way for rather thorough organization of the work of pressing the claims of the College upon individuals. There is no reason why private gifts coming from people interested in education and especially in agriculture, should not be available. A growing educational institution always has needs far beyond any possible source of income. Moreover, there are always in a State institution many demands which it is difficult to supply from State funds, sometimes because they are insufficient, sometimes because there is a prejudice against such expenditures. Moreover, as a college of agriculture like any other institution renders such a fundamental service to the welfare of society, there is the same argument for private gifts as there is on behalf of the endowed institution. It is believed that many individuals quite outside of the alumni body, once they understand the work and needs of an institution like ours, may be persuaded either directly or in their wills to make substantial gifts to the institution.

Professional Improvement.

I trust that your Board of Trustees may soon announce a plan for encouraging the professional improvement of members of the staff. We have here a problem of first importance, not only because we need to give the members of the staff every chance to keep growing, but because with the scale of salaries as it is we must give some measure of real and substantial encouragement. Details of such a plan are of importance, but the main thing is to have a general policy in operation so that the staff may make their own personal plans for taking advantage of it.

Town Representatives.

Two years ago we inaugurated a plan of having a College representative in each town and city of the Commonwealth. At the present time we have two hundred and sixty-four. These men are, of course, serving without any perquisites and are rendering a real service to the College. We send them monthly bulletins of information. We ask them to let us know about prospective students, to distribute publicity material now and then, and this winter we hope to bring them together into county groups, in order to tell them more about the College. Many of these town representatives are alumni of the College.

Administrative Organization.

The administrative officers of the college are now considering a long list of suggestions looking toward the need of changes of organization of the institution on the administrative side. We are endeavoring to determine the function of different bodies such as the faculty, administrative officers, committees, etc., as well as to work out a plan of operation that shall minimize machinery while at the same time giving a business-like and effective administration.

Self-study of Expenditures and Questions of Reducing Costs.

There is little doubt but during the past few years the per capita cost of instruction at the College has increased. Some of this is due to higher prices for supplies as well as an increased use of supplies. The College coal bill for example, in 1913 was \$20,000, in 1923 it is estimated that it will be \$72,000. Increase in salaries, thoroughly justified, nevertheless means increased per capita cost of instruction.

The appreciably smaller attendance in four year work since the war is one of the material causes of this increase. We of the faculty are not unmindful of this situation and not only are we endeavoring to be as economical as possible, but material has been gathered in a sort of self-study of the institution which we hope may be useful in discovering opportunities for still further savings without impairing the quality of the work.

The Building Program.

Until the future policy of the College and its place in the system of education in the Commonwealth is more fully determined it may not be possible to carry out the plan which we have discussed in former years of announcing a long-term building program. But we do need to consider at this time what shall be the next one of the larger buildings which we shall ask of the Legislature. There seem to be three of particular importance, namely, library, gymnasium and armory, and dormitories. I have taken occasion to sound alumni sentiment and find it somewhat divided, with the majority perhaps in favor of dormitories as the first need. Students favor the gymnasium. Personally I favor the gymnasium.

Massachusetts Food Supply Program.

In my report for 1917 I called attention to the growing conviction on the campus that the approach to the problem of agriculture must be made from the standpoint of the consumer, and that consequently not only would our policy be affected by such considerations but that also this institution was particularly well equipped and must hereafter consider it its duty to become essentially a food supply institution. Evidences of the soundness of this decision continue to multiply. The United States Department of Agriculture has recently instituted rather thorough-going studies of consumption as well as distribution. The great farmers' organizations are at present particularly concerned in economical methods of distributing farm products, and manufacturers are beginning to show concern over the place of food supply in their problem. Nearly two years ago a campus committee was organized to study this whole question by making an analysis of the problem itself and then indicating what this institution can and should do in the premises. I trust that the committee report will be made available during the coming year. I regard this move as one of the most significant that the College has ever taken, not only from the standpoint of increased possibilities of usefulness to the Commonwealth, but because of enlargement of scope and breadth of the work of the College itself.

LEGISLATIVE BUDGET, 1923.

Projects for Permanent Improvement.

Chemistry Laboratory, \$150,000. — The Legislature of 1922 appropriated \$150,000 for the construction and equipment of a Chemistry Laboratory with the understanding that an additional appropriation of \$150,000 would be made by the Legislature of 1923. On this basis, contracts have been awarded for the construction of the laboratory, and the work is at this date well advanced.

Laboratory for Horticultural Manufactures, \$38,000. — The importance of utilizing various by-products of the farm which formerly were wasted, such as fruit and vegetables, was emphasized during the war, and under the direction of Prof. W. W. Chenoweth of this institution farmers came to see whereby this saving could to advantage be made permanent. In order to give adequate instruction in the preservation of fruit and vegetable products, a new laboratory building is essential. The plans provide for a one-story building of inexpensive construction, which will furnish laboratories for the various phases of this work.

The pressing need for this building is now generally understood. However, some of the principal considerations may be recapitulated as follows:

1. The department of horticultural manufactures now has its work widely distributed in four buildings, viz. Flint Laboratory, Wilder Hall, French Hall, and a

workshop on the hill near the cold storage plant. This wide scattering of the work is obviously very detrimental to it.

2. The principal teaching is done at Flint Laboratory in rooms which were designed for the use of the dairy department. The dairy department needs these rooms and would like to see the department of horticultural manufactures cared for elsewhere as soon as possible.

3. The present quarters are entirely inadequate for the teaching work. On account of the limited space the department has been compelled to refuse admission to numbers of students. This is perhaps the only department in the institution which has been compelled frequently to refuse admission to students on account of lack of space. All the teaching could be much better organized and more efficiently conducted in a new building designed for this particular work.

4. It is highly desirable that vigorous research work be undertaken at the earliest opportunity in the field of fruit and vegetable preservation and the manufacture of by-products. A strong demand exists for this work among fruit growers, but the subject is equally important to all consumers of food in Massachusetts.

5. The department is now carrying on important extension work, but these extension projects need to be strongly supported by effective work at the college, and especially by well-directed research work.

6. The Massachusetts Fruit Growers' Association, the Boston Market Gardeners' Association and other organizations have urgently requested this proposed building. This specific demand from the fruit growers and vegetable growers should be squarely met.

Tunnels from the Power Plant to Stockbridge Hall and to First Steam Pit South of the Power Plant, \$39,250. — The principal argument advanced in support of this project is the recommendation made by French and Hubbard, Engineers, who recently made a study of the present heating plan and future development for the same, "that a tunnel be constructed to Flint Laboratory and Stockbridge Hall and the piping arranged so that exhaust steam can be used in these buildings. We are firm believers in tunnels for steam mains of this kind, and believe that when it is necessary to rearrange the underground piping, that tunnels be constructed. We would recommend this both for economy in the long run and on account of convenience in repairs and pipe insulation."

At present none of the underground steam lines are enclosed in tunnels. The result is a high cost of maintenance because of the excessive radiation and because of the difficulty in locating and repairing leaks. Also, at present, the maximum use is not made of exhaust steam; this latter difficulty would be met by the project here outlined.

Development of the Market Garden Field Station at Waltham, \$25,000. — The trustees of the will of the late Cornelia Warren have offered to the college about fifty acres of land located near the Clematis Brook railroad station in Waltham. This area is admirably suited for experimental work with vegetable crops. There are about twenty-three acres of level, uniform, well-drained, upland soil naturally much better adapted for experimental purposes than is the present area at North Lexington; and about fifteen acres of peaty, swamp deposit, typical in many respects of the area of wet land now being reclaimed in many different parts of the State, primarily as a health measure, but potentially of great importance to agriculture.

In addition, there is the old farmhouse, which may be remodeled to serve as living quarters for the Field Station foreman, and likewise as administrative headquarters for the plant. There are a number of other smaller buildings, some of which can be utilized, others of which may have to be wrecked.

The opportunity for more thoroughgoing investigational and demonstrational work in vegetable growing is so apparent that the trustees of the college have accepted this gift. The sum of \$25,000 is needed to cover the cost of the initial equipment at the new Field Station, in order that work may be started in the late fall of 1923. This appropriation is needed to erect a thief-proof wire fence around the plant, to care for the remodeling and moving of one of the smaller buildings now on the place to serve as service headquarters; to build a greenhouse range and heating plant; and to make preliminary repairs on the house and other build-

ings. In addition, small appropriations will later be needed to care for the draining of the swamp and to make other improvements.

By vote of the trustees a bill is being introduced into the legislature authorizing the college to sell the North Lexington plant. It is expected that receipts from the sale of this plant will be approximately \$20,000. In effect, therefore, the initial cost to the State of the much larger plant at Waltham, a total of fifty acres as against twelve acres, with increased opportunity for effective work, will be approximately \$5,000.

Women's Gymnasium, \$15,000. — With the number of women students now attending the college, a gymnasium is becoming constantly more imperative. Lack of gymnasium facilities for girls is in some respects a more pressing problem than lack of similar facilities for men students because for the latter there can be organized outdoor sports of a wide variety. An appropriation of \$15,000 would provide a frame gymnasium for women students which would meet our requirements for a number of years.

Addition to Rural Engineering Shops, \$15,000. — The demand for instruction in Rural Engineering has greatly increased during the past four years. The Two-Year students in particular elect this work in large numbers. In view of the fact that such a large proportion of the instruction is given in laboratories, it is essential that in the interests of economy as well as convenience larger laboratory facilities be provided. In the opinion of the head of the department, the present laboratory and shop should be double in size; the appropriation here indicated would provide for an increase of 50% in the floor space of the existing facilities. This additional space would be used for instruction in the care of motors, farm machinery and in the making of concrete, and for the display of farm machinery and other equipment.

Roads, \$8,000. — The college is responsible for the upkeep of approximately two miles of road running through its grounds, — a road which is used constantly by the public. Over a section of approximately two thousand feet of this road all the coal which is used at the college is hauled by truck. About half this section was rebuilt with thin macadam several years ago; it is now, however, in poor condition and accordingly no portion of the roads passing through the campus is of first class construction. Negotiations have been entered into with the State Highway Department relative to a plan of co-operation between that department, the town of Amherst, and the college, whereby different sections of the roads passing through college grounds as well as certain roads approaching the college may be used as demonstrations of various types of road construction. In order that a beginning may be made on this test and also that a portion of the road bearing the heaviest traffic may be placed in suitable condition the sum of \$8,000 is requested to be expended during the ensuing year.

Tool Sheds and Garage for Division of Horticulture, \$6,000. — At present there is no garage in which to keep the service truck operated by the grounds department; it is stored in a shed with other equipment under conditions which are unsafe from the standpoint of fire risk. Furthermore, there is not sufficient shed room to house other equipment such as wagons, sleds, and plows which are used in the farm operations. If the present tool house were rearranged as is contemplated, the work of the service department could be carried on more satisfactorily and economically. The plan proposed provides for the rearrangement of an existing building in order to provide a larger storage room and for the equipment of a carpenter shop, blacksmith shop, and an automobile repair shop. It would also provide more adequate facilities for the storage of tools and the installation of a suitable washroom for the workmen.

Live Stock Replacement, \$5,000. — It is necessary to replace a certain number of live stock each year. Unless this is done, the college herd will deteriorate and the educational effectiveness will thereby be greatly lessened. A considerable amount of live stock is sold each year, but in view of the fact that all receipts of the college are turned into the State treasury, the funds thus derived from the sale of live stock cannot be used for the purchase of new animals. As a result of this situation which has continued for four years, a substantial sum of money should be expended

immediately in this department, and \$5,000 is requested for such expenditures during the coming year.

Calf Barn, \$5,000. — This appropriation is requested in order to construct a wing to the south of the present hay barn and of the same dimensions as the present young stock stable, but fitted with pens for a calf barn. This addition to the barns is considered essential for the proper care of the large number of young stock which is carried.

Improvements at the Tillson Farm, \$5,000. — Following out the project submitted a year ago and for which the legislature of 1922 made an appropriation of \$5,000, a second appropriation of like amount is requested to further the development of Tillson Farm as a poultry plant for experimental use. This last year four unit houses, 30 x 30 feet, were built, a water supply was developed, and the old cellar on the place was repaired and roofed over to serve as an incubator cellar. The appropriation here requested is to cover the cost of the station requests for living quarters for the foreman of the experimental farm, for feed room, shop, operating room, office and storage; and for a laying house for pullets, the total cost of these being estimated at \$5,000. Since there will be at various times from 1,500 to 4,000 birds kept on the farm, the necessity of having the foreman resident at the plant will of course be apparent to all. This appropriation will not cover all of the requirements of the new plant, but will put it in condition for effective use this coming year.

Superintendent's Cottage at Farm, \$5,000. — The barns where the sheep and swine are housed are located a considerable distance from the main stock barns. The shepherd who has charge of the sheep and swine lives a mile distant. Frequently, during the winter months especially, the caretaker should be sufficiently near the stock to enable him to visit them late at night, early in the morning, and if necessary, frequently during the night. This close care can be insured only in case the superintendent lives near the barn.

Fencing Fruit Plantations, \$3,000. — Because of lack of funds, the fencing of the large fruit plantations owned by the college has been deferred. As a result, a good deal of fruit is stolen each year in spite of the fact that the orchards are protected by a watchman during the season when the fruit is ripening. The expenditure of the sum here indicated would seem to be justified on the grounds of economy.

New Walks, \$2,500. — For a number of years practically no money has been spent in the construction of new walks or renewing old walks. In order to meet the more imperative demands for walk construction a sum of \$2,500 is requested for this purpose for the ensuing year. With this appropriation it is proposed to construct a cinder walk 6 ft. wide from the Physics Building to the East Experiment Station, a distance of 960 ft. estimated at approximately \$700. It is also proposed to re-lay a strip of worn out tar walk and substitute a granolithic walk from the Drill Hall north to South College and North College, length approximately 800 ft., width 6 ft. and estimated to cost \$1,800.

Grading and Draining Addition to Athletic Field, \$2,500. — It is planned to extend the present athletic field south on existing college property a distance of 300 feet. This will make possible the installation of several tennis courts, and the extension of the present recreation field to accommodate a much larger number of students than is now possible. The entire project cannot be completed with an appropriation of \$2,500 although this amount will meet the immediate requirements.

Land for Cranberry Station at East Wareham, \$1,000. — An appropriation is requested of \$1,000 for the purchase of about sixteen acres of land contiguous to the Cranberry Station at East Wareham, for the purpose of providing opportunity for increase in experimental work with blueberries, for variety testing of cranberries, and other experimental work of a similar nature. A part of this sixteen acres is adjacent to a pond, and is a favorable site for the construction of a second experimental bog. Another part is well suited to the extension of the commercial blueberry work, while the remaining area is needed both for straightening the boundary of the present plant and to serve as a source of upland peat, sand, and fuel.

KENYON L. BUTTERFIELD,
President.

REPORTS OF OTHER ADMINISTRATIVE OFFICERS.

Report of the Acting Dean.

On account of the absence of Dean Lewis it becomes my duty to present the Dean's report for the year. Dean Lewis was granted a six months' leave of absence beginning October 1. He has used part of this time for a much needed rest. Recently he has been studying administrative practices in other state institutions. The last half of his leave he intends to spend in travel and study abroad. He is expected to return in April, 1923.

During the first part of the period this report covers Dean Lewis was Acting President. His duties demanded practically all the time and energy he could command, but his helpful experienced counsel made my work as Acting Dean considerably easier.

The year opened auspiciously. We began by getting our students into classes without delay. In this matter the Supervisor of the Schedule, Professor Julian, rendered invaluable assistance. Text-books were on hand, section lists posted and schedules made up with dispatch.

Very soon after the opening of college a Freshman teacher's meeting was called at which time attention was directed to special cases of Freshmen and suggestions as to general procedure were pointed out. Possibly never before did a term's work start off more promptly and run more smoothly. The result was very few failures at the end of the first term.

However, during the second and third terms the number of failures showed a marked increase. One reason for this increase may be traced to the effects of the "rushing" season. This came at the beginning of the second term, immediately upon the return of the students from their Christmas vacation. Although the season was not a long one it was sufficiently intense to unbalance the regular routine and the setback suffered by many Freshmen and even by members of the other classes was never fully overcome. So harmful and unsatisfactory were the results that it was decided to change the time for and the length of the "rushing season," by confining it to the first three days of the fall term. This new plan seems to work well and is likely to become our permanent practice. Certainly satisfactory class work and "rushing" cannot be carried on at the same time.

The Freshman advisory work was continued during the first term in accordance with the practice inaugurated several years ago. In this work I was assisted very ably by Professors Parker, Rand, Moore and Julian. Acting on the principle that gradual release from authoritative supervision must prepare the student for self-supervision, the efforts of the adviser in behalf of his advisees were materially reduced during the second term and almost abandoned during the third term. Of course counsel, sympathy and friendliness towards them were never relinquished.

While a start has been made there still remains much to be done to give our new men the right point of view as to relative importance of so-called extra curriculum activities and studies, respectively. When parents back home often have the wrong viewpoint, it is not surprising that a large number of our incoming students should have the wrong attitude.

Anything that we can do by better teaching, closer contact, and wiser direction will not be amiss because it will tend to correct those tendencies and viewpoints in students which, if allowed to grow unnoticed, will sadly hamper, if not entirely annul, the effectiveness of what the college should give to every student. A contented student usually does good work — he profits by what the college has to offer. Hence our interest in a student must be broad enough to concern itself with the problems of housing, feeding, class relations, habits of study, regularity, punct-

tuality and effective sympathetic teaching. Too much care cannot be had in the selection of teachers of Freshmen.

During the year we lost the services of our head clerk, Miss Gertrude Hollis, who was connected with the Dean's Office for more than two years. She was a faithful and careful worker and her resignation meant a distinct loss. To fill the vacancy caused by the resignation of Miss Hollis we were fortunate indeed to secure Miss Grace Gallond who came to us from the Dairy Department. By her tactful and thorough manner she has already demonstrated her fitness for handling the innumerable office details in a sympathetic and satisfactory manner.

No distinctly new policies were inaugurated during the year. Routine matters in connection with scholarship, class attendance, committees, adjustment of schedules and conferences with students on numerous and varied problems more than comfortably filled every available minute which I could command.

The practice of keeping office hours at the rooms of the Department of Education, State House, Boston, every Thursday, started last year by Dean Lewis, was continued and the large number of conferences sought by those interested in the college and the opportunities which it offers fully justify the expenditure of whatever time and money may be necessary.

In addition to the work in the Dean's Office I continued to carry my regular teaching schedule in the Department of Mathematics. This direct contact with students in the class room is a real help to one who counsels and directs them in matters of scholarship and conduct.

The year's work was pleasant. To assist the students of slow mind, to encourage those who had a bad start, and to spur on the fellows inclined to loaf kept the duties sufficiently varied to make the work interesting. In my efforts I enjoyed the almost unanimous co-operation of the faculty and splendid support from the student body.

Attendance records and scholarship reports as a general rule were sent in regularly. Such support must be whole hearted if the Dean's office is to function as it should. Every effort is being made to use effectively every report asked for. Several changes in absence reporting which have a tendency to tighten up on attendance will be made this coming year.

WILLIAM L. MACHMER,
Acting Dean.

Report of the Director of the Experiment Station.

The year just passing has shown distinct improvement in the land equipment of the Experiment Station, but no corresponding change in its human equipment. There has been increased realization of the fact that the starting scale of station salaries, at least, has been and is too low to encourage men to either prepare for or enter station work. It has not yet been possible to increase materially the scope of station work, so as to enable it to give more service in relation to the food supply problem of the State. There has been but little change in the conduct of regulative work.

LAND EQUIPMENT.

The action of the last legislature in appropriating money for the purchase of the "William P. Brooks Experimental Farm" fills a need of long standing, and for the first time gives to the Experiment Station land facilities for the investigation of problems of tobacco and onion culture as well as of other problems of importance to the State at large. This advance is supplemented by the offer of gift from the trustees of the will of the late Miss Cornelia Warren, which places at the disposal of the Station, through the College, an area of about fifty acres of land situated in Waltham, and very well suited for experimental work on vegetable crops. Two important soil types are embraced in this new area, and the location is in many respects superior to that of the present experimental plant at North Lexington. Finally, the action of the Trustees in approving a plan whereby the College farm may be used for certain types of experimental work gives a certain degree of elasticity to the work of the Station which previously it did not have.

A PASTURE EXPERIMENT STATION.

These additions to equipment fill most of the larger and more important land needs of the Station. There remains, however, one most important item, — a Pasture Experiment Station. Good pasture has always been a mainstay to the dairy industry. When our pastures were in their prime they contributed very largely to farm production and family income. At present, however, they are rapidly going to decay, and becoming liabilities instead of assets. One reason for the ability of the Vermont dairy farmer to enter and successfully compete in the home market of Massachusetts farmers lies in the efficiency of his pastures. Of course, it may be that the problem cannot be solved economically, but not until every attempt has been made should the State give up this source of potential food. As soon as existing land facilities are organized on a research basis, the matter of securing land for work of this kind will be pressed. The proposed farm should be located either in the highlands of Worcester County, in the heart of its dairy section; or in the hill country west of the Connecticut.

THE HUMAN EQUIPMENT OF THE STATION.

Unfortunately, progress in human equipment has not kept pace with that in land equipment. A year ago I specified five new positions, among all of those requested, as being essential for the economical conduct of work already under way. Not one of these requests has been granted. It is unnecessary for me to reiterate statements already made in support of plans presented. From the standpoint of institutional policy, however, it may be well to admit the fact that existing work cannot be efficient unless some of our departments are more adequately manned. We should not attempt to do some of the work which we are now doing unless we have some assurance that deficiencies in personnel may be remedied in the fairly near future.

THE SALARY SCALE.

At the present time difficulty in maintaining personnel is being caused by the low salary offered as a starting point in station service. Agricultural research as now organized differs radically from the "agricultural experimentation" of an earlier day, and requires more intensively trained men. Research work in disease prevention is replacing that of disease control. Fundamental studies in animal nutrition are supplanting comparative studies in the characteristics and properties of feeding stuffs. Systematic studies in plant and animal breeding, in the light of the new science of genetics, are taking the place of the comparative breed and variety tests of former days. Because of these changes in the character of research work, more is now required of research workers, in the way of fundamental training, than was either necessary or possible in the earlier days of the experiment stations. Preparation for the work is a long and arduous task. It must be based on four years in regular college course, followed by the equivalent of three years in a graduate school. Interpreted in terms of human values, seven years of a man's lifetime must be spent in training before a man may be properly equipped to fill anything other than an apprenticeship position in the Experiment Station. Few men will be willing, and fewer still able, to undertake this training unless they feel fairly certain of suitable rewards. Our present starting point in the salary scale is so low that there is no encouragement for a man to either prepare for or enter station service.

Quite pertinent in this respect is a statement made a year ago by the Director of the Graduate School. He said, "Men . . . must be able to solve the problems satisfactorily and not dawdle over them because of lack of training and understanding. The limitations in training and education should never be regarded as an excuse." This statement should be accepted as a fundamental truth; yet in view of the low starting point of station salaries, it is difficult to see how these positions can serve other than apprenticeship functions.

THE FOOD SUPPLY SERVICE.

During the year attention has been given to the problem of co-ordinating the station research work with the problem of the food supply of the Commonwealth. Analysis of this problem shows the following salient subdivisions:

1. Production on the farm.
2. Conservation and prevention of waste.
3. Transportation.
4. Storage.
5. Marketing and distribution of food products.
6. Utilization of food.

The service of the Station to productive agriculture represents its major service to date. It is not complete; but we can at least say that the machinery for giving full service, or as full as may humanly be expected, is in existence. In the problem of conservation of food already produced, the Station is just beginning to serve. The fact that during the past year thousands of gallons of milk were wasted because of lack of a market for this product in its fluid form; the fact that during the early fall countless bushels of fall apples were wasted because of glut in the market; the fact of waste of even such a staple product as potatoes through disorganization of the market indicates the need of fundamental service of this kind.

Notwithstanding this, our Department of Horticultural Manufactures has not yet commenced to function in a research way. The work on food preservation represented by certain fundamental studies in the Department of Microbiology, first initiated during the War, has languished because of lack of sufficient man power. These facts are cited simply to show the need of service and our inability to render it.

In the next three subdivisions of the analysis, *i.e.*, transportation, storage, marketing and distribution, the Station is just beginning to serve. It is probably true that economical transportation, modernizing of marketing and distribution methods, and the removal of storage from the speculative field to that of real economic service are as important to the food consumers of the State as is economic production on the farm itself. The matter of equipping the Station so as to undertake this basic work is second to none in importance.

No work has been done at the Station on the problems of food utilization or human nutrition. It may be an open question as to whether the Station is the organization to undertake this important work. I hardly care to discuss this at this time, other than to state that the problem is most vital to an industrial Commonwealth such as Massachusetts, far removed from supplies of raw materials and from the centers of food production.

REGULATIVE WORK.

During the year the law governing police control of animal feeds was amended so as to make this activity self-supporting. Operations under the poultry disease elimination law were radically changed, so as to secure better co-ordination of effort with the Extension Service of the College, and with the purpose of developing certain centers from which disease-free breeding stock or eggs for hatching might be secured. Of the fertilizer control law little need be said other than to point out the fact that the State is at present making a profit on something which should be no more than self-supporting. This was certainly not contemplated in the original law, as it was specified that any surplus over the cost of carrying on this regulative work should be expended in carrying out field experiments in the use of fertilizers. Under the present organization such margin is not available to the Station. During the year just past \$13,000 were appropriated by the State for the police control work in fertilizers. The receipts from this service were \$16,560. In my opinion

the existing law should either be amended so as to bring to the Station, to be expended as provided for in the original law, full receipts from this police control law; or rebate should be given to manufacturers for the difference between the actual cost of carrying on the work and the actual receipts.

SIDNEY B. HASKELL,
Director of the Experiment Station.

Report of the Director of the Extension Service.

Few changes in staff, and the steady development of projects have characterized the work of the past year, which has been the most satisfying since the war. This was true not only at the college but in the County Extension services also. Serious interruptions of work have been few. Conditions of the agricultural industry have been far from satisfying, although some groups have prospered. The rainy season injured many crops, and caused special problems to some, while it helped others. Wherever special problems in production or marketing resulted, special demands were made on the Extension Service to meet them. Few material changes have been made in projects and plans of work, and this is as it should be. Few pieces of project work can be completed in a single season. Emphasis may be shifted as one phase becomes the more important; but continuity is preserved. In the soils and crops project, for instance, much less time is given to promoting the use of certified seed potatoes when the use becomes more common, and more time is given to the care of the crop and to protecting it from disease. Demonstrations have increased in number, continuity, and teaching value. Relations with the Experiment Station work have continued most friendly, and have been developed to give greater values to extension teaching. Effective co-operation with the resident teaching staff continues. Mailing lists have been revised to eliminate duplication and avoid wastes. Many new publications have been prepared, and several older ones rewritten. Periodical publications have been prepared and mailed regularly. Over five hundred students were enrolled in correspondence courses. Very little was attempted in exhibits because of lack of funds. Extension schools followed the trend toward the short specialized school instead of the longer, diversified session. The rainy haying season reduced attendance at Farmers' Week, but the work done by the groups which gathered was more effective than ever. Camp Gilbert, for the county champions in Junior Extension work, was an unqualified success. The general camp for boys and girls who paid their own expenses was omitted for lack of funds.

The professional staff at the college numbered nineteen at the beginning of the fiscal year. Mrs. Ruth S. Reed resigned as Clothing Specialist, and Miss Marion L. Tucker was engaged to fill the position. Mr. Joseph F. Whitney, Specialist in Landscape Gardening, was granted leave of absence and left in the late summer for Europe for further study. Mr. Robert D. Hawley, who resigned in November 1921, returned in September of this year to his former position as supervisor of exhibits, extension schools, and extension courses at the college. No other changes have occurred in the specialist staff at the college. A number of changes in the secretarial and clerical staff have caused noticeable retardation of work, but with the close of the year the new staff-members are assuming their responsibilities satisfactorily.

The total professional staff in the counties has numbered approximately fifty. Two county agricultural agents and one assistant agent, two county home demonstration agents and two assistants, and one assistant county club agent have resigned during the year.

The financial support of extension work, both at the college and in the counties, has enabled continuance of work without much increase or decrease. County appropriations were in nearly all cases the same as for the preceding years. States Relations funds, assigned by the United States Department of Agriculture to

salaries in the counties and at the college remained the same. Regular Smith-Lever funds (Federal) reached their maximum under the law during the Federal fiscal year 1922-1923, and will hereafter remain constant, barring amendments to the appropriating act, or changes in the census return of rural population. Supplementary Smith-Lever funds were reduced in total, and may soon be entirely withdrawn. State appropriations enabled us to hold our staff, with no serious changes. The personal service item would have permitted more use of temporary help on extension schools and special projects, but a reduction of the appropriations for maintenance made it unwise to employ help for whose travel expense we had no adequate funds.

For a statement of the receipts and expenditures of the Extension Service at the College, may I refer you to the report submitted by the Treasurer of the College.

Detailed report on projects is not attempted here, but will be included in the report to the Governor in accordance with the requirements of the Smith-Lever Act.

The principal needs of the Extension Service for the coming year are maintenance funds to make more effective the work of the staff; specialists in crop protection, household management, rural engineering and animal disease control; ability to apply revenues to the costs of the projects in which they are earned; and a more liberal and dependable policy in the matter of out-of-state travel.

JOHN D. WILLARD,
Director of the Extension Service.

Report of the Director of the Graduate School.

A year ago the writer undertook to deal with "Fundamental Education" in graduate work. At that time he was conscious of certain forces operating in the general field of secondary and higher formal education to undermine not only fundamental education but also effective education of the formal nature. There are many of these forces which should be considered but in this instance it will be possible to study only one of several of these forces as an illustration for a group which is more or less conspicuous and pertinent at this time.

There has been developing a habit or a tendency in recent years to use certain euphonistic terms in a subjective and more or less detached manner. In the context the meaning is not decipherable, it is very vague and indefinite. There enters into them the spirit of innovation, of newness and of exploitation. The users seem to imply that the ideas have never before been conceived, while they are as old as history. To mention some of these terms will immediately provide the pabulum for energetic mental emissions. Some of the many are "personality," "service," "humanism," "Americanization," and "democracy." Most thinkers will grasp the significance from this limited enumeration.

It is not proposed to castigate such employment of these words or for a minute to assert that their implications, vague as they are, do not accomplish something of value, but as presented they serve merely as fireflies leading helter-skelter to light the wayfarer through the dense darkness of a labyrinthian life. At the same time these notions are eating away the supporting structures of a basic education upon which progress depends because of their transcendent use without objective anchorage. Agitative propaganda of a purely abstract idea does irreparable injury when it conflagrates and lacks tangible realization as developmental actualities. When serious matters are demagogized to elicit popular support without having accepted and tried mechanisms, such as are operable under existing conditions, to execute the task demanded, chaos and confusion are likely to follow and true progress turns into reaction. Safe superstructures arise only on firm and satisfactory foundations. History has repeatedly established this as a truism. It is the part of formal education to lead into the future through the established truths of the past and present or, in other words, base every step of advance upon the sure footing of the tried past or present. If science, has contributed naught else, it has demonstrated this advancement to be correct.

Let us now develop our thoughts concretely by the study of the word "personality". When it is said by seemingly sane men that the "personality" of a teacher is all there is to teaching and an education and that subject-matter does not enter; when a student is led to believe that college life as lived in athletics and student activities is the all of a college career and that class studies have little significance; when public school pupils speak derisively of pupils who try to do their assigned duties and who do not spend their evenings in movies and dances, as "grinds", then there is no alternative in concluding that personality is either misunderstood or education is not a matter of individual study and effort but a monstrosity parading under false colors. These expressions, of course, must be obviously spontaneous, subjective and whimsical statements made without objective foundation and without due reflection. As such, too, they are often repeated and sent along floating upon the tide of verbal exchange without further consideration and without challenge. Many believe, few doubt and still fewer weigh the statements at all.

Personality has a very distinctive meaning and place. Its nature is dualistic. There is the mental self, the ego bound up with the consciousness that finds expression in "I am." In a sense it is an empty or evasive consciousness which man fails to determine fully and which yet exists for every human. Then there is a consciousness of things *extra-mental*, *extra-self*, or *extra-ego* or a consciousness which incorporates those things which exist beyond or apart from the *ego*. These *extra-impressions* reach the mind, perhaps the *ego*, through the sensations. They activate the mental mechanism which reveals itself in the consciousness *I am* and in turn which gives recognition to the consciousness of those things which have been received through the senses. In some manner the *ego* and the things received coalesce. The babe comes into the world with the mental self or mechanism ready for development. He starts with a mental capacity given by heredity and this mental capacity must be activated. He slowly responds to environment through his sensations. He notices the movement of his fingers, feels his toes, suffers pain, smiles when tickled and finally awakes to the fact that he is supported by a body. He becomes conscious of it. This process proceeds from a consciousness of self to companionship, to family, to those without his immediate environs, society, and later to community, state and nation. From the very beginning he has been accumulating experiences of the objective world in which he finds himself placed. These experiences create as he advances to manhood estate a more or less stable complex, subject to border variation, which represents his personality. Probably built upon an hereditary capacity is a self regulated functioning mechanism which secures its food or fuel or energy out of the materials with which the individual comes in assimilating contact and unifies these materials in accordance with his hereditary capacity, his environment and his real experiences into a *personality* — a personified synthesis.

If this is a personality, then constructive human effort is dependent largely upon the objective knowledge growing out of experiences and environment. It is made up of the objective world. If the hereditary mental transmissions were subject to the regulations of man, this aspect of the case would also enter, yet it would enter objectively and not subjectively. As it is there is an assumed simple recognition.

Whether a personality is attractive, appealing and possibly influential or inspiring to people at large, depends mainly upon the temperament of the individual. Some individuals, as thinkers, look beyond the temperament to the substance which makes for personality and are little influenced by it but there can be no doubt about the values of temperament. Based upon available present knowledge, however, it is probably safe to ascribe temperament to a purely psychological basis. The *brutish*, *snarling*, *cunning*, *snapping*, *bristling*, *creeping*, *barking*, *chirping*, *singing*, *frolicking*, *playful*, *purring* and *fawning* qualities are animal in origin. Man has them, too. While they influence personality they are not the substance of personality at all unless they become a part by objective incorporation through training.

Great personalities appear in history, biography, literature, science, art, business and in all lines of effort. They are found everywhere. The percentage in edu-

educational institutions is probably no greater than elsewhere. Young and adult minds are stimulated by them and draw from each those features which appeal and use them in producing a composite ideal of their own. But these personalities are formed largely out of objective or material matters and experiences which are utilized for constructive purposes. The wider these experiences or the greater the material experiences or education, the greater the personality provided mental capacity exists for receiving and creating unification or synthesis.

If this were not true, how would it be possible to account for self-educated men who have little if any personal instruction; for the student who gains success by application when his neighbor has the same personal contacts but fails; for the continuous mental development of men after they leave college when their real education seems to begin; for the values of mere reading which we all seem to accept? Why is that subject matter is undergoing division after division until specialization startles us? Why is it that pedagogic methods in subject-matter receive so much attention? Why is it that so many courses are established? Why is it that certain courses are considered necessary to attain a certain objective? Why is it that many men who are following specific professions or vocations regret that they did not pursue certain pertinent subjects while in college? Why are specialists employed? Do not all of these point to the very large part objective study exerts upon the experiences and environment of man, not only upon his value as a man but likewise his personality which is his larger and expanded self. Subject matter, of course, to be really significant and intrinsically worth-while must be intimately understood to be the basis for judgments and the material for reasoning out of which springs wisdom. Perception, understanding, judgments, reasoning and wisdom may be graphically represented as synthesized in personality.

Much could be gained were it within the scope of this article to take up the other terms for the benefit of assigning their present applications. To follow the concepts of service from primitive conditions to its present ephemeral agitative employment; to study the similarity of humanism as it existed in the days when it was proper to "do unto others as you would have others do unto you"; to parallel the liberty which was a branch of bigotry in the days of our Puritan fathers and the liberty which stands for Americanization, as it is measured by our "dollar" era; to understand a democracy which is idealistic as long as one's own ideas prevail and his faction is in control but when they do not prevail or control, blindness, ignorance and class prejudice dominate — let us repeat, this would perhaps furnish enlightening and profitable study. The general difficulty seems to lie in a chimerical and evanescent usage of these terms and the detachment of the ideas from bases which have been already materially established by experiences. Accretive growth upon that which has been already created has been totally forgotten in an enthusiasm to start a consuming spiritual conflagration without any real substance to feed the flames. It would be a great advantage to recall that science moves ahead cautiously by building critically and experimentally upon the concrete experiences of the past and present.

The whole matter centers in following one of two paths in penetrating the future: revolution or accretive progress. Education, on the whole, should be concerned with the latter only and its results, should furnish the stable basis of life and natural growth. Revolution, on the other hand, is an attempt to disorganize what already exists without gradual adjustment, to kill off our enemies which if carried to the extreme would reduce our population to a single individual and perhaps wipe it out completely, to reduce to primitive conditions which have been the product of centuries, and, in short, to create human anarchy. Everything that can be done to forestall unnatural or human turmoil and create civilizing stability should be the function of education, plodding and toiling at the foundations of society and not through its powwows.

CHARLES E. MARSHALL,
Director of the Graduate School.

Report of the Director of Short Courses.

The status of short course work during the past year has been very satisfactory from the standpoint of administration. Reasonable financial support has been granted by the legislature. The number of students registered in all courses is normal; the slight decrease in the entering class of the Two-Year Course for September, 1922, being due to the increase in tuition for non-resident students and to the elimination of the special unit courses for ex-service men. The percentage of non-resident students, exclusive of Federal trainees, for the entering class of 1921 was approximately fourteen; the percentage for the entering class of 1922 was nine.

Your attention is called especially to the following items in this report:—

(1) Recommendation for supervision of project work of students who have finished the Two-Year Course.

(2) Recommendation for the employment of a supervisor of oral and written English in the Two-Year Course.

(3) The need for housing of a part of the student group now enrolled in the college.

COURSES DISCONTINUED.

A. *Teachers' Courses.*—In 1918 the State Department of Education, at the request of some of the school superintendents in the western part of the state, offered at the Massachusetts Agricultural College during the summer professional courses in elementary subjects intended for public school teachers. The organization of these courses was in the nature of an experiment to determine whether or not there was such a demand for this type of work as to justify the State Department of Education making provision for it in some institution in Western Massachusetts. These courses were offered at the Massachusetts Agricultural College because the college was already maintaining a summer school. It was understood at the time that in the event there was a real need for this type of work the courses would be transferred to one of the normal schools in the western part of the state. The expense of the courses was borne by the State Department of Education; the college co-operated only in administration. The registration from the beginning demonstrated that there was a real demand. The total enrollment in all courses offered at the college was about 350. Approximately one-half of this number was enrolled in teachers' special subjects. In the summer of 1922 the courses were transferred to the normal school at North Adams. The college offered during the past summer its regular four weeks' summer school with an enrollment of 170 students. This number shows a slight increase over the enrollment in previous years in those courses offered by the college.

B. *Unit Courses for Ex-Service Men.*—The special unit courses for men disabled in the military and naval service of the United States offered by the college ever since the close of the war were discontinued June 30th, 1922. The Federal Government has now made such provision as to make this service of the college unnecessary.

REORGANIZATION OF THE TWO-YEAR COURSE.

The Two Year Course has been reorganized so that it is now possible for a student to devote the major part of his time to one of seven lines of work. These are animal husbandry, dairy, poultry, floriculture, horticulture, pomology, and vegetable gardening. The number of subjects that the student may take has been reduced to four. The student recites in each subject five times a week. The student chooses a group of subjects when he chooses a major, but once having elected that group there are practically no other electives. This plan has greatly reduced the cost of administration, and at the same time has made for greater efficiency.

ORGANIZATION OF NEW COURSES.

Professor H. C. Judkins of the Dairy Department has organized four new short courses in dairy manufactures. These are given during the winter school. Each course continues for approximately ten days. The entire time of the student is devoted to some phase of dairy manufactures. The course for nurserymen organized last year by Professor Frank A. Waugh was promptly filled. The college is co-operating in the administration of this course with the New England Nurserymen's Association, the Massachusetts Nurserymen's Association and the Connecticut Nurserymen's Association. The course is limited to students who have already had some practical experience in nursery work. Plans are now under way for the organization of a similar course for the training of gardeners.

SUPERVISION OF PROJECT WORK AND PLACEMENT TRAINING.

The six months' farm experience required of all Two Year students has proved to be one of the most valuable features of the course. The purpose of the Two Year Course is to train young men and women for agriculture; for the ownership of farms rather than for paid positions on farms. The most critical time in the life of the student is when he first attempts to apply for himself in a farm business enterprise what he has learned. At that time he needs and should have the advice of an experienced man who is personally interested in his success. I would suggest a further extension of the plan now followed in placement training by the employment of a man whose particular business it would be to advise with and continue the instruction of graduates of the course who are going into farming for themselves. We need a part of the time of this man anyway for the supervision of the men during the six months of placement training. Mr. Viets, who has proved to be a very capable energetic supervisor, is unable at the present time to supervise the work as carefully as it should be during the time that the men are in the field.

SUPERVISION OF ENGLISH.

The students in the Two Year Course should have some supervision in the use of oral and written English. I do not wish to have formal courses in English offered. This plan would not meet the needs. The students will, in my judgment, derive the greatest benefit if they are held strictly accountable in every class for written and oral work. We can accomplish this by employing a man whose particular task it will be to advise, correct, and, if necessary, discipline a student who does not make a reasonable effort to improve his written and oral English in all classes.

HOUSING.

I can but repeat at this time a statement I have made several times — that there is a real need for the housing of a part of the student body on the campus. I would suggest that if there be a dormitory it be for four-year men. I do not think our two-year men would take very kindly to dormitory life, but the dormitory would make other rooms in town available for the Two-Year students.

The following tables are included showing enrollment in the Two Year Course:

A. Total Yearly Enrollment of Each Year Based on Enrollment from June to September.

	1918.	1919.	1920.	1921.
Two Year Course	37	209	295	302
Ten Weeks' Winter School	91	63	112	83
Summer School	68	238	322	353
School for Country Clergymen	-	-	-	19
Vocational Poultry Course	5	13	19	25

B. Age Distribution of Two Year Students Based on Total Enrollment June to September.

AGE (YEARS).	1920.		1921.	
	Number.	Per Cent.	Number.	Per Cent.
16	—	—	—	—
17	21	7.1	16	5.3
18	34	11.5	26	8.6
19	35	11.9	44	14.6
20	38	12.88	41	13.6
21	27	9.2	25	8.3
22	26	8.9	18	5.9
23	21	7.1	18	5.9
23	21	7.1	18	5.9
24	16	5.4	15	5.0
25 and over	77	26.1	99	32.8
Total	295	100.00	302	100.00

JOHN PHELAN,
Director of Short Courses.

TABLES AND STATISTICS.

TABLE I. — *Resignations.*

POSITION.	Name.
Instructor in Zoölogy	Charles H. Abbott.
Stenographer, Extension Service	Mrs. Esther W. Arrp.
Assistant Research Professor of Chemistry	Carlos L. Beals.
Analyst, Control Service	Ethel M. Bradley.
Department Librarian	Margery Burnett.
Collector of blood samples, Poultry Disease Elimination	Ray A. Carter.
Stenographer, Extension Service	Hazel D. Chandler.
Professor of Vegetable Gardening	Arthur L. Dacy.
Clerk, Extension Service	Margaret G. Davidson.
Resident Nurse	Marguerite N. Davis.
Clerk, Extension Service	Florence E. Day.
Stenographer, Dean's Office	Mary A. Evans.
Stenographer, President's Office	Margaret Fish.
Research Professor of Poultry Husbandry	Hubert D. Goodale.
Instructor in Home Economics	Olga Grizzle.
Stenographer, Department of Rural Home Life	Mrs. Ethel L. Hammond (Carrier).
Clerk, Dean's Office	Gertrude E. Hollis.
Assistant Librarian	Florence B. Kimball.
Chief Clerk, Extension Service	Marguerite C. Leduc.
Instructor in Physical Education	Elton J. Mansell.
Bookkeeper, Treasurer's Office	Mrs. Gertrude L. Milne.
Professor of Veterinary Science	James B. Paige. ¹
Assistant Professor of Beekeeping	Norman E. Phillips.
Stenographer, Library	Frances Powers.
Stenographer, Extension Service	Mildred Putney.
Assistant Extension Professor of Home Economics	Mrs. Ruth S. Reed.
Bookkeeper, Treasurer's Office	Mrs. Ruth L. Rodwaye.
Instructor in Poultry Husbandry	William E. Ryan.
Analyst, Poultry Disease Elimination	Ann Smith.
Clerk, President's Office	Harriet A. Smith.
Stenographer, Extension Service	Mrs. Ruth M. Smith.
Stenographer, Poultry Husbandry	Mrs. Laura S. Tower.
Matron, Women's Dormitory	Mrs. Marie E. White.

¹ Died Oct. 5, 1922.TABLE II. — *New Appointments.*A. *In the Academic Departments.*

POSITION.	Name.	Degrees.
Assistant Professor of entomology	Charles P. Alexander .	B.Sc., Cornell, 1913; Ph.D., Cornell, 1918.
Instructor in home economics	Mary A. Bartley .	—
Instructor in physical education	Herbert L. Collins .	B.Sc., Massachusetts Agricultural College, 1922.
Assistant professor of botany	William H. Davis .	A.B., Cornell, 1912; M.A., University of Wisconsin, 1916; Ph.D., University of Wisconsin, 1922.
Instructor in zoölogy	Philip E. Foss .	B.Sc., Bowdoin, 1922.
Instructor in microbiology	Mary E. M. Garvey .	B.Sc., Massachusetts Agricultural College, 1919.
Field professor of teacher training	Charles W. Kemp .	B.Sc., New Hampshire State College, 1910.
Instructor in vegetable gardening	Grant B. Snyder .	B.S.A., Ontario Agricultural College, 1922.
Instructor in poultry husbandry	Lewis W. Taylor .	B.Sc., University of Wisconsin, 1922.

TABLE II. — *New Appointments* — Concluded.

B. In the Experiment Station.

POSITION.	Name.	Degrees.
Assistant research professor of chemistry	John G. Archibald	B.Sc., Toronto University, 1916.
Research professor of poultry husbandry	Frank A. Hays	B.Sc., Oklahoma A. & M. College, 1908; A.M., University of Nebraska, 1912; Ph.D., Iowa State College, 1917.
Assistant Research professor of avian pathology	Norman J. Pyle	V.M.D., University of Pennsylvania, 1918.

C. In the Control Service.

Analyst, Poultry Disease Elimination	Mildred H. Hollis	- - -
Analyst, Control Service	Frank J. Kokoski	B.Sc., Massachusetts Agricultural College, 1922.
Collector of blood samples, Poultry Disease Elimination	John J. Smith	- - -

D. In the Extension Service.

Extension professor of agronomy	John B. Abbott	B.Sc., University of Vermont; M.Sc., Purdue University.
Supervisor of extension schools and exhibits	Robert D. Hawley	B.Sc., Massachusetts Agricultural College, 1918.
Extension assistant professor of home economics	Marion L. Tucker	B.Sc., Columbia University, 1914.

E. Miscellaneous.

Resident Nurse	Anna M. Gabriel	- - -
Matron, Women's Dormitory	Mrs. Marie B. Marsh	- - -

F. In the Clerical Staff.

POSITION.	Name.
Clerk, Short Courses	May G. Arthur.
Clerk, Extension Service	Mrs. Teresa M. Binner.
Stenographer, Department of Rural Home Life	Nellie S. Carl.
Stenographer, Extension Service	Hazel D. Chandler.
Clerk, President's Office	Affie M. Cook.
Bookkeeper, Treasurer's Office	Marion B. Damon.
Stenographer, Extension Service	A. Iva Denny.
Stenographer, Extension Service	Jeannette M. Elder.
Stenographer, Extension Service	Laura Garnjobst.
Stenographer, Extension Service	Louise Leonard.
Clerk, Extension Service	Esther J. Lester.
Stenographer, Division of Horticulture	Hazel A. Longden.
Clerk, Department of Veterinary Science and Animal Pathology	Katharine M. Martin.
Junior Assistant Librarian	Katherine L. Powell.
Bookkeeper, Treasurer's Office	Mrs. Emma F. Sargent.
Clerk, Department of Dairying	Charlotte M. Sheffield.
Clerk, Extension Service	Dorothea E. Sinclair.
Stenographer, Department of Poultry Husbandry	Alice J. Twible.
Assistant Librarian	Bessie M. Weymouth.
Stenographer, Extension Service	Elizabeth A. Wheeler.
Stenographer, President's Office	Harriette C. Whitney.

TABLE III. *Speakers for the Year.*A. *Speakers at Assembly for Year ending Nov. 30, 1922.*

1921.

- Dec. 1. — Mr. Clifton D. Jackson, Springfield.
 Dec. 8. — Dr. C. W. Pugsley, Washington, D. C.
 Dec. 15. — Student Forum.

1922.

- Jan. 4. — Mr. Lewis Hodous, Hartford, Conn.
 Jan. 11. — Mr. James R. Marsh, Roxbury.
 Jan. 18. — Student Forum.
 Jan. 25. — Mr. Harry F. Ward, New York City.
 Feb. 1. — Freshman-Sophomore Debate.
 Feb. 8. — Mr. John L. Finley, Easthampton.
 Feb. 15. — Prof. Raymond G. Gettell, Amherst.
 March 1. — President Kenyon L. Butterfield.
 March 8. — Hon. James J. Jackson, Boston.
 March 15. — Student Forum.
 April 5. — Prof. Curry S. Hicks, M. A. C.
 April 12. — Mr. Joe Mitchell Chapple, Boston.
 April 26. — Hon. J. Weston Allen, Newton.
 May 3. — Prof. Paul Monroe, New York City.
 May 17. — Student Mass Meeting.
 May 31. — General Clarence R. Edwards, Boston.
 June 14. — President Kenyon L. Butterfield.
 Oct. 5. — Prof. Frank A. Waugh, M. A. C.
 Oct. 19. — Mr. Roland D. Sawyer, Ware.
 Oct. 26. — Senator George D. Chamberlain, Springfield.
 Nov. 2. — Dr. Joel E. Goldthwait, Boston.
 Nov. 9. — Prof. C. E. A. Winslow, New Haven, Conn.
 Nov. 16. — Student Forum.
 Nov. 23. — Dr. Homer J. Wheeler, Newton.

B. *Speakers at Sunday Chapel for Year ending Nov. 30, 1922.*

1921.

- Nov. 20. — Bishop Thomas F. Davies, Springfield.
 Dec. 4. — Rev. John Haynes Holmes, New York City.
 Dec. 11. — Rev. Henry K. Sherrill, Brookline.
 Dec. 18. — Rev. William I. Chamberlain, New York City.

1922.

- Jan. 8. — Bishop Edwin H. Hughes, Malden.
 Jan. 15. — Dean Charles R. Brown, New Haven, Conn.
 Jan. 22. — Mr. Owen R. Lovejoy, New York City.
 Jan. 29. — P. Whitwell Wilson, M. P., New York City and London.
 Feb. 5. — Rev. Newton M. Hall, Springfield.
 Feb. 12. — Rev. Neil McPherson, Springfield.
 Feb. 19. — Mr. Alfred E. Stearns, Andover.
 Feb. 26. — Rev. Daniel A. Evans, Cambridge.
 March 5. — Rev. Henry S. MacCready, Willimantic, Conn.
 March 12. — Dr. Albert Parker Fitch, Amherst.
 March 19. — Rev. Fred W. Adams, Springfield.
 April 9. — Dr. Howard A. Bridgman, Groton.
 April 16. — Mr. Albert E. Roberts, New York City.
 April 23. — Rev. William S. Beard, New York City.
 April 30. — Rev. James G. Gilkey, Springfield.
 Oct. 1. — Dean Edward M. Lewis, M. A. C.
 Nov. 5. — Dr. Hugh Black, New York City.
 Nov. 12. — Dr. Herbert J. White, Hartford, Conn.
 Nov. 19. — Dr. Albert Parker Fitch, Amherst.
 Nov. 26. — Dean Thomas Arkle Clark, Urbana, Ill.

TABLE IV. — *Attendance.*A. *In work of College Grade.*

	REGISTRATION NOV. 30, 1921.			REGISTRATION NOV. 1, 1922.		
	Men.	Women.	Total.	Men.	Women.	Total.
Graduate students	53	8	61	48	6	54
Senior class	91	5	96	84	7	91
Junior class	93	8	101	89	6	95
Sophomore class	104	9	113	91	6	97
Freshman class	147	15	162	167	20	187
Special students	10	3	13	9	4	13
Totals	498	48	546	488	49	537

TABLE IV. — Attendance — Concluded.

B. Short Course Enrollment.

	REGISTRATION NOV. 30, 1921.			REGISTRATION NOV. 1, 1922.		
	Men.	Women.	Total.	Men.	Women.	Total.
Two-Year Course, second year	129	9	138	116	5	121
Two-Year Course, first year	150	5	155	128	8	136
Vocational Poultry Course	26	—	26	8	1	9
Unit Course	29	—	29	—	—	—
Totals	334	14	348	252	14	266

C. Other Short Course Enrollment.

School for Country Clergymen	18	1	19	31	2	33
Winter School	69	14	83	77	20	97
Summer School	67	192	259	23	147	170
Summer School for Federal men	65	—	65	—	—	—
School of Rural Home Life	—	—	—	—	16	16
Totals	219	207	426	131	185	316

D. Convention Registration.

	1921.	1922.
State institutional superintendents and farmers	50	—
Polish farmers' day	100	125
Farmers' week and annual poultry convention	3,000	2,000
Junior boys' and girls' prize winners' camp	95	100
Girls' camp (paid)	14	—
Boys' camp (paid)	34	—
One-day campers (boys and girls)	198	70
Extension workers' conference	80	80
Sheep breeders' conference	212	100
Clothing efficiency conference (2) for paid leaders	14	—
Clothing efficiency conference for local leaders	53	—
Tri-State Conference on Marketing	—	150
	3,850	2,625

TABLE V. — Legislative Budget, 1922.

ITEMS.	Amount asked.	Amount granted.
Chemistry laboratory and equipment	\$350,000 00	\$150,000 00 ¹
Improvements at power plant	80,000 00	63,000 00
Laboratory for horticultural manufactures	50,000 00	—
Improvements at Tillson Farm	5,000 00	5,000 00
Macadam road	8,000 00	—
Purchase of Brooks Farm	20,000 00	15,000 00
	\$513,000 00	\$233,000 00

¹ An additional appropriation of \$150,000 to be made in 1923.

TABLE VI. — *Current Account, State Funds.*

	Requested 1922.	Appro- priated 1922.	Deficiency Appro- priation. ¹	Expended 1922.	Balance.
Personal services:—					
Administration	\$43,360	\$42,020	—	\$41,180 88	\$839 12
Instruction	203,175	187,875	—	184,440 92	3,434 08
General maintenance	120,000	118,000	\$367 43	115,364 35	3,003 08
Experiment Station	66,075	60,000	36 00	59,014 57	1,021 43
Extension Service	59,780	52,200	2 70	50,693 81	1,598 89
Market Garden Field Station	6,500	6,000	—	5,453 54	546 46
Short Courses	53,640	48,000	—	47,418 28	581 72
Travel, office and other expenses	46,000	45,000	622 11	42,544 50	3,077 61
Teaching, laboratory supplies and equipment	56,000	55,000	361 05	55,800 59	—439 54
Experiment Station:—					
Supplies, equipment and publi- cations	20,050	14,000	263 56	13,619 19	644 37
Travel and office expenses	4,785	3,300	5 16	4,081 81	—776 65
Extension Service, supplies, equip- ment, travel, etc.	44,000	35,000	910 62	37,702 69	—1,792 07
Short courses	19,235	12,000	78 94	11,793 16	285 78
Heat, light and power	68,000	59,000	3,375 00	64,049 62	—1,674 62
Farm	24,000	22,000	408 45	18,447 76	3,960 69
Repairs, ordinary	25,000	25,000	81 69	30,847 83	—5,766 14
Replacements	75,000	25,000	—	25,533 92	—533 92
Market Garden Field Station	3,825	3,000	230 36	3,624 85	—394 49
Fertilizer law control	14,500	13,000	—	12,961 80	38 20
Poultry disease law	6,500	6,000	17 91	6,135 61	—117 70
Milk-testing inspection law	700	600	9 60	631 30	—21 70
Commercial feedstuffs	8,000	7,000	4 79	7,011 19	—6 40
Trustees' expenses	1,200	1,200	—	874 07	325 93
Printing reports	5,000	2,000	—	1,965 82	34 18
	\$974,325	\$842,285	\$6,775 37	\$841,192 06	\$7,868 31

¹ Balance from deficiency appropriation \$680,000.TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College
September 1922.*A. *Home Addresses of Students (classified by Towns and Cities.)*

Abington	1	Hopedale	1	Reading	3
Adams	1	Hopkinton	1	Richmond	1
Amherst	8	Hubbardston	1	Salisbury	1
Andover	1	Ipswich	1	Shelburne	4
Arlington	2	JACKSONVILLE, Fla.	1	Shrewsbury	1
Ashburnham	2	Kars, Armenia	1	South Hadley	2
Athol	2	LAWRENCE	2	Spencer	1
Barnstable	2	Longmeadow	1	SPRINGFIELD	10
Bernardston	1	Ludlow	1	Stoneham	3
BEVERLY	2	Manchester	2	Stoughton	1
Billerica	1	MANCHESTER, N. H.	1	Stow	2
Bolton	2	MELROSE	3	Sunderland	1
BOSTON	10	Methuen	1	TAUNTON	2
Bridgewater	1	Middleborough	1	Templeton	1
Brimfield	5	Milford	1	Tisbury	1
BROCKTON	3	Millis	1	Topsfield	1
Brookline	1	Millville	1	Townsend	1
CAMBRIDGE	2	Montpelier, Ohio	1	Vastarvik, Sweden	1
CHELSEA	1	Natick	3	Wallingford, Conn.	1
Colrain	2	Needham	1	WALTHAM	1
Conway	1	NEW BEDFORD	1	Ware	3
Dalton	2	NEW ROCHELLE, N. Y.	1	Warren	1
Deerfield	2	NEWTON	5	Westborough	1
East Bridgewater	1	NEW YORK, N. Y.	2	West Bridgewater	1
Easthampton	2	NORTHAMPTON	1	WESTFIELD	3
EVERETT	2	North Brookfield	1	WEST HARTFORD, Conn.	1
Fairhaven	1	Northfield	2	Westport, Conn.	1
FALL RIVER	1	Norwood	1	West Newbury	1
Glastonbury, Conn.	1	Orange	1	West Springfield	1
Grafton, Vt.	2	Oxford	1	Williamsburg	1
Greenfield	2	Pelham	1	Winchester	2
HABANA, Cuba	1	PORTLAND, Me.	1	WORCESTER	5
HOLYOKE	13	PROVIDENCE, R. I.	2		

TABLE VII. — *Statistics of Freshman entering Massachusetts Agricultural College, September 1922 — Continued.**B. Home Addresses (classified by States and Countries).*

	Number.	Per Cent.		Number.	Per Cent.
Armenia	1	.53	New York	3	1.60
Connecticut	4	2.13	Ohio	1	.53
Cuba	1	.53	Rhode Island	2	1.06
Florida	1	.53	Sweden	1	.53
Maine	1	.53	Vermont	2	1.06
Massachusetts	169	90.37			
New Hampshire	1	.53		187	100.00

C. Home Addresses (classified by Counties of Massachusetts).

	Number.	Per Cent.		Number.	Per Cent.
Barnstable	2	1.18	Middlesex	31	18.34
Berkshire	4	2.36	Norfolk	5	2.96
Bristol	5	2.96	Plymouth	8	4.73
Dukes	1	.59	Suffolk	11	6.50
Essex	12	7.10	Worcester	22	13.01
Franklin	16	9.52			
Hampden	34	20.11		169	100.00
Hampshire	18	10.65			

D. Nativity of Parents.

	Number.	Per Cent.
Neither parent foreign born	134	71.65
Both parents foreign born	33	17.64
Father (only) foreign born	11	5.88
Mother (only) foreign born	6	3.20
No statistics	3	1.60
	187	100.00

E. Education of Father.

	Number.	Per Cent.
Common school	77	41.17
High school	51	27.27
Business school	15	8.02
College or university	32	17.11
No statistics	12	6.41
	187	100.00

TABLE VII.—*Statistics of Freshman entering Massachusetts Agricultural College, September 1922—Concluded.**F. Religious Census.*

	MEMBERSHIP.		PREFERENCE.		TOTALS.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist	22	11.76	2	1.06	24	12.97
Catholic	28	14.97	—	—	28	14.97
Congregationalist	52	27.80	18	9.62	70	37.43
Episcopal	9	4.81	1	.53	10	5.34
Methodist	16	8.55	—	—	16	8.55
Presbyterian	4	2.13	2	1.06	6	3.20
Unitarian	9	4.81	5	2.67	14	7.41
Universalist	1	.53	—	—	1	.53
Miscellaneous	12	6.41	5	2.67	17	9.09
No statistics	1	.53	—	—	1	.53
	154	82.30	33	17.61	187	100.00

G. Occupation of Father.

	Number.	Per Cent.
Agriculture and horticulture	41	21.92
Artisans	37	19.79
Business	43	22.99
Deceased or no statistics	21	11.23
Miscellaneous	24	12.83
Professional	21	11.23
	187	100.00

H. Intended Vocation of Student.

	Number.	Per Cent.
Agriculture or horticulture (practical)	75	40.11
Agriculture or horticulture (professional)	42	22.46
Professions	17	9.09
Miscellaneous	26	13.90
Undecided or no statistics	27	14.44
	187	100.00

I. Farm Experience.

	Number.	Per Cent.
Brought up on a farm	55	29.41
Not brought up on a farm and having no or practically no farm experience	45	24.06
Not brought up on a farm, but having had some farm experience	86	46.00
No statistics	1	.52
	187	100.00

J. Miscellaneous Statistics.

Average age 19.19 years.

REPORT OF THE TREASURER.

FOR THE FISCAL YEAR ENDING NOV. 30, 1922.

BALANCE SHEET.

		Dr.	Cr.
1921			
Dec. 1.	To balance on hand	\$30,227 89	
1922			
Nov. 30.	To departmental income	136,039 79	
Nov. 30.	To receipts from State Treasurer	874,475 48	
Nov. 30.	To refunds to State Treasurer	216 45	
Nov. 30.	To receipts from United States Treasurer	119,802 58	
Nov. 30.	To November schedule in transit	109,305 12	
Nov. 30.	Refunds transferred to State Treasurer		\$216 45
Nov. 30.	Expenditures for fiscal year		1,096,431 67
Nov. 30.	Income transferred to State Treasurer		136,039 79
Nov. 30.	Balance on hand		37,379 40
		\$1,270,067 31	\$1,270,067 31

STATEMENT OF LEGISLATIVE APPORTIONMENT AND EXPENDITURES FOR FISCAL YEAR ENDING NOVEMBER 30, 1922, AND APPORTIONMENT REQUESTED FOR 1923.

	Apportionment for Last Fiscal Year.	Expenditures.	Requested Apportionment for New Fiscal Year.
College:			
Personal services	\$348,262 43	\$340,986 15	\$359,030 00
Maintenance	210,848 30	211,690 30	220,695 00
	\$559,110 73	\$552,676 45	\$579,725 00
Experiment Station:			
Personal services	\$60,036 00	\$59,014 57	\$72,420 00
Maintenance	17,568 72	17,701 00	20,000 00
	77,604 72	76,715 57	92,420 00
Extension Service:			
Personal services	\$52,292 70	\$50,693 81	\$52,180 00
Maintenance	35,910 62	37,762 69	40,000 00
	88,203 32	88,396 50	92,180 00
Short Courses:			
Personal services	\$48,000 00	\$47,418 28	\$53,230 00
Maintenance	12,078 94	11,793 16	12,000 00
	60,078 94	59,211 44	65,230 00
Market Garden Field Station:			
Personal services	\$6,000 00	\$5,453 54	\$6,000 00
Maintenance	3,230 36	3,624 85	4,000 00
	9,230 36	9,078 39	10,000 00
Trustees travel	\$1,200 00	\$874 07	\$1,200 00
Printing reports	2,000 00	1,965 82	2,000 00
Commercial feedstuffs	7,004 79	7,011 19	9,000 00
Totals	10,204 79	9,851 08	12,200 00
Fertilizer law	\$13,000 00	\$12,961 80	\$14,500 00
Poultry law	6,017 91	6,135 61	7,000 00
Milk testing law	609 60	631 30	600 00
Totals	19,627 51	19,728 71	22,100 00
Replacements	\$25,000 00	\$25,533 92	\$40,000 00
Totals	- \$849,060 37	- \$841,192 06	- \$913,855 00
Balance unexpended	- -	- 7,868 31	- -
	- -	- \$849,060 37	- -

CASH STATEMENT.

	Other Funds.	State Funds.	Totals.
Balance Dec. 1, 1921	\$30,227 89	-	\$30,227 89
<i>Receipts.</i>			
College receipts from students and others	-	-	21,864 17
Tuition	-	\$3,998 01	
Laboratory fees	-	5,863 81	
Rents	-	12,002 35	
Departmental sales	-	-	73,859 16
Produce	-	63,971 48	
Miscellaneous	-	9,887 68	
Experiment Station	-	-	8,723 76
Cranberry receipts	-	6,138 21	
Chemical receipts	-	466 74	
Miscellaneous	-	2,118 81	
Extension Service	-	-	1,086 90
Correspondence Courses	-	860 12	
Miscellaneous	-	226 78	
Short Courses	-	-	6,893 91
Students' fees	-	6,385 08	
Winter school	-	450 00	
Miscellaneous	-	58 83	
Market Garden Field Station	-	-	3,594 41
Produce	-	3,594 41	
Feed Law	-	-	267 00
Fertilizer Law	-	16,571 08	16,571 08
Milk testing law	-	675 05	675 05
Poultry disease law	-	2,504 35	2,504 35
Treasurer of the Commonwealth	-	-	874,475 48
Maintenance	-	746,847 17	
Special appropriations	-	122,852 49	
Endowment	3,313 32	-	
Department of Education	1,462 50	-	
Federal Government	-	-	119,802 58
Land Grant of 1862	7,300 00	-	
Hatch fund of 1887	15,000 00	-	
Morrill fund of 1890	16,666 67	-	
Adams fund of 1906	15,000 00	-	
Nelson fund of 1907	16,666 66	-	
Smith Lever fund of 1914	30,644 89	-	
Short Course, two years	18,524 36	-	
November schedules in transit	-	109,305 12	109,305 12
	\$154,806 29	\$1,115,044 57	\$1,269,850 86
<i>Payments.</i>			
College expenses	-	-	\$598,085 60
Personal services	\$45,409 15	\$340,986 15	
Maintenance	-	211,690 30	
Experiment Station	-	-	105,834 07
Personal services	28,698 50	59,014 57	
Maintenance	420 00	17,701 00	
Extension Service	-	-	115,744 32
Personal services	26,306 30	50,693 81	
Maintenance	1,041 52	37,702 69	
Short Courses	-	-	74,762 86
Personal services	13,046 85	47,418 28	
Maintenance	2,504 57	11,793 16	
Market Garden Field Station	-	-	9,078 39
Personal services	-	5,453 54	
Maintenance	-	3,624 85	
Trustees travels	-	874 07	874 07
Printing reports	-	1,965 82	1,965 82
Replacements	-	25,533 92	25,533 92
Commercial feed-stuffs	-	7,011 19	7,011 19
Fertilizer law	-	12,961 80	12,961 80
Milk testing law	-	631 30	631 30
Poultry disease law	-	6,135 61	6,135 61
Special appropriations	-	-	137,812 72
1921 Market Garden Field Station Administration Building	-	2,668 99	
1922 Purchase of Brooks Farm	-	15,000 00	
1922 Chemistry Building	-	56,720 37	
1922 Improvements to Power Plant	-	58,604 71	
1922 Improvements to Tillson Farm	-	4,818 65	
Income	-	136,039 79	136,039 79
Balance	37,379 40	-	37,379 40
	\$154,806 29	\$1,115,044 57	\$1,269,850 86

CURRENT ACCOUNTS, 1922.

Disbursements and Receipts.

ACCOUNTS.	Disbursements from Nov. 30, 1921, to Nov. 30, 1922.	Receipts from Nov. 30, 1921, to Nov. 30, 1922.	Apportionment for Year ending Nov. 30, 1922.	Balance to Credit.
Administration:				
Dean's office	\$569 26	-	\$703 00	\$133 74
Executive order	8,241 69	-	12,920 57	4,678 88
President's office	1,843 06	80 25	2,200 69	357 63
Registrar's office	771 70	15 00	807 40	35 70
Salaries	41,180 88	-	42,020 00	839 12
Treasurer's office	1,615 41	97 94	1,812 76	197 35
Maintenance, academic:				
Agricultural economics	564 60	-	568 75	4 15
Agricultural education	224 38	-	400 65	176 27
Agronomy	1,248 92	342 50	1,203 26	-45 66
Animal husbandry	648 51	140 00	600 95	-47 56
Beekeeping	353 69	34 32	521 60	167 91
Botany	1,497 32	598 50	1,533 50	36 18
Chemistry	8,205 18	2,267 63	5,255 23	-2,949 95
Dairying	30,463 16	23,248 66	33,027 30	2,564 14
Domestic Science	1,281 74	79 70	1,410 66	128 92
Economics and sociology	223 07	-	223 28	21
Entomology	1,097 39	114 50	1,250 00	152 61
Farm management	374 90	34 50	511 92	137 02
Floriculture	7,463 73	2,991 69	7,502 55	38 82
Forestry	273 50	6 00	350 20	76 70
General agriculture	2,451 39	-	2,500 00	48 61
Horticultural manufactures	3,015 35	602 75	3,582 05	566 70
Hospital	3,833 91	777 25	3,340 56	-493 35
Landscape gardening	587 25	401 50	529 34	-57 91
Language and literature	243 71	153 00	300 00	56 29
Mathematics	405 03	61 70	490 00	84 97
Microbiology	2,285 89	441 68	2,154 21	-131 68
Military science	1,459 21	30 00	1,420 60	-38 61
Mount Toby	3,358 91	2,273 06	3,508 85	149 94
Physical education	1,028 23	-	1,006 71	-21 52
Physics	788 62	69 00	718 85	-69 77
Pomology	5,161 43	2,979 10	5,321 59	160 16
Poultry husbandry	14,304 92	14,559 37	14,506 73	201 81
Rural engineering	902 28	182 35	900 00	-2 28
Rural sociology	160 71	-	200 00	39 29
Vegetable gardening	6,114 50	2,558 15	6,501 70	387 20
Veterinary science	2,139 23	108 00	2,007 00	-132 23
Women's dormitory	3,117 36	6,509 46	2,702 64	-414 72
Zoölogy and geology	554 12	418 00	650 00	95 88
Maintenance, general:				
Farm	38,363 24	15,597 67	37,559 05	-804 19
General horticulture	8,865 58	330 58	8,529 46	-336 12
Graduate school	54 94	-	100 00	45 06
Grounds	8,693 62	10 10	8,900 00	206 38
Library	8,713 44	67 12	8,281 24	-432 20
General expense	3,114 49	3,161 21	-	-
Operating and maintenance	140,448 88	14,461 09	140,544 64	95 76
Replacements	25,533 92	-	25,000 00	-533 92
Endowment fund	10,613 32	10,613 32	10,613 32	3,650 00
Instruction:				
Salaries	184,440 92	-	187,875 00	3,434 08
United States Treasurer, Morrill Fund	16,666 67	16,666 67	16,666 67	9,722 22
United States Treasurer, Nelson Fund	16,666 66	16,666 66	16,666 66	9,722 21
State Treasurer, account of schedules	-	578,210 37	-	-
Income to State Treasurer	95,723 33	-	-	-
	\$717,953 15	\$717,880 35	\$627,901 14	\$31,880 24
Less refunds	72 80	-	-	-
	\$717,880 35	\$717,880 35	-	-
Balance beginning fiscal year Dec. 1, 1921	-	23,094 43	-	-
Balance on hand Nov. 30, 1922	23,094 43	-	-	-
	\$740,974 78	\$740,974 78	-	-

COLLEGE ACCOUNTS.

Summary.

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1921	-	\$23,094 43
Institution receipts Nov. 30, 1922	-	95,723 33
State Treasurer's receipts Nov. 30, 1922	-	578,210 37
United States Treasurer's receipts Nov. 30, 1922	-	33,333 33
State Treasurer, Department of Education	-	1,462 50
Endowment Fund	-	10,613 32
Total Disbursements	\$598,085 60	-
Receipts turned in to State Treasurer	95,723 33	-
	\$693,808 93	\$742,437 28
Bills receivable Dec. 1, 1921 deducted	-	8,552 48
Bills payable Dec. 1, 1921 deducted	3,801 17	-
	\$690,007 76	\$733,884 80
Bills receivable Nov. 30, 1922	-	14,219 25
Bills payable Nov. 30, 1922	1,063 12	-
Balance	57,033 17	-
	\$748,104 05	\$748,104 05

FARM DISBURSEMENTS.

	Repairs.	Labor.	Equip-ment.	Feed.	Supplies.	Sundry.	Bedding.	Fertilizer.	Seeds.	Improve-ments.	Totals.
Dairy cattle	-	\$4,100 07	\$129 24	\$412 97	\$1,108 51	\$654 59	-	-	-	-	\$6,705 38
Horses	-	1,337 93	54 05	-	16 17	217 28	-	-	-	-	1,625 43
Sheep	-	1,088 30	29 09	-	17 88	59 77	-	-	-	-	1,195 13
Live stock	-	434 12	-	-	-	-	\$3,253 35	-	-	-	10,486 82
Swine	-	1,061 17	9 36	6,799 35	7 37	-	-	-	-	-	1,833 75
Teams	-	379 61	-	674 16	-	81 67	-	-	-	-	760 41
Field crops	-	4,364 30	-	-	1 50	189 37	-	\$975 93	\$444 70	-	5,813 59
Tools and machinery	\$752 29	666 28	320 08	-	787 58	27 16	-	-	-	-	2,526 23
Miscellaneous	-	6,453 61	-	-	89 04	136 57	-	-	-	\$707 30	7,416 52
Totals	\$752 29	\$19,915 48	\$733 25	\$7,886 48	\$2,028 05	\$1,666 41	\$3,253 35	\$975 93	\$444 70	\$707 30	\$38,363 24

FARM CREDITS.

	Wool.	Milk.	Stock.	Sundry.	Labor.	Field Crops.	Tools and Machinery.	Totals.
Dairy cattle	-	\$7,614 30	\$4,452 36	-	-	-	-	\$12,066 66
Horses	-	-	40 00	-	-	-	-	40 00
Sheep	-	-	632 31	\$160 00	-	-	-	946 77
Live stock, supplies	\$154 46	-	-	117 18	-	-	-	117 18
Field crops	-	-	-	-	\$586 71	-	-	586 71
Swine	-	-	828 10	-	-	-	-	828 10
Teams	-	-	-	-	\$47 44	-	-	47 44
Tools and machinery	-	-	-	-	-	-	\$17 00	17 00
Miscellaneous	-	-	-	851 64	96 17	-	-	947 81
Totals	\$154 46	\$7,614 30	\$5,952 77	\$1,128 82	\$143 61	\$586 71	\$17 00	\$15,597 67

AGRICULTURAL DIVISION.
Disbursements and Receipts.

	Disbursements.	Receipts.
Agronomy	\$1,248 92	\$342 50
Animal husbandry	648 51	140 00
Dairying	30,463 16	23,248 66
Farm	38,363 24	15,597 67
Farm management	374 90	34 50
Poultry husbandry	14,304 92	14,559 37
Rural engineering	902 28	182 35
Division totals	\$86,305 93	\$54,105 05

Summary.

	DR.	CR.
By total division receipts		\$54,105 05
By bills receivable		13,065 67
By net apportionment		34,204 16
To total division disbursements	\$86,305 93	
To bills payable	307 28	
Balance	14,761 67	
	\$101,374 88	\$101,374 88

Inventory of Quick Assets.

	Nov. 30, 1921.	Nov. 30, 1922.
Inventory of produce	\$10,487 81	\$13,038 91
Inventory of cattle	18,975 00	19,510 00
Inventory of swine	701 00	1,487 00
Inventory of horses	3,850 00	3,800 00
Inventory of poultry	3,390 00	4,243 75
Inventory of sheep	1,842 00	1,805 00
	\$39,245 81	\$43,884 66

HORTICULTURAL DIVISION.
Disbursements and Receipts.

	Disbursements.	Receipts.
Floriculture	\$7,463 73	\$2,991 69
Forestry	273 50	6 00
General horticulture	8,865 58	330 58
Grounds	8,693 62	10 10
Horticultural manufactures	3,015 35	602 75
Landscape gardening	587 25	401 50
Mount Toby	3,358 91	2,273 06
Pomology	5,161 43	2,979 10
Vegetable gardening	6,114 50	2,558 15
Division totals	\$43,533 87	\$12,152 93

HORTICULTURAL DIVISION — *Concluded.**Summary.*

	DR.	CR.
By total division receipts		\$12,152 93
By bills receivable		830 64
By net apportionment		32,572 81
To total division disbursements	\$43,533 87	
To bills payable	25 69	
By balance	1,996 82	
	\$45,566 38	\$45,566 38

Inventory of Quick Assets.

	Nov. 30, 1921.	Nov. 30, 1922.
Floriculture	\$2,000 00	\$1,000 00
General horticulture (live stock)	1,285 00	1,385 00
Horticultural manufactures	150 00	420 00
Mount Toby	660 00	98 75
Pomology	1,400 00	1,300 00
Vegetable gardening	245 00	75 00
	\$5,740 00	\$4,278 75

EXPERIMENT STATION.

Disbursements and Receipts.

	Disbursements from Dec. 1, 1921, to Nov. 30, 1922.	Receipts from Dec. 1, 1921, to Nov. 30, 1922.	Apportionment for Year ending Nov. 30, 1922.	Balance to Credit.
Administration	\$1,413 42	\$12 00	\$1,568 38	\$154 96
Agricultural	9,763 79	547 09	9,468 13	—295 66
Agricultural economics	675 46	—	675 00	—46
Botanical	2,557 89	—	2,546 36	—11 53
Chemical	3,005 14	466 74	3,432 83	427 69
Cranberry	4,298 39	6,138 21	4,004 46	—293 93
Entomological	685 35	—	700 00	14 65
Freight and express	536 96	—	300 00	—236 96
Library	1,029 98	—	1,040 82	10 84
Meteorology	595 04	—	600 00	4 96
Microbiology	991 53	—	1,000 00	8 47
Pomology	2,703 94	1,559 72	3,100 00	396 06
Poultry	3,844 03	—	3,200 00	—644 03
Publications	2,143 70	—	3,136 24	992 54
Salaries	70,453 16	—	71,632 50	1,179 34
Treasurer's office	408 69	—	400 00	—8 69
Veterinary	737 80	—	800 00	62 20
Hatch fund	—	15,000 00	—	—
Adams fund	—	15,000 00	—	—
State Treasurer, account of schedules	—	76,715 57	—	—
Income remitted to State Treasurer	8,723 76	—	—	—
	\$114,568 03	\$115,439 33	\$107,604 72	\$1,760 45
Less refunds	10 20	—	—	—
	\$114,557 83	\$115,439 33	—	—
Balance beginning fiscal year Dec. 1, 1921	—	3,112 50	—	—
Balance on hand Nov. 30, 1922	3,994 00	—	—	—
	\$118,551 83	\$118,551 83	—	—

EXPERIMENT STATION — *Concluded.**Summary.*

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1921	-	\$3,112 50
Receipts from State Treasurer	-	76,715 57
Receipts from United States Treasurer	-	30,000 60
Receipts from other sources	-	8,723 76
Total disbursements	\$105,834 07	-
Receipts turned in to State Treasurer	8,723 76	-
	\$114,557 83	\$118,551 83
Bills receivable Dec. 1, 1921 deducted	-	1,340 16
Bills payable Dec. 1, 1921 deducted	173 73	-
	\$114,384 10	\$117,211 67
Bills receivable Nov. 30, 1922	-	1,046 60
Bills payable Nov. 30, 1922	34 43	-
Balance	3,839 74	-
	\$118,258 27	\$118,258 27

EXTENSION SERVICE.

Disbursements and Receipts.

CLASSIFICATION.	Disbursements.	Receipts.	Apportionment.	Balance.
Administration	\$3,271 64	\$106 96	\$4,036 18	\$764 54
Animal husbandry	1,055 70	-	1,200 00	144 30
Co-operative marketing	944 25	-	1,050 39	106 14
Correspondence courses	1,654 33	860 12	1,512 69	-141 64
County agents' work	1,335 22	-	1,200 50	-134 72
Clothing efficiency	1,428 02	-	839 76	-588 26
Dairying	81 47	2 65	450 00	368 53
Entomology	22 80	-	25 00	2 20
Exhibits	706 13	-	750 00	43 87
Extension courses at college	1,489 34	-	1,200 00	-289 34
Extension schools	125 39	-	268 67	143 28
Farm management demonstration	1,245 19	49 70	1,604 70	359 51
Forestry	45 20	-	-	-45 20
Home demonstration agents	2,224 10	67 47	2,027 59	-196 51
Home gardening	541 01	-	550 75	9 74
Horticultural manufactures	1,683 76	-	1,200 00	-483 76
Junior extension work	6,340 44	-	5,694 43	-646 01
Landscape extension	566 22	-	1,200 00	633 78
Lectures	53 59	-	50 00	-3 59
Library extension	167 20	-	300 00	132 80
Nutrition and household management	2,099 30	-	790 23	-1,309 07
Plant diseases	-	-	25 00	25 00
Pomology	1,769 70	-	1,501 23	-268 47
Poultry husbandry	1,235 81	-	1,200 00	-35 81
Printing	6,766 54	-	5,730 44	-1,036 10
Personal services	50,693 81	-	52,290 00	1,596 19
Rural engineering	196 92	-	500 00	303 08
Soils and crops	653 42	-	1,005 76	352 34
State Treasurer, account of schedules	-	88,396 50	-	-
Income to State Treasurer	1,086 90	-	-	-
	\$89,483 40	\$89,483 40	\$88,203 32	-\$193 18

EXTENSION SERVICE — *Concluded.*
Summary.

	Disbursements.	Receipts.
Balance Dec. 1, 1921 ¹	—	\$4,006 75
Receipts Nov. 30, 1922	—	1,086 90
Received from State Treasurer	—	83,396 50
Received from United States Treasurer	—	30,644 89
Disbursements to Nov. 30, 1922	\$115,744 32	—
Receipts turned in to State Treasurer	1,086 90	—
	\$116,831 22	\$124,135 04
Bills receivable Dec. 1, 1921 deducted	—	14 51
Bills payable Dec. 1, 1921 deducted	753 88	—
	\$116,077 34	\$124,120 53
Bills receivable Nov. 30, 1922	—	55 47
Bills payable Nov. 30, 1922	—	—
Balance	8,098 66	—
	\$124,176 00	\$124,176 00

¹ Includes Federal Smith-Lever Fund.

SMITH-LEVER FUND (FEDERAL).

	Disbursements.	Receipts.
Administration	\$112 64	—
Animal husbandry	70	—
District and county agents	5 60	—
Co-operative marketing	95	—
Farm management demonstration	2 45	—
Home economics	16 76	—
Home gardening	1 20	—
Junior Extension work	26 80	—
Pomology	42 60	—
Poultry husbandry	3 84	—
Printing and publications	742 50	—
Salaries	26,306 30	—
Clothing efficiencies	81 63	—
Nutrition and household management	3 85	—
State Treasurer	—	\$30,644 89
	\$27,347 82	\$30,644 89
Balance beginning fiscal year December 1, 1921	—	4,006 75
Balance on hand November 30, 1922	7,303 82	—
Totals	\$34,651 64	\$34,651 64

SHORT COURSES.

	Disbursements.	Receipts.	Apportionment.	Balance.
Agricultural economics	\$15 00	—	\$100 00	\$85 00
Agronomy	591 22	\$446 00	500 00	—91 22
Animal husbandry	103 94	290 00	121 01	17 07
Botany	—	6 50	—	—
Dairying	3,000 00	465 45	3,000 00	—
Domestic science	87 99	—	100 00	12 01
Entomology	41 75	—	50 00	8 25
Farm management	54 00	—	50 00	—4 00
Floriculture	99 09	68 00	100 00	91
Forestry	117 42	—	100 00	—17 42

SHORT COURSES—*Concluded.*

	Disbursements.	Receipts.	Apportionment.	Balance.
General horticulture	\$170 38	\$114 50	\$200 00	\$29 62
Horticultural manufactures	682 11	—	750 00	67 89
Library	88 58	—	150 00	61 42
Mathematics	—	4 00	—	—
Microbiology	50 00	75 00	50 00	—
Personal services	47,548 28	—	48,000 00	451 72
Pomology	1,087 33	—	1,004 50	—82 83
Poultry husbandry	599 23	980 00	600 00	77
Rural engineering	846 88	326 50	850 00	3 12
Short course office	3,652 17	58 83	3,814 73	162 56
Treasurer's office	201 25	—	200 00	—1 25
Tuition	—	3,459 13	—	—
Vegetable gardening	304 82	150 00	338 70	33 88
Winter school registration	—	450 00	—	—
	\$59,341 44	\$6,893 91	\$60,078 94	\$737 50
Less refunds	130 00	—	—	—
	\$59,211 44	—	—	—

SUMMARY.

	DR.	CR.
State appropriation		\$60,078 94
Amount of receipts		6,893 91
Amount of receipts transferred to State Treasurer	\$6,893 91	
Department expenditures	59,211 44	
Balance unexpended	867 50	
Totals	\$66,972 85	\$66,972 85

MARKET-GARDENING FIELD STATION.

	DR.	CR.
Labor	\$5,453 54	
Maintenance	3,628 30	
Totals	\$9,081 84	
Less refund	3 45	
	\$9,078 39	
State appropriation		\$9,230 36
Amount of receipts		3,594 41
Amount of receipts transferred to State Treasurer	\$3,594 41	
Department expenditures	9,078 39	
Balance unexpended	151 97	
Totals	\$12,824 77	\$12,824 77

SPECIAL APPROPRIATIONS.

	Date made.	Appropriation.	Amount expended to Date.	Unexpended Balance.
Market-Garden Field Station administration building	1921	\$10,000 00	\$10,000 00	-
Chemistry building	1922	150,000 00	56,720 37	\$93,279 63
Power plant improvements	1922	63,000 00	58,604 71	4,395 29
Purchase of Brooks Farm	1922	15,000 00	15,000 00	-
Tillson Farm improvements	1922	5,000 00	4,818 65	181 35
		\$243,000 00	\$145,143 73	\$97,856 27
Amount spent previous to Dec. 1, 1921	-	-	-	7,331 01
Amount expended during fiscal year	-	-	-	137,512 72
Unexpended balance Nov. 30, 1922	-	-	97,856 27	-
		\$243,000 00	\$243,000 00	\$243,000 00

INVENTORY — REAL ESTATE.

Land (Estimated Value).

Angus land	\$800 00
Allen place	500 00
Baker place	2,500 00
Bangs place	2,350 00
Brooks farm	11,000 00
Brown land	500 00
Charmbury place	450 00
Clark place	4,500 00
College farm	37,000 00
Cranberry land	12,745 00
George Cutler, Jr., trustee	2,700 00
Dickinson land	7,850 00
Harlow farm and orchard	3,284 63
Hawley and Brown place	675 00
Kellogg place	3,368 45
Loomis place	415 00
Louisa Baker place	5,000 00
Market-Garden Field Station	4,800 00
Mount Toby demonstration forest	30,000 00
Newell farm	2,800 00
Old creamery place	1,000 00
Owen farm	5,000 00
Pelham quarry	500 00
Tillson farm	2,950 00
Westcott place	2,250 00
	\$144,938 08

INVENTORY — *Continued.**College Buildings (Estimated Value) 1922.*

	Inventory at Beginning of Year.	Per Cent deducted.	Value at Beginning of Year less Deterioration.	Repairs and Improvements during Year.	Total Value at Close of Fiscal Year.
Adams Hall	\$129,616 70	2	\$127,024 37	\$580 14	\$127,604 51
Apiary	2,905 76	2	2,847 64	37 18	2,884 82
Cashier's House	1,510 80	5	1,435 26	240 73	1,675 99
Clark Hall	61,376 07	2	60,148 55	918 04	61,066 59
Cold storage laboratory	10,586 37	2	10,374 64	75	10,375 39
Dairy barn and storage	30,958 65	3	30,028 89	124 09	30,162 98
Draper Hall	69,052 27	3	66,980 70	2,634 40	69,615 10
Drill Hall and gun shed	9,245 82	5	8,783 53	399 50	9,183 03
Durfee glass house, old	7,479 76	5	7,105 77	192 82	7,298 59
Durfee glass house, new	11,015 26	5	10,464 50	-	10,464 50
Farm blacksmith shop	444 39	3	451 06	-	431 06

INVENTORY — *Continued.*
College Buildings (Estimated Value) 1922 — Concluded.

	Inventory at Beginning of Year.	Per Cent deducted.	Value at Beginning of Year less De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Farm bull pens	-	-	-	-	\$3,377 50
Farm bungalow	\$2,563 57	3	\$2,486 66	\$22 71	2,509 37
Farmhouse No. 1	2,922 50	3	2,834 82	262 24	3,097 06
Farmhouse No. 2	4,366 22	8	4,016 92	31 85	4,048 77
Fernald Hall	71,845 57	2	70,408 66	372 40	70,781 06
Flint Laboratory	69,131 75	2	67,749 11	1,106 97	68,856 08
French Hall	45,824 27	2	44,907 78	569 17	45,476 95
Grinnell Arena	8,905 84	2	8,727 72	13 39	8,741 11
Grounds tool shed	210 05	5	199 55	-	199 55
Harlow house	2,008 97	5	1,908 52	48 04	1,956 56
Horse barn	4,755 83	3	4,613 16	42 64	4,655 80
Head of division of horticulture	2,187 92	5	2,078 52	408 08	2,486 60
Horticultural barn	3,707 60	3	3,596 37	59 06	3,655 43
Horticultural tool shed	1,615 97	3	1,567 39	-	1,567 39
Horticultural open shed	494 05	5	469 35	-	469 35
Horticultural manufactures shed	3,624 51	5	3,443 28	28	3,443 56
Hospital	14,617 40	2	14,325 05	1,152 94	15,477 99
Jewett house and barn	3,153 68	5	2,996 00	110 31	3,106 31
Machinery barn	3,407 21	3	3,304 99	26 70	3,331 69
Market-Garden Field Station barn	3,118 86	3	3,024 29	-	3,024 29
Market-Garden Field Station Foreman's cottage	4,234 05	3	4,107 03	-	4,107 03
Market-Garden Field Station Greenhouse plant	9,476 25	5	9,002 44	-	9,002 44
Market-Garden Field Station Wagon shed	522 70	3	507 02	-	507 02
Market-Garden Field Station Administration building	9,600 00	3	8,730 00	-	8,730 00
Market-Garden Field Station Boiler House	5,820 00	3	5,645 40	-	5,645 40
Mathematical building	4,670 07	5	4,436 57	101 80	4,538 37
Memorial Hall	105,000 00	2	102,900 00	586 14	103,486 14
Microbiology building	57,144 96	2	56,002 06	241 38	56,243 44
Military storage	214 34	5	203 62	-	203 62
Mount Toby house and barn	3,486 32	5	3,312 00	-	3,312 00
North dormitory	26,916 37	2	26,378 04	841 43	27,219 47
Physics laboratory	4,432 97	5	4,211 32	585 86	4,797 18
Piggery	2,469 43	3	2,395 35	-	2,395 35
Poultry departments —					
No. 1, demonstration building	1,481 31	2	1,451 68	64 35	1,516 03
2, oil house	75 06	2	73 56	-	73 56
3, brooder, killing and fattening laboratory	2,361 99	2	2,314 75	35	2,315 10
4, mechanics, storage building and incubator cellar	3,367 23	2	3,299 89	669 78	3,969 67
5, laying house	1,665 32	2	1,632 01	-	1,632 01
6, manure shed	89 16	2	87 38	-	87 38
7, small henhouse	44 87	2	43 97	-	43 97
8, breeding house	1,423 70	2	1,395 23	50 06	1,445 29
9, experimental breeding house	557 40	2	546 25	-	546 25
10, duck house	92 25	2	90 40	70	91 10
11, unit house for 200 hens	466 69	2	457 36	-	457 36
12, unit house for 100 hens	376 57	2	369 04	-	369 04
Power plant and storage building including coal pocket	48,055 29	2	47,094 18	1,177 66	48,271 84
President's house	12,994 52	3	12,604 68	422 54	13,027 22
Rural engineering building	15,316 55	2	15,010 22	284 22	15,294 44
Sheep barn	1,380 88	3	1,339 45	3 58	1,343 03
South dormitory	39,298 22	2	38,512 26	1,846 12	40,358 38
Stable for cavalry unit	18,141 38	3	17,597 14	552 17	18,149 31
Stockbridge Hall	166,475 88	2	163,146 36	1,284 45	164,430 81
Agronomy greenhouse	1,924 16	2	1,885 68	78 27	1,963 95
Stockbridge house	1,570 32	5	1,491 80	864 69	2,356 49
Stone chapel	30,079 72	2	29,478 13	289 20	29,767 33
Turbine house	18,436 15	2	18,067 43	-	18,067 43
Vegetable plant house	4,160 45	5	3,952 43	412 88	4,365 31
Veterinary laboratory and stable	21,343 68	2	20,916 81	1,305 10	22,221 91
Waiting station	457 33	2	448 18	59 09	507 27
Wilder Hall	33,171 15	2	32,507 73	577 91	33,085 64
Young stock barns	5,635 11	3	5,466 06	42 40	5,508 46
	\$1,246,483 42	-	\$1,217,393 96	\$21,706 56	\$1,242,478 02

INVENTORY — *Continued.*
College Equipment (Estimated Value).

Administrative division:		
Dean's Office		\$1,147 15
President's Office		2,728 50
Registrar's Office		1,238 97
Treasurer's Office		4,707 02
Agricultural division:		
Agronomy		8,444 94
Animal Husbandry		896 10
Dairy		25,838 54
Farm		20,905 57
Farm Livestock		26,602 00
Farm Management		984 39
General Agriculture		2,528 15
Poultry		10,752 27
Rural Engineering		6,999 62
Domestic Science		3,495 18
Dining Hall		26,183 81
Extension		12,968 93
General Science:		
Apiary		2,362 11
Botanical		24,038 35
Chemistry		10,454 42
Entomology		5,216 21
Mathematics		2,314 25
Microbiology		7,182 10
Physics		7,379 12
Veterinary		10,557 76
Zoölogy and Geology		17,346 34
Graduate School		97 55
Horticultural division:		
Floriculture		30,311 98
Forestry		2,567 46
General Horticulture		7,892 44
Grounds		2,086 52
Horticultural Manufactures		5,490 05
Landscape Gardening		5,522 31
Market-Garden Field Station		3,841 73
Mount Toby Reservation		176 00
Pomology		8,437 69
Vegetable Garden		3,706 07
Hospital		989 40
Humanities division:		
Economics and Sociology		202 70
Language and Literature		621 50
Library		126,958 35
Military		1,360 28
Operating and Maintenance:		
College Supply		1,659 83
Fire Apparatus		1,700 00
General Maintenance:		
Office		854 05
Carpentry and Masonry Supplies		5,349 71
Carpentry and Masonry Tools		4,087 28
Electrical Supplies		3,735 47
Electrical Tools		178 55
Electrical Commencement supplies		619 75
Heating and Plumbing supplies		10,268 00
Heating and Plumbing Tools		2,635 34
Painting Supplies		1,342 90
Painting Tools		283 73
Steam Main		53,620 69
Lighting Lines		9,930 79
Janitor's Supplies		1,401 29
Sewer Line		13,942 54
Water Mains		13,374 41
Power Plant:		
General Equipment		113,492 80
Tools		255 04
Supplies		465 18
Fuel		13,125 00

INVENTORY — *Continued.**College Equipment (Estimated Value) — Concluded.*

Physical Education	\$1,776 65
Rural Social Science:	
Agricultural Economics	1,599 35
Agricultural Education	1,466 48
Rural Sociology	376 06
Rural Social Science	40 00
Short Course	1,552 08
Textbooks	2,878 40
Trophy Room	1,200 00
Women's Dormitory	9,912 30
Memorial Hall	21,564 21
Total	\$738,221 71

Experiment Station Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent.	Cost at Beginning of Year, less Per Cent De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Year.
Agricultural laboratory	\$14,763 72	2	\$14,468 45	\$66 76	\$14,535 21
Agricultural barn	4,202 20	3	4,076 13	—	4,076 13
Agricultural farmhouse	1,604 59	3	1,556 45	54 08	1,610 53
Agricultural glasshouse	349 17	5	331 71	—	331 71
Brooks house	—	—	—	—	2,500 00
Brooks barn and sheds	—	—	—	—	1,500 00
Cranberry buildings	3,080 19	5	2,926 18	—	2,926 18
Entomological glasshouses	648 21	5	615 80	—	615 80
Plant and animal chemistry laboratory	27,630 86	2	27,078 24	302 49	27,380 73
Plant and animal chemistry barns	4,581 64	3	4,444 19	659 25	5,103 44
Plant and animal chemistry dairy	1,615 97	3	1,567 49	—	1,567 49
Six poultry houses	615 68	2	603 37	113 78	717 15
Tillson house	527 88	5	501 49	448 58	950 07
Tillson barn	977 41	5	928 54	—	928 54
Tillson poultry houses (4)	—	—	—	—	2,749 75
Tillson incubator cellar	—	—	—	—	713 50
Totals	\$60,597 52	—	\$59,098 04	\$1,644 94	\$68,206 23

Experiment Station Equipment (Estimated Value).

Apiary	\$152 67
Agricultural Economics Department	477 57
Agricultural Laboratory	7,339 93
Botanical laboratory	6,180 10
Chemical laboratory	25,685 30
Cranberry Station	3,841 80
Director's office	5,031 18
Entomological laboratory	24,063 18
Meteorological laboratory	778 00
Microbiological laboratory	2,771 20
Pomology	4,609 19
Poultry department	5,297 25
Treasurer's Office	1,021 34
Veterinary	594 76
Total	\$87,843 47

INVENTORY — *Concluded.**Summary.*

Land	\$144,938 08
College buildings	1,242,478 02
College equipment	738,221 71
Experiment Station buildings	68,206 23
Experiment Station equipment	87,843 47
Total	\$2,281,687 51
	Acres.
College estate (area)	702 19
Cranberry Station, Wareham (area)	23 67
Market Garden Field Station, Lexington (area)	12 00
Mount Toby demonstration forest (area)	755 27
Rifle range	46 20
Pelham quarry	50
Total acreage	1,539 83

STUDENTS' TRUST FUND ACCOUNT.

	Disbursements, Year ending Nov. 30, 1922.	Receipts, Year ending Nov. 30, 1922.	Balance on Hand.	Balance brought forward Dec. 1, 1921.
Athletics	\$17,035 79	\$19,595 56	\$295 06	\$-2,264 71
Dining Hall	88,070 72	89,050 92	43 27	-936 93
Keys	107 00	112 00	86 00	81 00
Students' deposits	52,030 35	51,079 25	14,866 07	15,817 17
Social Union	3,624 42	3,306 93	483 07	800 56
Textbooks	11,981 69	10,904 95	1,080 22	2,156 96
Athletic Field	-	-	169 70	169 70
Uniforms	4,898 80	4,876 48	3,495 30	3,517 62
Cow-Testing	22,734 40	23,438 14	2,220 34	1,516 60
Totals	\$200,483 17	\$202,364 23	\$22,739 03	\$20,857 97
Balance beginning fiscal year	-	20,857 97	-	-
Balance on hand Nov. 30, 1922	22,739 03	-	-	-
Totals	\$223,222 20	\$223,222 20	-	-

CONDENSED OPERATING STATEMENT OF THE DINING HALL.

	Operating Charges.	Income.
1921.		
Dec. 1, Balance	-\$936 93	-
1922.		
Nov. 30, Total Disbursements	88,070 72	-
Outstanding Bills	5,225 15	-
Total Collections	-	\$89,050 92
Accounts Outstanding	-	1,100 71
Inventory	-	10,482 31
Balance	6,401 14	-
Totals	\$100,633 94	\$100,633 94

ENDOWMENT FUND.¹

	Principal.	Income.
United States grant (5 per cent)	\$219,000 00	\$7,300 00
Commonwealth grant (3½ per cent)	142,000 00	1,313 32
	-	\$10,613 32

¹ This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

BURNHAM EMERGENCY FUND.

	Market Value Dec. 1, 1922.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s at \$910	\$1,820 00	\$2,000 00	\$80 00
Two bonds Western Electric Company 5s at \$1,000	2,000 00	2,000 00	100 00
One United States Liberty Bond 4¼s, \$980	490 00	500 00	21 25
Louisville Gas & Electric Co. 7s, \$1,000	500 00	500 00	35 00
	\$4,810 00	\$5,000 00	\$236 25
Unexpended balance Dec. 1, 1921	-	-	325 81
	-	-	\$562 06
Disbursements for fiscal year ending November 30, 1922	-	-	70 00
Cash on hand November 30, 1922	-	-	\$492 06

LIBRARY FUND.

Five bonds New York Central & Hudson River Railroad Company 4s at \$920	\$4,600 00	\$5,000 00	\$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s at \$940	4,700 00	5,000 00	200 00
Two shares New York Central & Hudson River Railroad Company Stock at \$96	192 00	200 00	10 00
Amherst Savings Bank, deposit	167 77	167 77	8 01
	\$9,659 77	\$10,367 77	\$418 01
Returned Funds	-	-	1 15
	-	\$10,367 77	\$419 16
Disbursements for fiscal year, November 30, 1922	-	-	419 16

SPECIAL FUNDS.

Endowed Labor Fund (the Gift of a Friend of the College).

Two bonds American Telephone and Telegraph Company 4s at \$910	\$1,820 00	\$2,000 00	\$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s at \$940	1,880 00	2,000 00	80 00
One bond New York Central Railroad debenture 4s	920 00	1,000 00	40 00
One bond Louisville Gas and Electric 7s	1,000 00	1,000 00	70 00
Amherst Savings Bank, deposit	143 39	143 39	6 85
One United States Liberty Bond 4¼	980 00	1,000 00	42 50
	\$6,743 39	\$7,143 39	\$319 35
Unexpended balance December 1, 1921	-	-	10 96
Cash on hand November 30, 1922	-	-	\$330 31

SPECIAL FUNDS — *Continued.*
Whiting Street Scholarship Fund.

	Market Value Dec. 1, 1922.	Par Value.	Income.
One bond New York Central debenture 4s	\$920 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit	271 64	271 64	13 02
	\$1,191 64	\$1,271 64	\$53 02
Unexpended balance December 1, 1921	—	—	502 63
Cash on hand November 30, 1922	—	—	\$555 65

Hills Fund.

Two United States Liberty Bonds $4\frac{1}{2}$ at \$980	\$1,960 00	\$2,000 00	\$85 00
One bond American Telephone and Telegraph Company 4s, at \$910	910 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad debenture 4s at \$920	920 00	1,000 00	40 00
One bond New York Central Railroad debenture 4s at \$920	920 00	1,000 00	40 00
Three bonds Pacific Telephone and Telegraph Company 5s, at \$970	2,910 00	3,000 00	150 00
One bond Western Electric Company 5s at	1,000 00	1,000 00	50 00
Boston & Albany Railroad stock $3\frac{5}{8}$ bonds at \$145	526 00	362 00	31 68
Amherst Savings Bank, deposit	72 75	72 75	3 46
Electric Securities Company bonds, $1\frac{1}{2}$ % bonds, \$950	1,121 00	1,180 00	59 00
Two bonds Louisville Gas and Electric 7s at \$1,000	2,000 00	2,000 00	140 00
	\$12,339 75	\$12,614 75	\$639 14
Unexpended balance Dec. 1, 1921	—	—	1,681 47
	—	—	\$2,320 61
Disbursements for fiscal year ending Nov. 30, 1922	—	—	401 79
Cash on hand November 30, 1922	—	—	\$1,918 82

Mary Robinson Fund.

Amherst Savings Bank deposit	\$142 00	\$142 00	\$6 81
Boston & Albany Railroad stock $\frac{3}{8}$ share at \$145	54 00	38 00	3 32
Electric Securities Company bonds, $4\frac{1}{2}$ % bond at \$950	779 00	820 00	41 00
	\$975 00	\$1,000 00	\$51 13
Unexpended balance Dec. 1, 1921	—	—	393 48
Cash on hand Nov. 30, 1922	—	—	\$444 61

Grinnell Prize Fund.

Ten shares New York Central & Hudson River Railroad stock at \$96	\$960 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1921	—	—	245 74
	\$960 00	\$1,000 00	\$295 74
Disbursements for Prizes	—	—	50 00
Cash on hand Nov. 30, 1922	—	—	\$245 74

Students' Loan Fund of the Massachusetts Agricultural Club.

First National Bank	\$500 00	\$500 00	—
Disbursements for fiscal year ending Nov. 30, 1922	—	150 00	—
Cash on hand Nov. 30, 1922	—	\$350 00	—

SPECIAL FUNDS — *Continued.*
Gassett Scholarship Fund.

	Market Value Dec. 1, 1922.	Par Value.	Income.
One bond New York Central & Hudson River Railroad debenture 4s at \$920	\$920 00	\$1,000 00	\$40 00
Amherst Savings Bank deposit	11 64	11 64	51
	\$931 64	\$1,011 64	\$40 51
Unexpended balance Dec. 1, 1921	-	-	385 27
Cash on hand Nov. 30, 1922	-	-	\$425 78

Massachusetts Agricultural College (Investment).

One share New York Central & Hudson River Railroad stock \$96	\$96 00	\$100 00	\$5 00
Unexpended balance Dec. 1, 1921	-	-	105 45
Cash on hand Nov. 30, 1922	-	-	\$110 45

Danforth Keyes Bangs Fund.

Two bonds Pacific Telephone and Telegraph Company 5s at \$970	\$1,940 00	\$2,000 00	\$100 00
Two bonds Union Electric Light and Power Company 5s at \$940	1,880 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s at \$910	1,820 00	2,000 00	80 00
One United States Liberty Bond 4½s \$980	980 00	1,000 00	42 50
Interest from student loans	-	-	90 93
	\$6,620 00	\$7,000 00	\$413 43
Unexpended balance Dec. 1, 1921	-	-	1,375 22
	-	-	\$1,788 65
Total loans made to students during fiscal year \$4,551 00	-	-	-
Cash received on account of student loans 2,750 00	-	-	-
Excess of loans made over accounts paid by students	-	-	1,801 00
Cash overdrawn Nov. 30, 1922	-	-	-\$12 35

John C. Cutter Fund.

One bond Pacific Telephone and Telegraph Company 5s at \$970	\$970 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1921	-	-	104 12
	\$970 00	\$1,000 00	\$154 12
Disbursements for fiscal year ending Nov. 30, 1922	-	-	87 69
Cash on hand Nov. 30, 1922	-	-	\$66 43

William R. Sessions Fund.

One \$500.00 bond New York Central & Hudson River Railroad 6s \$1,040	\$520 00	\$500 00	\$30 00
Three United States Liberty Bonds, two at \$1,000.00 and one at \$500.00, 4½s at \$980	2,450 00	2,500 00	106 25
One bond Adirondack Light and Power Company 6s	1,010 00	1,000 00	60 00
One bond Southern Illinois Light and Power Company 6s	1,000 00	1,000 00	-
	\$4,980 00	\$5,000 00	\$196 25
Toledo Light and Power Company	-	-	35 00
Conemaugh Light and Power Company	-	-	80 00
Earnings from exchange of bonds	-	-	20 92
Unexpended balance Dec. 1, 1921	-	-	41 39
	-	-	\$373 56
Disbursements for fiscal year ending Nov. 30, 1922	-	-	33 50
Cash on hand Nov. 30, 1922	-	-	\$340 06

SPECIAL FUNDS — *Concluded.*
Alvord Dairy Scholarship Fund.

	Market Value Dec. 1, 1922.	Par Value.	Income.
One United States Liberty Bond 4½	\$980 00	\$1,000 00	\$42 50
One bond Southern Illinois Light and Power Co. 7s	1,015 00	1,000 00	—
Two bonds Great Western Power Co. 6s \$1,000	2,000 00	2,000 00	90 00
	\$3,995 00	\$4,000 00	\$132 50
Toledo Light and Power Company	—	—	35 00
Conemaugh Light and Power Company	—	—	160 00
Earnings from exchange of bonds	—	—	64 00
Unexpended balance Dec. 1, 1921	—	—	768 61
Cash on hand Nov. 30, 1922	—	—	\$1,160 11

SUMMARY OF BALANCE ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST BY THE
 MASSACHUSETTS AGRICULTURAL COLLEGE.

Burnham Emergency Fund	\$492 06
Endowed Labor Fund	330 31
Whiting Street Scholarship Fund	555 65
Hills Fund	1,918 82
Mary Robinson Fund	444 61
Grinnell Prize Fund	245 74
Gassett Scholarship Fund	425 78
Massachusetts Agricultural College Investment Fund	110 45
Danforth Keyes Bangs Fund	—12 35
John C. Cutter Fund	66 43
William R. Sessions Fund	340 06
Alvord Dairy Scholarship Fund	1,160 11
Massachusetts Agricultural Club	350 00

\$6,427 67

350 00

\$6,077 67

J. D. W. FRENCH FUND.

Framingham National Bank	\$6,847 55
Worcester County Institution for Savings	1,728 82
Natick Five Cents Savings Bank	391 16
Millbury Savings Bank	1,685 35

\$10,652 88

Less amount withdrawn from Framingham National Bank
 500 00 |

\$10,152 88

Amount expended for live stock exhibit at Eastern States Fair
 455 20 |

Cash on hand
 44 80 |

Total amount available
 \$10,197 68 |

I hereby certify that I have this day examined the Massachusetts Agricultural College Account, as reported by the Treasurer, Fred C. Kenney, for the year ending November 30, 1922. All bonds and investments are as represented in the Treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
Auditor.

JAN. 2, 1923.

HISTORY OF SPECIAL FUNDS.

Burnham emergency fund:

A bequest of \$5,000 from T. O. H. P. Burnham of Boston made without any conditions. The trustees of the college directed that \$1,000 of this fund should be used in the purchase of the Newell land and Goessmann Library. The fund now shows an investment of \$4,000 00

Library fund:

The library of the college at the present time contains 69,272 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave \$2,000; Jan. 1, 1894, Charles L. Flint gave \$1,000; in 1887, Elizur Smith of Lee, Mass., gave \$1,315. These were the largest bequests and now amount to 10,000 00

Endowed labor fund:

Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students. 5,000 00

Whiting Street scholarship fund:

Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship 1,000 00

Hills fund:

Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden 10,000 00

Mary Robinson fund:

Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship 1,000 00

Grinnell prize fund:

Gift of Hon. Wm. Claffin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York 1,000 00

Gassett scholarship fund:

Gift of Henry Gassett of Boston, the income to be used for scholarship 1,000 00

Massachusetts Agricultural College investment fund:

Investment made by vote of trustees in 1893 to purchase one share of New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate 100 00

Danforth Keyes Bangs fund:

Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious, and deserving students to obtain an education in said college 6,000 00

John C. Cutter fund:

Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene 1,000 00

Alvord dairy scholarship fund:

Gift of Henry E. Alvord, who was the first instructor in military tactics, 1869-71, and a professor of agriculture, 1885-87, at this institution. The income of this fund is to be applied to the support of any worthy student of said college, graduate or postgraduate, who may be making a specialty of the study of dairy husbandry (broadly considered) with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry, provided that no benefits arising from such fund shall at any time be applied to any person who then uses tobacco in any form, or fermented or spirituous beverages, or is known to have done so within one year next preceding 4,000 00

William R. Sessions fund:

In accordance with the request of my deceased wife, Clara Markham Sessions, made in her last will, I bequeath to the trustees of the Massachusetts Agricultural College, Amherst, Mass., the sum of \$5,000, it being the amount received by me from the estate of the said Clara Markham Sessions. The said \$5,000 to be kept by the said trustees a perpetual fund, the income from which shall be for the use of the Massachusetts Agricultural College; and according to the further request of my deceased wife, made in her last will, this is to be known as the William R. Sessions fund, and is to be a memorial of William R. Sessions; and it is my special request that the said trustees shall make record of the fact that this fund came from the estate of my deceased wife, Clara Markham Sessions, in accordance with her request made in her last will 5,000 00

J. D. W. French Fund 10,000 00

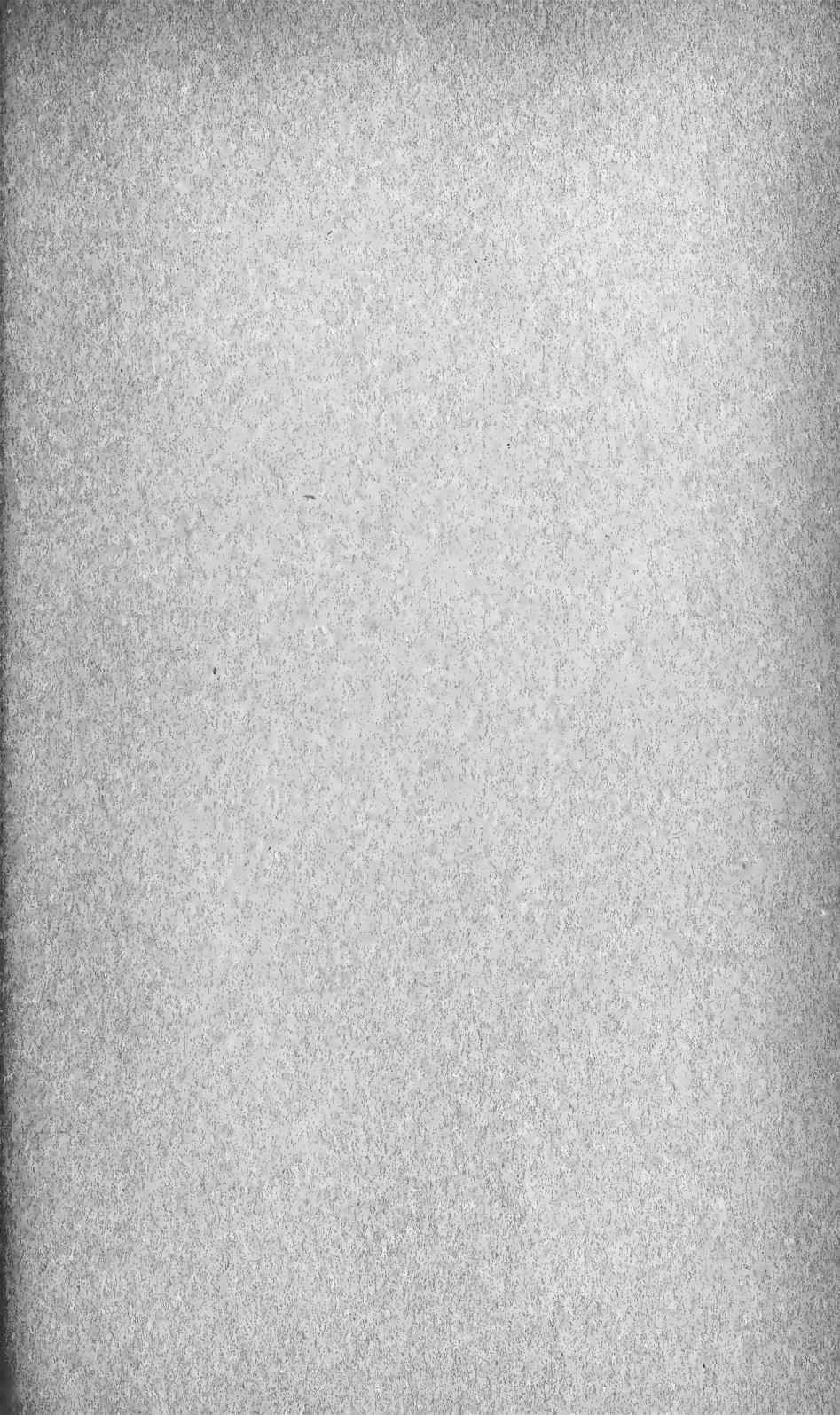
Massachusetts Agricultural Club 500 00

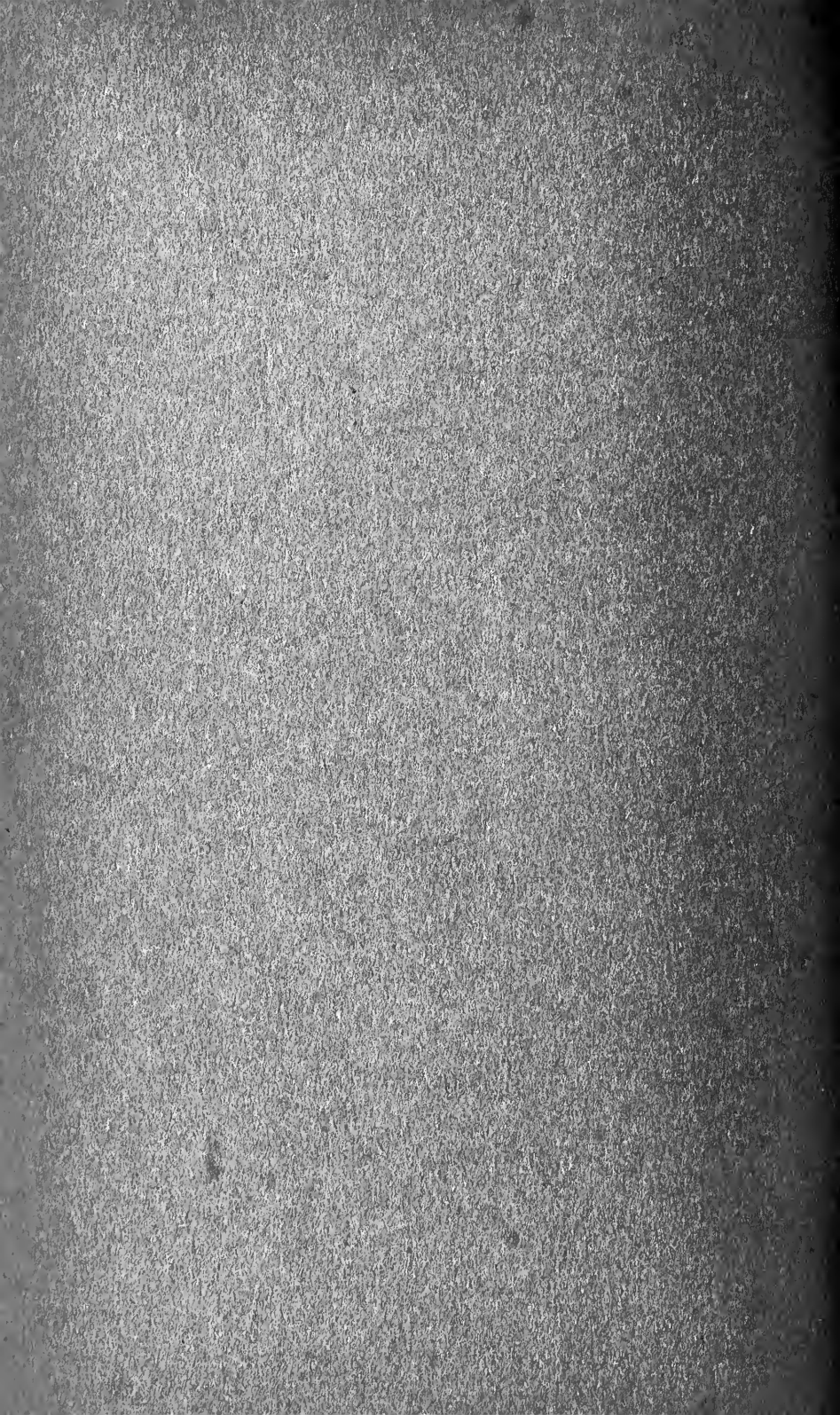
10,500 00

\$59,600 00

FRED C. KENNEY,
Treasurer.







MASSACHUSETTS
AGRICULTURAL COLLEGE

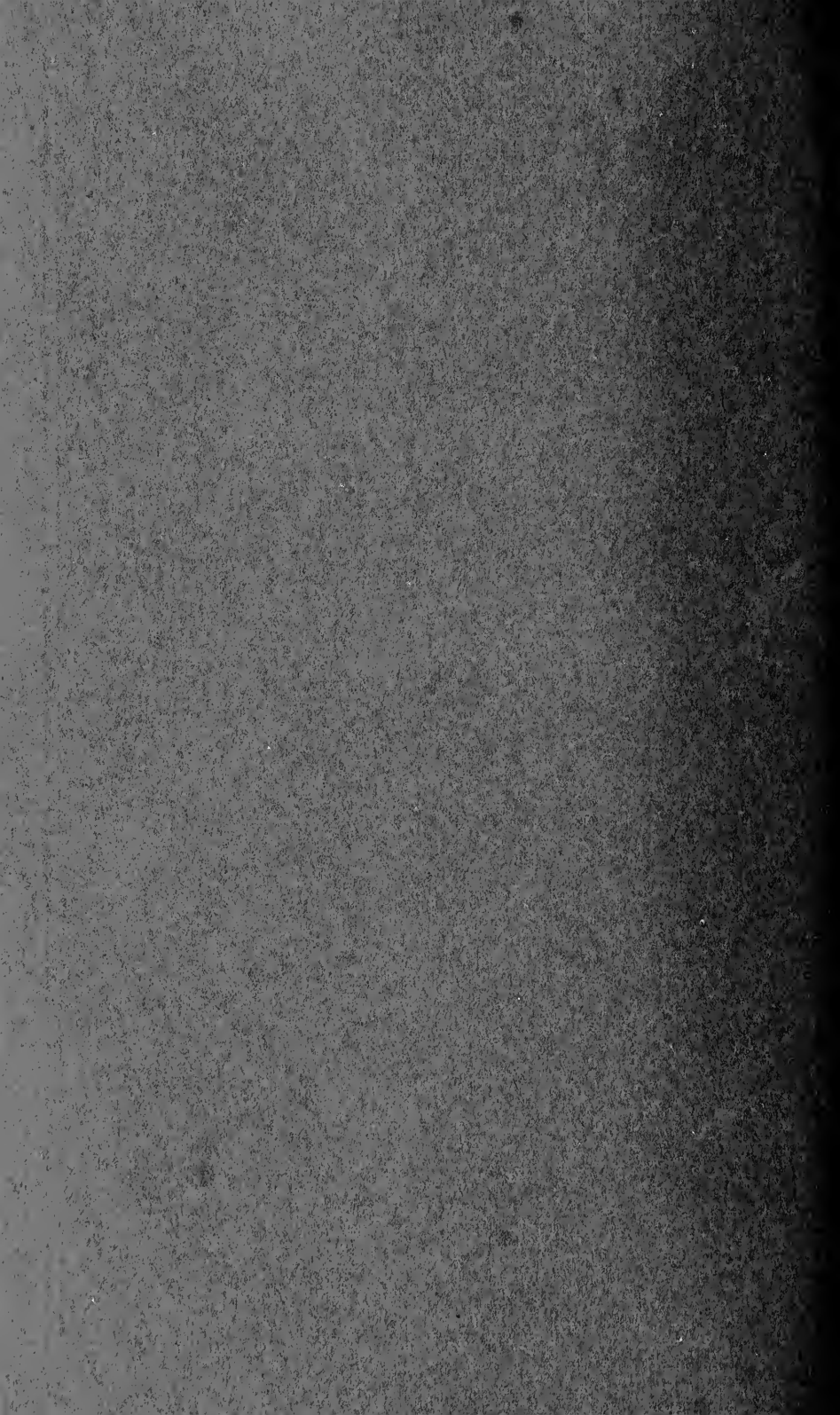
ANNOUNCEMENT

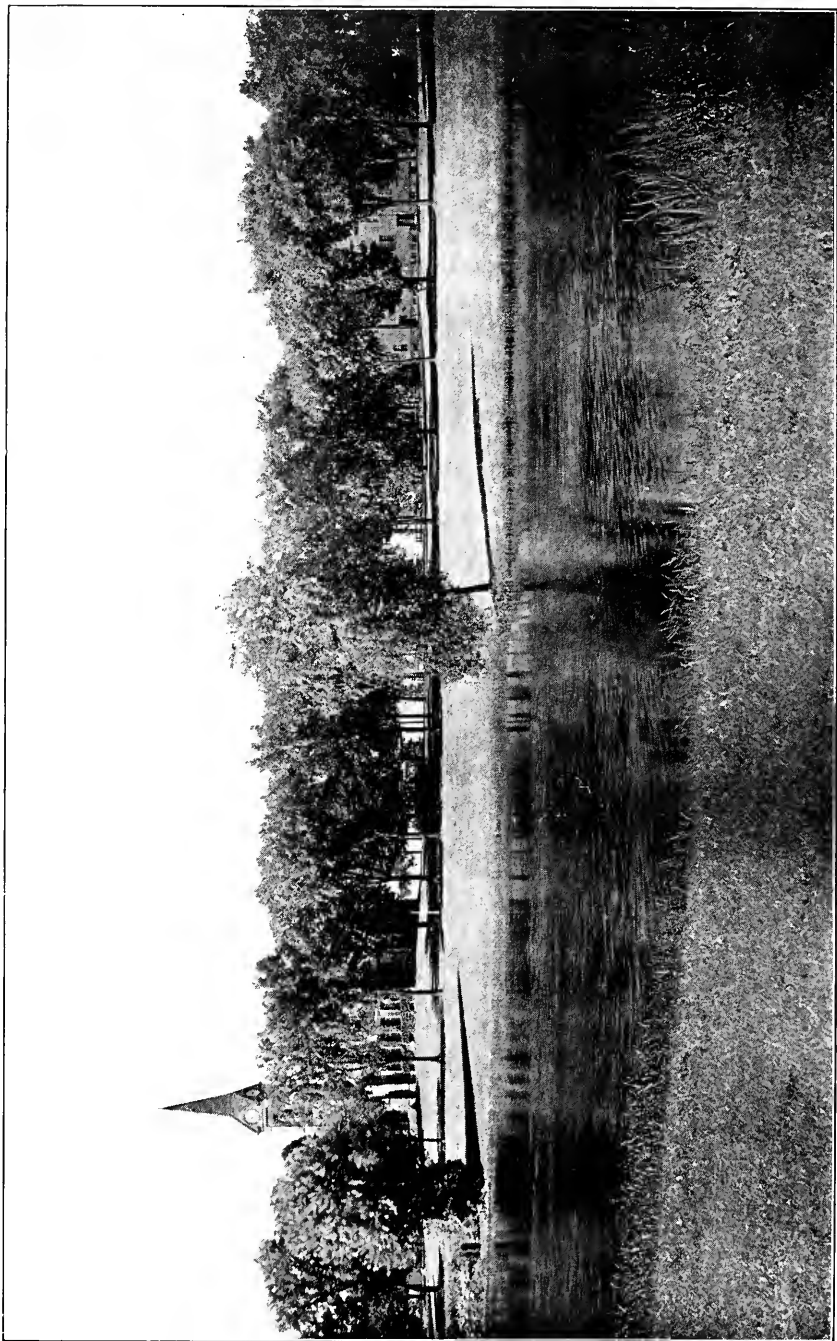
OF THE

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

1923-1924







A View of the Campus, showing Library

THE M. A. C. BULLETIN

Amherst, Massachusetts

Volume XV

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THE TWO-YEAR SHORT COURSE IN PRACTICAL AGRICULTURE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE



PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
COMMISSION ON ADMINISTRATION AND FINANCE

CALENDAR, 1923-24

Two-Year Course

1923

September 24 and 25, Monday and Tuesday	Registration
September 26, Wednesday, 1.30 P.M.	Fall term begins; assembly
October 12, Friday	Holiday—Columbus Day
November 28—December 3, Wednesday, 12 M.— Monday, 8 A.M.	Thanksgiving recess
December 21, Friday, 5 P.M.	Fall term ends

1924

January 2, Wednesday, 8.00 A.M.	Winter term begins
February 22, Friday	Holiday—Washington's Birthday
March 14, Friday, 5 P.M.	Winter term ends
March 18, Tuesday, 7.30 A.M.	Spring term begins; assembly
April 19, Saturday	Holiday—Patriots' Day
May 30—June 2, Friday to Monday	Commencement
September 22 and 23, Monday and Tuesday	Registration
September 24, Wednesday, 1.30 P.M.	Fall term begins; assembly

STAFF

Officers of General Administration

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College.

HENRY S. GREEN, A.B., LL.D.
Librarian of the College

EDWARD M. LEWIS, A.M.
Dean of the College

PHILLIP B. HASBROUCK, B.Sc.
Registrar of the College

WILLIAM L. MACHMER, A.M.
Assistant Dean of the College

FRED C. KENNEY
Treasurer of the College

JOHN PHELAN, A.M.
Director of Short Courses

RALPH J. WATTS, B.Sc.
Secretary of the College

The Faculty of Instruction

MAX F. ABELL, B.Sc. <i>Assistant Professor of Farm Management</i>	North Amherst
LUTHER BANTA, B.Sc. <i>Assistant Professor of Poultry Husbandry</i>	Sunset Avenue
MARY A. BARTLEY <i>Instructor in Home Economics</i>	50 Pleasant Street
ARTHUR B. BEAUMONT, Ph.D. <i>Professor of Agronomy and Head of Department</i>	51 Amity Street
ALEXANDER E. CANCE, Ph.D. <i>Professor of Agricultural Economics and Head of Department</i>	9 Fearing Street
MORTON H. CASSIDY, B.Sc. <i>Assistant Professor of Entomology</i>	82 Pleasant Street

WALTER W. CHENOWETH, A.B., M.Sc. <i>Professor of Horticultural Manufactures and Head of Department</i>	North Amherst
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GUY V. GLATFELTER, M.Sc. <i>Assistant Professor of Animal Husbandry</i>	10 Kendrick Place
JOHN C. GRAHAM, B.Sc.Agt. <i>Professor of Poultry Husbandry and Head of Department</i>	68 Lincoln Avenue
EMORY E. GRAYSON, B.Sc. <i>Instructor in Physical Education</i>	Belchertown
LAURENCE R. GROSE, A.B., M.F. <i>Professor of Forestry and Head of Department</i>	45 Amity Street
CHRISTIAN I. GUNNESS, B.Sc. <i>Professor of Rural Engineering and Head of Department</i>	105 Butterfield Terrace
MARGARET HAMLIN, B.A. <i>Agricultural Counselor for Women</i>	12 North East Street
ROY B. HARRIS, B.Sc. <i>Assistant Professor of Vegetable Gardening</i>	North Amherst
CURRY S. HICKS, B.Pd. <i>Professor of Physical Education and Hygiene and Head of Department</i>	The Davenport
S. C. HUBBARD <i>Foreman, Department of Floriculture</i>	North Amherst
HENRY F. JUDKINS, B.Sc. <i>Professor of Dairying and Acting Head of Department</i>	103 Butterfield Terrace
MARSHALL O. LANPHEAR, B.Sc. <i>Instructor in Agronomy</i>	4 Nutting Avenue
JOHN B. LENTZ, A.B., V.M.D. <i>Assistant Professor of Veterinary Science</i>	3 Dana Street
JOHN J. MAGINNIS, B.Sc. <i>Instructor in Agricultural Economics</i>	Amherst Tavern
CHARLES E. MARSHALL, Ph.D. <i>Professor of Microbiology and Head of Department</i>	44 Sunset Avenue
CHARLES A. MICHELS, M.Sc. <i>Assistant Professor of Agronomy</i>	9 Fearing Street
RICHARD T. MULLER, M.Sc. <i>Assistant Professor Floriculture</i>	45 East Pleasant Street
JOHN B. NEWLON <i>Instructor in Rural Engineering</i>	North Amherst
CHARLES H. PATTERSON, A.M. <i>Professor of English, Coach in Dramatics</i>	26 Lincoln Avenue
HARLOW L. PENDLETON, B.Sc.Agt. <i>Instructor in Dairying</i>	Fearing Street
JOHN PHELAN, A.M. <i>Professor of Rural Sociology and Head of Department</i>	3 Mount Pleasant
GEORGE F. PUSHEE <i>Instructor in Rural Engineering</i>	North Amherst
NORMAN J. PYLE, D.V.M. <i>Assistant Research Professor of Avian Pathology</i>	Amherst House
VICTOR A. RICE, B.S.Agt. <i>Assistant Professor of Animal Husbandry</i>	10 Woodside Avenue

WILLIAM F. ROBERTSON, B.Sc. <i>Instructor in Horticultural Manufactures</i>	10 Nutting Avenue
ROLAND W. ROGERS, B.Sc. <i>Assistant Professor of Horticulture</i>	32 North Prospect Street
SCHUYLER M. SALISBURY, B.Sc. Agr. <i>Professor of Animal Husbandry and Head of Department.</i>	12 Nutting Avenue
WILLIAM A. SANCTUARY, B.Sc. <i>Professor of Poultry Husbandry</i>	South Pleasant Street
FRED C. SEARS, M.Sc. <i>Professor of Pomology and Head of Department</i>	Mount Pleasant
HAROLD W. SMART, Attorney <i>Instructor in Business Law</i>	Nash Block
EDNA L. SKINNER, B.Sc. <i>Professor of Home Economics, Head of Department and Adviser of Women</i>	50 Lincoln Avenue
RICHARD W. SMITH, B.Sc. <i>Instructor in Dairying</i>	17 Fearing Street
GRANT B. SNYDER, B.Sc. Agr. <i>Instructor in Vegetable Gardening</i>	17 Fearing Street
JAMES L. STRAHAN, M.Sc. <i>Assistant Professor of Rural Engineering</i>	50 Amity Street
LEWIS W. TAYLOR, B.Sc. <i>Instructor in Poultry Husbandry</i>	Poultry Plant
CHARLES H. THAYER <i>Instructor in Agronomy</i>	South East Street
CLARK L. THAYER, B.Sc. <i>Professor of Floriculture and Head of Department</i>	North Amherst
WESTON C. THAYER, B.Sc. <i>Instructor in Animal Husbandry</i>	14 Nutting Avenue
GUY THELIN, B.Sc. <i>Instructor in Agronomy</i>	21 Pleasant Street
CHARLES H. THOMPSON, M.Sc. <i>Assistant Professor of Horticulture</i>	Mount Pleasant
HAROLD F. THOMPSON, B.Sc. <i>Professor of Vegetable Gardening and Head of Department</i>	10 Temple Street, Arlington
RALPH A. VANMETEE, B.Sc. <i>Professor of Pomology</i>	7 East Pleasant Street
PAUL W. VIETS <i>Supervisor of Farm Placement Training</i>	5 Kendrick Place
FRANK A. WAUGH, M.Sc. <i>Professor of Landscape Gardening and Head of Division of Horticulture</i>	Campus
T. GEORGE YAXIS, M.Sc. <i>Assistant Professor of Dairying</i>	5 Tillson Court

The above list of names of the faculty includes not only those of teachers but also of members of the staff who bear administrative relation to the Two-Year men.

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture was organized in 1918 to meet the demand for a short course in agriculture that might be taken by students who either did not possess college entrance requirements, or who, for one reason or another, were unable to take the regular Four-Year Course.

The growth of the course and the demand for more specific vocational training made necessary a reorganization of the course in 1921. As now arranged the student may specialize in one of seven vocations, — animal husbandry, dairy, floriculture, horticulture, pomology, poultry and vegetable gardening. This specialization does not prevent his securing a general working knowledge of other subjects.

The Two-Year Course will appeal not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. The fact is shown by the following table, indicating the relative age of students enrolled in the Two-Year Course in 1921: —

AGE.	Number.	Per Cent.
17	16	5.3
18	26	8.6
19	44	14.6
20	41	13.6
21	25	8.3
22	18	5.9
23	18	5.9
24	15	5.0
25 and over	99	32.8
Total	302	100.0

FARM PLACEMENT

The work of placing students on farms is in charge of the supervisor of farm placement training. Farms are selected in the State that will enable a student to gain practical experience in his particular vocation. This farm experience may, by special arrangement, be secured on the home farm. As a rule, it will be found better for a student to spend this six months away from the home farm, even though he plans to be employed on the home farm after finishing the course. This statement is based on the experience of students who have already taken the course.

If credit is to be secured for the six months' placement training the following conditions must be carefully observed: (1) the student must interview the supervisor early in his first year in order that his qualifications, the type of farming he wishes to pursue, and his general fitness be determined; (2) no arrangement for placement training may be made by the student himself until the supervisor has been consulted; (3) students are required to complete their period of training without unnecessary absences; (4) no transfers are to be made by a student if he is to receive credit until permission has been had from the supervisor; (5) a position may not be given up by the student until the supervisor has been notified; (6) students will not be permitted to appear with the graduating class until the farm placement has been fully completed; (6) a monthly report must be furnished on the form supplied, and submitted not later than the fifth of each month during his training period. It should be clearly understood by both employer and employee that the same energy, regularity and general conduct will be expected of the student during his period of placement training as is expected in his work in classes and on the campus.

It should also be noted that this six months' farm experience is educational in its nature. Students are expected to earn and receive a reasonable wage, but the purpose of the training is the experience gained rather than the wage earned. The scale of wages may vary in different localities, but each man's ability is given very careful thought, that he may obtain a wage that is fair to him. In the event of any misunderstanding the supervisor should be immediately informed.

General Information

INSTRUCTION. — The instruction is given by the regular faculty by means of classroom teaching, laboratory exercises and practical work. The work of the classroom is supplemented by demonstration work in the laboratory, dairy room, greenhouse and stables. It is designed to offer plain, practical, direct information, and to establish the underlying reasons as well as the method employed in the various operations. The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and women electing this course.

ENTRANCE CONDITIONS. — Students must be seventeen years of age or over and have completed at least an elementary school course or its equivalent. They must have had six months' practical farm experience before they will be permitted to enroll for the work of the second year. This experience may be gained after the first year of study at the college. Application for registration must be made at least two weeks before the opening of the college year, and references furnished to whom the college may write concerning a student's ability and general character.

The Two-Year Course is not intended for students already enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement, either from the principal of the high school or from the parent or guardian, requesting enrollment.

CREDIT AND CERTIFICATE. — In order to obtain a certificate a student is expected to have satisfactorily completed all of the work called for in the general course which he has selected. A total of 100 credits is required for graduation. A credit is given for one class hour, of either recitation or lecture, per week throughout a term of twelve weeks. Each two-hour laboratory period also counts for one credit. The course calls for twenty credits each term, that is, four subjects meeting five times per week, either in class or laboratory. Upon the satisfactory completion of the course, the student is given a certificate showing the work he has done and the grades he has obtained. A certificate will not be issued to any student whose record shows a deficiency in any subject or in his farm placement training. At the close of each term students receive a formal report showing the standings given in the subjects pursued by them. If a student's work is unsatisfactory he may be asked to withdraw.

HOW TO ENROLL. — Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town. A blank for this purpose is inserted at the end of this catalogue. Upon arrival report at the office of the Director of Short Courses, located in South College, where information may be obtained in regard to board and room, schedule of classes, etc.

Rules and Regulations

The Director of Short Courses shall have charge of all cases of absence. Regularity in attendance at all classes is required of the student body. It is expected that a student will not be absent except for good reasons. In the event of absences his work must be made up to the satisfaction of the instructor.

All applications to the Director for excuses of absence shall be made in writing and presented in person. They must, if possible, be made in advance. If they cannot be made in advance they must be made within two days after the expiration of the period of absence, and they must contain a full statement of the reason of the delay in presenting them. A blank form will be furnished at the Short Course office.

Absences from exercises immediately or consecutively following a holiday may not be taken without special permission. A committee is appointed to pass on these requests.

All physicians' certificates must be approved by the Professor of Physical Education and deposited with the Director of Short Courses within three days after the last absence covered by the certificate or they will be invalid.

In the record of absences two tardy marks shall be considered equivalent to one absence.

Any student who absents himself from an appointed examination without sufficient cause shall be given zero thereon. In such case he shall not be entitled to a make-up examination unless the Director so requests. A previously announced test may, at the discretion of the instructor, be regarded as a test or as an examination.

Every absence taken before enrollment (the signing of the registration card by the teacher) in a class will be deducted from the student's absence allowance in that class. The Director, however, may grant the special privilege of a visitor's card.

If a student's term mark in any subject falls below 60 per cent, or if he drops a course without the consent of the Director, he is thereby *failed* (F) in that subject. He shall be debarred from taking the final examination in that subject, and must repeat it with the following class.

If the average of the term mark and the final examination is below 60 per cent, the student is thereby *conditioned* (#).

Student Expenses

TUITION. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$60 a term. The tuition charged persons not citizens of the United States is \$60 a term. *Students entering from Massachusetts are required to file with the President a statement, signed by either town or city clerk, stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.*

All students entering the college for the first time in this course are charged a matriculation fee of \$5, which, in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the certificate.

LABORATORY FEES

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present the fees charged are as follows: —

	Per Term
Agronomy S-1	\$1 50
Agronomy S-2	2 00
Animal Husbandry S-1, S-5	1 50
Animal Husbandry S-4	1 00
Dairying S-1, S-2, S-3, S-4	3 00
Floriculture S-3, S-5	3 00
Floriculture S-6	2 50
Horticulture S-1	1 00
Horticulture S-5, S-6, S-7	1 50
Microbiology S-2	5 00
Poultry S-1, S-2, S-3, S-4, S-5	2 00
Rural Engineering S-1, S-2, S-3, S-4, S-5, S-6, S-7	1 50
Vegetable Gardening S-1, S-2	1 50

INITIAL CHARGES

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	First Year	Second Year
Matriculation fee	\$5 00	-
Board (if at college dining hall) four weeks in advance	28 00	\$28 00
Assessment for support of Social Union	1 50	1 50
Laboratory fees	See schedule	See schedule
Student tax for support of athletics ¹	15 00	15 00
Student tax for support of non-athletic activities ¹	3 50	3 50

¹ While this is not essentially a college charge, the Treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers, the amount of athletic tax by vote of the student body.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; others \$180 a year.

	Low	High
Matriculation fee, first year	\$5 00	\$5 00
Room in private houses	72 00	110 00
Board, \$7 per week	252 00	252 00
Laundry, 50 to 85 cents a week	18 00	30 00
Laboratory fees	5 00	20 00
Books, stationery, and miscellaneous items	35 00	70 00
	\$387 00	\$487 00

The estimate given above is for the regular college year of nine months. The estimate for six months would be approximately two-thirds of the amount stated above.

Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining clubs or entering into other social activities of the college. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

Student Aid

SELF HELP. — Many students are obliged to find work of some sort to earn their way through college. It is recommended that no new student enter without having at least \$250 and preferably \$350 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The student will find it better either to work and accumulate money before coming to college, or to take more than two years in completing his course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

Application for student labor should be made directly to Kenyon L. Butterfield, President of the college. An applicant is required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which he resides, explaining the necessity of the applicant's need of assistance. Students whose department or class work is not satisfactory are not likely to be continued in student labor. Opportunities for labor for Short Course men on the campus are limited to second-year men in the Two-Year Course in Practical Agriculture. Students, therefore, may find it rather difficult to obtain all the work they desire during their first year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Rooms

Students must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the Director of Short Courses.

Women students are expected to occupy rooms in the college dormitory and such houses or apartments as the college may provide, and board at the college dining hall. No woman student will be allowed to room in a private house without a special written permission from the Director.

General Exercises

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the President is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about fifteen years ago. All students become members of the Union by paying a small fee, and in the fall and winter months the Union gives a series of entertainments, free to students and faculty. The Memorial Building, recently erected, will be the center of student activities. Offices for the various student organizations, including the Two-Year Student Council, will be maintained in this building. On the first floor are located a lounging room, the Memorial Room, and the offices; in the basement, bowling alleys, pool tables, store, post office, and barber shop; and on the second floor an auditorium for meetings and dances. This building was erected by the alumni, students, faculty, and friends in honor of the fifty-one "Aggie" men who gave their lives in the World War.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

The Two-Year Council is composed of representatives of the first and second year classes. This body serves as general director of the conduct in classes of the Two-Year men, and represents before the faculty the interests of this group of students.

Student Relations

The customary high standard of college men in honor, manliness, self-respect, and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the President for discipline.

The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the college, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts").

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students:—

MANAGEMENT OF THE INFIRMARY

Supervision

1. The infirmary is under the *general supervision* of Dr. Charles E. Marshall, who is designated as Supervisor of the Infirmary. A resident nurse is in *immediate* charge of the infirmary.

Use of Infirmary

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses

5. In addition to the fee charged as specified in paragraph 4, the following additional expenses will be charged to the patient:—

(a) *Nurses*.— In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service*.— If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies*.— Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry*.— Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

The Library

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 65,000 volumes, in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find splendid material for their line of college work and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

Agricultural Opportunities for Women

Agriculture is a field in which women are finding increasingly good opportunities. Poultry keeping, fruit growing, floriculture, dairying, truck farming, general farming, — all offer favorable openings for women. In all of these branches of agriculture women are farming independently. Women are also filling paid positions which include farm and estate managers and workers, garden supervisors, and workers in boys' and girls' agricultural clubs.

For the woman or girl whose home is already upon the farm the opportunity is exceptionally good. With the help of an agricultural education there are open to her many means of increasing her own or the farm income. With the knowledge of farm life which she already possesses, and with the possibility of securing occasional help from her family, she can easily carry on and develop a profitable enterprise of her own. The Two-Year Course in Agriculture will afford to the women who wish to engage in farming the practical training which they will need to fit them for their work, and will open to them new doors of opportunity. The particular problems which the women engaged in farming will have to meet, and the special lines of farming in which they will have favorable opportunities, will be considered in a series of conferences.

Women who are interested in taking agricultural courses should correspond with Miss Margaret Hamlin, who acts as adviser for agricultural courses for women. Women interested in home economics should address Miss Edna L. Skinner.

Positions

The college does not guarantee positions to students registered in any of its courses, but it has an opportunity to recommend students for a large number of positions. A record is kept of each student's work and of his farm experience, and of his success in positions for which he has been recommended after he has finished his course. The opportunities for trained men and women, especially those who have had farm experience, are exceptionally good.

A student desiring a recommendation from the college must meet the following conditions: —

- (1) He must be of good character.
- (2) His previous record must be good.
- (3) His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of farm experience cannot, as a rule, be recommended for positions of responsibility. This is especially true of the better positions for which managers or superintendents are wanted.

ANIMAL HUSBANDRY

The course in Animal Husbandry is designed to give men a broad knowledge of the problems surrounding the breeding and production of farm live stock. It includes enough of the other general agricultural courses to give these men a rather broad view of practical agriculture as a vocation. It is designed to prepare men to become practical farmers as farm superintendents, herdsman, shepherds or farm owners.

The Animal Husbandry Department is especially equipped to give good Animal Husbandry instruction having an excellent laboratory in Grinnell Arena. This arena has a seating capacity of 180, and is adapted to the showing of live stock for judging purposes.

The live-stock equipment consists of about 150 head of cattle, including both dairy, beef, and dual purpose animals. Of the dairy breeds, we have representatives of superior merit of the Guernsey, Jersey, Ayrshire and Holstein. Our beef breed is the Hereford, and our dual purpose breed, the Milking Shorthorn. A few steers are fed out each year. All of these animals are used for classroom purposes from the standpoint of practice judging, feeding, breeding, care and management.

Our sheep equipment is made up of very excellent individuals of both the Shropshire and Southdown breeds. These have been shown at the Eastern States Exposition and won many prizes. The students get practical work in the care and management, shearing and other problems of sheep husbandry.

In swine, we keep a herd each of the Berkshire and Chester White breeds. We have been using excellent sires and are developing two high-class herds.

For horses we have two pure-bred Percheron stallions, four pure-bred Percheron mares, as well as growing colts. We also have a number of work teams of different types which are used for classroom purposes.

All of the equipment in the barns is of practical and sensible type, and everything is available for the instruction of students in Animal Husbandry.

Animal Husbandry

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers) Animal Husbandry S-1 (Types and Breeds) Dairy S-1 (General Dairy) Poultry S-1	Animal Husbandry S-2 (Principles of Feeding) Microbiology S-1 (Hygiene and Sanitation) Motors S-2 Business Law S-1	Six months' farm placement training

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Animal Husbandry S-3 (Feeding Practice) Rural Sociology S-1 (Social and Economic Problems) Rural Engineering S-1 (Farm Engineering) Construction ¹	Animal Husbandry S-4 (Herd Book Study and Animal Breeding) Pomology S-7 (general) Farm Management S-1 (Farm Management and Accounts) Agricultural Economics S-1	Animal Husbandry S-5 (Live-stock Management and Stock Judging) Agronomy S-2 (Crops) Veterinary Science S-2 (Animal Diseases) Vegetable Gardening S-6 (general)

Courses in Home Economics and Agricultural Opportunities for Women may be had by arrangement.

Animal Husbandry S-1. (Types and Breeds.) I.

This course is a study of the history of the various breeds of cattle, swine, and horses; their origin and development; their characteristics; and a discussion of the conditions to which each breed seems best adapted. The laboratory work

¹ Construction — Rural Engineering S-7+S-3.

will give the student an opportunity to do practice judging, which will familiarize him with the different types and breeds. Textbook: Plumb, "Types and Breeds of Farm Animals."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Animal Husbandry S-2. (Principles of Feeding.) II.

A study of the fundamental principles of animal nutrition; of the composition and quality of feeding materials and their relative importance for the different classes of farm animals. The latter part of this course will be devoted to a study of feeding standards and the calculation of rations. Textbook: Henry and Morrison, "Feeds and Feeding."

5 class hours a week.

Credits, 5.

Animal Husbandry S-3. (Feeding Practice.) I.

This course will consist of a study of the feeding, care, and management of all classes of live stock, giving special attention to economic production. How to feed to get a large flow of milk, how to fatten, and how to grow breeding animals will receive proper attention. Prerequisite: Types and Breeds and Principles of Feeding. Textbook: Henry and Morrison, "Feeds and Feeding."

5 class hours a week.

Credits, 5.

Animal Husbandry S-4. (Animal Breeding and Herd-Book Study.) II.

A study of the principles involved in reproduction and improvement of farm animals; the laws of heredity and variation; the various methods of breeding, — inbreeding, line breeding, outcrossing, grading, and crossbreeding; the importance of selection; and a discussion of the needs and possibilities of improvement. Prerequisite: Types and Breeds and Principles of Feeding. Textbook: Babcock & Clausen's "Genetics in Relation to Agriculture."

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Animal Husbandry S-5. (Live Stock Management and Stock Judging.) III.

This course consists of laboratory work in the college barns by individual students, with handling of all classes of live stock. The course will consist of five two-hour laboratory periods, three of which will be devoted to the problems of live-stock management, and two to stock judging.

5 2-hour laboratory periods a week.

Credits, 5.

Animal Husbandry S-6. (General Animal Husbandry.) I.

This course consists of a general study of the subject material of animal husbandry; types and market classes of live stock, breeds of farm animals, principles and practice of feeding, live-stock breeding; and management of herds, flocks and studs. Laboratory work is given in live-stock judging and management. As much detail of this broad subject is given as is consistent with time allotted. Textbook: Plumb, "A Study of Farm Animals."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

POULTRY HUSBANDRY

Six courses are offered by this department. One course is a general course designed particularly to equip the student with the fundamental principles underlying successful poultry keeping as related especially to the farm flock. The other five courses are for the student who desires to specialize in poultry culture.

There is a broad field of opportunity for adequately trained men in the commercial handling and sale of poultry and poultry products, specialists in incubation, brooding and rearing, and assistants or managers of commercial poultry farms. Good profits and wages await well-equipped men and women in these and other branches of poultry work.

This department is well equipped to offer practical instruction in poultry husbandry. Our quarters and equipment in Stockbridge Hall provide ample facilities for efficient classroom and laboratory teaching.

Our practical laboratory (college poultry plant) comprises about 1,500 adult birds, divided into some 40 pens of various designs, the flocks ranging in size from 10 to 250 birds; thirty lamp incubators, as well as three mammoth machines; brooding and rearing facilities for 5,000 chicks, including many styles of stove, kerosene and electric brooders; facilities for practice in pen management, fattening, killing, picking, caponizing, judging, mixing rations; construction of poultry houses and appliances, etc.

In addition to the actual practice work performed, the student has an opportunity to keep under observation practical experiments and demonstrations continually under way for the instruction of students and practical poultry keepers.

Poultry

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers) Animal Husbandry S-1 (Types and Breeds) Dairy S-1 (General Dairy) Poultry S-1	Poultry S-2 Microbiology S-1 (Hygiene and Sanitation) Motors S-2 Business Law S-1	Six months' farm placement training.

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Poultry S-3 Veterinary Science S-1 (Poultry Diseases) Rural Sociology S-1 (Social and Economic Problems) Construction ¹	Poultry S-4 Pomology S-7 (general) Farm Management S-1 (Farm Management and Accounts) Agricultural Economics S-1	Poultry S-5 Agronomy S-2 (Crops) Vegetable Gardening S-6 (general) Entomology S-1 (Beekeeping)

Courses in Home Economics and Agricultural Opportunities for Women may be had by arrangement.

Poultry S-1. (Judging and Marketing.) I.

Types, breeds, varieties, — their origin and development; poultry judging; utility — for eggs, meat, and constitutional vigor; exhibition — for fancy show-room characteristics by score card and comparison; fattening, killing, dry and scald picking, drawing, shaping, packing, and boning; judging of dressed fowl; market classification of poultry, eggs, and feathers; the requirements of various markets and relative merits of different systems of marketing. Practical exercises will also be provided in all of the above subjects. A trip will be taken to one of the leading Connecticut Valley poultry shows. Opportunity will also be presented

¹ Construction — Rural Engineering S-7+S-3.

each member of the class to fit entries for the Market Poultry Show, held each year as part of the activities of the poultry students of the college.

4 class hours and 2 2-hour laboratory periods a week.

Credits, 6.

Poultry S-2. (Incubation and Brooding.) II.

The principles of incubation, natural and artificial; lamp and mammoth incubators; the production, care and selection of hatching eggs. The principles of brooding and rearing; brooding systems and equipment; management of the colony house and rearing of the chicks. Students will carry through a hatch with the lamp incubators, and will have charge of a colony house of chicks under supervision.

2 class hours and the equivalent of 3 2-hour laboratory periods a week. Credits, 5.

Poultry S-3. (Feeding and Housing.) I.

Principles of feeding; the poultry feeds and compounding of rations. Feeding practices for maintenance and production. Artificial illumination as an aid to winter egg production. Students will have charge of feeding and caring for a pen of laying birds. Poultry houses and fixtures; the principles of design; common types and cost of construction.

4 class hours and 2 2-hour laboratory periods a week.

Credits, 6.

Poultry S-4. (Poultry Breeding.) II.

The principles of breeding and their application to poultry practice work in record keeping, pedigree hatching, stud and flock mating will be required as season permits.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Poultry S-5. (Poultry Farm Organization.) III.

A study of the organization of the poultry farm as a business. The layout of the poultry plant for efficiency. Study of poultry surveys, records, accounts and advertising. One or more poultry trips will be made to representative successful poultry farms.

Practice work with mammoth incubators will be given this term.

4 class hours and the equivalent of 1 2-hour laboratory period a week. Credits, 4.

Poultry S-6. (General Poultry Course.) II.

Poultry keeping as a national industry; its importance and geographical distribution; opportunities and possibilities in poultry culture in Massachusetts; principles of feeding; utility classification of fowl; incubation, both natural and artificial; the production and packing of hatching eggs; the baby chick industry; and brooding and rearing. Practical exercises will be closely correlated with the breeds and varieties, studies of various types and sizes of incubators, brooders, and brooder houses.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

NOTE. — Students who take course 6 must get permission from the Poultry Department to take advanced poultry courses.



A Class in Egg Packing



Two-Year Course Men testing Soil



DAIRY MANUFACTURES

The course in dairy manufactures is designed to fit men for positions with market milk concerns, creameries, ice-cream factories, and specialized dairy farms. It is limited to 12 students.

The dairy work is given in Flint Laboratory, a modern building designed especially for dairy work and equipped with the newest and best types of dairying machinery.

The pasteurizing room contains a milk clarifier, cooler, and two 200-gallon vat pasteurizers. There is an ample and modern sterilizing outfit and a large and very well-equipped refrigerating plant.

The room designed for cheese making contains double-jacketed vats, cheese mixer, and draining racks, presses, etc. The buttermaking room is well equipped with power and hand churns of various types, scales, and other accessories.

In the starter-making room there is a 50-gallon double-jacketed vat, a 100-gallon vat pasteurizer, a 50-gallon starter can, and other smaller ones.

The separator room has a complete equipment of power and hand separators, milk heater, Babcock tester, sterilizer, etc.

The testing laboratory contains all necessary apparatus, both steam and hand, for Babcock testing, and individual apparatus necessary for each student.

Dairy Manufactures

FIRST YEAR

Fall Term

Agronomy S-1 (Soils and Fertilizers)
Animal Husbandry S-1 (Types and Breeds)
Dairy S-1 (General Dairy)
Poultry S-1

Winter Term

Microbiology S-1 (Sanitation and Hygiene)
Animal Husbandry S-2 (Principles of Feeding)
Motors S-2
Business Law S-1

Spring Term

Six months' farm placement training

SECOND YEAR

Fall Term

Dairy S-2 (10 credits) (Milk Products)
Microbiology S-2 (Dairy Bacteriology)
Rural Sociology S-1 (Social and Economic Problems)

Winter Term

Dairy S-3 (10 credits) (Market Milk)
Farm Management S-1 (Farm Management and Accounts)
Agricultural Economics S-1

Spring Term

Dairy S-4 (10 credits) (Butter Making)
Veterinary Science S-2 (Animal Diseases)
Rural Engineering S-5 (Dairy Mechanics)

Dairy S-1. (General Dairy.) I, II.

This course takes up the question of the importance of dairying in the United States, and especially in the New England States, giving the development of dairying from the earliest to the present time. It covers the secretion, composition, and properties of milk; reasons for variation in the per cent of fat in different samples of milk; the Babcock test for fat in milk and other dairy products; other common milk tests; the advantage of testing herds, cow test associations, advanced registry work; the handling of market milk; soft cheese making, ice-cream making, and butter making as applied to general farm conditions. The laboratory work consists mainly in testing milk and dairy products for butter fat, solids, and acidity, together with some laboratory work in milk handling, butter making, cheese making, and ice-cream making.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Dairy S-2. (Milk Products.) I.

This course is mainly on soft cheese and ice-cream making, but includes some lectures on the manufacture of other milk products, such as artificial buttermilk,

casein, condensed milk, milk powder, etc. It deals primarily with the up-to-date methods of making ice cream and various kinds of soft cheese, such as pimento, olive, nut, Neufchâtel, cottage, etc., and shows how a product of good quality can be made either as a means of marketing the entire milk supply or utilizing the surplus. Considerable attention is given to different methods of preparation for marketing. The laboratory work consists in the making of ice cream and various forms of soft cheese.

4 class hours and 4 3-hour laboratory periods a week.

Credits, 10.

Dairy S-3. (Market Milk.) II.

This course takes up the history of market milk, its food value and use. Attention is given to the necessary essentials in producing a clean product; the economics of milk production; the advantages of co-operative milk producers' organization; the various methods of marketing milk; clarification; pasteurization; cooling, etc. The laboratory work consists in visiting dairy herds and city milk plants; the operation of machinery used in connection with market milk work.

4 class hours and 4 3-hour laboratory periods a week.

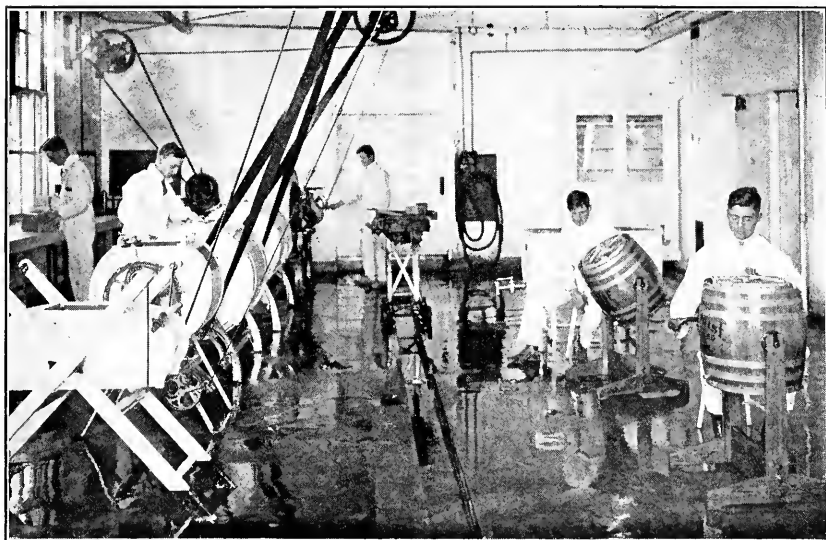
Credits, 10.

Dairy S-4. (Butter Making.) III.

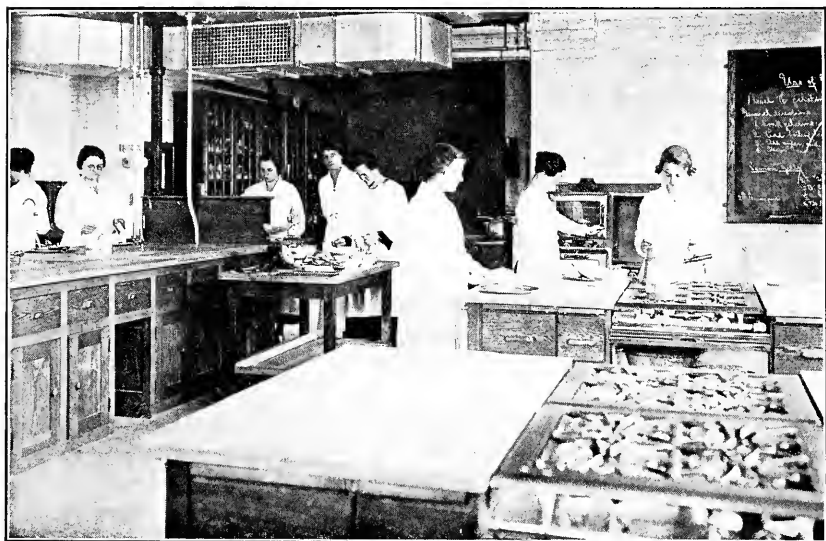
This course covers the various methods of separating milk; the history, selection, care, and use of cream separators; the pasteurization and ripening of cream; testing of acidity in cream; the making and use of starters; a study of churns and churning; up-to-date methods of making butter; marketing butter, and tests for moisture and salt in butter. The laboratory work consists in the actual operation of separators and churns.

4 class hours and 4 3-hour laboratory periods a week.

Credits, 10.



Making Butter



A Class in Cooking



GENERAL HORTICULTURE

The object of this course is to train men for positions as superintendents or foremen in parks or on private estates, or as foremen for landscape gardeners, or for private practice in horticultural service, including so-called tree surgery and city forestry.

Ample classrooms and laboratories with necessary equipment are provided for all work that must necessarily be done indoors. The extensive college campus, with its stretches of lawn, its plantings of trees, shrubs, and vines, its drives and walks, furnishes an outdoor laboratory where the student will be brought into personal relation with problems comparable in every way with those that arise in the management of a park, private estate, etc. Work with various types of horse power, motor power and hand machinery and implements will give him practical knowledge of their use, care, and application. A growing nursery furnishes opportunity for the propagation and culture of those plants used in ornamenting grounds, the transplanting of these about the grounds in compliance with prepared landscape plans, and their subsequent care, including proper methods of pruning.

Horticulture

FIRST YEAR

Fall Term

Agronomy S-1 (Soils and Fertilizers)
 Floriculture S-1 (Garden Flowers and Bedding Plants)
 Pomology S-1 (Fruit Varieties)
 Vegetable Gardening S-1

Winter Term

Horticulture S-1 (Plant Propagation)
 Forestry S-1 (Woodlot Management)
 Construction ¹
 Business Law S-1

Spring Term

Six months' farm placement training.

SECOND YEAR

Fall Term

Horticulture S-2 (Plant Materials)
 Horticulture S-5 (Construction and Maintenance)
 Floriculture S-6 (Greenhouse Management)
 Agricultural Economics S-1

Winter Term

Horticulture S-3 (Plant Materials)
 Horticulture S-6 (Construction and Maintenance)
 Horticulture S-8
 Rural Sociology S-1 (Social and Economic Problems)

Spring Term

Horticulture S-4 (Plant Materials)
 Horticulture S-7 (Construction and Maintenance)
 Floriculture S-5 (Conservatory Plants)
 Motors S-2, or —
 Entomology S-1 (Beekeeping)

Horticulture S-1. (Plant Propagation.) II.

This course sets forth the principal and best methods used in reproducing and increasing the number of those plants cultivated in the various branches of horticulture.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Horticulture S-2. (Plant Materials.) I.

The object of this course is to learn to know the trees, shrubs, and vines used in ornamental planting, — their names, their individual characteristics as to foliage, fruit, and dormant twig features, and their habits of growth.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-3. (Plant Materials.) II.

This course will deal with plant associations in nature and the application of the principles governing such association to the ornamental arrangement of cultivated plants.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

¹ Construction — Rural Engineering S-7+S-3.

Horticulture S-4. (Plant Materials.) III.

A continuation of Horticulture S-3, giving special attention to foliage and flower characters and flowering habits of the plants. In addition, a study will be made of the evergreens and their uses.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-5. (Construction and Maintenance.) I.

Particular stress will be given to fall pruning of shrubs, together with their preparation for winter, also fall transplanting of shrubs. In addition, instruction will be given in elementary tree surgery and in walk and road maintenance.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-6. (Construction and Maintenance.) II.

In this term cost analyses and various park systems of maintenance will be discussed, together with park appliances, also winter pruning, snow removal, and winter protection of shrubs.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-7. (Construction and Maintenance.) III.

Especial attention will be given to spring pruning, lawn mowing, and lawn construction and maintenance. Tree surgery, walk and road construction and maintenance, together with weed eradication, will be studied.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-8. (To be announced.) II.

POMOLOGY

The courses in fruit growing have been arranged with a view to training the student for work on a farm on which the growing of fruit is the leading branch of farming. As will be seen, he gets a fair training in many other lines of farm work, but the emphasis is on fruit.

It is hoped that students who have completed this work, and who have supplemented it with a sufficient amount of practical experience on the farm, will be fitted to take up fruit farming for themselves, or to manage fruit farms or fruit departments for others.

In all of this fruit work the emphasis is on the practical side, with only enough of the science and theory involved to make the student a more efficient man or woman. If the question under consideration is the healing of wounds made in pruning fruit trees, the student is given a brief discussion of the scientific principles involved, and is then taken into the orchard and required to do pruning in such a way that the wounds made will heal most satisfactorily. If it is a question of how to prune a grapevine to insure the maximum crop, the method of bearing in the grape and the various systems of pruning are discussed in the classroom, and the student is then taken into the vineyard and studies the vine to see where it bore last year, and then prunes it under expert supervision.

The Department of Pomology has 50 acres of orchard of various ages and methods of arrangement, including all the principal fruits; 5 acres of vineyards in which are shown the principal types of trellis and the leading methods of training grapes; several acres of small fruits; and a good equipment of orchard and nursery tools of all the principal types, enabling students to learn the value of each type. For orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided.

Pomology

FIRST YEAR

Fall Term

Agronomy S-1 (Soils and Fertilizers)
Floriculture S-1 (Garden Flowers and Bedding Plants)
Pomology S-1 (Fruit Varieties)
Vegetable Gardening S-1

Winter Term

Pomology S-2 (Orchard Production)
Horticulture S-1 (Plant Propagation)
Construction ¹
Business Law S-1

Spring Term

Six months' farm placement training.

SECOND YEAR

Fall Term

Pomology S-3 (Harvesting and Marketing)
Animal Husbandry S-6 (general)
Horticultural Manufactures S-1
Agricultural Economics S-1

Winter Term

Pomology S-4 (Orchard and Vineyard Pruning)
Poultry S-6 (general)
Dairy S-1 (general)
Rural Sociology S-1 (Social and Economic Problems)

Spring Term

Pomology S-5 (Spraying)
Pomology S-6 (Orchard Management)
Agronomy S-2 (Crops)
Motors S-2, or —
Entomology S-1 (Beekeeping), or —
Horticultural Manufactures S-2

Pomology S-1. (Fruit Varieties.) I.

This introductory course of the work in fruit growing will consist of a thorough study of the principal varieties of the different fruits.

One of the most prolific causes of failure in the fruit business is the growing of wrong varieties; varieties requiring a dry soil are set in a wet soil; tender varieties are set in a wet soil or where only hardy ones should be used; quality, productiveness, and season of ripening are ignored; and varieties are set which might be

¹ Construction — Rural Engineering S-7+S-4.

excellent in Ohio or Virginia or Missouri, but which cannot be grown profitably in Massachusetts.

This course aims to lay the foundation for a better state of things, and the student will be given a thorough drill on the leading varieties of the different fruits, and will have an opportunity to test personally many of the leading varieties, especially of apples.

5 Class hours a week.

Credits, 5.

Pomology S-2. (Orchard Production.) II.

This course deals with questions concerning the establishing and maintaining of fruit plantations.

It will include a full discussion of the choice of a site for the plantation. Many an orchard has failed simply because it was put in the wrong place. On another site on the same farm it might have been a conspicuous success.

The soil preferences of varieties of fruits will be considered, so that the student may avoid setting Rhode Island greenings where Baldwins should be grown, or Spies where Hubbardstons should stand.

The culture of fruit plantations will be considered, and the comparative value of sod and cultivation presented. Each system has its advantages and disadvantages. What are they, and under what conditions should each system be used?

Orchard implements will be discussed, examined, and tested, in order that the student may see for himself their good and bad points.

The question of cropping orchards will be discussed, — whether it is best to grow corn and beans and potatoes in the orchard, or to allow the trees to use all the land.

5 class hours a week.

Credits, 5.

Pomology S-3. (Harvesting, Marketing.) I.

This course will deal with the picking, packing, storing, and marketing of fruits. More men fail on these points than anywhere else in the fruit-growing business. There is a vast difference between good and bad cultivation or fertilizing of fruit plantations, but there is still more between good and bad picking or packing. The student in this course will have actual practice, so far as is possible, in the harvesting of all the fruits available in the college plantations. He will put these same fruits in storage, and will later grade them and put them up for market. At the same time, he will receive lectures on all phases of the subjects under consideration.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-4. (Orchard and Vineyard Pruning.) II.

More fruit plantations are damaged by unintelligent pruning than by mismanagement in any other single operation. If the orchardist does not know that apple trees bear in spurs, he is very liable to cut these off in pruning, and so reduce his chances of a crop. If he is ignorant of the fact that the peach bears on last year's wood, he may remove most of this wood, and incidentally most of his crop. This course aims to give the student a thorough training in the theory of pruning and the methods of bearing of the different fruits.

At the same time, every student is required to do the work of pruning in the college orchards and vineyards until he becomes reasonably proficient with each kind of fruit.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-5. (Spraying.) III.

In this course a careful study is made of modern methods of spraying. All the principal spray materials are studied, and the student is given practice in their preparation for use and in applying them to the orchard.

The department is well equipped with modern spraying apparatus, from bucket pumps to large power outfits, and students are required to study the construction of these pumps, and to operate them in the orchards.

Spraying is very properly regarded as one of the most important operations in connection with growing fruit, and it is the aim of this course to train students to recognize the work of our common orchard pests, to prepare the proper materials for their control, and to apply these efficiently.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-6. (Orchard Management.) III.

The work in orchard management includes a detailed study of such questions as the planning and laying out of fruit plantations so that they may be handled most economically; the cost of various operations, and methods of reducing expenses; efficient handling of labor on fruit farms; the use of labor-saving devices in fruit work; the most economical units in fruit production.

While orcharding will always be the leading phase of the fruit business in Massachusetts, there are many unusual opportunities for success in growing the various small fruits. This course will deal with the problems of establishing and handling successfully plantations of strawberries, raspberries, blackberries, currants, gooseberries, and grapes, including such questions as the choice of varieties; the best types of soils; laying off and setting the plantation; the proper fertilizing; methods of pruning and training. The college has large plantations of most of these fruits, so that the student will have ample opportunity for all types of practical work. Everything possible will be done to make the course of the utmost practical value, as well as to give the scientific principles on which our practices are based.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Pomology S-7. (General Course.) II.

This course is intended to meet the needs of students in the Animal Husbandry and Poultry majors who cannot devote more than one term to the subject of Pomology. The course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing.

3 lectures and 2 2-hour laboratory periods a week.

Credits, 5.

FLORICULTURE

Students who complete the course in floriculture are fitted primarily for work in commercial greenhouse establishments and retail flower stores. After gaining experience, such students may be able to start in business for themselves. Those who elect the courses in general horticulture, also, should be qualified for positions on private estates, in parks, or in nurseries.

The offices and classrooms of the Department of Floriculture are located in French Hall. Of the two lecture rooms, one will accommodate 40 students, the other 90 students; a laboratory, equipped with slate-covered tables, will accommodate 40 students. In the basement of the building the department has a specially prepared room for bulb storage, a fertilizer and tool room, and a large room for general storage purposes.

The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall, range of 7,200 square feet, a durable practical commercial range, composed of palm and fern, violet, carnation, rose, and students' houses; the old Durfree range of 7,400 square feet, devoted to the growing of decorative, conservatory, and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This includes a garden of about 4,700 square feet, devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained, and is being enlarged from year to year.

Floriculture

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers) Floriculture S-1 (Garden Flowers and Bedding Plants) Pomology S-1 (Fruit Varieties) Vegetable Gardening S-1	Floriculture S-2 (Greenhouse Construction and Management) Horticulture S-1 (Plant Propagation) Construction ¹ Business Law S-1	Six months' farm placement training.

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Floriculture S-3 (Commercial Floriculture) Horticulture S-2 (Plant Materials) Horticulture S-5 (Construction and Maintenance) Agricultural Economics S-1	Floriculture S-4 (Commercial Floriculture) Horticulture S-3 (Plant Materials) Rural Sociology S-1 (Social and Economic Problems) Horticulture S-6 (Construction and Maintenance)	Floriculture S-5 (Conservatory Plants) Horticulture S-4 (Plant Materials) Motors S-2 Horticulture S-7 (Construction and Maintenance)

Floriculture S-1. (Garden Flowers and Bedding Plants.) I.

This course is intended for students who will take up private estate work or who will specialize in floriculture. It will include a study of the annuals, biennials, herbaceous perennials, and bedding plants which are commonly used in commercial floriculture and in private estate work. Methods of propagation, culture, and uses will be considered. Laboratory exercises will include work in propagation, planting, study of materials, and planning of beds and borders.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

¹ Construction — Rural Engineering S-7+S-4.

Floriculture S-2. (Greenhouse Construction, Heating, and Management). II.

This course will take up the origin, growth, and importance of the floriculture industry; development of the greenhouse; types of houses and construction; methods of greenhouse heating; general principles of greenhouse management, including soils and their preparation, fertilizers, watering, ventilation, and fumigation; methods of propagation for plants grown under glass. Textbook: White's "Principles of Floriculture."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-3. (Commercial Floriculture.) I.

Courses S-3 and S-4 will be devoted primarily to a consideration of the important commercial crops. Special attention will be given to the culture (under glass) of roses, carnations, chrysanthemums, violets, and sweet peas. Other cut-flower crops and various potted plants will also be considered. Textbooks required during the two courses will be: Holmes, "Commercial Rose Culture;" Dick, "Commercial Carnation Culture;" Smith, "Chrysanthemum Manual."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-4. (Commercial Floriculture.) II.

A continuation of Floriculture S-3. In addition, a part of the course will be devoted to floral arrangement, including the general principles underlying the use of flowers in funeral designs and sprays, table decorations, corsages, vase, and basket arrangements.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-5. (Conservatory Plants.) III.

A study of the plants, both foliage and flowering, which are used in conservatories and in decorative work. Methods of propagation, culture, uses, and identification of plants will be included in the work.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-6. (Greenhouse Management.) I and III.

A course of general nature intended for those who have not taken the other courses in floriculture. Students who have taken the other courses will not be allowed to register in this course. It will include a brief description of greenhouse construction and heating; general principles of greenhouse management, including soils and their preparation, fertilizers, watering, ventilation, and fumigation; methods of propagation for plants grown under glass; outlines of cultural methods for important greenhouse crops. Textbook: White's "Principles of Floriculture."

3 class hours and 2 2-hour laboratory periods per week.

Credits, 5.

VEGETABLE GARDENING

The business of vegetable growing is one of the leading types of agriculture in Massachusetts. Middlesex County is surpassed in the value of vegetables grown for sale by only four other counties in the United States. The value of vegetables grown for home use in Massachusetts is more per farm than in any other State in this country. The vegetable greenhouse district around Boston is one of the largest in the United States, and the only district growing head lettuce under glass. The Massachusetts markets for vegetables are considered by many to be among the best, for we are further removed from the large vegetable trucking sections than other large centers of population, while our markets demand high-quality vegetables.

This course is fitting men who wish to go into business for themselves to become market gardeners, truck farmers, and greenhouse vegetable growers. For those whose principal interest may be other types of agriculture the course has much to offer along the lines of special crops often spoken of as cash crops. For those who wish to work for some one else this course offers training such that its graduates are being placed in responsible positions with commercial vegetable growers, seed growers, and private estates.

Vegetable Gardening

FIRST YEAR

Fall Term

Agronomy S-1 (Soils and Fertilizers)
Floriculture S-1 (Garden Flowers and Bedding Plants)
Pomology S-1 (Fruit Varieties)
Vegetable Gardening S-1

Winter Term

Vegetable Gardening S-2
Horticulture S-1 (Plant Propagation)
Construction ¹
Business Law S-1

Spring Term

Six months' farm placement training.

SECOND YEAR

Fall Term

Vegetable Gardening S-3
Pomology S-3 (Harvesting and Marketing)
Agricultural Economics S-1
Horticultural Manufactures S-1

Winter Term

Vegetable Gardening S-4
Pomology S-4 (Orchard and Vineyard Pruning)
Poultry S-6 (general)
Rural Sociology S-1 (Social and Economic Problems)

Spring Term

Vegetable Gardening S-5
Pomology S-5, or —
Pomology S-6
Motors S-2
Horticultural Manufactures S-2, or —
Entomology S-1 (Beekeeping)

The business of vegetable gardening may be entered with a limited outlay of capital, for the returns on the capital invested are quickly secured, as some vegetable crops mature in a very few weeks, which enables one to turn over his capital from one to three times per season. The nature of this business is such that one locates as near the market as possible, and, because of the growth of our cities, vegetable growers, as a group, have profited much by an increase in land values.

The Vegetable Gardening Department has 10 acres of land, 3,500 square feet of greenhouse space, and 500 linear feet of hotbeds and cold frames. These are used to give the student thorough practical training in the fundamentals of vegetable growing, plant production, and vegetable forcing. The office, classroom and laboratory are located in French Hall.

Vegetable Gardening S-1. (Garden Farming.) I.

Students will find this course one which will fit them to carry on estate work, to make the best use of the farm home garden, or to go on with commercial vegetable growing. This is a well-rounded course, studying vegetables from the standpoint of types. The student will work with the leading types of the common vegetables,

¹ Construction — Rural Engineering S-7+S-4.



Fertilizer Mixing



Tractors at Work



learning their requirements. Special attention will be given to the harvesting and storage of crops for winter and fall preparation of the land.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-2. (Commercial Vegetable Gardening.) II.

"As a prospective commercial vegetable grower and a producer of food, what must I know of the value of vegetables as a food, their history, present extent of this business and the outlook for the future?" These facts are studied as well as many of the fundamentals of vegetable production. Practical work will consist of vegetable seed study, seed germination, and production of vegetable plants under glass. Special care will be given to acquaint the student with the importance of detail, so that he will be able to make the best of the six months' training with some of the leading vegetable growers of this State.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-3. (Types and Varieties.) I.

Success or failure in vegetable production depends upon the proper selection of types and varieties. Market demands differ in different sections, and there is a difference in the types produced from various seed sources. This department maintains a variety garden, growing some 250 or more varieties of vegetables, so as to train the student in the proper selection of types and varieties. Study is given to the source and desirability of good seed. The importance of high quality and good appearance of vegetables is kept before the student so that he will be fitted to better judge and exhibit vegetables.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-4. (Vegetable Forcing.) II.

The demand is increasing for fresh vegetables out of season, and Massachusetts markets are among the best for these types of vegetables. There are many large greenhouse plants in the State, and this course meets a real demand by giving the student training in the production of vegetables out of season. There is a demand for the men with this training. The student will try out the latest and best methods of caring for greenhouse crops.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-5. (Commercial Vegetable Gardening.) III.

Commercial vegetable gardening demands that there should be a thorough understanding of the principles which underlie the practices which are necessary for success. Planning of the season's operation, the buying of seeds, fertilizers, miscellaneous equipment and supplies are studied. Spring preparation of the land, seeding, transplanting, cultivating, thinning, weeding and commercial control of insects and diseases are among the operations studied with the view of training the student to think out the most efficient method to follow. Organized trips to Boston and Springfield districts are part of the requirements of this course.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-6. (Vegetable Crops for the General Farm.) III.

Many of the vegetable crops are of such a nature that they can be successfully grown as a side line to other types of farming. Special emphasis will be given to those crops which the men interested in animal husbandry can use for a money crop or for stock-feeding purposes. The farm home garden is important for any farm, and here in this State the yield from such gardens is greater than in other States. As the area on the general farm devoted to vegetables is one of the most productive in money value, this course will show the student how to make the best use of this farm home garden.

3 class hours, 2 2-hour laboratory periods a week.

Credits, 5.

GENERAL COURSES FOR WOMEN

There was offered in the fall of 1922, for the first time, a general course for those young women who do not want to specialize in any one branch of agriculture, but who do want preparation for rural life. This course includes such agricultural and home economic courses as the country girl would be most likely to use, both for profit and for pleasure. This course should appeal to many young women whose home is on a farm or in a small town; or those who hope some time to live in the country.

General Course for Women

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 Floriculture S-1 Rural Sociology S-1 Home Economics S-1 Agricultural Opportunities for Women S-1	Horticulture S-1 Business Law S-1 Home Economics S-2 Microbiology S-1 (Sanitation and Hygiene)	Six months' farm placement training.

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agricultural Economics S-1 Animal Husbandry S-6 (general) Home Economics S-3 or S-4 Horticultural Manufactures S-1	Poultry S-6 (general) Pomology S-7 (general) Home Economics S-5 Dairy S-1 (general)	Horticultural Manufactures S-2 Vegetable Gardening S-6 (general) Home Economics S-6 Entomology S-1, or — Floriculture S-6, or — Poultry S-5

RELATED SUBJECTS IN OTHER DEPARTMENTS

Agricultural Opportunities for Women. S-1. I.

Agriculture is a field in which women are finding increasingly good opportunities. The particular problems which the women engaged in farming will have to meet, and the special lines of farming in which they will have favorable opportunities, will be considered in a series of conferences.

2 class hours a week.

Credits, 2.

Home Economics Department.

Agronomy S-1. (Soils and Fertilizers.) I.

In this course will be studied the origin and formation of soils; classes and types of soils; the control of soil moisture; tillage operations; organic matter, its importance and maintenance; acid soils and liming; commercial fertilizers. Considerable time will be devoted to actual work with fertilizing materials, and the student will be expected to become thoroughly familiar with farm manures, forms of agricultural lime, and commercial fertilizers—their composition, properties, care, and use.

3 class hours, and 2 3-hour laboratory periods a week.

Credits, 5.

Agronomy Department.

Agronomy S-2. (Crops.) III.

A course covering the production of field crops and including a study of their adaptation to soils and climate; varieties and the selection of seed; the preparation of the soil; fertilization, planting, cultivation, care, harvesting, and use of field crops. Special attention will be given the establishment and improvement of mowings and pastures in Massachusetts. Corn, oats, rye, barley, buckwheat, grasses, clovers, vetches, beans, peas, potatoes, and root crops will be studied. Actual practice with growing crops in the field and greenhouse, and with prepared specimens in the laboratory, including the judging of corn and potatoes, will be given.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Agronomy Department.

Agricultural Economics S-1. (Marketing.) I, II.

The purpose of this course is to present the business side or economics of agriculture. It is based upon the principle that products are made to sell, that the real object is to produce large money returns. The goal is the largest possible net profits with a given amount of land, labor, money, and equipment. The course deals with the possible types of profitable commercial agriculture in New England; the present location of the most profitable farming sections; the choice of a farm; the necessary investment, and the proportion to invest, in land, in improvements, in stock and equipment, and in reserves for labor and supplies on different kinds of farms.

Another section of the course treats of the principles of farm credit. Who should borrow, sources of credit, mortgage credit, farm loan associations, land banks, personal credit, national bank loans, credit unions, terms of credit, and how to use credit profitably are some of the topics studied.

Another division of the subject is marketing farm products. This will be treated in a very practical manner. The following are some of the topics: marketing as a part of production; outlets for the sale of farm products; principles of market-

ing; description of wholesale methods of distribution; middlemen, functions, and abuses; methods of sale, prices of farm products; price quotations; government aid in marketing; direct marketing; co-operative buying and selling; methods of successful co-operation; farmers' exchanges in Massachusetts; how to organize successfully.

Each student will be required to select some principal product in which he is interested, and make a careful study of its production, handling, and marketing on a profitable commercial scale. This course is given by the Department of Agricultural Economics. Lectures, textbook, original study, and report.

5 class hours a week.

Credits, 5.

Department of Agricultural Economics.

Business Law S-1. II.

The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper, and distinctions between personal and real property. Text, written exercises, lectures, and class discussions.

5 class hours a week.

Credits, 5.

Entomology S-1. (Beekeeping.) III.

This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand practical experience with bees, to the end of enabling their proper maintenance for any purpose, — horticultural, educational, or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus and in the manipulation of bees.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Entomology Department.

Farm Management S-1. (Farm Management and Accounts.) II.

A study of farming as a business; the correlation and adaptation of different farm enterprises, as dairy, orchard, poultry, to the specific farm; land, labor, and capital requirements; farm and building, plans and arrangements; the choice and purchase of a farm. Several laboratory periods will be devoted to practice in farm accounting. Farm experience is a prerequisite to this course.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Department of Farm Management.

Forestry S-1. (Woodlot Management.) II.

A course in tending, harvesting, marketing, and renewing the forest crop, with particular reference to the problems of the farm woodlot. The instruction is mainly practical, and is conducted in the field, with a minimum of bookwork; but there is a constant emphasis upon the development of keen and imaginative observation, and the acquisition of the conservationist point of view. Opportunities for field work are varied and extensive. There are woodlots of several types on or near the campus, and students have the fullest use of the Mt. Toby Demonstration Forest, a 750-acre tract 7 miles distant, belonging to the college and managed by the Forestry Department.

2 class hours and 1 4-hour and 1 2-hour field periods a week.

Credits, 5.

Forestry Department.

Home Economics S-1. (Clothing.) I.

An important problem in the home to-day is the selection of fabrics; therefore their character, cost, and durability are studied with reference to planning a wardrobe for a limited income.

Consideration will also be given to the principles of design, appropriateness, and simplicity in dress to develop good taste.

There will be practical work in sewing and making garments.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-2. (Foods.) II.

Every woman concerned with the welfare of the family is interested in the problem of nutrition. To select food wisely, and to prepare it so that the greatest amount of nutriment may be saved, is of the utmost importance.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods, and planning meals for efficiency and economy.

Balanced menus are not vague and mysterious, but result from the application of a few fundamental principles. Many people are underfed, not from a lack of food, but from an unwise choice.

This course will include laboratory work of practical value.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-3. (Clothing.) I.

A continuation of course S-1, which is a prerequisite for this course.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-4. (Foods.) I.

A continuation of course S-2, with special emphasis upon the planning and serving of the meals. Consideration will also be given to special problems of nutrition.

Course S-2 is a prerequisite for this course.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-5. (Home Management.) II.

There are many efficient methods successfully used in the business world which can be applied in the business of home-making.

Since the home-maker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, and the use of time and labor saving devices.

5 class hours a week.

Credits, 5.

Home Economics Department.

Home Economics S-6. (Home Nursing.) III.

It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of the family health.

However, every home-maker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured.

5 class hours a week.

Credits, 5.

Home Economics Department.

Horticultural Manufactures S-1. I.

The utilization of culls and low grades of fruits and vegetables is becoming a more important problem each year. Producers should be able to market their whole crop at a profit. The general problems studied in this course will be: the manufacture of apple products from cull apples; the canning of all fruits and vegetables available at this season, together with the manufacture of their various products, such as jams, jellies, conserves, pickles, etc.

Students will be required to keep accurate costs of materials in all canning and manufacturing operations, together with a record of methods used.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Department of Horticultural Manufactures.

Horticultural Manufactures S-2. III.

This is a continuation of Course S-1. The preservation of small fruits, together with the manufacture of their products, the evaporation of fruits and vegetables, the manufacture of maple products, and the canning of spring vegetables are the principal subjects studied. Prerequisite: Horticultural Manufactures S-1.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Department of Horticultural Manufactures.

Microbiology S-1. (Hygiene and Sanitation.) II.

Deviation from health, from the normal being, is disease. The human body is susceptible to deviation from health. Certain elements are responsible for the entrance of disease into the body. The body becomes weakened through exposure, lack of exercise, unsuitable food, abuses. Under such circumstances it lays itself open to attack. There is the attack from within, which consists of some organic derangement, and the attack from without, which makes it possible for foreign enemies, agents, or micro-organisms to enter.

Closely associated with the production of disease are intermediaries and causal factors, as ventilation, water-supplies, sewage disposal, and food. They serve as vehicles for disease agents. The germs of disease find their way through them, and are carried by them. Besides, human contact seems to be the most important disseminator, and insects and animals may harbor or convey, and in some instances instigate, disease.

Then there are those conditions which react on the body in a physical manner and influence its mechanism and its operating facilities, as mental disturbances, character of food, conditions of living.

It is the purpose of this course to discuss the nature of diseases, what causes them, the significance of sanitation and hygiene in preventing them, and the methods of control; in other words, to study, in the light of present knowledge, how to preserve health and prevent deviation from health.

5 class hours a week.

Credits, 5.

Microbiology Department.

Microbiology S-2. (Dairy Bacteriology.) I.

Bacteria and other micro-organisms are the responsible agents for the changes which occur in milk and for the contagion which sometimes causes disease. They are found in milk at times when leaving the udder, they get in with the dust and

dirt while milking, and they adhere to the dairy utensils, which carry them over from one milking to the next. From the cow to the consumer there is the constant presence of these micro-organisms to contend with, on the one hand, and to foster, on the other. All steps taken are significant in their control. The milking process, the handling of the cow, the condition of the milker, the cleansing of utensils, the management of the stable, the feeding, straining, aëration, cooling, clarifying, pasteurizing, — all are steps in the control of micro-organisms.

Many kinds of changes take place in milk, due to different kinds of micro-organisms. Many of these changes are sought, as the ripening of cream for butter, of milk for cheese, of milk for milk drinks; and many of these changes, also, are fought against, as ropy milk, sour milk, bitter milk, tainted milk, etc.

Micro-organisms of typhoid fever, scarlet fever, diphtheria, and others not infrequently find their way through the milk to the consumer, and produce epidemic forms of these diseases.

It is evident, therefore, that to handle milk and milk products safely it is desirable to know something of the agents which are the source of so much attention in the dairy. This indicates the nature of the substance of this course. This course is required of all students who elect dairying as one of their special lines of work.

5 2-hour laboratory periods a week.

Credits, 5.

Microbiology Department.

Rural Engineering S-1. (Farm Engineering.) I.

This course is intended to familiarize the student with the various types of farm implements, to teach him their operation and care, and give practice in the adjustment and repair of the mechanical equipment on the farm.

The various types of field implements are studied, and emphasis is laid on the selection of implements suited to New England conditions. The adjustment of machines is discussed and the student is given practice in setting machines for different field conditions.

Part of the course is given over to the repair of farm equipment. In this work part of the time is given over to blacksmithing and the balance to such exercises as soldering, babbitting and fitting bearings, lining up shafting, pipe fitting, threading bolts and nuts, and practice in tying knots and splicing rope. Farm implements are brought in and overhauled to give practical work in this line. In the limited time available it is not expected to make a blacksmith or mechanic out of the student, but it is hoped that the student will learn to know the tools used and get sufficient practice in their use so that he can make repairs on his own equipment.

Part of the course is given over to the study of water supply systems, including pumps, rams, and complete power systems. Farm-lighting plants are also studied, attention being given to selection, as well as care and operation. The principles underlying the practice of farm drainage are discussed, and practice is given in the use of simple leveling instruments for the purpose of accurately grading tile drainage ditches.

2 lectures and 3 2-hour laboratory periods a week.

Credits, 5.

Rural Engineering Department.

Rural Engineering S-2. (Farm Motors.) I, III.

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Department of Rural Engineering.

Rural Engineering S-3. (Carpentry.) I, II.

This course gives practice in the care and use of carpenters' tools through bench work, repair of farm equipment, and building construction. Small buildings are erected by the students to give practice in all the phases of house construction. Practice is given in the building of forms and in the mixing and placing of concrete. (Must be taken with Rural Engineering S-7.)

2 2-hour laboratory periods a week.

Credits, 2.

Department of Rural Engineering.

Rural Engineering S-4. (Repair of Farm Equipment.) II.

The object of this course is to give practice in the handling of tools, which will help in the repair of farm machines and miscellaneous farm equipment. Practice is given in forging, including drawing and shaping iron and steel, welding and tempering edge tools, and general blacksmith's repairing. Exercises also include pipe fitting, soldering, splicing rope, belt lacing, and babbiting and adjusting bearings. Practice is given in the use of machinist's tools, such as cold chisel, file, taps and dies, drill press, and lathe. (Must be taken with Rural Engineering S-7.)

2 2-hour laboratory periods a week.

Credits, 2.

Department of Rural Engineering.

Rural Engineering S-5. (Dairy Mechanics.) III.

This course is planned for men who are fitting themselves to take charge of dairy plants or allied lines of work. A study of steam boilers, steam engines, steam turbines, pumps, steam traps, line shafts, belting, electric motors, milking machines, and refrigeration plants.

3 class hours and 1 4-hour laboratory period a week.

Credits, 5.

Department of Rural Engineering.

Rural Engineering S-7. (Farm Structures.) I, II.

A study of the building materials commonly used in farm construction; details of construction and simple structural mechanics; the principle of design of such farm buildings as the dairy stable, hog house, horse barn, general purpose farm, fruit and vegetable storage buildings, etc.

In the drafting room practice will be given in the use of drawing instruments, and instruction given in the fundamentals of mechanical drawing. Each student will have opportunity to design in complete detail one of the major farm buildings in which he is particularly interested. (Must be taken with Rural Engineering S-3 or S-4.)

1 class hour and 2 2-hour laboratory periods a week.

Credits, 3.

Department of Rural Engineering.

Rural Sociology S-1. (Social and Economic Problems.) I, II.

The purpose of this course is to acquaint the students with present-day problems of economics, sociology, and politics. The first part of the course will deal with general problems. During the second part a study will be made of the social, economic, and political aspects of rural community life, readings, discussions, and written reports.

5 class hours a week.

Credits, 5.

Department of Rural Sociology.

Veterinary Science S-1. (Poultry Diseases.) I.

This course is planned for students specializing in poultry work. Anatomy and physiology of the domestic fowl are briefly considered, and particular attention is devoted to the diseases which may cause heavy losses in the flock. Prevention rather than cure is emphasized.

5 class hours a week.

Credits, 5.

Department of Veterinary Science.

Veterinary Science S-2. (Animal Diseases.) III.

This course acquaints the student with the more common diseases to which domesticated animals are susceptible. Particular attention is given to conditions favoring diseases, to communicable diseases, and to prophylactic measures, in order that the student may be able to reduce the prevalence of diseases among animals in his charge.

5 class hours a week.

Credits, 5.

Department of Veterinary Science.

SHORT COURSES AT THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Short Courses are based on the idea that the motive which inspires study is the most significant factor in study itself, and that this motive rises when the student himself realizes he faces a problem that calls for a solution. Therefore, there is no age limit. Enrolled in short courses are found the young and the old, the experienced and the inexperienced, the theoretical and the practical. In this grouping there is a value, since students learn from each other as well as from the instructors. Practically all Short Course students intend to make a direct application of the knowledge given. Hence the aim of Short Course work is to offer the largest amount of information and training in agricultural and horticultural lines in the shortest possible time. During the past twenty years Short Courses have served hundreds of students in this Commonwealth, and the demand for these courses in recent years has been even greater than in the past.

A ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY.

J. C. GRAHAM, LUTHER BANTA, W. A. SANCTUARY, *Staff.*

The One-Year Vocational Poultry Course is designed to meet the needs of those who wish to specialize in this branch of agriculture, but who can spend only one year at the college. The course is vocational in its nature, the plan of which is to "learn to do by doing."

During the winter term the students take Course 1, Elementary Poultry Keeping, and elect about fifteen credits from other subjects listed in Course 6. From the close of the Winter School, about March 10, until college closes, the latter part of June, they devote all of their time to poultry work. During the summer vacation students have an opportunity to secure additional practical experience on general or specialized farms. With the opening of college in the fall, students again devote all of their time to poultry work, finishing the course at the end of the fall term, the latter part of December. As the busy season with poultrymen begins soon after the first of the year, the students, by finishing the course before the holiday season, are ready to accept attractive positions or enter business for themselves.

Course of Study

Course 1. Elementary Poultry Keeping. A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, marketing, and poultry diseases. Five recitations per week throughout the year.

Course 2. A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging. Fall term. A study of the "Standard" and economic classification of poultry, including score card and comparative judging of exhibition and utility poultry for egg and meat characters. Selecting hens for high and low production (or culling) will receive special emphasis in this course. "The American Standard of Perfection" will be used for a text. Two two-hour laboratory periods per week.

Course 4. A practical laboratory course in incubation, brooding, and growing stock. Students receive practice in operating small and mammoth incubators as well as kerosene and coal stove brooders. Some time is devoted to natural incubation and brooding. Equivalent to five laboratory periods per week from March to June, inclusive.

Course 5. A conference, observation, and general reading course, equivalent to one or two recitations per week during the spring and fall terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultryman is a strong feature of this course.

Course 6. Supplementary Courses. Each student shall select from the winter short course enough of the following subjects to give him at least 12 to 18 credit hours: pomology, soils, agronomy, rural engineering, beekeeping, market gardening, animal husbandry, farm management, dairying, etc.

Course 7. Poultry Management. A general poultry practice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks, under the supervision of instructors, from March until college closes, and from October until December, inclusive. Equivalent to six two-hour periods per week.

Entrance Requirements

Applicants must be at least eighteen years of age and have a good elementary education.

Fees

There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for the fall term and the same for the spring term.

THE SUMMER SCHOOL

The college has maintained a Summer School for the past fifteen years. The Summer Course is intended for teachers of agriculture, instructors in home economics, and for students who wish short, practical courses in agriculture and horticulture. The course lasts four weeks, beginning about the first of July and continuing through the month.

The following schedule of courses, offered in 1922, indicates the nature of the work:—

Poultry Husbandry Fruit Growing Flower Growing Vegetable Gardening Food Preservation Beekeeping Foods and Nutrition Preparation and Serving of Meals Hygiene and Sanitation Garment Making	Dress Design and Construction Millinery House Furnishing Home Management Dramatic Presentation Design and Practical Arts Rural Sociology Agricultural Education Bird Life Insect Life
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THE WINTER SCHOOL

The Winter School has been established for a number of years at the college, and has proved to be very popular with farmers, their wives, sons, and daughters, teachers, college graduates, and others. This school begins about the first of January. Instruction was offered last year in —

<ul style="list-style-type: none"> Soil Fertility Field Crops Types and Breeds of Live Stock Live-stock Feeding Animal Breeding Dairy Bacteriology Animal Diseases Poultry Diseases Poultry Husbandry Fruit Growing Vegetable Gardening Floriculture Horticultural Manufactures Farm Management Farm Accounts 	<ul style="list-style-type: none"> Supply and Marketing of Farm Products Sources and Use of Agricultural Credit Botany Entomology Farm Structures Farm Motors Rural Sanitary Science and Hygiene Agricultural Opportunities for Women Foods Millinery Clothing Business of the Household Home Care of the Sick Agricultural Education
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The Ten Weeks Dairy Course was discontinued in the Winter School of 1922. In its place a series of special two-week courses in ice-cream making, butter making, milk testing, and market milk were offered. During the two weeks the student devoted all of his time to the work of the special course in which he was enrolled. The instruction lasted throughout the day from 8 to 5. These courses met a very definite need in the State for those who wished instruction, but who could not attend for a longer period of time, and who did not wish to take other subjects.

Instruction was given by members of the college staff and non-resident specialists.

DIRECTORY OF INFORMATION

A. The College

Those desiring college catalogues, the President's annual report, and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, should address Ralph J. Watts, Secretary, Amherst, Mass.

All questions regarding admission to the college, either to the freshman class or to advanced standing, should be addressed to Prof. P. B. Hasbrouck, Registrar, Amherst, Mass.

B. Experiment Station

The Experiment Station conducts investigations in as many lines of agricultural science and practice as its funds will permit. It has charge of the inspection of commercial fertilizers, commercial feeding stuffs, and milk-testing apparatus. Branch stations in cranberry and market-garden culture are maintained in other sections of the State.

The station considers the farmers' problems to be its problems, and desires to keep in touch with them.

Requests for bulletins reporting the results of experiments and inspections, and for other information on the work of the station, should be addressed to Sidney B. Haskell, Director of the Experiment Station, Amherst, Mass.

C. The Graduate School

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Dr. Charles E. Marshall, Director of the Graduate School, Amherst, Mass.

D. The Extension Service

Inquiries of a general nature regarding the work of the Extension Service, extension publications, or requests for new lines of work should be addressed to John D. Willard, Director of Extension Service, Amherst, Mass.

E. Short Courses

For information concerning the Short Courses, the Two-Year Course in Practical Agriculture, the Ten-Weeks Winter School, the Summer Schools, write or apply to John Phelan, Director of Short Courses, Amherst, Mass.

SHORT COURSE ENROLLMENT

1922 — 1923

Second Year

Adams, Alton William	Brattleboro, Vt.	36 North Prospect Street
Albee, Frank Smith	Lee	15 Hallock Street
Allen, Milton Clifford	North Dartmouth	Kolony Klub
Ambrose, Earle Clifford	Amherst	6 Phillips Street
Armstrong, John Shepard	East Sandwich	23 East Pleasant Street
Austin, Eunice Marie	Fall River	Abigail Adams House
Bacon, Harold Northrup	Welfare Island, N. Y.	Kolony Klub
Bangs, Walter Albert	Somerville	10 McClellan Street
Barnicle, Edward Joseph	Waltham	17 Kellogg Avenue
Barrett, Avery Herbert	Brattleboro, Vt.	36 North Prospect Street
Beekman, Warren Amerman	Clover Hill, N. J.	15 Hallock Street
Beley, Robert Arsene	Newtonville	36 North Prospect Street
Benson, John Melvell	Mount Desert, Me.	44 Pleasant Street
Blake, Roger Clarence	East Bridgewater	Middle Street
Bligh, Norman Francis	West Willington, Conn.	29 East Pleasant Street
Booth, Sarah Elizabeth	Springfield	Abigail Adams House
Breivogel, Henry Adam	Amherst	13 Amity Street
Brown, Herbert Ellsworth	Holden	Pine Street
Burrington, Frederick William	Heath	15 Hallock Street
Carlson, Carl Albert	Beverly	3 McClellan Street
Caron, Albert Francis	Orleans, Vt.	16 Nutting Avenue
Carroll, Charles Raymond	Amherst	24 South East Street
Carver, Richard Constance	Dwight	Box 44, Dwight
Case, Richard Scofield	Winchester	73 Pleasant Street
Chisholm, Roy Bedford	Dorchester	27 Fearing Street
Cox, Henry Jarus	Melrose	Care of Mr. W. H. Howes, North Amherst
Crandall, Alfred Arthur	Montpelier, Vt.	Kolony Klub
Cutler, Walter Leon	Springfield, Vt.	Kolony Klub
Daw, Elwyn Hudson	Amherst	8 Kellogg Avenue
DeNyse, Arthur William	North Amherst	North Amherst
Diebner, Louis Theodore	Amherst	8 North Prospect Street
Edminster, Allen W.	Brooklyn, N. Y.	Care of Fred C. Kenney, Mount Pleasant
Elliott, William James, Jr.	Brookline	15 Hallock Street
Emerson, Theodore Waldo	Chelmsford	13 Phillips Street
Fairman, Frederick Donald	Amherst	Amherst, R. F. D. 1
Feeney, Charles Joseph	North Amherst	North Amherst
Foster, Henry Cope	Centerville, R. I.	20 Lessey Street
Galbraith, Herman	South Hadley	15 Hallock Street
Garrison, Winfield Hancock	Amherst	Cowles Lane
Gammon, Walter Elmer	Whitinsville	20 Spring Street
Grayson, Donald Dean	South Milford	Hatfield
Harvey, William Moody	Waltham	17 Kellogg Avenue
Hastings, Edward Henry	Worcester	Kolony Klub
Haugland, John Richard	Somerville	3 McClellan Street
Hawthorne, Peter	Amherst	Amherst
Hayward, Lester Burton	Amherst	West Street
Hazard, James Joseph	Providence, R. I.	18 Spring Street
Healey, Martin Joseph	Amherst	11 Salem Street
Henry, Carl Blaney	Westborough	45 Pleasant Street
Hersome, Clyde Elwood	Lowell	Baker Place
Hesse, Fred August	Hasbrouck Heights, N. J.	20 Lessey Street
Hesse, Louis August	Hasbrouck Heights, N. J.	20 Lessey Street
Johnson, Harold Webster	Melrose Highlands	15 Fearing Street
Jones, Lindsey Luther	Amherst	R. F. D. 2
Kavanaugh, John Fordey	Amherst	Pelham Road
Kelley, Edward Bernard	South Hadley Falls	42 McClellan Street
Kelly, S. Scofield	Blackstone	17 Kellogg Avenue
Kenison, Ralph Milton	Saugus	37 Cottage Street
Kitchell, Wilfred Harold	Winthrop	40 Amity Street
Kleyla, Beatrice Barbara	South Deerfield	Abigail Adams House
Kruk, John Alexander	South Deerfield	South Deerfield
Kuppers, John Leonard	Worcester	20 Lessey Street
Legare, Roy Roosevelt	Petersham	31 East Pleasant Street
Legro, Chester James	Lynn	27 Fearing Street
Leitch, Fredonna	Amherst	9 College Avenue
LeMoult, Everett Joseph	New York, N. Y.	75 Pleasant Street
Luther, Bradford Wheeler	Fairhaven	18 Spring Street
Malouf, Elias	Boston	Amherst Tavern
Marshall, Frederick William	Altona, N. Y.	9 High Street
Mattimore, James Francis	Worcester	Amherst Tavern
McGrath, Matthew	Dedham	17 Phillips Street
McKenna, George Edward	Orange	36 North Prospect Street
McKinstry, John Percy	Southbridge	94 Pleasant Street

Second Year — Concluded

McNamara, Francis Joseph	Boston	116 Pleasant Street
Merrifield, Ralph Addison	Athol	North Amherst
O'Donnell, Joseph Charles	East Boston	21 Pleasant Street
Outhuse, Donald Stedman	Littleton	84 Pleasant Street
Packard, Edward Albert	Dorchester	116 Pleasant Street
Park, William Hamlin	Newtonville	9 Fearing Street
Peirce, Elisha Nye	Waltham	35 East Pleasant Street
Perry, Udell Thurston	Santuit	44 Pleasant Street
Phinney, Henry	West Roxbury	18 Spring Street
Potter, Raymond Terry	Great Barrington	83 Pleasant Street
Rambo, Samuel Everett	Grafton	Sunderland
Rand, Arden Wilfred	Amherst	12 Beston Street
Rand, George Lester	North Weymouth	18 Nutting Avenue
Ravinski, Albert J.	Dover	Leverett Road
Rawson, Floyd Stuart	East Douglas	24 Lessey Street
Richardson, Milton C.	West Brookfield	84 Pleasant Street
Sahlin, Harry Sixten	Dorchester	20 Lessey Street
Sayles, Arthur Updike	Providence, R. I.	Baker Place
Schnitzer, Harold Edward	Newport, R. I.	36 North Prospect Street
Scribner, Harry Verne	Waltham	Sunderland
Shepherd, Owen	Bronxville, N. Y.	81 Pleasant Street
Slattery, John Thomas	Hatfield	32 High Street
Smith, Charles Emerson	Westfield, N. J.	75 Pleasant Street
Smith, William	Whitinsville	35 North Prospect Street
Spengler, Robert	Springfield	3 Nutting Avenue
Spooner, Edward Howland	Brimfield	22 North Prospect Street
Springer, Harry Brooke	Amherst	North Amherst
Stevenson, John	Sunderland	36 North Prospect Street
Stever, Clifton Biard	Yarmouthport	23 East Pleasant Street
Stickney, Burton Marsh	Chester, Vt.	Kolony Klub
Sullivan, Frank Leo	North Andover	Amherst Tavern
Sullivan, John Michael	Cambridge	36 North Prospect Street
Sunbury, Kenneth Arthur	Lowell	Colonial Inn
Swanson, Paul Fredolf	Chelmsford	42 McClellan Street
Swenbeck, Herman Robert	Boston	116 Pleasant Street
Taft, George Kenneth	Mendon	Colonial Inn
Thomas, Leon Chessman	South Weymouth	18 Nutting Avenue
Trull, Benjamin Franklin	Lowell	84 Pleasant Street
Tufts, William Harold	North Easton	North Amherst
Unwin, Edward	Amherst	Cottage Street
Walker, Wallace Hayward	Ashby	Stockbridge Hall
Wales, Forrest Martin	Stoughton	70 Lincoln Avenue
Ward, Nelson Erwin	Buckland	94 Pleasant Street
Watson, Grant Mack	Amherst	R. F. D. 3, Box 72
Weagle, Dennis William	Marlborough	73 Pleasant Street
Webster, Phyllis M.	Cambridge	Abigail Adams House
Weed, Theodore Henry	Lenox	9 Fearing Street
Wells, Alphonus	Brighton	Colonial Inn
Wentworth, Wesley John	Amherst	R. F. D. 1
Westervelt, Harold Eric	Tenafly, N. J.	23 East Pleasant Street
Wheeler, Charles Paine	Brimfield	Kolony Klub
Wiedenmayer, George B.	Glen Ridge, N. J.	Sunset Avenue
Wilson, Henry James	Boston	Apiary
Woodward, Everett Brigham	Hubbardston	Experiment Station Barn
Wydeen, Albert Ferdinand	Amherst	R. F. D. 1

First Year

Adelt, Joseph Francis	Adams	Baker Place
Aiken, Howard William	South Hadley	22 Amity Street
Alander, John Alfred	Kingston	30 North Prospect Street
Aldrich, James Arin	Belchertown	17 Phillips Street
Baker, Herbert Kingsbury	Wellesley	20 Lessey Street
Baker, Ralph Holabird	Cambridge	7 McClellan Street
Billings, Samuel Thurston	Ashland	Colonial Inn
Bisbee, John Carroll, Jr.	Moretown, Vt.	35 East Pleasant Street
Blanchard, Lawrence Newell	Leominster	13 South Prospect Street
Blue, James Reuben	Stony Point, Va.	35 East Pleasant Street
Booth, George Wellesley	Everett	29 East Pleasant Street
Bowden, Leon Melvin	West Roxbury	Meadow Street
Brewster, Malcolm Leslie	Waltham	8 South Prospect Street
Briggs, Arthur Clenton	Falmouth	Colonial Inn
Brownell, Abbott Francis	New York City	6 Allen Street
Bryant, Berton Davis	Lowell	101 Pleasant Street
Caless, Thomas Winfred	Belmont	Amherst Tavern
Carageorgis, Andrew Stefanon	New Bedford	The Perry
Carter, William Bradley	Tewksbury	101 Pleasant Street
Cassidy, Francis P.	Plainville, Conn.	3 Nutting Avenue
Chaisson, Joseph Daniel	Worcester	Amherst Tavern
Clarkson, Arnold	Reading	Colonial Inn
Clune, Arthur John	Springfield	7 McClellan Street
Cole, Albert Bradley	Millbrook, N. Y.	29 Lincoln Avenue
Conklin, Lester Martin	Patchogue, N. Y.	29 Lincoln Avenue
Coombs, Marjorie Donelson	Shelburne Falls	Abigail Adams House

First Year — Continued

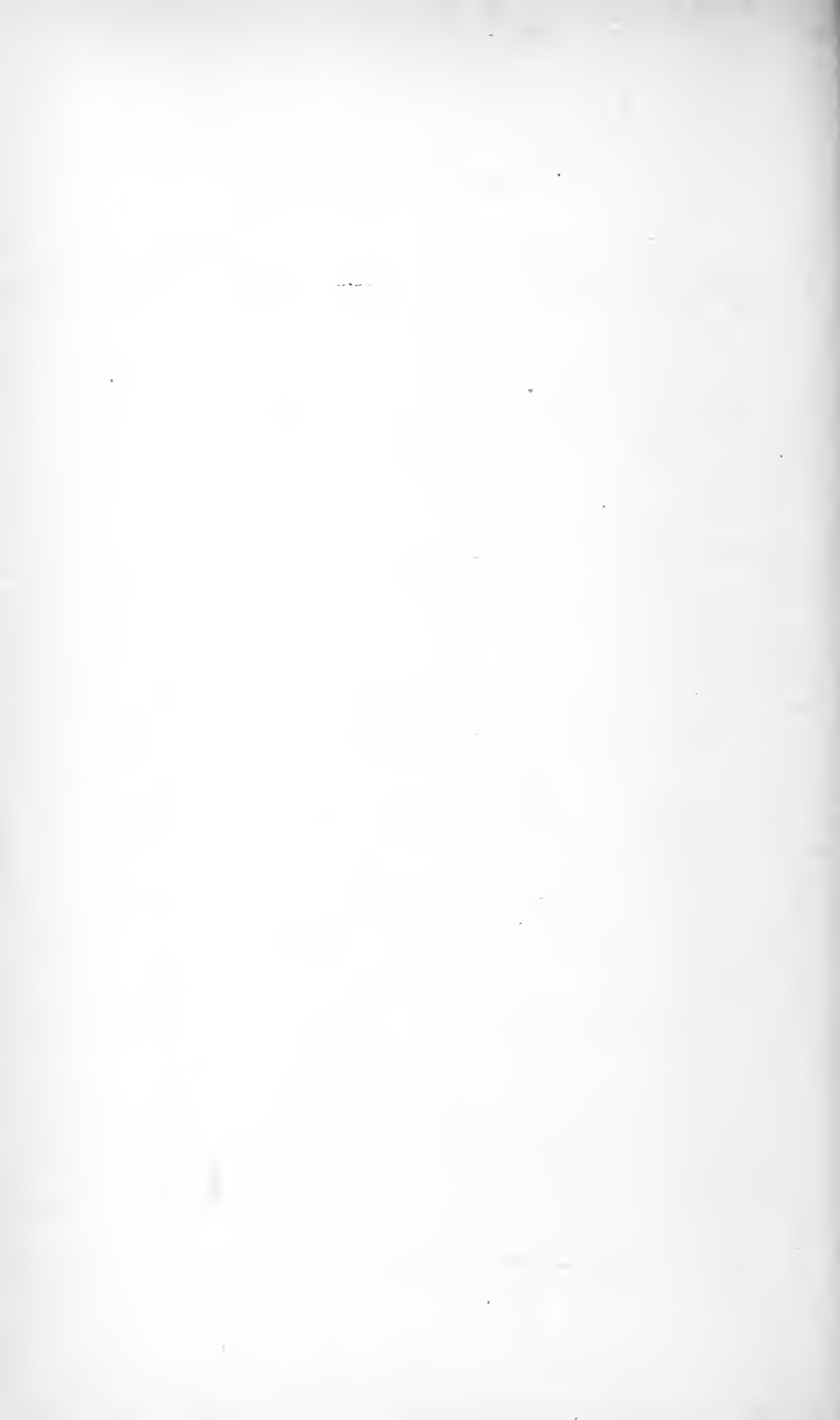
Craig, Kenneth	Boston	29 Northampton Road
Creeron, Hugh Joseph	Worcester	36 North Prospect Street
Cromack, Elwin Baldwin	Colrain	6 Nutting Avenue
Cutler, Samuel Austin	Boylston	8 South Prospect Street
Darling, Walter	Franklin	12 South Prospect Street
Dawson, Robert Entwistle	Saxonville	17 Phillips Street
Dennen, Charles Otis	East Pepperell	31 North Prospect Street
Dennison, Leon Henry	Atlantic	83 Pleasant Street
Denmore, Theodore Calder	Natick	Colonial Inn
Eastwood, Wilfred	North Adams	73 Pleasant Street
Eaton, Wallace Freeman	Springfield	Amherst Tavern
Emery, Edward Conant	Weymouth Heights	Care of George Cooley, Sunderland
Emery, Russell Louis	Needham	35 East Pleasant Street
English, Sherman Clements	Mattapan	101 Pleasant Street
Falconer, Robert Norris	Hyde Park	17 Kellogg Avenue
Field, Brierly	Scarsdale, N. Y.	37 Cottage Street
Files, Arthur Dysart	Wilbraham	30 North Prospect Street
Finney, John Taft	Brookfield	17 Kellogg Avenue
Fitts, Harry Bucklin	Orange	36 North Prospect Street
Fortune, Battie	Boston	Abigail Adams House
Frawley, Earl Alton	New Bedford	Amherst Tavern
Freeman, Hayden	Winthrop	7 Nutting Avenue
Garrett, Wallace Frederick	Milton	Colonial Inn
Gates, Mary Ellen	Amherst	50 Amity Street
Gibbs, Karl Everett	Cochituate	75 Pleasant Street
Giessler, Carl Donald	New York City	81 Pleasant Street
Glencross, John Donald	Amherst	18 Hallock Street
Goode, Frank Arthur	Boston	Colonial Inn
Goodnow, Alice Marguerite	Athol	Abigail Adams House
Griffith, Harold Winthrop	Amherst	18 Nutting Avenue
Haffermehl, Forrest Wendell	Newton Centre	Colonial Inn
Harris, George Mitchell	Lynn	8 South Prospect Street
Haskell, Dorothy Edith	Holyoke	Abigail Adams House
Haynes, Joseph Dwight	Keene, N. H.	Care of Professor Banta, Sunset Avenue
Hazen, Stanley Luther	Longmeadow	Pine Street, North Amherst
Healey, Frank Hugh	Clinton	36 North Prospect Street
Hernance, Warren Edwin	Boston	North College
Higgins, Leonard Martin	Fall River	3 Nutting Avenue
Hines, Oliver Clayton	Everett	Amherst House
Hillman, Nelson Bennett	Fairhaven	15 Hallock Street
Hoar, Richard Edwin	Winchendon	30 North Prospect Street
Howe, Wesley Mason	Milbury	6 North College
Hulbert, Jewett William	Dorchester	30 North Prospect Street
Hull, Amy Harriett	Agawam	Abigail Adams House
Huntley, Ernest John, Jr.	Springfield	28 Amity Street
Jackson, John Windfield, Jr.	Belchertown	17 Phillips Street
Jennings, Thomas Joseph	New Bedford	7 McClellan Street
Johnstone, Allerton	Hamilton	83 Pleasant Street
Jones, Charles K.	Waitsfield, Vt.	18 Nutting Avenue
Jones, Wendell Albert	Rosindale	7 McClellan Street
Joslin, Ralph Herbert	Waitsfield, Vt.	35 East Pleasant Street
Kelley, Malachi Michael	Northbridge	Amherst Tavern
Kenney, William Francis	Dorchester	35 East Pleasant Street
Kinder, Lawrence Philip	Framingham	17 Phillips Street
Kozanis, George Nicholas	New Bedford	The Perry
Lacombe, Albert George	Beverly	12 South Prospect Street
Lalumiere, William	Haverhill	15 Fearing Street
Lane, Maynard Wallace	Gloucester	23 East Pleasant Street
Lauterbach, Louis Jacob	Rosindale	5 Spring Street
Longley, Lawrence Stanley	Greene, Me.	29 North Prospect Street
Lowe, Dwight Mansfield	Watertown	8 Allen Street
MacFayden, Alfred Wellington	Wellesley	20 Lessey Street
MacLeod, Everett William	Reading	Colonial Inn
Macuen, Harvey Andrew	Newton	8 Kellogg Avenue
Malouf, Elias S.	Boston	Amherst Tavern
Martin, Emilio Elenterie	Buenos Aires, Argentina	3 McClellan Street
Martyn, Roland Fowler	West Suffield, Conn.	3 Nutting Avenue
Maxson, Willis Henry	Berkeley, Calif.	28 Northampton Road
Merchant, Percy Albert	Gloucester	23 East Pleasant Street
Miller, Everett Woodman	Fairhaven	15 Hallock Street
Morrissey, John Francis	Brooklyn, N. Y.	Amherst Tavern
Murphy, Mortimer Vincent	Norwood	66 Pleasant Street
Norell, John	Sunderland	Sunderland
O'Connor, Harold Francis	Weymouth	101 Pleasant Street
O'Connor, Joseph Francis	Lynn	Amherst Tavern
O'Doherty, John Edward	Woburn	Amherst Tavern
O'Hara, Francis Edward	Worcester	36 North Prospect Street
Olsen, Harold Bailey	Pepperell	31 North Prospect Street
Paddock, Franklin Selby	Worcester	Farmhouse
Palmer, Albert Tresnon	Everett	13 South Prospect Street
Patterson, Millard James	Ipswich	37 Cottage Street
Parsons, Sidney Wing	Conway	83 Pleasant Street
Paulson, Rudolph Bror	Somerville	8 South Prospect Street

First Year — Concluded

Peaslee, George Raymond	Pittsfield	20 Lessey Street
Peck, John Wesley	Seekonk	116 Pleasant Street
Peklaris, Spiros Antony	Lowell	Meadow Street
Prentiss, Arthur Palmer	Danvers	22 Sunset Avenue
Price, Clifford Abel	Medford	29 North Prospect Street
Rainbo, Mildred Evelyn	Sunderland	Sunderland
Ramsbottom, Thomas	Lowell	15 Phillips Street
Ray, Gordon Horace	West Newbury	12 South College
Rodeen, William	Ludlow	69 Main Street
Rogers, John	Cambridge	101 Pleasant Street
Rooks, Roger Franklin	Somerville	3 McClellan Street
Sahlin, Carl Evert	Somerville	31 East Pleasant Street
Sargent, Stanley Morse	Amherst	6 Nutting Avenue
Scotland, Gordon Lionel	Saxonville	17 Phillips Street
Scribner, Esther Helen	Sunderland	Sunderland
Smith, Harold Earle	Springfield	17 Phillips Street
Smith, William John	Charlestown	Amherst Tavern
Solomon, Maurice	Melrose	56 Pleasant Street
Sprague, Gordon Charles	Boston	The Davenport
Stevens, Glenn William	Waverley	61 Amity Street
Stover, Walter Edward	Wellesley Hills	20 Lessey Street
Taylor, Henry Pease	Westfield	83 Pleasant Street
Tobin, Michael Francis	Adams	28 Amity Street
Thompson, George Howard	Worcester	One Acre
Tirrell, Phillip	Quincy	7 McClellan Street
Tucker, Clarence Murray	Waitsfield, Vt.	35 East Pleasant Street
Turffs, Clarence Joseph	Worcester	73 Pleasant Street
Walker, Franklin Perry	Westboro	3 Nutting Avenue
Wentworth, Frederick Henry	Jamaica Plain	Colonial Inn
White, Lawrence Schaffner	Dover	31 North Prospect Street
White, Newell Dudley	Bristol, Conn.	Pelham Road
Young, Francis Arthur	Northampton	121 Florida Avenue, North- ampton
Zinn, Arnold	New York City	81 Pleasant Street

Special Students, 1923

Burnett, Marston	Cambridge	73 Pleasant Street
Ross, Ian	New York City	Fearing Street
White, Donald	Brooklyn, N. Y.	Fearing Street



APPLICATION FOR ENROLLMENT

IN THE

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

OFFERED BY THE

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

Name

Date of Application

Post Office.....Street.....State.....

Present Occupation.....

Previous Education.....

Finished Elementary Schools at.....

High School: Number of Years.....Where.....

College.....Where.....

Farm Experience: Number of Years.....Type of Farm.....

References as to character:

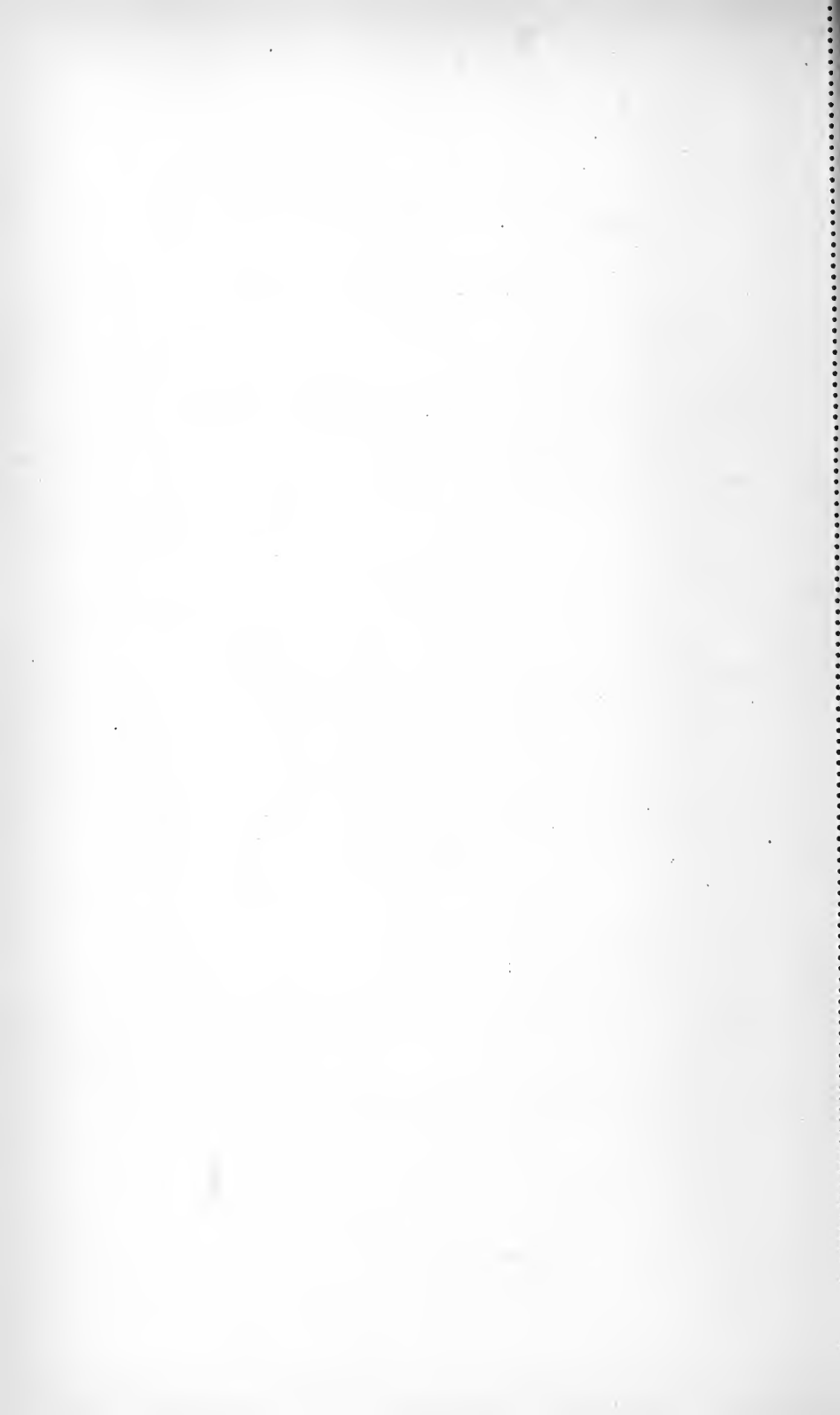
1.
Name Address

2.
Name Address

Name and address of person to notify in case of illness or accident:.....

.....

Mail this blank to John Phelan, Director of Short Courses, Massachusetts Agricultural College.



MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

PRESIDENT'S OFFICE.

The Massachusetts Agricultural College charges a tuition fee of \$60 a term to students who are not residents of Massachusetts. In order to satisfy the college authorities that an applicant is entitled to free tuition they require a statement, signed by the clerk of the city or town in which the applicant resides, certifying to the fact that the father of the applicant is a legal resident of said city or town. Such a statement may be made on the form below. If this is not presented when the student registers, the Treasurer has no option but to collect tuition on the above basis.

KENYON L. BUTTERFIELD.

JULY 1, 1922.

.

To the President of the Massachusetts Agricultural College.

This is to certify that on the date specified below, the father of _____

is a legal resident of _____

City

State

Signed _____

Town or city clerk

Date _____

(Seal)

Mail this blank with your application blank to

JOHN PHELAN, *Director of Short Courses*

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.



TWO-YEAR COURSES

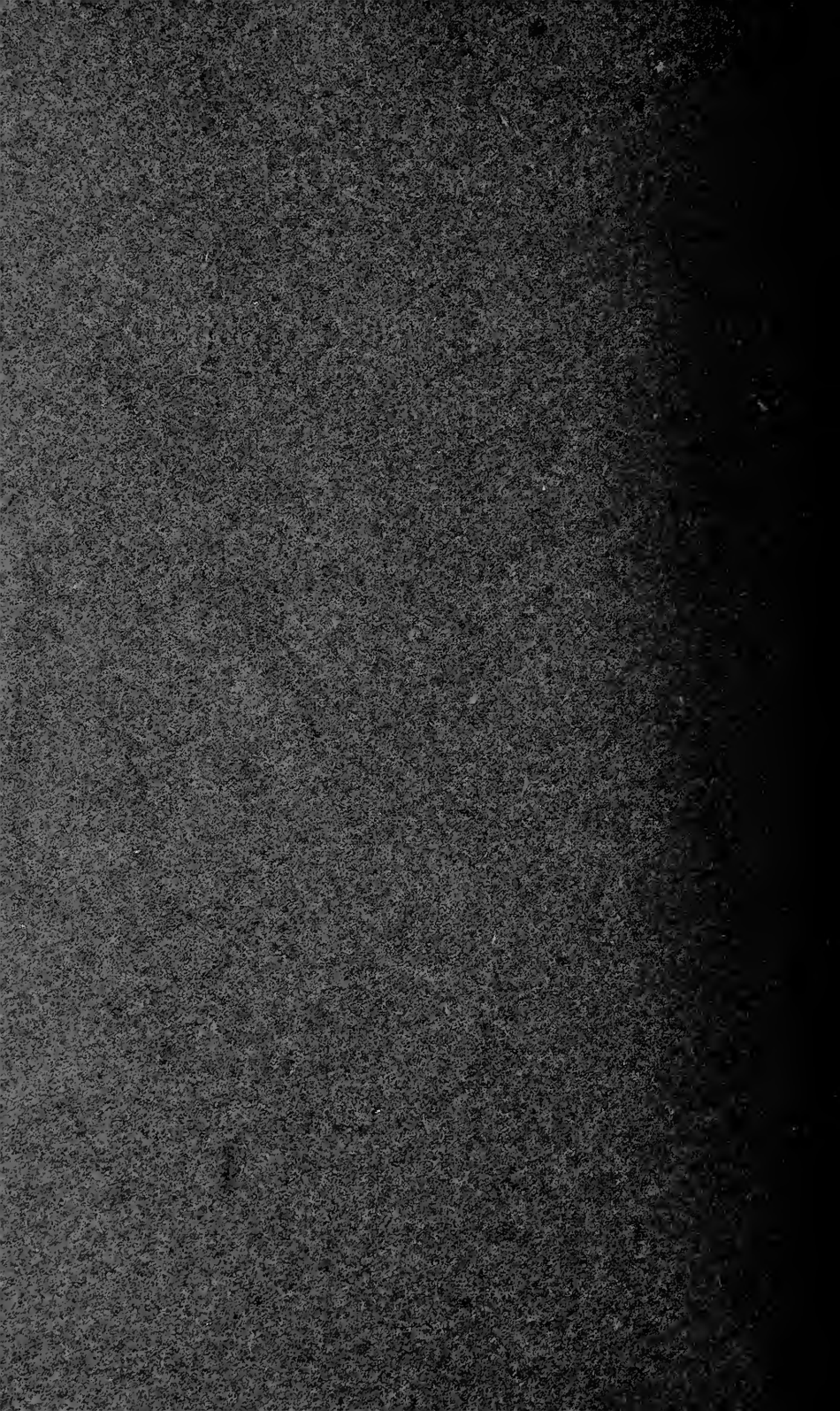
1. ANIMAL HUSBANDRY
2. DAIRY MANUFACTURES
3. FLORICULTURE
4. HORTICULTURE
5. POMOLOGY
6. POULTRY
7. VEGETABLE GARDENING
8. GENERAL COURSE FOR WOMEN

MASSACHUSETTS
AGRICULTURAL COLLEGE

THE TEN WEEKS' WINTER SCHOOL

1924





THE M. A. C. BULLETIN

Amherst, Massachusetts

Volume XV

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Number 7

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The Ten Weeks' Winter School

AT THE

MASSACHUSETTS AGRICULTURAL COLLEGE



PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
COMMISSION ON ADMINISTRATION AND FINANCE

STAFF OF INSTRUCTION, 1923-24.

KENYON L. BUTTERFIELD, A.M., LL.D.

President of the College

EDWARD M. LEWIS, A.M.

Dean of the College

JOHN PHELAN, A.M.

Director of Short Courses

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<i>Assistant Professor of Entomology</i>		
LUTHER BANTA, B.Sc.	. . .	Poultry
<i>Assistant Professor of Poultry</i>		
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<i>Instructor in Home Economics</i>		
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<i>Professor of Agronomy</i>		
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<i>Professor of Agricultural Economics, Head of Department</i>		
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<i>Professor of Horticultural Manufactures, Head of Department</i>		
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<i>Assistant Professor of Pomology</i>		
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<i>Professor of Entomology, Head of Department</i>		
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<i>Professor of Farm Management, Head of Department</i>		
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<i>Professor of Animal Pathology, Head of the Department of Veterinary Science and Animal Pathology</i>		
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<i>Instructor in Microbiology</i>		
GUY V. GLATFELTER, M.Sc.	. . .	Animal Husbandry
<i>Assistant Professor of Animal Husbandry</i>		
HARRY N. GLICK, M.A.	. . .	Agricultural Education
<i>Professor of Agricultural Education</i>		
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<i>Professor of Poultry Husbandry, Head of Department</i>		

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<i>Professor of Rural Engineering, Head of Department</i>	
MARGARET HAMLIN, B.A.	Agricultural Opportunities for Women
<i>Agricultural Counsellor for Women</i>	
ROY D. HARRIS, B.Sc.	Vegetable Gardening
<i>Assistant Professor of Vegetable Gardening</i>	
FRANKLIN E. HEALD, M.A.	Vocational Agricultural Education
<i>State Agent for Agricultural Teacher-Training</i>	
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<i>Foreman of Floriculture Department</i>	
HENRY F. JUDKINS, B.Sc.	Dairying
<i>Professor of Dairying, Head of Department</i>	
MARSHALL O. LANPHEAR, B.Sc.	Agronomy
<i>Instructor in Agronomy</i>	
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<i>Assistant Professor of Botany</i>	
CHARLES E. MARSHALL, Ph.D.	Microbiology
<i>Professor of Microbiology, Head of Department</i>	
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<i>Assistant Professor of Agronomy</i>	
RICHARD T. MULLER, M.Sc.	Floriculture
<i>Assistant Professor of Floriculture</i>	
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<i>Instructor in Dairying</i>	
GEORGE T. PUSHEE	Rural Engineering
<i>Instructor in Rural Engineering</i>	
NORMAN J. PYLE, V.M.D.	Veterinary Science
<i>Professor of Veterinary Science</i>	
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<i>Assistant Professor of Animal Husbandry</i>	
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<i>Instructor in Horticultural Manufactures</i>	
FRED C. SEARS, M.Sc.	Pomology
<i>Professor of Pomology, Head of Department</i>	
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<i>Professor of Home Economics, Head of Department, Adviser of Women</i>	
RICHARD W. SMITH, B.Sc.	Dairying
<i>Instructor in Dairying</i>	
JAMES L. STRAHAN, M.Sc.	Rural Engineering
<i>Assistant Professor of Rural Engineering</i>	
CHARLES H. THAYER	Agronomy
<i>Instructor in Agronomy</i>	

CLARK L. THAYER, B.Sc.	. . . . .	Floriculture
<i>Professor of Floriculture, Head of Department</i>		
WESTON C. THAYER, B.Sc.	. . . . .	Animal Husbandry
<i>Instructor in Animal Husbandry</i>		
GUY A. THELIN, B.Sc.	. . . . .	Agronomy
<i>Instructor in Agronomy</i>		
HAROLD F. TOMPSON, B.Sc.	. . . . .	Vegetable Gardening
<i>Professor of Vegetable Gardening, Head of Department</i>		
PAUL W. VIETS	. . . . .	Short Courses
<i>Supervisor of Farm Placement Training</i>		
WINTHROP F. WELLES, B.Sc.	. . . . .	Agricultural Education
<i>Professor of Agricultural Education, Head of Department</i>		
T. GEORGE YAXIS, M.Sc.	. . . . .	Dairying
<i>Assistant Professor of Dairying</i>		
HUBERT W. YOUNT, B.Sc. Agr.	. . . . .	Agricultural Economics
<i>Instructor in Agricultural Economics</i>		

HENRY S. GREEN, A.B., LL.D.
Librarian of the College

THE TEN WEEKS' WINTER SCHOOL

January 2 to March 8, 1924

The Winter School has been maintained by the college for over twenty years. It meets a definite need in providing instruction for groups of men and women who can most conveniently leave the farm during the winter months. The school closes in time for students to return to take up the spring work.

In addition to the regular Winter School, the attention of the student is directed to the following special schools described in this bulletin offered during the winter period: —

The School for Florists.
The Vocational Poultry Course.
The Dairy School.

In order that the Winter School may serve as many people of the Commonwealth as wish to take advantage of it, no entrance requirements have been fixed other than that the student shall be at least eighteen years of age and shall have completed the elementary or common schools. The expenses are very moderate.

The instruction is thorough. The regular faculty teach the Winter School, assisted, if necessary, by additional instructors and lecturers from outside.

There are no required courses. The advice of the faculty in regard to the course may be had, but the students are left free to select the courses in which they are interested.

A social program is arranged for the Winter School in order that students may enjoy the advantages of college life. One of the most pleasant features of the Winter School in previous years has been the strong group spirit developed through wise leadership on the part of the student body.

The college does not guarantee positions, but frequently has calls for capable, energetic men and women with farm experience. Students interested in securing positions should consult the Supervisor of Farm Placement Training early in the winter. Employers who wish to secure the services of reliable men are also advised to take the matter up directly with the Supervisor of Farm Placement Training in the Short Course Office.

TUITION, FEES AND EXPENSES

There is no tuition in the Winter School, but each student is required to pay to the Treasurer a \$5 registration fee. There are no laboratory fees in connection with any of the courses. The registration fee, unless sent in advance, must be paid at the time of registration to the Treasurer of the college.

Board may be obtained at the college dining hall for approximately \$7 a week. Rent for furnished rooms in private houses varies in price from \$2.50 to \$4 a week for each occupant. There is room for a limited number of women students in the new women's dormitory. Make application for reservation immediately to Miss Edna Skinner, dean of women, Massachusetts Agricultural College. The price per week will be approximately \$3 for each occupant. Information regarding room and board may be obtained at the Short Course Office.

REGISTRATION

Students will be registered in classes Wednesday, January 2, at the Short Course Office. Classes will begin Thursday, January 3, at 8 o'clock A.M.

Each student wishing to register for the Winter School must furnish in advance the names and addresses of two citizens who will recommend him as to moral character.

Upon arrival the student should report at the office of the Director of Short Courses, located in South College; telephone 424.

RULES AND REGULATIONS

The choice of subjects is left to the student, but students are advised to elect not less than ten nor more than twenty-five hours per week. All variations from this rule must be approved by the Director of Short Courses.

A class that meets for one hour a day for five days per week is reckoned as five credit hours. A two or three hour laboratory period counts as one class hour.

Information in regard to books used in the various courses will be given by the instructors at the first meeting of the class. The necessary textbooks may be purchased at the Treasurer's office.

As a guide to those who come to the college for the first time, the following extracts are taken from the regular rules of the college:—

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standard of student department.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend, but also to name conditions under which students may remain in the institution.

Regularity of attendance and conformity to general college rules are required of all Winter School students.

THE LIBRARY

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 60,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 9.30 P.M. every week day, and from 10 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find excellent material for their lines of work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

THE INFIRMARY

The college maintains an infirmary for the care of sick or injured students. Students are urged to go to the infirmary when in need of the services rendered by the resident nurse or by a physician. Inasmuch as the physical director gives

special attention to all student diseases, it is to be expected that students will go to the infirmary at his suggestion.

The infirmary fee is \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights.

SCHOLARSHIPS

The Jewish Agricultural and Industrial Aid Society of New York instituted in 1908 a system of free scholarships to enable the children of Jewish farmers to attend the short winter courses offered by the agricultural colleges in the states in which they reside. The scholarships are awarded by competition, which consists in the writing of a brief essay on an agricultural topic. Children of Jewish farmers living and working on the farms of their parents are eligible to compete for these scholarships.

Applications for these scholarships should be made to The Jewish Agricultural and Industrial Aid Society, 174 Second Avenue, New York City.

POSITIONS

A student desiring a recommendation from the college must meet the following conditions: —

1. He must be of good character.
2. His previous record must be good.
3. His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of farm experience cannot, as a rule, be recommended for positions of responsibility. This is especially true for the better positions for which managers or superintendents are wanted.

DESCRIPTION OF COURSES

GENERAL AGRICULTURE

Soil Fertility

A course in which the origin of soils, their properties and management, will be studied. Emphasis will be placed on: the control of soil moisture; tilth and tillage; importance and maintenance of soil organic matter; manures, — their composition, value, preservation, and use; limes and liming; and the properties and use of commercial fertilizers. Two lectures and one two-hour laboratory period.

Mr. Thayer and Mr. Lanphear

Field Crops

The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work gives the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Course I required. Two lectures and one two-hour laboratory period a week.

Assistant Professor Michels and Mr. Thelin

Tobacco Growing

A short course dealing with the practices of growing tobacco in the Connecticut Valley, and designed especially for those expecting to go into the tobacco industry. The crop from the seed bed to the market will be studied and special problems of soil, commercial fertilizers, green manures and tobacco diseases and insect pests will be considered. 4 periods per week.

Mr. Lanphear

Types and Breeds of Live Stock

Outlines of the market classes and grades of beef cattle, horses, sheep, and swine, placing emphasis upon the characteristics of each class and its adaptations. The characteristics, the adaptations, and so far as is possible the historic development of each of the more important breeds of live stock are also carefully studied, as well as their distribution in America. Special emphasis is laid upon dairy cattle and horses in the judging work. Three lectures and two two-hour judging periods a week.

Mr. W. C. Thayer

Live Stock Feeding

A study of the physiology of nutrition, the composition of feedstuffs, and of rational economic feeding. The feeding of dairy cattle and their management for profitable milk production receives first attention. Similarly, the feeding of horses, of beef cattle, of sheep, and of swine is studied. Three lectures a week.

Assistant Professor Glatfelter

Animal Breeding

A discussion of the more common problems pertaining to the breeding of live stock, their explanation and solution; in-breeding; cross-breeding; grading.



Mixing fertilizer



Studying field crops



Constructing a poultry house

The work of the most successful men in history is studied. Time is given to the study of pedigrees of the different breeds of dairy cattle and other stock. One lecture and one two-hour laboratory period a week.

Assistant Professor Rice

Dairy Bacteriology

The characteristics and functions of bacteria and their relation to the different branches of the dairy industry. The scientific basis for cream ripening, sterilization, pasteurization, control of fermentation, and the production of the best quality of market milk. Two lectures and one two-hour laboratory period a week.

Professor Marshall and Miss Garvey

Animal Diseases

This course acquaints the student with the more common diseases to which domesticated animals are susceptible. Particular attention is given to conditions favoring diseases, to communicable diseases, and to prophylactic measures, in order that the student may be able to reduce the prevalence of diseases among animals in his charge. Five class hours a week.

Dr. J. B. Lentz

Poultry Diseases

This course is planned for students specializing in poultry work. Anatomy and physiology of the domestic fowl are briefly considered, and particular attention is devoted to the diseases which may cause heavy losses in the flock. Prevention rather than cure is emphasized. Five class hours a week.

Dr. Norman Pyle

Poultry Husbandry

This course meets the needs of those who can spend only a short time at the college, but who wish to get a general survey of poultry keeping and some technical knowledge of the latest and most scientific methods in vogue. It is a lecture and laboratory course, the former covering opportunities in poultry culture, poultry housing, winter egg production, incubation and brooding, feeds and feeding, poultry management, and the most popular methods of marketing poultry and eggs in Massachusetts. The laboratory work consists of demonstrations and practical work in killing, picking, caponizing, judging and culling for egg production, and studying types and construction of incubators and brooders. Practical work in operating incubators is given to as many as can be accommodated. The large poultry plant furnishes facilities for demonstrating various methods of housing and feeding. A splendid opportunity is afforded those who have time for observation work outside of class hours. Five lectures and one two-hour laboratory period per week.

Assistant Professor Banta

Fruit Growing

This course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented by demonstrations, and whenever possible, actual work by the student. Students electing fruit growing are also required to take soil fertility, and it is recommended that they take botany and entomology. Three lectures and one two-hour laboratory period a week.

Assistant Professor Drain

Vegetable Gardening

The successful commercial production of vegetables requires a clear understanding of the problems that the vegetable grower meets. Practical contact is made with the problem in so far as the season of the year and time devoted to the work

permit. Classroom instruction makes clear the fundamental principles underlying the problem; and gives opportunity for discussion. The laboratory periods aim to give the student practice in applying the fundamental principles to the problems he is to meet as a commercial vegetable grower. Some of these will be discussed under the leadership of market gardeners and specialists.

Students electing this course are required to take soil fertility, and it is recommended that they take botany and entomology. Three lectures and two two-hour laboratory periods a week.

Assistant Professor Harris

Floriculture

This course is outlined primarily for students who are interested in commercial floriculture. Some of the subjects considered are: greenhouse construction and heating, greenhouse management, culture of the important commercial crops, and floral arrangement. A portion of the course will be devoted to a consideration of gardening and garden flowers. Special trips are taken to study floricultural establishments in the State; students desiring credit for the course are required to take these trips. A series of lectures will be given by men who are engaged in various phases of floricultural work. Students taking this course are required to take soil fertility, and it is recommended that they take fruit growing and vegetable gardening. Five lectures a week; laboratory work or field trips on Saturday.

Professor Thayer, Assistant Professor Muller and Mr. Hubbard

Horticultural Manufactures

The utilization of culls and low-grade fruits and vegetables, and the marketing of excess crops are always serious problems to the producer. The economic conversion of these materials into palatable nutritious food products is becoming a greater necessity each year.

This course aims to place before the student the fundamental principles underlying the various means of food preservation and the manufacturing of food products.

The canning, drying, and storage of fruits and vegetables, together with the manufacture of many of their products, will be studied in detail, and the methods illustrated with laboratory exercises. Students will be given opportunity to do canning and drying, to manufacture many fruit and vegetable products, and to investigate storage conditions. The work in both classroom and laboratory will be of such a character as to be readily applied in the home or in the farm factory. Two lectures and two laboratory periods per week. Class limited to sixteen students.

Professor Chenoweth and Mr. Robertson

Farm Management

A study of some of the problems of modern farming and the factors that influence success, such as the choice of a region and of a farm, types of farming, size of farm, rotation of crops, and labor problems. Two lectures a week.

Professor Foord

Farm Accounts

Actual practice in the use of a simple system of farm accounting, including cost accounts suitable for the large or the small farm. Two two-hour laboratory periods a week.

Professor Foord

The Supply and Marketing of Farm Products in Massachusetts

The course will attempt to show what products New England can most profitably produce and how and when they can best be marketed. The principles of marketing, the importance of marketing as compared with production, the best outlets

for sale, proper methods of preparation, packing, shipping, storing, advertising and selling, direct marketing, use of motor truck, trolley freight and express, collective selling, planning production with a view to marketing, will be some of the topics presented. Each student will be given an opportunity to study the market for some product in which he is interested. Twenty lectures.

Mr. Yount

Botany

A study of the structure, functions, and diseases of greenhouse, garden, orchard, and field crops, together with methods of disease prevention, including spraying and the application of fungicides. Two one-hour periods a week.

Assistant Professor McLaughlin

Entomology

The course in entomology covers the topics outlined below. It is aimed to cover the fundamentals of the subject rather fully. Time will permit the discussion of only the more important of the injurious and beneficial insects with which we have to deal in this section of the country.

1. Insects and their nearest relatives — how to distinguish them.
2. Structure or make-up of insects and the practical application of this knowledge in insect control.
3. Development, metamorphoses (changes), and stages of insect life.
4. Composition, preparation, combination, and use of insecticides, fumigants, etc.
5. Spraying apparatus and its use.
6. Beneficial and injurious insects.
 - A. The life history, habits, behavior, and control of some of the most important insect pests.
 - B. Beneficial insects.

Three lectures a week.

Assistant Professor Alexander

Farm Structures

A study of design and arrangement of farm buildings, including the general purpose barn, dairy stable, horse barn, milk house, ice house, root cellar, etc.; building materials used in farm construction; heating and lighting systems and road construction.

Working drawings of farm buildings will be prepared, a complete set of drawing being worked up by each student from any design problem he may select. Practice is given in the care and use of carpenter's tools through bench work, repair of farm equipment, and building construction. Small buildings are erected by the students to give practice in all the phases of house construction. Practice is given in the building of forms and in the mixing and placing of concrete. One lecture and four two-hour laboratory periods per week.

Assistant Professor Strahan and Mr. Pushee

Farm Motors

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing. Three class hours and two two-hour laboratory periods a week.

Professor Gunness and Mr. Pushee

Rural Sanitary Science and Hygiene

Significance of sanitary science in the relation to health; the theories of disease; air and ventilation; water and its protection; sewage, disposal and purification; foods, their care, preservation, decomposition, and nutrition; vaccines and serum treatment; carriers of disease, immunity, and susceptibility; infectious diseases; disinfection and care of infectious diseases. Two lectures a week.

Professor Marshall

Agricultural Opportunities for Women

A course for the woman who is interested in agriculture and who wishes to know what opportunities are open to her in that field. A study will be made of the types of agricultural work for which women are best adapted; of the special problems which will confront them in such work and how these may be met. Two class hours per week.

Miss Hamlin

HOMEMAKING

Owing to the increasing demand for instruction in homemaking, provision has been made in the Winter School for a course combining homemaking with agriculture.

There are many women and girls throughout the State who are vitally interested in studying home problems and at the same time would like to become proficient in some phase of agriculture, as poultry, gardening, floriculture, or fruit growing. The college is able to extend this unusual opportunity.

Attractive laboratories equipped for homemaking work will be at the disposal of all women students in the Winter School.

Foods

When one realizes that a large percentage of the family income must be spent for food, it is easy to understand that this is one of the most timely topics of the day in the interest of thrift and health.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods. Emphasis will be given to the application of fundamental principles in planning balanced menus. An unwise selection of foods may result in malnutrition rather than in health.

Consideration will be given also to such special problems as infant feeding and school lunches. This course will include laboratory work of practical value. Two lectures and two two-hour laboratory periods per week.

Clothing

Consideration will be given to making over and extending the use of fabrics as well as the selection of new materials. Their character, cost, and durability are studied with reference to planning a wardrobe for a limited income, emphasizing the beauty of simplicity and suitability. There will be practical work in sewing and making garments. Two lectures and two two-hour laboratory periods per week.

Miss Bartley



Table decoration by the class in floriculture



A course in the cooking school

Millinery

The selection of color and form as related to the individual, the wardrobe, the occasion and the season will be given careful attention. Laboratory work will include covering of hat frames with velvet, silk, net and straw; lining and finishing; trimmings, bows, pleatings, hand-made flowers, together with pressing and renovating materials. One lecture and two two-hour laboratory periods per week.

Miss Bartley

The Business of the Household

Good management is a science. For generations women have failed to apply to the business of homemaking many efficient methods so successfully used in the business world.

Since the homemaker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, the use of time and labor-saving devices. Three class hours per week.

Home Care of the Sick

Health preservation and home care of the sick are of prime importance. It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of family health.

Every homemaker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured. Three class hours per week.

Miss Skinner

VOCATIONAL AGRICULTURAL TEACHING

The Massachusetts Agricultural College has been designated by the Massachusetts Department of Education as the institution for training teachers of vocational agriculture for the State. The work is being carried along the following lines:—

1. Regular college courses, four or five years, leading to a degree.
2. Shorter courses to supplement the training of more mature men who are partly qualified through practical experience, or through scientific study of agriculture, or through study of methods and principles of education, or through teaching experience.
3. Professional improvement training for employed teachers in regular college courses, courses in the winter term, or courses specially organized on request of a sufficient number of students.

The Winter Short Course period provides in part for the second and third lines. An intensive course during the first two weeks is provided for the instructors who may leave their teaching for only a brief period. This course may be continued on a lighter schedule for such persons as may be able to remain throughout the winter term.

For all of these there will be an opportunity to take courses in general agricultural teaching, special Massachusetts problems, and agricultural subject-matter. An attempt will be made to furnish any subject-matter course which enough men may request.

High school principals and science teachers who have had farm experience, or practical agriculturists, may find this an opportunity to qualify for vocational teaching, — a field in which the demand is fairly strong.

The educational courses supplemented by an adequate amount of agriculture will be credited by the Department of Education towards approval of candidates or for professional improvement programs. Similar courses are offered in the summer school.

The following courses have proved to be of greatest benefit to those enrolled at this time: —

Principles and Methods of Teaching

The aim of this course is to present the fundamental principles of teaching as applied to high school students. It treats such topics as interest, apperception, imaging, reasoning, and other activities of the mind in its learning processes, and endeavors to apply the study of these in each student's case in order that he may learn to promote such mind activities in others. Such matters as discipline, lesson plans, teaching efficiency and other topics of general method are thoroughly handled and illustrative work done. Five exercises per week.

Professor Glick and Professor Welles

Special Methods in Vocational Agricultural Teaching

This course consists of intensive work on the important principles underlying the successful teaching of vocational agriculture and a thorough study of the special plans and activities of the teacher of this subject. The job is analyzed to determine what the teacher must know as to character, setting, technique, and relations of his work. All available sources are consulted for information as to State requirements, industrial conformity, and professional ideals. Illustrative material showing how particular departments and schools work out their problems in this subject is gathered and studied. Plans for the year's work, unit study and daily lessons are worked out on the home-project basis. Special lessons are planned and taught by students in moot class.

In case both experienced and untrained men apply for this course, the group may be divided into two sections. Five exercises per week.

Professor Welles

Professional Improvement Problems

A seminar course for employed teachers or directors of vocational agriculture, dealing with problems which constantly arise in the agricultural schools of the State. Prospective teachers may be admitted by special arrangement. Includes plans for the coming season, and campaigns for improved methods based on experiences and needs of men in service; for this season special emphasis on summer teaching of related subjects, and the proper approach to teaching a vocational topic.

Under special arrangement of the Massachusetts Department of Education and the Massachusetts Agricultural College, students in this course may be admitted to Professor Welles' class in principles and methods of teaching.

Class meets for double periods five days each week for two weeks. May be continued, on request, for a longer term at four days each week.

Mr. Heald

PRACTICAL AND SCIENTIFIC COURSE FOR FLORISTS

MASSACHUSETTS AGRICULTURAL COLLEGE
AMHERST, MASS.

January 2 to March 8, 1924

A special course for men engaged in floricultural work will be given at the Massachusetts Agricultural College beginning on January 2, 1924 and continuing through a period of ten weeks, closing March 8, 1924.

The course has been arranged in cooperation with the Boston Gardeners' and Florists' Club. The program of the course has been drawn up with the assistance of a committee from this club consisting of the following:

Harold A. Ryan, Retail Florist, Cambridge, Mass., President of the Club.

W. N. Craig, Horticulturist, Weymouth, Mass., Secretary of the Club.

W. H. Judd, Arnold Arboretum, Jamaica Plain, Mass., Ex-President of the Club.

Program of Studies

The work, as outlined by the committee in cooperation with the Department of Floriculture and scheduled for the coming term, is as follows:

1. Soils and fertilizers, covering the origin of soils, soil types, soil moisture, tillage, organic matter, humus, fertilizers, mixing and application of fertilizers, etc.

Mr. M. O. Lanphear

2. *Commercial Floriculture.* — A brief consideration of greenhouse construction and heating, principles of greenhouse management, propagation, cultural methods and practices in the growing of the important commercial crops under glass.

Mr. S. C. Hubbard

3. *Garden Flowers and Bedding Plants.* — A study of annuals, biennials, herbaceous perennials, tender perennials, and bedding plants which are commonly used in commercial floriculture. Methods of propagation, culture, and uses will be considered.

Professor C. L. Thayer

4. *Floral Arrangement.* — A study of the principles underlying the arrangement and use of cut flowers and plants; basket and vase arrangements, table decorations; home, church, and other interior decorations; funeral designs and arrangements. This course will also include a study of color as applied to such work.

Assistant Professor R. T. Muller

5. *Insect Pests.* — A study of the insects injuring floricultural crops — how to recognize them and their work in different stages, their habits and life histories, conditions favoring their development, and the most effective control measures.

6. *Plant Diseases.*—The diseases attacking floricultural crops—how to identify them, how they grow and develop, cultural practices favoring diseases, and the methods of control.

Assistant Professor F. A. McLaughlin

7. Special lectures by commercial florists, retail florists, gardeners, and others, on such subjects as greenhouse construction, heating, wholesaling, retailing, advertising, commercial crops, pot plants, bedding plants, perennials, design work, etc.

General Requirements

The number of students will be limited to fifteen. Applicants should register early as they will be accepted in the order of their application. Students will have all the advantages and privileges of the Winter School.

No entrance examinations are required, but it is expected that every student will have a reasonable general education, especially in the English language, and that he will have had some practical experience in floricultural work. If possible, each student should present a personal recommendation from his employer or from some person of his acquaintance, showing the experience of the applicant in floricultural work.

The college reserves the right to reject any applicant obviously unqualified for the work, or to dismiss any student whose presence, for any reason, proves detrimental to other members of the school. Strict attention to the work of the course will be required of all students.

Those who complete the entire course with credit will receive the Winter School certificate of the college.

Expenses

	Low	High
Registration fee	\$5 00	\$5 00
Board (10 weeks at \$7.00)	70 00	70 00
Room rent (10 weeks at \$2.50-\$4.00)	25 00	40 00
Textbooks	10 00	15 00
	\$110 00	\$130 00

Information

For further information communicate with any member of the previously mentioned committee, with the Short Course Office, or with Professor C. L. Thayer, Massachusetts Agricultural College, Amherst, Mass.



Nursery practice



Class work in greenhouses

WINTER SHORT COURSES IN DAIRYING

January 2 to March 8, 1924

STAFF OF INSTRUCTION, 1924

H. F. JUDKINS, B.Sc., *Professor of Dairying*
 T. G. YAXIS, M.Sc., *Assistant Professor of Dairying*
 H. L. PENDLETON, B.Sc., *Instructor in Dairying*
 R. W. SMITH, B.Sc., *Instructor in Dairying*

In addition to the above, specialists in the commercial field will be secured to help with the laboratory work and discussion.

CALENDAR, JANUARY 2, 1924 TO MARCH 8, 1924

- Course I. Testing Milk and its Products, Wednesday, January 2, 8 A.M., to Saturday, January 12, 12 M.
 Course II. Market Milk Handling and Soft Cheese-Making, Tuesday, January 15, 8 A.M., to Saturday, January 26, 12 M.
 Course III. Butter-Making, Tuesday, January 29, 8 A.M., to Saturday, February 9, 12 M.
 Course IV. Ice-Cream Making, Tuesday, February 12, 8 A.M., to Saturday, February 23, 12 M.
 Course V. Repetition of Course IV if demand warrants, Tuesday, February 26, 8 A.M., to Saturday, March 8, 12 M.

GENERAL INFORMATION

A series of four ten-day courses in dairying will be conducted between January 2 and February 23, 1924. The courses cover four distinct subjects connected with the handling of milk or with the making of milk products. These courses were conducted in 1923 for the first time and they seemed to meet the demand for short course instruction along these lines, which has come in recent years from creamery, market milk, and ice-cream plant operators and workers.

Many a plant manager, foreman, or worker would do better work and get more satisfaction out of his work if he understood the reasons for doing certain things. It is the man who wants to know more about his work, and who is anxious to become expert enough to advance in it, that plant operators can more profitably encourage to take these courses. Owners of dairy plants sending men of this type will profit principally through the fact that the men will learn economy of operation resulting in a saving of labor, and better handling and processing methods resulting in a better and more uniform product. The courses are purposely given at a time of year when help can most easily be spared.

The courses are intended not only for experienced plant men but for men having little experience. Those who are unexperienced should plan to take all of the courses. Farm men and women who are responsible for milk handling, butter making, or the making of soft cheese will also find these courses adapted to their needs.

The courses are so arranged that a student can report for the first on January 2 and take all the courses in succession, finishing February 23, or he can take any course separately. There are no prerequisites in any course but the student will better understand the work in the last three courses and will be able to get a little more out of them if he understands first, the testing of milk and its products. A

certificate showing the subject studied is given at the end of each course to those doing satisfactory work.

Admission. — There are no entrance requirements except that the student must be eighteen years of age, and must have a common school education.

Registration. — Students should enroll by mail. A registration card will be sent upon application.

Enrollment for the course "Testing Milk and its Products" must be made by January 2, 1924. Those failing to enroll by mail may enroll on January 2. Students should arrive January 1, as classes begin at 8 A.M. January 2.

Enrollment for the course "Market Milk Handling and Soft Cheese-Making" must be made by January 14. Classes begin at 8 A.M. January 15.

Enrollment for the course "Butter-Making" must be made by January 28. Classes begin at 8 A.M. January 29.

Enrollment for the course "Ice-Cream Making" must be mailed so that it will arrive in Amherst not later than February 1. Fifteen students are all that can be registered in this course at one time and the first fifteen men and women to enroll will be scheduled for the first section, classes to begin at 8 A.M. February 12. Those enrolling later will be scheduled for the second section, beginning February 26 at 8 A.M. The Director of Short Courses will notify applicants of the section to which they have been assigned.

All applications for entrance to these courses should be addressed to the Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

Upon arrival the student should report at the office of the Director of Short Courses in South College, telephone 424, for information concerning rooming accommodation.

Tuition, Fees and Expenses. — There is no tuition fee in connection with any of the courses, but each student is required to pay to the Treasurer a registration fee of \$2 per course. This must be mailed with the registration card.

Students will need white suits for laboratory work, and may wish to purchase one or more textbooks for each course.

Board may be obtained at the college dining hall for approximately \$7 a week. Rent for furnished rooms in private houses varies in price from \$2.50 to \$4 a week for each occupant.

Positions. — The Dairy Department is often called upon to recommend candidates for positions, and stands ready to recommend those who take these courses with the idea of getting positions, providing they are of good character, have good previous records, and do satisfactory work in the courses.

Methods of Instruction. — Instruction is given (1) by lecture, by recitation and discussion, and by the working out of problems; (2) by practical work in the laboratories. In general, two one-hour periods each day will be allowed for discussion and two three-hour periods for laboratory work. The student is expected to give practically the entire day from 8 A.M. to 5 P.M. to his work. The services of the entire department are available at different times for men taking these courses.

Flint Laboratory. — The dairy building is practically new, and with its equipment stands as one of the best college dairy buildings in the country. The testing laboratory is spacious and is well equipped for testing milk and its products. Equipment includes a Mojonnier Tester. About 1,000 quarts of milk are received daily, and the market milk department is equipped to weigh, clarify, pasteurize, cool and bottle this milk.

There is a 10-ton compression refrigerating system in the building arranged for making ice, freezing ice cream and cooling the ice-cream hardening box. The ice-cream room contains two brine freezers and one tub freezer, a mixing tank, emulsing and viscolizing outfits, a filling machine, and other smaller equipment. The butter department is equipped with power and hand churns of different makes, starter-making equipment, pasteurizers, and various makes of separators. The cheese room is equipped to make cheese of all kinds, and especially soft cheese.

DESCRIPTION OF WINTER COURSES

Course I. Testing Milk and its Products (January 2 to 12).

This course is designed to fit men and women to test milk and its products in various kinds of dairy plants, or to supply some new information to those now engaged in this work. Those who do satisfactory work will be eligible to secure a State testing certificate.

Lecture and discussion topics include the magnitude of the dairy industry, secretion of milk and its composition, factors affecting the percentage of fat in milk, the sampling of milk, the Babcock test for milk and its products, the use of the lactometer, the acid tests, moisture and salt testing of butter, and total solid tests for condensed milk and ice cream including the Mojonnier test.

Practical application of the lecture and discussion work will be carried out in the laboratory, and all the common tests of milk and its products will be performed.

Course II. Market Milk Handling and Soft Cheese-Making (January 15 to 26).

This course is designed to help milk plant employees to a better understanding of economy of operation and uniformity of product. It will help prepare men to be foremen and superintendents of the country end of the business.

Some of the lecture and discussion topics are: general scope of the market milk industry, value of milk as a food, relation of bacteria to milk, sanitary production, marketing, plant construction and selection of equipment, processing, delivery, handling surplus, standardizing, grading and labeling, and care of milk in the home.

Laboratory exercises will cover milk sampling, the scoring of dairies, cream line problems, the scoring of milk, the study of milk plant equipment, milk processing, and the manufacture of cottage, neufchatel, and cream cheese.

Course III. Butter-Making (January 29 to February 9).

This course is designed to help those with a little knowledge of butter-making to make a better and more uniform product. There are many positions in plants and on farms, which require a knowledge of butter-making.

Lectures will cover the operation of the separator, the handling of cream for butter-making, the selection of a churn and the preparation of starters, the pasteurization of cream, starter making, the churning process, packing butter, the moisture content and overrun, marketing, storing and judging butter.

Laboratory work will include a study of the construction of separators, their operation under different conditions, starter making, cream pasteurization and ripening, churning practice under varying conditions, moisture and salt testing and butter judging.

Course IV. Ice-Cream Making (February 12 to February 23).

This course aims to present the most up-to-date information on ice-cream making and fit men to operate or take charge of operating any part of the ice-cream business.

Lectures and discussions will cover the selection of ingredients for the mix, standardizing and calculating the mix, processing the mix, factors influencing the yield, causes and remedies of ice-cream defects, the manufacture of brick ice cream, special ice creams and fancy molds, marketing ice cream, and the handling of ammonia refrigerating plants.

Laboratory exercises will include work on the whipping properties of different creams, tests of ingredients used in the mix, study of ice-cream equipment and its operation, calculating and making up of the ice-cream mix, effect on the quality of

ice cream of such factors as fat content, solids not included in the fat content, temperature of the mix, temperature of brine, age of the mix, speed of the dasher, treatment of the cream or mix, and making various kinds of frozen delicacies.

FOUR-YEAR COURSE

The call for students trained in the manufacture and handling of dairy products is an ever-increasing one. The Dairy Department offers a four-year course for students qualified to enter the college. This course fits men for development in teaching, research, and extension work, and for such commercial positions as dairy plant managers, milk sanitarians, and dairy products or dairy equipment salesmen.

TWO-YEAR COURSE

An elective vocational course is offered for two-year students covering the subjects of milk testing, market milk handling, butter-making and the manufacture of ice cream and of miscellaneous dairy products. This course prepares men for positions as testers for cow testing associations or for advanced registry work, as well as for positions in all types of dairy plants.

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture is intended for men and women who desire a working knowledge of the best methods in farming but who cannot spend four years in college. An applicant for admission must be at least 17 years of age and must have a common school education.

Tuition is free to residents of Massachusetts; others are charged \$60.00 per term, or \$180.00 per year. All students must pay small laboratory fees in several courses.

The course is so organized that each student specializes along one of the following lines: animal husbandry, poultry, dairy manufactures, general horticulture, fruit growing, floriculture, or vegetable gardening. Each specialized course is intensive, with emphasis on practical work under competent supervision. It covers two winters and the intervening summer. The first year is made up of six months of study at the college followed by six months of practical farm experience on selected farms. Nine months more of study at the college completes the course. Each student, at graduation, receives a certificate showing the subject studied.

THE ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

January 2 to December 19, 1924

Enrollment in the Vocational Poultry Course is limited to twelve students. Applications for this course should be made early.

The institution of the One-Year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and devote practically all of their time to it, and who feel they cannot spend either two or four years in college.

Entrance Requirements. — Applicants must be at least eighteen years of age and have a good elementary education.

Fees. — There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for the spring term, and the same for the fall term.

The material for this course has been carefully selected from the various courses for the four-year students. Use is made of the very practical portions, but enough of the more scientific work is given to enable the student to get a thorough grasp of the "whys and wherefores" of the subject. The former has been much enlarged upon, and an immense amount of practical laboratory work in care and management of poultry is required. "Learn to do by doing" is the slogan for this course. The aim is to develop as much skill as time will permit.

The general plan is as follows: —

Winter Term. — The student takes Course 1, outlined below, and in addition, farm accounts, avian pathology, agricultural economics, poultry husbandry, rural sanitary science, and hygiene. The student may elect either fruit growing or vegetable gardening. This plan brings the student in contact with other members of the faculty, and acquaints him with important correlated work.

Spring Term. — From early April until college closes, in June, the student takes Courses 1, 4, 5 and 7, devoting all his time to poultry work.

Fall Term. — The student continues Courses 1, 5 and 7, and in addition takes Courses 2 and 3, still devoting all his time to poultry work.

Course of Study

Course 1. Elementary Poultry Keeping.—A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, poultry farm management, and poultry diseases. Five recitations per week throughout the year.

Course 2.—A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging.—Fall term. This course embodies the latest methods of judging egg production capacity by external characters as approved by the American Association of Instructors and Investigators in Poultry Husbandry; the history and evolution of our breeds and varieties of domestic fowl, their standard qualities, and their preparation and judging for exhibition purposes. In the latter portion of the course the "American Standard of Perfection" is used as a text. Two two-hour laboratory periods.

Course 4.—A practical laboratory course in incubation, brooding, and growing stock, equivalent to five laboratory periods per week from March to June, inclusive.

Course 5.—A conference, observation, and general reading course equivalent to one or two recitations per week during the fall and spring terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultrymen is a strong feature of this course.

Course 6. Poultry Management.—A general poultry practice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks under the supervision of instructors from April until college closes, and from October until December, inclusive.

Course 7. Elements of Poultry House Designing.—This course embraces the elements of mechanical drawing and the principles of designing; and special attention is given to the preparation of plans for all kinds of poultry buildings, including incubator cellars, brooder, laying, breeding, and growing houses; also feed hoppers, trapnests, and other equipment. Two two-hour laboratory periods per week. Credits, 2.

THE SUMMER SCHOOL

The Summer School at the Massachusetts Agricultural College has been a feature of Short Course work for fifteen years. In previous years the school has opened about July 1 and lasted for about four weeks. The following courses were offered in 1923:—

Poultry Husbandry
Fruit Growing
Flower Growing
Vegetable Gardening
Food Preservation
Beekeeping
Foods and Nutrition
Preparation and Serving of Meals
Garment Making
Dress Design and Construction
Millinery

House Furnishing
Home Management
Insect Life
Bird Life
Recreation
Dramatic Presentation
Design and Practical Arts
Rural Sociology
Hygiene and Sanitation
Agricultural Education

THE MASSACHUSETTS AGRICULTURAL COLLEGE

TEN WEEKS' WINTER SCHOOL

Application for Enrollment

I hereby make application for admission to the Ten Weeks' Winter Courses which are to begin Jan. 2, 1924. I am enclosing the registration fee of five dollars (\$5) in cash, check, or money order. (Designate which one.)

Name (Mr., Mrs., or Miss).....

Home address.....

Date of application.....

My choice of courses is as follows:—

- | | | |
|--------|--------|--------|
| 1..... | 3..... | 5..... |
| 2..... | 4..... | 6..... |

Kindly give us the names and addresses of two persons to whom we may refer for a statement of character.

- 1.....
- 2.....

Mail this blank, enclosing fee, to John Phelan, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass. Checks or money orders should be made payable to the Massachusetts Agricultural College.

