

UMASS/AMHERST




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The M. A. C. Bulletin

Amherst, Mass.

1911
1912
1913
1914

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v. 10

- Contents -

v. 10

- No. 1 Catalog of the Massachusetts Agricultural College 1917-1918.
- " 2 Fifty-fifth annual report of the Massachusetts Agricultural College 1918.
- " 3 Summer Schools 1918.
- " 4 The Massachusetts Agricultural College and the war.
- " 5 Agricultural education, the training of teachers for a new and attractive field.
- " 6 War service roll of the Massachusetts Agricultural College.
- " 7 Announcement of the two-year course in practical agriculture of the Massachusetts Agricultural College.
- " 8 The ten weeks' winter school 1918-1919.

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THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. X. No. 1.

January, 1918

Published Six Times a Year by the College.

Jan., Feb., Mar., May, Sept., Oct.

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No. 31

CATALOGUE

OF THE

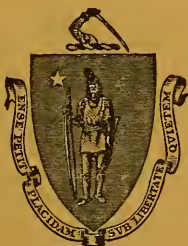
MASSACHUSETTS

AGRICULTURAL COLLEGE,

1917-1918.

FIFTY-FIFTH ANNUAL REPORT.

PART II.

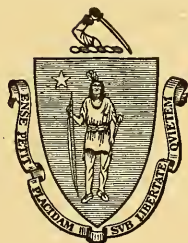


BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1918.

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.*

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST.

CATALOGUE, 1917-1918.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1918.

PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

The Commonwealth of Massachusetts.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Dec. 1, 1917.

To His Excellency SAMUEL W. McCALL.

SIR:— On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part II. of the fifty-fifth annual report of the trustees, this being the catalogue of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

THE MASSACHUSETTS
AGRICULTURAL COLLEGE.

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. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1917-18-19.

REGULAR COURSES.

1917.

October 10, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 28, Wednesday, 12.30 P.M.—Friday, November 30, 1.30 P.M.,	Thanksgiving recess.
December 15, Saturday, 12.30 P.M.,	Fall term ends.
December 17, Monday, 7.30 A.M.,	Winter term begins.
December 22, Saturday, 12.30 P.M.,	Christmas recess begins.
December 31, Monday, 1.30 P.M.,	Christmas recess ends.

1918.

February 23, Saturday, 12.30 P.M.,	Winter term ends.
February 25, Monday, 7.30 A.M.,	Spring term begins.
April 26, Friday, 5.30 P.M.,	Spring term ends.
April 26, 27, Friday, Saturday,	Commencement.
June 27-29, Thursday-Saturday,	Entrance examinations.
September 18-21, Wednesday-Saturday,	Entrance examinations.
September 25, ¹ Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 27, Wednesday, 12.30 P.M.—Friday, November 29, 1.30 P.M.,	Thanksgiving recess.
December 20, Friday, 5.30 P.M.,	Fall term closes.
December 30, Monday, 1.30 P.M.,	Winter term begins.

1919.

March 21, Friday, 5.30 P.M.,	Winter term ends.
March 31, Monday, 1.30 P.M.,	Spring term begins.
May 30, Friday,	Holiday—Memorial Day.
June 21-25, Saturday-Wednesday,	Commencement.
June 25, Wednesday,	Spring term closes.
June 26-28, Thursday-Saturday,	Entrance examinations.
September 17-20, Wednesday-Saturday,	Entrance examinations.
September 24, Wednesday, 1.30 P.M.,	Fall term begins; chapel.

¹ This is the calendar for a normal year; if any modification in the length of terms is made such will be announced in the autumn. The date of opening in 1918 will be as stated above.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the Federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the Federal station, and subsequently the whole was incorporated with the college.

COURSES. — 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 four-year¹ course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science, doctor of philosophy and master of agriculture. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations and circulating libraries.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is 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, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural col-

¹ Twenty-seven teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses permits a student to elect major work in 1 of 17 departments, specializing in that and allied subjects for a period of two years.

leges and high schools, for scientific experts in chemistry, entomology, botany and microbiology and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which a major course is offered.

LOCATION AND EQUIPMENT. — The agricultural college is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. In addition the college has a demonstration forest of 755 acres, located some 8 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

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 then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college, and was supported by the general government. 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 general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-half 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 and to a committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

ORGANIZATION OF 1918.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
DAVIS R. DEWEY of Cambridge,	1919
JOHN F. GANNON of Worcester,	1919
ARTHUR G. POLLARD of Lowell,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923
FRANK GERRETT of Greenfield,	1924
HAROLD L. FROST of Arlington,	1924
CHARLES H. PRESTON of Danvers,	1925
FRANK A. HOSMER of Amherst,	1925

MEMBERS EX OFFICIO.

His Excellency Governor SAMUEL W. MCCALL, *President of the Corporation.*
 KENYON L. BUTTERFIELD, *President of the College.*
 PAYSON SMITH, *State Commissioner of Education.*
 WILFRID WHEELER, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor SAMUEL W. MCCALL of Boston, *President.*
 CHARLES A. GLEASON of New Braintree, *Vice-President.*
 WILFRID WHEELER of Concord, *Secretary.*
 FRED C. KENNEY of Amherst, *Treasurer.*
 CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.¹

Committee on Finance.

CHARLES A. GLEASON, <i>Chairman.</i>	ARTHUR G. POLLARD.
GEORGE H. ELLIS.	FRANK A. HOSMER.
NATHANIEL I. BOWDITCH.	EDMUND MORTIMER.

Committee on Course of Study and Faculty.

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

Committee on Farm.

NATHANIEL I. BOWDITCH, <i>Chairman.</i>	GEORGE H. ELLIS.
FRANK GERRETT.	EDMUND MORTIMER.

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

Committee on Horticulture.

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

ELMER D. HOWE.
WILFRID WHEELER.

EDMUND MORTIMER.

Committee on Experiment Department.¹

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.

ARTHUR G. POLLARD.
HAROLD L. FROST.

EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

FRANK GERRETT, *Chairman.*
WILLIAM WHEELER.

CHARLES H. PRESTON.
GEORGE H. ELLIS.

JAMES F. BACON.

Committee on Extension Service.

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

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

Examining Committee of Overseers from the State Board of Agriculture.

JOHN BURSLEY of West Barnstable.
FRANK P. NEWKIRK of Easthampton.
WILLIAM E. PATRICK of Warren.
L. L. RICHARDSON of Leominster.
HOWARD A. PARSONS of Amherst.

¹ The director of the experiment station is a member of the committee on experiment department, without vote.

OFFICERS OF THE INSTITUTION.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held. Changes in personnel occurring after Nov. 30, 1917, are not indicated.]

THE FACULTY.

KENYON L. BUTTERFIELD, A.M., L.L.D.,	President's House.
President of the College and Head of Division of Rural Social Science.	
CHARLES H. FERNALD, Ph.D.,	3 Hallock Street.
Honorary Director of the Graduate School.	
EDWARD M. LEWIS, A.M.,	19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.	
FRED C. KENNEY,	Mount Pleasant.
Treasurer of the College.	
WILLIAM P. BROOKS, Ph.D.,	6 Farview Way.
Director of the Experiment Station and Lecturer on Soil Fertility.	
WILLIAM D. HURD, ¹ M.Agr.,	46 Amity Street.
Director of the Extension Service and Supervisor of Short Courses.	
CHARLES E. MARSHALL, Ph.D.,	44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.	
FRANK A. WAUGH, M.Sc.,	Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.	
JAMES A. FOORD, ² M.Sc.Agr.,	54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Management.	
ROBERT J. SPRAGUE, Ph.D.,	Mount Pleasant.
Head of Division of Humanities and Professor of Economics and Sociology.	
JOSEPH B. LINDSEY, Ph.D.,	47 Lincoln Avenue.
Goessmann Professor of Chemistry.	
CHARLES WELLINGTON, Ph.D.,	34 Amity Street.
Professor of Chemistry.	
JAMES B. PAIGE, B.Sc., D.V.S.,	42 Lincoln Avenue.
Professor of Veterinary Science.	
PHILIP B. HASBROUCK, B.Sc.,	Fearing Street.
Registrar of the College and Professor of Physics.	
JOHN E. OSTRANDER, A.M., C.E.,	33 North Prospect Street.
Professor of Mathematics and Civil Engineering.	
HENRY T. FERNALD, Ph.D.,	44 Amity Street.
Professor of Entomology, Chairman of Division of Science.	
A. VINCENT OSMUN, M.Sc.,	16 Northampton Road.
Professor of Botany.	
CLARENCE E. GORDON, Ph.D.,	38 Lincoln Avenue.
Professor of Zoölogy and Geology.	
WILLIAM R. HART, A.M., L.L.B.,	97 Pleasant Street.
Professor of Agricultural Education.	
FRED C. SEARS, M.Sc.,	Mount Pleasant.
Professor of Pomology.	
WILLIAM P. B. LOCKWOOD, M.Sc.,	34 North Prospect Street.
Professor of Dairying.	

¹ On leave of absence, service with United States Department of Agriculture.

² On leave of absence to Jan. 15, 1918.

ALEXANDER E. CANCE, Ph.D., Professor of Agricultural Economics.	9 Fearing Street.
JOSEPH S. CHAMBERLAIN, Ph.D., Professor of Organic and Agricultural Chemistry.	Mount Pleasant.
JOHN C. GRAHAM, B.Sc.Agr., Professor of Poultry Husbandry.	Lincoln Avenue.
G. CHESTER CRAMPTON, Ph.D., Professor of Insect Morphology.	The Davenport.
CHARLES A. PETERS, Ph.D., Professor of Inorganic and Soil Chemistry.	2 Sunset Avenue.
CURRY S. HICKS, B.Pd., Professor of Physical Education and Hygiene.	The Davenport.
WILLIAM D. CLARK, ¹ A.B., M.F., Professor of Forestry.	- -
ERNEST ANDERSON, ² Ph.D., Professor of General and Physical Chemistry.	- -
CHRISTIAN I. GUNNESS, B.Sc., Professor of Rural Engineering.	105 Butterfield Terrace.
HAROLD F. TOMPSON, B.Sc., Professor of Market Gardening.	10 Temple Street, Arlington.
JOHN PHELAN, A.M., Professor of Rural Sociology.	29 Northampton Road.
JOHN C. McNUTT, B.Sc.Agr., Professor of Animal Husbandry.	33 East Pleasant Street.
RICHARD H. WILSON, Colonel, U.S.A., Professor of Military Science and Tactics.	The Perry.
ROBERT W. NEAL, A.M., Associate Professor of English.	Kendrick Place.
EDGAR L. ASHLEY, A.M., Associate Professor of German.	24 Pleasant Street.
ALEXANDER A. MACKIMMIE, A.M., Associate Professor of French.	Pine Street, North Amherst.
BURTON N. GATES, Ph.D., Associate Professor of Beekeeping.	42 Lincoln Avenue.
GEORGE E. GAGE, Ph.D., Associate Professor of Animal Pathology.	27 Sunset Avenue.
WALTER W. CHENOWETH, A.B., M.Sc., Associate Professor of Pomology.	North Amherst.
HAROLD E. ROBBINS, B.Sc., A.M., Associate Professor of Physics.	4 Nutting Avenue.
PAUL J. ANDERSON, Ph.D., Associate Professor of Botany.	McClure Street.
ARTHUR B. BEAUMONT, B.Sc., Associate Professor of Agronomy.	103 Butterfield Terrace.
RALPH J. WATTS, B.Sc., Secretary of the College.	101 Butterfield Terrace.
CHARLES R. GREEN, B.Agr., Librarian of the College.	Mount Pleasant.
C. ROBERT DUNCAN, B.Sc., C.E., Assistant Professor of Mathematics.	23 Lincoln Avenue.
ARTHUR K. HARRISON, Assistant Professor of Landscape Gardening.	6 Allen Street.
WILLIAM L. MACHMER, ³ A.M., M.E., Assistant Professor of Mathematics.	3 Kendrick Place.
WALTER E. PRINCE, Ph.B., A.M., Assistant Professor of English.	4 Kendrick Place.
HAROLD M. GORE, ⁴ B.Sc., Assistant Professor of Physical Education.	- -

¹ On leave of absence, service with New England Fuel Administrator.

² On leave of absence.

³ On leave of absence, service with United States Department of Agriculture.

⁴ On leave of absence, war service.

ORTON L. CLARK, B.Sc.,	16 College Street.
Assistant Professor of Botany.	
LOYAL F. PAYNE, B.Sc.,	12 Chestnut Street.
Assistant Professor of Poultry Husbandry.	
LORIAN P. JEFFERSON, A.M.,	84 Pleasant Street.
Assistant Professor in the Division of Rural Social Science.	
EARL JONES, M.Sc.Agr.,	8 Allen Street.
Assistant Professor of Agronomy.	
CHARLES H. THOMPSON, M.Sc.,	Mount Pleasant.
Assistant Professor of Horticulture.	
ANDREW S. THOMSON, Ph.B., A.M.,	10½ Kellogg Avenue.
Assistant Professor of Market Gardening, and in charge of Short Courses.	
ORVILLE A. JAMISON, M.Sc.,	7 East Pleasant Street.
Assistant Professor of Dairying.	
ARAO ITANO, Ph.D.,	7 East Pleasant Street.
Assistant Professor of Microbiology.	
JOHN T. WHEELER, ¹ B.Sc.Agr.,	- -
Assistant Professor of Horticulture.	
CHARLES H. PATTERSON, A.B., A.M.,	26 Lincoln Avenue.
Assistant Professor of English.	
AUGUST G. HECHT, B.Sc.,	3 Mount Pleasant.
Assistant Professor of Floriculture.	
BYRON E. PONTIUS, B.Sc.Agr.,	5½ East Pleasant Street.
Assistant Professor of Animal Husbandry.	
FRANK W. RANE, M.F.,	Boston.
Lecturer in Forestry.	
HELENA T. GOESSMANN, M.Ph.,	13 Main Street.
Instructor in English.	
-----	- -
Instructor in French.	
ARTHUR N. JULIAN, A.B.,	4 Farview Way.
Instructor in German.	
FREDERICK A. McLAUGHLIN, B.Sc.,	15 Fearing Street.
Instructor in Botany.	
PAUL SEREX, JR., M.Sc.,	5 East Pleasant Street.
Instructor in Chemistry.	
FREDERICK G. MERKLE, M.Sc.,	East Street.
Instructor in Agronomy.	
STANLEY E. VANHORN,	20 Amity Street.
Instructor in Dairying.	
BURT A. HAZELTINE, ² B.Sc.,	- -
Instructor in Mathematics.	
WILLIAM S. REGAN, Ph.D.,	The Davenport.
Instructor in Entomology.	
FRANK P. RAND, A.M.,	North Amherst.
Instructor in English.	
WALTER M. PEACOCK, M.Sc.Agr.,	24 Pleasant Street.
Instructor in Farm Management.	
-----	- -
Instructor in Botany.	
HARRY D. DRAIN, B.Sc.Agr.,	24 Pleasant Street.
Instructor in Dairying.	
STANLEY C. BALL, Ph.D.,	45 Amity Street.
Instructor in Zoölogy.	
EGERTON G. HOOD, B.Sc.Agr.,	15 Spring Street.
Instructor in Microbiology.	
OTTO F. WILKINSON, B.Sc.,	7 Phillips Street.
Instructor in Agricultural Economics.	
CHARLES H. GOULD, ³ B.Sc.,	Kendrick Place.
Field Agent.	

¹ Resigned, to take effect Dec. 15, 1917.

² On leave of absence, war service.

³ On leave of absence, with Hampshire County Farm Bureau.

LLOYD L. STEWART, B.Sc.Agr., Instructor in Poultry Husbandry.	18 Nutting Avenue.
Assistant in Physics.	
JOSEPH NOVITSKI, Assistant in Rural Sociology.	30 Cottage Street.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

WILLIAM P. BROOKS, Ph.D., Director.	6 Farview Way.
JOSEPH B. LINDSEY, Ph.D., Vice-Director.	47 Lincoln Avenue.
FRED C. KENNEY, Treasurer.	Mount Pleasant.
CHARLES R. GREEN, B.Agr., Librarian.	Mount Pleasant.

DEPARTMENT OF AGRICULTURAL ECONOMICS.

ALEXANDER E. CANCE, Ph.D., In charge of Department.	9 Fearing Street.
SAMUEL H. DEVAULT, A.M., Assistant.	39 East Pleasant Street.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., Agriculturist.	6 Farview Way.
HENRY J. FRANKLIN, Ph.D., In charge of Cranberry Investigation.	Wareham.
EDWIN F. GASKILL, B.Sc., Assistant Agriculturist.	North Pleasant Street.
ROBERT L. COFFIN, Assistant.	19 Phillips Street.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

A. VINCENT OSMUN, M.Sc., Botanist.	16 Northampton Road.
GEORGE H. CHAPMAN, Ph.D., Research Physiologist.	Fearing Street.
PAUL J. ANDERSON, Ph.D., Associate Plant Pathologist.	McClure Street.
ORTON L. CLARK, B.Sc., Assistant Plant Physiologist.	16 College Street.
WEBSTER S. KROUT, M.A., Field Pathologist.	46 Pleasant Street.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., Entomologist.	44 Amity Street.
BURTON N. GATES, Ph.D., Apiarist.	42 Lincoln Avenue.
ARTHUR I. BOURNE, A.B., Assistant Entomologist.	12 East Pleasant Street.
STUART C. VINAL, M.Sc., Assistant in Entomology.	112 Pleasant Street.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., Chemist.	47 Lincoln Avenue.
EDWARD B. HOLLAND, Ph.D., Associate Chemist in charge of Research Division.	28 North Prospect Street.

FRED W. MORSE, M.Sc., Research Chemist.	40 Pleasant Street.
HENRI D. HASKINS, B.Sc., In charge of Fertilizer Division.	14 Amity Street.
PHILIP H. SMITH, M.Sc., In charge of Feed and Dairy Division.	102 Main Street.
LEWELL S. WALKER, B.Sc., Assistant.	19 Phillips Street.
CARLTON P. JONES, M.Sc., Assistant.	8 Nutting Avenue.
CARLOS L. BEALS, M.Sc., Assistant.	4 Kendrick Place.
JAMES P. BUCKLEY, B.Sc., Assistant.	29 Lincoln Avenue.
WINDOM A. ALLEN, ¹ B.Sc., Assistant.	- -
BERNARD L. PEABLES, B.Sc., Assistant.	4 Kendrick Place.
JOHN B. SMITH, ¹ B.Sc., Assistant.	- -
ROBERT S. SCULL, ¹ B.Sc., Assistant.	- -
JAMES T. HOWARD, Collector.	46 Pleasant Street.
HARRY L. ALLEN, Assistant.	89 Main Street.
JAMES R. ALCOCK, Assistant.	North Amherst.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., Horticulturist.	Campus.
FRED C. SEARS, M.Sc., Pomologist.	Mount Pleasant.
JACOB K. SHAW, Ph.D., Research Pomologist.	5 Farview Way.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., Meteorologist.	33 North Prospect Street.
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DEPARTMENT OF MICROBIOLOGY.

CHARLES E. MARSHALL, Ph.D., In charge of Department.	44 Sunset Avenue.
ARAO ITANO, Ph.D., Assistant Professor of Microbiology.	7 East Pleasant Street.

DEPARTMENT OF POULTRY HUSBANDRY.

JOHN C. GRAHAM, B.Sc.Agr., In charge of Department.	Lincoln Avenue.
HUBERT D. GOODALE, Ph.D., Research Biologist.	North Amherst.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., Veterinarian.	42 Lincoln Avenue.
GEORGE E. GAGE, Ph.D., Associate Professor of Animal Pathology.	27 Sunset Avenue.
JOHN B. LENTZ, ¹ V.M.D., Assistant in Veterinary Science.	- -
C. THEODORE BUCHHOLZ, ² V.M.D., Assistant in Veterinary Science.	- -

¹ On leave of absence; war service.² Resigned.

THE EXTENSION SERVICE STAFF.

WILLIAM D. HURD, ¹ M.Agr.,	46 Amity Street.
Director and Supervisor of Short Courses.	
AUSTIN D. KILHAM, B.Sc.Agr.,	12 Nutting Avenue.
Extension Assistant Professor of Pomology. Acting Director, 1917-18.	
SUMNER R. PARKER, B.Sc.,	51 Amity Street.
Extension Professor of Rural Organization and County Agent Leader.	
GEORGE L. FARLEY, M.Sc.,	31 Lincoln Avenue.
Supervisor of Junior Extension Work.	
EZRA L. MORGAN, A.M.,	2 Allen Street.
Extension Professor of Community Planning.	
LAURA COMSTOCK,	84 Pleasant Street.
Extension Professor of Home Economics and Leader of County Work for Women.	
ALFRED G. LUNN, B.Sc.,	North Amherst.
Extension Professor of Poultry Husbandry.	
E. FARNHAM DAMON, B.Sc.,	35 South Pleasant Street.
Extension Associate Professor of Agricultural Economics.	
WESLEY H. BRONSON, ² B.Sc.,	- - -
Extension Assistant Professor of Farm Demonstration.	
WILLIAM F. TURNER, B.Sc.,	37 Cottage Street.
Extension Assistant Professor of Animal Husbandry.	
FRANK A. C. SMITH, ³ B.Sc.,	The Davenport.
Extension Assistant Professor of Landscape Gardening.	
MARIE SAYLES, ¹ B.Sc.,	79 Pleasant Street.
Extension Assistant Professor of Home Economics.	
VICTOR A. RICE, B.Sc.Agr.,	24 Pleasant Street.
Extension Instructor in charge of Pig Club Work.	
L. WAYNE ARMY, B.Sc.,	7 Allen Street.
Supervisor of Correspondence Courses and Editor of Extension Service Publications.	
HELEN NORRIS,	16 Nutting Avenue.
Extension Instructor in Agricultural Education.	
BERNARD W. SHAPER, B.Sc.,	24 Pleasant Street.
Assistant to the Director.	
ROSSELL W. HENNINGER, ² B.Sc.,	- - -
Extension Instructor in charge of Poultry Club Work.	
ALBERT L. DEAN, ⁴	24 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.	
RALPH E. VAN METER, ⁴ B.Sc.Agr.,	24 Pleasant Street.
Extension Instructor in Pomology.	

THE CLERICAL STAFF.

ELBERT L. ARNOLD,	McClellan Street.
Chief Clerk, Extension Service.	
ELLA B. BALDWIN,	73 Pleasant Street.
Clerk, Extension Service.	
ELEANOR F. BISHOP,	3 Spaulding Street.
Bookkeeper, Treasurer's Office.	
EVELYN BREWSTER, B.Sc.,	16 Nutting Avenue.
Clerk, President's Office.	
JOHN K. BROADFOOT,	7½ East Pleasant Street.
Cashier, Treasurer's Office.	
LENA V. CHAPMAN,	77 South Pleasant Street.
Library Assistant.	
LUCIA G. CHURCH,	North Amherst.
First Clerk, Experiment Station.	

¹ On leave of absence; service with United States Department of Agriculture.² On leave of absence; war service.³ On leave of absence; war service from Jan. 1, 1918.⁴ Temporary appointment.

BERTHA E. CONNELLY,	Phillips Street.
Stenographer, Division of Rural Social Science.	
LALIA M. DAMON,	10 Nutting Avenue.
Cataloguer, Library.	
EMILY DAVIDSON,	7 Northampton Road.
Telephone Operator, Stockbridge Hall.	
LOUISE G. DAVIDSON, ¹	7 Northampton Road.
Telephone Operator, Stockbridge Hall.	
LLEWELYN L. DERBY, ²	81 Pleasant Street.
Assistant, Department of Physical Education.	
HAZEL A. DEWAR,	6 High Street.
Stenographer, Division of Agriculture.	
MARION F. DONDALE, A.B.,	101 Butterfield Terrace.
Clerk, Graduate School and Department of Microbiology.	
NOELLA DUVAL,	34 McClellan Street.
Clerk, Power Plant.	
MARGARET EVENS,	73 Pleasant Street.
Stenographer, Extension Service.	
F. ETHEL FELTON, A.B.,	7 Allen Street.
Clerk and Editorial Assistant, Experiment Station.	
LINA M. FISHER,	28 Pleasant Street.
Clerk, Department of Chemistry.	
GRACE E. GALLOND,	28 Pleasant Street.
Clerk, Department of Dairying.	
MARGARET T. GASKELL,	105 Main Street.
Stenographer, Offices of Dean and Registrar.	
LILLIAN M. GELINAS,	77 Pleasant Street.
Clerk, President's Office.	
CORA B. GROVER,	North Amherst.
Clerk, Extension Service.	
MARION G. GUERTIN, ¹	- - -
Stenographer, Department of Beekeeping.	
LILLIAN S. HADFIELD,	16 Nutting Avenue.
Clerk, Extension Service.	
LAURA M. HAGER, A.B.,	South Deerfield.
Clerk, Department of Agricultural Economics.	
MARY G. HANIFIN,	Northampton.
Clerk, Division of Agriculture.	
MARY E. HORTON,	79 Pleasant Street.
Clerk, Department of Rural Sociology.	
ALICE M. HOWARD,	North Amherst.
First Clerk, Experiment Station.	
MARION M. KELSEY,	Belchertown Road.
Clerk, Treasurer's Office.	
CLARENCE E. KENDALL,	Hadley.
Mailing Clerk, Extension Service.	
ETHEL L. KENNEDY,	8 Allen Street.
Clerk, Extension Service.	
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Stenographer, Department of Entomology.	
RACHAEL G. LESLIE,	Allen Street.
Clerk, Department of Poultry Husbandry.	
GRACE MACMULLEN, A.B.,	87 Pleasant Street.
Clerk, Department of Poultry Husbandry.	
IRENE A. MARTIN,	19 South East Street.
Stenographer, Treasurer's Office.	
REBECCA L. MELLOR,	10 Kellogg Avenue.
Clerk, Experiment Station.	
GLADYS I. MINER,	South Deerfield.
Clerk, Extension Service.	
ELISABETH E. MOONEY,	Northampton.
Clerk, Department of Poultry Husbandry.	

¹ Resigned.² On leave of absence; war service from Dec. 8, 1917.

MARION NORTON, A.B.,	87 Pleasant Street.
Library Assistant.	
BRIDIE E. O'DONNELL,	Hadley.
Clerk, Department of Entomology.	
HAZEL PARKER,	North Amherst.
Stenographer, Division of Horticulture.	
HELEN C. POMEROY,	North Amherst.
Clerk, Department of Floriculture.	
FRANCES POWERS,	44 Lincoln Avenue.
Stenographer, Department of Dairying.	
EDITH ROBINSON,	South Deerfield.
Clerk, Department of Beekeeping.	
MARY I. SHORES,	35 South Pleasant Street.
Clerk, Dean's Office.	
ELIZABETH STRACHAN,	17 High Street.
Clerk, Treasurer's Office.	
ETHELYN STREETER,	55 Amity Street.
Clerk, Division of Horticulture.	
FLORA E. TORREY,	21 North Prospect Street.
Clerk, Extension Service.	
ETHEL M. TURNER,	55 Pleasant Street.
Library Assistant.	
OLIVE M. TURNER, B.Sc.,	22 Spaulding Street.
Clerk, Registrar's Office.	
ELLEN L. WELCH, A.B.,	Hadley.
Clerk, Department of Botany.	
AURELIA B. WENTWORTH,	South Amherst.
First Clerk, Division of Agriculture.	
MAE HOLDEN WHEELER, B.Sc.,	7 Phillips Street.
Curator, Department of Botany.	

STAFF OF OPERATING AND MAINTENANCE.

JOHN J. BARBER,	Campus.
Farm Superintendent.	
THOMAS BUTTERWORTH,	3 Phillips Street.
Engineer.	
JOHN L. BYARD,	21 Pleasant Street.
Superintendent of the Apiary.	
LAWRENCE S. DICKINSON, B.Sc.,	2 Farview Way.
Superintendent of Grounds.	
CLARENCE A. JEWETT,	112 Pleasant Street.
Superintendent of Buildings.	
ORA L. KENNEDY,	Draper Hall.
Manager of the Dining Hall.	
JOHN J. LEE,	38 Cottage Street.
Assistant to the Military Detail.	
FLORENCE LEVENSALER,	Infirmary.
Resident Nurse.	
GEORGE F. PUSHEE,	Northampton.
Shop Assistant, Rural Engineering.	
JAMES WHITING,	16 Hallock Street.
Foreman, Department of Floriculture.	

GRADUATE ASSISTANTS.

HARRY A. CHEPLIN, ¹	- - -
Department of Microbiology.	
FRANK N. FAGAN, B.Sc.Agr.,	75 Pleasant Street.
Department of Pomology.	
THOMAS B. GORDON, B.Sc.Agr.,	24 Pleasant Street.
Department of Agronomy.	

¹ Resigned.

LOUISE HOMPE, A.B.,	9 Phillips Street.
Department of Microbiology.	
CONRAD H. LIEBER, B.Sc.,	- -
Department of Microbiology.	
RALPH L. MACNEIL, B.Sc.,	- -
Department of Chemistry.	
JAMES E. MARTIN, ¹	- -
Department of Microbiology.	
SATWAJI G. MUTKEKAR, M.Sc.,	Draper Hall.
Department of Microbiology.	
JAMES M. NEILL, B.Sc.,	15 Phillips Street.
Department of Microbiology.	
WILLIAM C. PAULEY, B.Sc.,	24 Pleasant Street.
Department of Landscape Gardening.	
JAMES A. PURINGTON, B.Sc.,	- -
Department of Agronomy.	
GEORGE B. RAY, B.Sc.,	3 Nutting Avenue.
Department of Microbiology.	
DONALD WHITE, A.B.,	24 Pleasant Street.
Department of Botany.	
CARRICK E. WILDON, B.Sc.,	66 Pleasant Street.
Department of Floriculture.	
ELWIN G. WOOD, ¹ B.Sc.,	- -
Department of Pomology.	

¹ Resigned.

STANDING COMMITTEES OF THE FACULTY.

1917-18.

CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Professor LOCKWOOD.
Secretary WATTS.

COMMENCEMENT.

Dean LEWIS.
Treasurer KENNEY.
Colonel WILSON.
Professor PETERS.
Associate Professor ROBBINS.
Secretary WATTS.
Assistant Professor HECHT.

COURSE OF STUDY.

President BUTTERFIELD.
Dean LEWIS.
Professor HART.
Professor WAUGH.
Professor FOORD.
Professor SPRAGUE.
Professor FERNALD.
Professor OSTRANDER.
Professor MARSHALL.
Professor CHAMBERLAIN.
Professor CANCE.
Associate Professor CHENOWETH.

DISCIPLINE (ADVISORY).

Dean LEWIS.
Registrar HASBROUCK.
Professor HICKS.
Professor PHELAN.
Professor GUNNESS.

EMPLOYMENT.

Professor SEARS.
Dean LEWIS.
Treasurer KENNEY.
Professor LOCKWOOD.
Professor McNUTT.
Secretary WATTS.

ENTRANCE EXAMINATIONS AND ADMISSION.

Registrar HASBROUCK.
 Dean LEWIS.
 Professor OSMUN.
 Associate Professor ASHLEY.
 Assistant Professor PATTERSON.
 Assistant Professor DUNCAN.
 Mr. RAND.

HEALTH AND SANITATION.

Professor MARSHALL.
 Treasurer KENNEY.
 Colonel WILSON.
 Professor HICKS.
 Miss COMSTOCK.

LIBRARY.

Professor MARSHALL.
 Professor SPRAGUE.
 Professor GUNNESS.
 Assistant Professor A. S. THOMSON.
 Mr. GREEN.

SCHEDULE.

Professor LOCKWOOD.
 Professor PETERS.
 Assistant Professor DUNCAN.

SCHOLARSHIP.

Dean LEWIS.
 Registrar HASBROUCK.
 Professor CHAMBERLAIN.
 Professor PHELAN.
 Associate Professor MACKIMMIE.
 Associate Professor ROBBINS.
 Assistant Professor PATTERSON.
 Mr. RAND.

STUDENT LIFE.

President BUTTERFIELD.
 Dean LEWIS.
 Treasurer KENNEY.
 Director HURD.
 Professor CHAMBERLAIN.
 Professor SPRAGUE.
 Professor HART.
 Professor CRAMPTON.
 Professor PHELAN.
 Professor LOCKWOOD.
 Professor GUNNESS.
 Professor HICKS.
 Associate Professor MACKIMMIE.
 Associate Professor ROBBINS.
 Secretary WATTS.
 Associate Professor PAUL J. ANDERSON.
 Assistant Professor HARRISON.
 Assistant Professor PATTERSON.
 Assistant Professor A. S. THOMSON.

UNCLASSIFIED STUDENTS.

Dean LEWIS.

Professor WAUGH.

Professor FOORD.

Registrar HASBROUCK.

Assistant Professor PATTERSON.

APPOINTED TO ATHLETIC BOARD.

Dean LEWIS.

Registrar HASBROUCK.

Professor OSMUN.

APPOINTED TO NON-ATHLETIC BOARD.

Professor LOCKWOOD.

Assistant Professor PATTERSON.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

All 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 good character. Such testimonials, 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 examination is desired. 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 at least three of the necessary fourteen 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 27-29, inclusive, 1918.—The examinations in June will follow this schedule:—

First Day.

7.45 A.M. Registration.
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. Required English.
11.00 A.M. Algebra.
2.00 P.M. History, required and elective.

Third Day.

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

Schedule for Entrance Examinations in September.—In September, 1918, the examinations will be given September 18-21, inclusive, and will follow the order indicated below:—

First Day.

1.00 P.M. Registration.
1.15-5.00 P.M. Greek A and B.

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. Required English.
11.00 A.M. Algebra, agriculture.
2.00 P.M. History, required and elective.

Fourth Day.

8.00 A.M. French, German, required and elective.
1.00 P.M. Latin A and B 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. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is prescribed and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

Agriculture, ¹	½ or 1 (or 3)*
Botany, ²	½ or 1
Chemistry, ²	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics, ²	1
Geology,	½
Physiography,	½
Physiology,	½
Zoölogy, ²	½
History² (Ancient; Medieval and Modern; English; General; United States and Civics), <i>any one,</i>	1½
English 1,	1½
English 2,	1½
Modern Language (elementary French or elementary German),	2
Elementary French, ⁵	2
Elementary German, ⁵	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A, ¹	2
Greek B, ¹	1
Latin A,	2
Latin B,	1
Commercial geography, ⁶	½
Drawing, ⁶	½
Manual training, ⁶	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, 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.

* This additional entrance credit in agriculture may be allowed in individual cases, if recommended and authorized by the Division of Agriculture of the college. Early application to the head of the division is advisable, and schools likely to present such candidates are urged to correspond with this officer at once, that the necessary investigation and inspection may be made in time.

¹ Examination in September only.

² Note-book required as part of preparation will be credited as part of the examination.

³ One must be offered for the required point; one, two or three others may be offered for elective points.

⁴ For each offered.

⁵ May be offered as elective if not offered to satisfy *prescribed* points.

⁶ On certificate only, no examination given.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. **The examination in agriculture will be given in September only.**

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 text-book 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 Steven's "Introduction to Botany" and Bergen and Davis's "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 such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements. The keeping of a note-book is required.

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 text-books, 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 text-books, 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 "Text-book 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 paper 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."

ZOOLOGY, PHYSIOGRAPHY, 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, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book 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 text-books, 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. — For 1916-19 inclusive: —

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(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 lines of the authors whose works he reads and with their place in literary history.

A. *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.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I. : —

Group I. Classics in Translation: The "Old Testament," comprising 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., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any one selection from Group I. a selection from any other group may be substituted.

Group II. Shakspeare: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo

and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"¹ "Macbeth;"¹ "Hamlet."¹

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one*; Jane Austen's novels, any *one*; Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one*; Thackeray's novels, any *one*; George Eliot's novels, any *one*; Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reader's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one*; Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay," selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years Before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;"

¹ If not chosen for study under B.

Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry," Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "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 Lost Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. 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: Shakspeare's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

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.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. (**The examination in Greek A and Greek B will be given in September only.**)

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (b) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (a) the translation of a passage or passages from the first six books of Homer's "Iliad," and (b) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. 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.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (a) the translation of a passage or passages selected from either Books I. to VI. of Virgil's "Æneid," or six orations of

Cicero, including those against Catiline; and (b) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV. †

COMMERCIAL GEOGRAPHY.¹—Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

DRAWING.¹—The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

MANUAL TRAINING.¹—An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

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.

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. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed.

¹ On certificate only; no examination given.

Not more than five and one-half credits from the elective group will be accepted. 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."

G. UNCLASSIFIED STUDENTS.

All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions:—

1. All unclassified students are subject to the supervision of a special committee.

2. No applicant under eighteen years of age will be admitted as an unclassified student.

3. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, or that they are graduates of a county agricultural school of Massachusetts, and furnish satisfactory testimonials as to moral character.

4. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

5. Each unclassified student must take from the regular technical elective courses, and necessary prerequisites, a minimum of twelve credit hours a week.

6. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

7. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 60 per cent. An unclassified student who passes in less than 60 per cent. of his work will be dropped from college.

8. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than six terms without the special permission of the faculty.

9. No unclassified student shall be allowed to participate in any intercollegiate contests.

10. Unclassified students are subject to the general regulations applying to classified students.

11. Every unclassified student should clearly understand that before any application for transfer to the regular registration for the Bachelor of Science degree will be considered by the registrar, he must present all entrance credits either by certificate or by examination in the same way as is required of a student who enters regularly.

H. 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, bee culture, 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 25 to 30 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 16 students.

COURSES OF INSTRUCTION.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

FIRST TERM.

All work required.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture,	Agronomy 1,	3
Tactics,	Military 1,	1
Drill,	Military 4,	2
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1
		22

College life (attendance without credit).

SECOND TERM.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture,	Agronomy 1, Animal Husbandry 1,	3
Tactics,	Military 2,	1
Drill,	Military 5,	1
Geology,	Geology 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1
		22

College life (attendance without credit).

FRESHMAN YEAR — *Concluded.*

THIRD TERM.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Agriculture,	Agronomy 1,	3
Solid geometry,	Mathematics 3,	3
Mensuration,	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Tactics,	Military 3,	1
Drill,	Military 6,	2
Recreation,	Physical Education 3,	1
Public speaking,	Public Speaking 1 (one-third of class),	1
		25

College life (attendance without credit).

SOPHOMORE YEAR.

FIRST TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Physics, <i>Required.</i>	25	3	1	4
Zoölogy,	25	2	2	4
Botany,	25	1	2	3
English,	25	2	-	2
Military,	25	1	-	1
Military,	28	-	2	2
Total required,	-	-	-	16
Chemistry, <i>Elective.</i>	25	1	2	3
French,	25 or 28	3	-	3
German,	25 or 28	3	-	3
Drawing,	25	-	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	-	2	2

SOPHOMORE YEAR — *Concluded.*

SECOND TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
<i>Required.</i>				
Physics,	26	2	1	3
Agricultural economics,	26	5	-	5
English,	26	2	-	2
Military,	26	1	-	1
Military,	29	-	2	1
	-	-	-	12
<i>Elective.</i>				
Chemistry,	26	1	2	3
French,	26 or 29	3	-	3
German,	26 or 29	3	-	3
Mathematics,	26	2	-	2
Drawing,	26	-	3	3
Entomology,	26	3	-	3
Animal husbandry,	26	1	2	3
Rural engineering,	26	-	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	-	5

THIRD TERM.

<i>Required.</i>				
Rural sociology,	27	3	-	3
Agronomy,	27	4	1	5
English,	27	2	-	2
Military,	27	1	-	2
Military,	30	-	2	2
Physical education, ¹	26	-	1	1
Total required,	-	-	-	15
<i>Elective.</i>				
Chemistry,	27	1	4	5
Chemistry,	30	3	2	5
French,	27 or 30	3	-	3
German,	27 or 30	3	-	3
Mathematics,	27	-	3	3
Drawing,	27	-	3	3
Entomology,	27	-	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3

¹ Credit for Physical Education 2 and 3 given in third term.

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, to be arranged by the student and an instructor called the 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 234 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, except that the minimum for the class of 1918 shall be 22 hours.

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 intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 45 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to 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 registrar's office three 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 college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by 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.

AGRICULTURE. (Major.)

Professor JAMES A. FOORD, *Adviser.*

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

Course.	Number.		Term.	Sophomore.		Junior.		Senior.	Credit.
		Credit.			Credit.		Credit.		
Agronomy,	50 I.	5	I.	Animal Husbandry 25, . . . 3	Agronomy 50, 5	Animal Husbandry 75, . . . 3			
Agronomy,	76 III.	5		Rural Engineering 25, . . . 2	Dairying 50, 5	Rural Engineering 75, . . . 5			
Animal Husbandry,	51 III.	3							
Animal Husbandry,	75 I.	3	II.	Mathematics 26, 2		Farm Management 75, . . . 3			
Animal Husbandry,	76 II.	3		Animal Husbandry 26, . . . 3		Animal Husbandry 76, . . . 3			
Dairying,	50 I.	5		Rural Engineering 26, . . . 2					
Farm Management,	75 II.	3	III.	Chemistry 30, 5	Microbiology 50, 5	Agronomy 76, 5			
Farm Management,	76 III.	5		Mathematics 27, 3	Animal Husbandry 51, . . . 3	Farm Management 76, . . . 5			
Microbiology,	50 I.	5		Horticulture 27, 3					
or									
Microbiology,	50 III.		IV.						
Rural Engineering,	75 I.	5							
		42							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, Mathematics 26 and 27, and Horticulture 27.

ADDITIONAL INFORMATION. — Dairying 75, Pomology 50 and 51, Rural Engineering 78, and Veterinary 51 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

AGRONOMY. (Major.)

Associate 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.			
Agronomy,	50 I.	5	I.	Chemistry 25,	3	Agronomy 50,	Agronomy 75,	3
Agronomy,	51 III.	5		German 25 or 28,	3	Chemistry 51,	Animal Husbandry 75,	5
Agronomy,	75 I.	5						
Agronomy,	77 II.	5	II.	Botany 26,	3	Chemistry 52,	Agronomy 77,	5
Animal Husbandry,	75 I.	3		Chemistry 26,	3			
Chemistry,	51 I.	8		German 26 or 29,	3			
				Mathematics 26,	2			
Chemistry,	52 II.	8	III.	German 27 or 30,	3	Agronomy 51,	Farm Management 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3			
				Geology 27,	5			
		44	IV.					

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 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 JOHN C. McNUTT, *Advisor.*

[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	Animal Husbandry 75,	3
Animal Husbandry,	51 III.	3				Veterinary 50, . . . . .	. 5		
Animal Husbandry,	50 II.	1				Dairying 50, . . . . .	. 5		
Animal Husbandry,	52 III.	3	II.	Animal Husbandry 26,	3	Animal Husbandry 50, . . . . .	. 1	Animal Husbandry 76,	3
Animal Husbandry,	75 I.	3						Animal Husbandry 78,	3
Animal Husbandry,	76 II.	3						Farm Management 75,	3
Animal Husbandry,	77 III.	3	III.	Chemistry 30,	5	Animal Husbandry 51, . . . . .	. 3	Animal Husbandry 80,	1
Animal Husbandry,	78 II.	3				Animal Husbandry 52, . . . . .	. 3	Animal Husbandry 77,	3
Animal Husbandry,	80 III.	1						Farm Management 76,	5
Dairying,	50 I.	5	IV.						
Farm Management,	75 II.	3							
Farm Management,	76 III.	5							
Veterinary,	50 I.	5							
		43							

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 WILLIAM P. B. LOCKWOOD, *Adviser.*

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

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	52 III.	3	I.	Animal Husbandry 25, . . . . .	. 3	Dairying 50, . . . . .	. 5	Animal Husbandry 75, . . . . .	. 3
Animal Husbandry,	75 I.	3		Rural Engineering 25, . . . . .	. 2	Microbiology 50, . . . . .	. 5	Microbiology 82, . . . . .	. 5
Animal Husbandry,	76 II.	3							
Dairying,	50 I.	5	II.	Animal Husbandry 26, . . . . .	. 3	Rural Engineering 77, . . . . .	. 5	Farm Management 75, . . . . .	. 3
Dairying,	51 III.	5		Rural Engineering 26, . . . . .	. 2	Microbiology 51, . . . . .	. 5	Animal Husbandry 76, . . . . .	. 3
Dairying,	75 II.	5				(Prerequisite to 82.)		Dairying 75, . . . . .	. 5
Dairying,	76 III.	5	III.	Chemistry 30, . . . . .	. 5	Animal Husbandry 52, . . . . .	. 3	Dairying 76, . . . . .	. 5
Farm Management,	75 II.	3				Dairying 51, . . . . .	. 5		
Microbiology,	50 I.	5							
Microbiology,	82 I.	5							
Rural Engineering,	77 II.	5	IV.						
		47							

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

POULTRY HUSBANDRY. (Major.)

Professor JOHN C. GRAHAM, *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,	75 I.	5	I.			Poultry 50,	3	Poultry 76,	5
Animal Husbandry,	51 III.	3				Poultry 51,	2	Poultry 77,	5
Poultry Husbandry,	50 I.	3				Agricultural Economics 75, 5	5	Pomology 50,	3
Poultry Husbandry,	51 I.	2	II.			Poultry 52,	3	Poultry 75,	5
Poultry Husbandry,	52 II.	3						Veterinary 86,	3
Poultry Husbandry,	53 III.	5							
Poultry Husbandry,	54 III	2	III.			Poultry 53,	5		
Poultry Husbandry,	75 II.	5				Poultry 54,	2		
Poultry Husbandry,	76 I.	5				Animal Husbandry 51,	5		
Poultry Husbandry,	77 I.	5	IV.						
Pomology,	50 I.	3							
Veterinary Science,	86 II.	3							
		44							

SOPHOMORE RECOMMENDATIONS. — Students intending to major in Poultry Husbandry are urged to take Zoology 27.
 ADVISED. — Juniors who did not take Zoology 27 as sophomores are strongly advised to include it in their program.

FLORICULTURE.

Assistant Professor AUGUST G. HECHT, *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.	2	I.	Drawing 25,	. . . . . 3	Floriculture 50,	. . . . . 4	Floriculture 75,	. . . . . 3
Botany,	51 II.	2				Floriculture 53,	. . . . . 3	Horticulture 50,	. . . . . 5
Entomology,	26 II.	3				Botany 50,	. . . . . 2		
Floriculture,	50 I.	4	II.	Drawing 26,	. . . . . 3	Floriculture 51,	. . . . . 4	Floriculture 77,	. . . . . 3
Floriculture,	51 II.	4		Entomology 26,	. . . . . 3	Floriculture 54,	. . . . . 3	Floriculture 76,	. . . . . 3
Floriculture,	52 III.	4		Botany 26,	. . . . . 3	Entomology 26,	. . . . . 5		
						Botany 51,	. . . . . 2		
Floriculture,	53 I.	3	III.	Drawing 27,	. . . . . 3	Floriculture 52,	. . . . . 4	Floriculture 80,	. . . . . 3
Floriculture,	54 II.	3		Entomology 27,	. . . . . 2	Floriculture 78,	. . . . . 3	Horticulture 51,	. . . . . 5
Floriculture,	75 I.	3		Horticulture 27,	. . . . . 3				
Floriculture,	76 II.	3							
Floriculture,	77 II.	3	IV.						
Floriculture,	78 III.	3							
Floriculture,	80 III.	3							
Horticulture,	50 I.	5							
Horticulture,	51 III.	5							
		50							

SOPHOMORE ELECTIVE PREREQUISITES. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors.

ADVISED. — The department advises all students who major in this subject to take Botany 78 and Landscape Gardening 75.

FORESTRY. (Major.)

Professor WILLIAM D. CLARK, *Advisor.*

[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,	3	Forestry 50,	3	Forestry 75,	5
Botany,	50 II.	2		Rural Engineering 25,	2	Landscape Gardening 50,	5		
Entomology,	75 III.	4				Horticulture 50,	5		
						Botany 50,	2		
Forestry,	50 I.	3	II.	Drawing 26,	3	Forestry 51,	3		
Forestry,	51 II.	3		Mathematics 26,	2	Botany 51,	2		
Forestry,	53 III.	3		Entomology 26,	3	Landscape Gardening 51,	4		
Forestry,	54 IV.	5		Botany 26,	3				
Forestry,	75 I.	5	III.	Drawing 27,	3	Forestry 53,	3	Forestry 78,	3
Forestry,	78 III.	3		Mathematics 27,	2	Horticulture 51,	5		
Horticulture,	50 I.	5		Entomology 27,	3	Entomology 75,	4		
				Horticulture 27,	3				
Horticulture,	51 III.	5	IV.			Landscape Gardening 53,	5		
Landscape Gardening,	50 I.	5				Forestry 54,	5		
Landscape Gardening,	51 II.	4							
		49							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

ADDITIONAL INFORMATION. — Substitutions according to individual needs may be made in conference with the adviser.

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.
Horticulture,	50 I.	5	I.	Drawing 25, . . . . .	. 3	Landscape Gardening 50, . . . . .	. 5	Landscape Gardening 75, . . . . .	. 3
Horticulture,	51 III.	5				Horticulture 50, . . . . .	. 5		
Landscape Gardening,	50 I.	5				Drawing 25, . . . . .	. 3		
Landscape Gardening,	51 II.	4	II.	Drawing 26, . . . . .	. 3	Landscape Gardening 51, . . . . .	. 4	Landscape Gardening 76, . . . . .	. 4
Landscape Gardening,	52 III.	5		Mathematics 26, . . . . .	. 2	Drawing 26, . . . . .	. 3		
Landscape Gardening,	53 IV.	5		Entomology 26, . . . . .	. 3				
Landscape Gardening,	75 I.	3	III.	Drawing 27, . . . . .	. 3	Landscape Gardening 52, . . . . .	. 5	Landscape Gardening 78	. 3
Landscape Gardening,	76 II.	4		Mathematics 27, . . . . .	. 3	Horticulture 51, . . . . .	. 5	or 79,	. 4
Landscape Gardening,	77 III.	4		Horticulture 27, . . . . .	. 3	Drawing 27, . . . . .	. 3	Landscape Gardening 77, . . . . .	. 4
Landscape Gardening,	78 III.	3	IV.			Landscape Gardening 78	. 3		
or						or 79,	. 3		
Landscape Gardening,	79 III.	3				Landscape Gardening 53, . . . . .	. 5		
		46							

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.	Credit.	Senior.	Credit.
					Credit.				
Agronomy,	75 I.	5	I.			Pomology 50,	3	Pomology 75,	3
Agronomy,	77 II.	5				Rural Engineering 76,	5	Pomology 77,	5
Rural Engineering,	76 I.	5						Pomology 80,	1
Farm Management,	75 II.	3						Agronomy 76,	5
Pomology,	50 I.	3	II.			Pomology 51,	3	Pomology 76,	3
						Farm Management 75,	3	Pomology 81,	1
								Agronomy 77,	5
Pomology,	51 II.	3	III.			Pomology 52,	3	Pomology 78,	3
Pomology,	52 III.	3			Horticulture 27,			Pomology 82,	1
Pomology,	75 I.	3							
Pomology,	76 II.	3	IV.			Pomology 53,	5		
Pomology,	77 I.	5							
Pomology,	78 III.	3							
Pomology,	80 I.	1							
Pomology,	81 II.	1							
Pomology,	82 III.	1							
		44							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Horticulture 27.

ADVISED. — Rural Engineering 26, Entomology 28 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, *Advisor.*

[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							
Botany,	75 I.	5	II.	Chemistry 26,	. . . 3	Botany 53,	. . . 3	Botany 76,	. . . 5
Botany,	76 II.	5		German 26 or 29,	. . . 3	Botany 56,	. . . 3	Botany 79,	. . . 5
Botany,	77 III.	5		Botany 26,	. . . 3			Botany 82,	. . . 3
Botany,	78 I.	5						Botany 87,	. . . 1
Botany,	79 II.	5							
Botany,	80 III.	5							
Botany,	82 II.	3	III.	German 27 or 30,	. . . 3	Botany 54,	. . . 3	Botany 77,	. . . 5
Botany,	83 III.	3						Botany 80,	. . . 5
Botany,	86 I.	1						Botany 83,	. . . 3
Botany,	87 II.	1						Botany 85,	. . . 3
Botany,	88 III.	1						Botany 88,	. . . 1
Chemistry,	51 I.	8							
		62							
			IV.						

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — German 25 or 28, 29 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.)

AGRICULTURAL CHEMISTRY. (Major.)

Professor CHARLES A. PETERS, *Adviser.*

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

Course.	N. number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 I.	8	I.	Chemistry 25,	3	Chemistry 51,	8	Chemistry 76,	5
Chemistry,	52 II.	8		German 25 or 28,	3	Chemistry 60,	3	Chemistry 80,	5
Chemistry,	60 I.	3							
Chemistry,	61 II.	3							
Chemistry,	62 III.	5							
Chemistry,	65 III.	5	II.	Chemistry 26,	3	Chemistry 52,	8	Chemistry 77,	3
Chemistry,	76 I.	5		German 26 or 29,	3	Chemistry 61,	3	Chemistry 90, 92, 94,	3 ²
Chemistry,	77 II.	3		Entomology 26, . .	3				
Chemistry,	80 I.	5							
Chemistry,	87 III.	3							
Chemistry,	90 II.	3 ¹							
Chemistry,	92 II.	}	III.	Chemistry 27,	5	Chemistry 62,	5	Chemistry 91, 93, 95,	5
Chemistry,	91 III.			German 27 or 30,	3	Chemistry 65,	5	Chemistry 87,	3
Chemistry,	93 II.			Entomology 27, . .	2				
Chemistry,	95 III.	5 ^{1,2}	IV.						

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

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

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

¹ Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits.

² To get the allowed 45 credits the student will select one of the following groups of courses: 90 and 91, or 92 and 93, or 94 and 95, together with the balance from courses shown above.

ECONOMIC ENTOMOLOGY. (Major.)
 PROFESSOR HENRY T. FERNALD, *Advertiser*.

[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.	2	I.	French 25-28, } or German 25-28, } Chemistry 25, . . . . .	. . . . . 3	Botany 50, . . . . .	. . . . . 2	Entomology 76, . . . . .	. . . . . 5	
Botany,	51 II.	3				Zoology 50, . . . . .		. . . . . 3			
Entomology,	50 I.	3				Entomology 50, 3			
Entomology,	51 II.	3											
Entomology,	52 III.	3											
Entomology,	75 III.	4	II.	French 26-29, } or German 26-29, } Entomology 26, 3	Zoology 51, 3		Entomology 77, 3		
Entomology,	76 I.	5				Entomology 51, 3	Zoology 76, 3	
Entomology,	77 II.	3				Botany 51, 2	Entomology 90, 3
Entomology,	78 III.	4	Chemistry 61, . . . . .	. . . . . 3								
Entomology,	90 II.	3	III.		French 27-30, } or German 27-30, } Entomology 27, 3	Zoology 52, 3	Entomology 78, 4	
Zoology,	50 I.	3						Chemistry 27, 2		Entomology 55, 3	Entomology 75, . . . . .	. . . . . 4
Zoology,	51 II.	3		Chemistry 27, 5							
Zoology,	52 III.	3											
Zoology,	54 II.	3	IV.										
		38											

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED).—Entomology 26 and 27, Botany 26.
 ADVISED.—French or German 25 or 28, 26 or 29, 27 or 30, Chemistry 25, 27 and 61.

ADDITIONAL INFORMATION.—The balance of the sophomore electives allowed are left for the student to choose. Juniors are advised to take Entomology 60. In 1916-17 Entomology 26 and 27 will be taken by juniors as part of their major. Beginning 1917-18 the regular junior courses 50, 51 and 52 will be in operation.

MICROBIOLOGY. (Major.)

Professor CHARLES E. MARSHALL, *Advisor.*

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

COURSE.	Number.	Credit.	Term.	Sophomore.		Junior.	Credit.	Senior.	Credit.			
					Credit.							
Chemistry,	51 I.	8	I.	Chemistry 25,	3	Microbiology 50,	. . . . .	5	Microbiology 81,	. . . . .	5	
Chemistry,	52 II.	8		German or French 25 or 25, 3	. . . . .	3	Microbiology 51,	. . . . .	5	Microbiology 82,	. . . . .	5
Microbiology, or	50 I.	5			Chemistry 51,	8				Microbiology 83,	. . . . .	5
Microbiology,	50 III.		II.	German or French 26 or 26, 3	3	Microbiology 51,	. . . . .	5	Microbiology 75,	. . . . .	5	
Microbiology,	51 I.	5			Chemistry 52,	8				Microbiology 80,	. . . . .	5
Microbiology,	51 II.	5								Dairying 75,	. . . . .	5
Microbiology,	51 III.		III.	Chemistry 27,	5	Microbiology 50,	. . . . .	5	Microbiology 76,	. . . . .	5	
Microbiology,	52 III.	5		German or French 27 or 30, 3	. . . . .	5	Microbiology 51,	. . . . .	5			
Microbiology,	81 I.			Physics 27,	5		Microbiology 52,	. . . . .	5			
Microbiology, or	82 I.	5	IV.									
Microbiology,	83 I.											
Microbiology,	80 II.											
Microbiology,	75 II.	5										
Dairying,	75 I.											
		41										

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. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 the preceding spring, and by those who are permitted to omit Microbiology 50.

RURAL JOURNALISM. (Major).
Associate Professor ROBERT W. NEAL, Adviser.

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

COURSE.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.		Credit.
					Credit.		Credit.		Credit.	
Rural Journalism,	50 I.	3	I.			Journalism 50, 3		Journalism 77, 3	. 3	
Rural Journalism,	51 II.	3				[Journalism 53, 3] Agricultural Economics 51, 5		Journalism 80, 4		. 5
Two out of three: —			II.		Economics and Sociology 26, 5	Journalism 51, 3		Journalism 77, 3	. 3	
[Rural Journalism,	53 I.	3					Journalism 54, 3			Journalism 81, 4
Rural Journalism,	54 II.	3					Economics and Sociology 51, 5			
Rural Journalism,	55 III.	3							. 5	
Two out of three: —			III.			Journalism 55, 3		[Journalism 77, 3]	. 3	
Rural Journalism,	77 I.	3						Journalism 82, 4		
Rural Journalism,	78 II.	3								. 5
Rural Journalism,	79 III.	3								
All: —										
Rural Journalism,	80 I.	4 (5)								
Rural Journalism,	81 II.	4 (5)								
Rural Journalism,	82 III.	4 (5)								
Agricultural Economics,	51 III.	5	IV.							
Economics and Sociology,	51 I.	5								
Courses to be individually prescribed for remainder of 48 hours.		5								
		45								

SOPHOMORE PREREQUISITES. — All sophomore English; Economics and Sociology 26. II.

SOPHOMORE RECOMMENDATIONS. — French or German 25 (28), 26 (29), 27 (30); Drawing 25. For agricultural journalism especially: Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

ADVISED. — French or German at least two years in college; at least two courses in literature; Music; Landscape 75, 78; Chemistry 87; Entomology 90; Microbiology 50; (Veterinary 78); Zoology 27; Geology 27; Agricultural Education 50, 53; Rural Sociology 50, 52; other courses in Economics and Sociology, Rural Sociology, Agricultural Economics, History and Government. Especially for agricultural journalism: Agronomy 50, 51; Animal Husbandry 51; Dairying 77; Farm Management 75, 76; Poultry 50; Rural Engineering 75, 76; Horticulture 27, 75; Forestry 52; Market Gardening 50; Pomology 50; Mathematics (75), 77; Veterinary 78; other courses in the economics and the sociology departments bearing on rural problems.

AGRICULTURAL ECONOMICS. (Major.)

Professor ALEXANDER E. CANCE, *Adviser.*

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

Course.	Number.		Term.	Sophomore.		Junior.	Senior.		Credit.
	50 I.	52 II.		Credit.	Credit.		57 I.	58 II.	
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,	53 III.	5							
Agricultural Economics,	78 III.	3							
Agricultural Economics,	76 II.	5	II.			Agricultural Economics 52, 5		Agricultural Economics 76, 5	
or									
Agricultural Economics,	77 I.	5				Rural Sociology 51, . . 3		Rural Sociology 78, . . 5	
Economic Sociology,	51 I.	5				Economic Sociology 50, . 5			
Economic Sociology,	50 II.	5	III.					Farm Management 76, . 5	
Farm Management,	76 III.	5				Rural Sociology 52, . . 3			
Rural Sociology,	51 II.	3				Agricultural Economics 53, 5		Agricultural Economics 78, 3	
or									
Rural Sociology,	52 III.	5	IV.						
Rural Sociology,	78 II.	5							
		46							

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

AGRICULTURAL EDUCATION. (Major.)
 Professor WILLIAM R. HART, *Advisor.*

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

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	Credit.
					Credit.		Credit.		
Agricultural Education,	50 I.	5	I.			Botany 50,		Agronomy 75,	5
Agricultural Education,	51 II.	5				Agricultural Education 50,		Poultry 50,	3
Agricultural Education,	52 I.					Agronomy 50,		Dairying 77,	5
Agricultural Education,	52 II.					Pomology 50,		Agricultural Education 52,	5
Agricultural Education,	52 III.	5							
Agricultural Education,	52 IV.								
Agricultural Education,	53 III.	5	II.			Botany 51,		Farm Management 75,	3
Agronomy,	50 I.	5						Agricultural Education, 51,	5
Agronomy,	75 I.	5						Agricultural Education, 52,	5
Botany,	50 I.	2	III.			Market Gardening 50,		Agricultural Education, 52,	5
Botany,	51 II.	2				Agricultural Education 53,			
Dairying,	77 I.	5							
Farm Management,	75 II.	3	IV.					Agricultural Education 52,	5
Market Gardening,	50 III.	3							
Pomology,	50 I.	3							
Poultry Husbandry,	50 I.	3							
		51							

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

Substitutions of other technical courses for some of those above mentioned may be made to meet the needs of individual students.

A selection is allowed of Poultry Husbandry 50 and Market Gardening 50, making 6 credits, or Agronomy 75, 5 credits, making the total credits 45 or 46.

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.	Credit.	Senior.	Credit.	
Agricultural Economics,	50 I.	5	I.		Agricultural Economics 50, 5	3	Rural Sociology 75,	3	
Agricultural Economics,	52 II.	5			Rural Sociology 50, .		5		Economics and Sociology 75, 5
Economics and Sociology,	51 II.	5			Economics and Sociology, .		5		
Economic Sociology,	76 III.	5	II.		Rural Sociology 51, .	3	Rural Sociology 77, .	3	
Rural Journalism,	55 III.	3			Agricultural Economics 52, 5		5		Rural Sociology 78, .	5
					Economic Sociology 51, .	5			
Rural Sociology,	50 I.	3	III.		Rural Journalism 55, .	3	Economic Sociology 76, .	5	
Rural Sociology,	52 III.	3			Rural Sociology 52, .		3		
Rural Sociology,	51 II.	3							
Rural Sociology,	77 II.	3	IV.						
Rural Sociology,	75 I.	3							
Agricultural Education,	52 II.	5							
or									
Rural Sociology,	78 II.	5							
		48							

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.]

AGRICULTURE AND HORTICULTURE. — Freshmen. This course continuing through the year constitutes the required elementary work dealing with the foundations of the subjects of live stock and the crops of the field, orchard and the garden. Several departments collaborate in giving the work; three credits each term are assigned to this course. For a description of the work, and for information as to distribution of credits, see the following:—

Agronomy 1, I., II., III.
Animal Husbandry 1, II.
Poultry Husbandry 1, I.
Horticulture 1, I., II., III.

Agronomy.

Associate Professor BEAUMONT, Assistant Professor JONES, Mr. MERKLE, Mr. PURINGTON, Mr. GORDON.

Required Course.

1. **I.** 2. **II.** 3. **III.** **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. | 2 2-hour laboratory periods. | Credit, 2. |
| 2. | 1 2-hour laboratory period. | Credit, 1. |
| 3. | 2 2-hour laboratory periods. | Credit, 2. |

Assistant Professor JONES and Mr. MERKLE.

Elective Courses.

29. **II.** **SOIL FERTILITY.** — For unclassified students. A study of soils and their properties, manure, fertilizers and soil amendments. The principles and factors of soil management are considered together with economical and practical means of improving and maintaining soil fertility.

3 class hours.

1 2-hour laboratory period, credit, 4.

Associate Professor BEAUMONT and the DEPARTMENT.

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 im-

portance in New England are briefly considered. The work includes lecture, laboratory and field study.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor JONES and the DEPARTMENT.

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.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor JONES and the DEPARTMENT.

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.

3 2-hour laboratory periods, credit, 5.

Associate Professor BEAUMONT and Mr. MERKLE.

Prerequisite, Agronomy 27.

76. **III. DRAINAGE AND IRRIGATION.** — For seniors; juniors may elect. A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers. Given in association with the department of Rural Engineering.

2 class hours.

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

Associate Professor BEAUMONT and Mr. MERKLE.

Prerequisites, Mathematics 26 and 27, Agronomy 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.

Associate Professor BEAUMONT and Mr. MERKLE.

Prerequisite, Agronomy 27.

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

3 class hours.

Assistant Professor JONES.

Prerequisite, Agronomy 51.

Animal Husbandry.

Professor McNUTT, Assistant Professor PONTIUS.

Required Course.

1. **II. ANIMAL HUSBANDRY.** — Freshmen. Given as part of the freshman agriculture and horticulture. This course acquaints the student with the foundations of the live-stock industry. In the lectures the types and market classes of farm animals, and their uses, are considered; in the laboratory period elementary judging practice familiarizes the student with animals of the various types.

1 class hour.

1 2-hour laboratory period, credit, 2.

Professor McNUTT.

Elective Courses.

25. **I. BREEDS AND TYPES OF LIVE STOCK.** — Sophomores. A course covering 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.

Assistant Professor PONTIUS.

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

2 lectures.

1 2-hour laboratory period, credit, 3.

Assistant Professor PONTIUS.

Prerequisite, Animal Husbandry 25.

50. **II. LIVE STOCK MANAGEMENT.** — For juniors; seniors may elect. The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

1 lecture.

2 2-hour laboratory period, credit, 3.

Professor McNUTT.

Prerequisites, Animal Husbandry 25 and 26.

51. **III. PRINCIPLES OF BREEDING.** — For juniors; seniors may elect. This course is designed to familiarize the student with the problems that are involved in animal improvement; to acquaint him 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. "Genetics," by Herbert E. Walter. Supplementary reading.

3 class hours.

Credit, 3.

Assistant Professor PONTIUS.

Prerequisite, Zoölogy 25.

52. **III. ADVANCED STOCK JUDGING.** — For juniors; seniors may elect. This course is designed to equip animal husbandry 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 will be 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 McNUTT.

Prerequisite, Animal Husbandry 50.

75. **I. FEEDING AND MANAGEMENT.** — For seniors; juniors may elect. 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 PONTIUS.

Prerequisite, Chemistry 30 or 51.

76. **II. FEEDING AND MANAGEMENT.** — For seniors; juniors may elect. A study of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Textbook, Henry's "Feeds and Feeding."
3 class hours.

Credit, 3.
Assistant Professor PONTIUS.

Prerequisite, Chemistry 30 or 51.

77. **III. FEEDING AND MANAGEMENT.** — For seniors; juniors may elect. A continuation of Courses 75 and 76, dealing in a similar manner with horses, sheep, beef cattle and swine.
3 class hours.

Credit, 3.
Assistant Professor PONTIUS.

Prerequisite, Animal Husbandry 75.

78. **II. HERD AND STUD-BOOK STUDY.** — For seniors; juniors may elect. An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.
1 class hour.

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

Prerequisite, Animal Husbandry 75.

80. **III. SEMINAR.** — For seniors majoring in animal husbandry only. Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis.

1 2-hour laboratory period, credit, 1.
Professor McNUTT.

Dairying.

Professor LOCKWOOD, Assistant Professor JAMISON, Mr. VAN HORN, Mr. DRAIN.

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 JAMISON and the DEPARTMENT.

51. **III. 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; problems; dairy machinery and care thereof.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Assistant Professor JAMISON and Mr. VAN HORN.

Prerequisite, Dairying 50.

75. **II. 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.

2 2-hour laboratory periods, credit, 5.

Professor LOCKWOOD and the DEPARTMENT.

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.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Mr. DRAIN.

Prerequisite, Dairying 75.

77. **I. DAIRYING.** — For seniors; juniors may elect. A general course designed primarily for students who wish to take only one course in dairying. The work given will cover 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.

Mr. DRAIN and the DEPARTMENT.

Farm Management.

Professor FOORD, Mr. PEACOCK.

Elective Courses.

75. **II. FARM 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.
Professor FOORD and Mr. PEACOCK.

76. **III. FARM MANAGEMENT.** — For seniors; juniors may elect. The student should have had considerable farm experience before taking this course. Discussion and study of farming as a business; size, diversity and production and their influence on the farmer's labor income; relation of live stock to profits; regions and types of farming; cropping systems; efficient arrangement of fields and buildings; efficient use of labor, horses and machinery; marketing; methods of renting land; ways of starting farming; proper diversion of capital invested in land, buildings, stock, machinery and supplies; choosing and buying a farm, and organization and management of specific farms in the State.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Professor FOORD and Mr. PEACOCK.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26.

Poultry Husbandry.

Professor GRAHAM, Dr. GOODALE, Assistant Professor PAYNE, Mr. STEWART.

Required Course.

1. **I. POULTRY HUSBANDRY.** — Freshmen. Given as part of the freshman agriculture and horticulture. The object of this course is to familiarize the student in a general way with the fundamental principles of poultry husbandry, — types of poultry houses, appliances, feeds and market products.

1 2-hour laboratory period, credit, 1.
Mr. STEWART.

Elective Courses.

50. **I. ELEMENTS OF POULTRY CULTURE.** — For juniors; seniors may elect. This course consists of a comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours.

Credit, 3.

Professor GRAHAM, Assistant Professor PAYNE and Mr. STEWART.

51. **I. POULTRY PRACTICE WORK.** — For juniors; seniors may elect. This is a practical laboratory course providing a study of external parasites, insecticides, poultry carpentry, caponizing, killing and picking; dressing and packing poultry.

2 2-hour laboratory periods, credit, 2.
Assistant Professor PAYNE.

Prerequisite, must be accompanied by Poultry 50.

52. **II. ELEMENTS OF POULTRY CULTURE.** — For juniors; seniors may elect. This course treats the subjects of incubation, brooding, care of growing stock, breeding for egg-production and diseases of poultry.

3 class hours.

Credit, 3.

Assistant Professor PAYNE and Mr. STEWART.

Prerequisite, Poultry 50.

53. **III. INCUBATION AND BROODING.** — For juniors; seniors may elect. In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Assistant Professor PAYNE.

Prerequisite, Poultry 52.

54. **III. PEN MANAGEMENT.** — For juniors; seniors may elect. This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.

1 2-hour laboratory period, credit, 1.

Assistant Professor PAYNE and Mr. COCKELL.

Prerequisite, Poultry 50.

55. **I., II. and III. INVESTIGATIONAL WORK.** — Seniors. This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.

1 to 5 2-hour laboratory periods, credits, 1 to 5.

Dr. GOODALE.

75. **II. POULTRY MANAGEMENT.** — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. A few good poultry plants will be visited by the class for practical demonstrations.

5 class hours.

Credit, 5.

Professor GRAHAM.

Prerequisites, Poultry 53, 54, 76 and 77.

76. **I. ADVANCED POULTRY JUDGING.** — Seniors. This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The laboratory work covers score card and comparative judging of exhibition and utility poultry; conditioning show birds, and applying the latest methods of selecting high and low producing hens. A few of the best Connecticut Valley poultry shows will be visited by the class. The American Standard of Perfection will be used as a text.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Mr. STEWART.

Prerequisite, Poultry 53.

77. **I. MARKET POULTRY AND POULTRY PRODUCTS.** — Seniors. This course includes the study of market classifications of poultry, eggs and feathers,

the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Preserving eggs, judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor PAYNE.

Prerequisites, Poultry 50, 51 and 52.

Rural Engineering.

Professor GUNNESS.

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.

RURAL ENGINEERING DEPARTMENT.

26. **II. REPAIR OF FARM EQUIPMENT.** — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering. Practice in the use of machinists' tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.

RURAL ENGINEERING DEPARTMENT.

75. **I. FARM STRUCTURES.** — For seniors; juniors may elect. Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

76. **I. FARM MECHANICS.** — For seniors; juniors may elect. A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 76 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses 75 and 78.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

77. **II. POWER MACHINERY.** — For seniors; juniors may elect. Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbiting and fitting bearings, lacing belts and packing valves. Course 77 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

78. 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. Special attention will be given to the use of power on the small farm. Practice in the adjustment of the various machines, babbitting and fitting bearings, lining shafts and pulleys, lacing belts, and splicing rope.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

DIVISION OF HORTICULTURE.

Professor WAUGH, Assistant Professor THOMPSON, Assistant Professor WHEELER.

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

Required Course.

1. **I.** 2. **II.** 3. **III.** HORTICULTURE. — Freshmen. Given as part of the freshman agriculture and horticulture.

Assistant Professor WHEELER.

Elective Courses (General).

27. **III.** NURSERY PRACTICE. — For sophomores; juniors and seniors may elect. This course treats of the fundamental methods of plant propagation 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. This course 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.

75. **I.** PLANT BREEDING. — For seniors and graduate students. [Not given in 1917-18.] This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Prerequisite, open only to students well prepared in agricultural or horticultural subjects.

Floriculture.

Assistant Professor HECHT, Mr. WILDON.

Elective Courses.

50. **I. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed and cuttings. They will also be expected to arrange their hours according to the needs of the work.

2 class hours.

1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Horticulture 27.

51. **II. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. Continuation of Course 50.

2 class hours.

1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Floriculture 50.

52. **III. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. A continuation of Courses 50 and 51.

2 class hours.

1 4-hour laboratory period, credit, 4.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Floriculture 51.

53. **I. GREENHOUSE CONSTRUCTION.** — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, should be taken with Floriculture 50.

54. **II. GREENHOUSE CONSTRUCTION.** — For juniors; seniors may elect. A continuation of Course 53.

2 class hours.

1 2-hour laboratory period.

Assistant Professor HECHT.

Prerequisite, Floriculture 53.

75. **I. COMMERCIAL FLORICULTURE.** — Seniors. A detailed study will be made of the methods of culture for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT.

Prerequisite, Floriculture 52.

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

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT.

Prerequisites, Floriculture 75 and 80.

77. **II. CONSERVATORY WORK AND DECORATIVE PLANTS.** — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT.

Prerequisite, Floriculture 75.

78. **III. GARDEN FLOWERS AND BEDDING PLANTS.** — Juniors and seniors. This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT and Mr. WILDON.

79. **III. SEMINAR.** — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work will be assigned a specific problem, and will pursue study in these problems by reading and research. No regular lectures will be given, but seminars will be conducted each week. A satisfactory report of the results must be presented.

2 to 6 laboratory hours.

Not to exceed 3 credits.

Assistant Professor HECHT.

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

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor HECHT and Mr. WILDON.

Prerequisite, Floriculture 75.

Forestry.

Professor CLARK.

Elective Courses.

50. **I. DENDROLOGY.** — For juniors; seniors may elect. During the first part of the term frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Lectures, recitations, laboratories or field work at option of instructor.

3 2-hour laboratory periods, credit, 3.

Professor CLARK.

51. **II. WOOD TECHNOLOGY.** — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identifica-

tion, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour.

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

52. **III. PRINCIPLES OF FORESTRY.** — For juniors; seniors may elect. A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours.

Credit, 2.

Professor CLARK.

53. **III. SILVICULTURE.** — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour.

1 4-hour laboratory period, credit, 3.
Professor CLARK.

Prerequisite, Forestry 50.

54. **IV. ARBORICULTURE.** — For juniors; seniors may elect. A course dealing with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.

Professor CLARK.

75. **I. FOREST MENSURATION.** — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours.

72 hours' field work, credit, 5.

Professor CLARK.

78. **III. SEMINAR — REPORT.** — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark.

6 laboratory hours, credit, 3.

Professor CLARK.

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

Elective Courses.

50. **I. ELEMENTS OF LANDSCAPE GARDENING.** — 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.

Professor WAUGH.

Prerequisites, Mathematics 25 and 26, 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. Must be followed by Course 53.

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.

53. **IV. (Summer.) GENERAL DESIGN.**—Juniors. As stated under Course 52.

120 laboratory hours, credit, 5.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 52.

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. **II. 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 53.

77. **III. CIVIC ART.**—Seniors. As stated under Course 76.

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

Prerequisite, Landscape Gardening 76.

78. **III. ARCHITECTURE.**—Alternating with Course 79; given in 1916-17. 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. **III. CONSTRUCTION AND MAINTENANCE.**—Alternating with Course 78; given in 1917-18. 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.

Market Gardening.

Professor TOMPSON, Assistant Professor THOMSON.

Elective Courses.

50. **III. ELEMENTS OF MARKET GARDENING.** — Juniors; seniors may elect. A study of the business of commercial vegetable growing to acquaint the student with the fundamental considerations of the business and a knowledge of the market-garden crops. The study of the crops will consist of classroom, laboratory and field work, dealing with propagation, cultivation and marketing. Text and reference books.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor THOMSON.

75. **I. ELEMENTS OF MARKET GARDENING.** — Seniors. A continuation of Market Gardening 50. A systematic study of types, varieties and strains of the leading vegetable crops, as well as a study of the problems of farm planning, irrigation, crop rotation, spraying, storage and methods of marketing and seed production. Text and reference books. Occasional seminars. Laboratory and field work.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor THOMSON.

Prerequisite, Market Gardening 50.

76. **II. GREENHOUSE VEGETABLE GROWING.** — Seniors. A study of the production of vegetables under glass as a business, briefly considering economic reasons for its development, progress in methods and management and the present status of the industry. A study of vegetable-forcing house construction, heating and greenhouse management, as applied to the leading greenhouse crops, lettuce, cucumbers and tomatoes, with proportionate time given to the crops of lesser importance. Text and reference books and periodicals. Greenhouse work in actual production and management is a part of this course, and the student must so arrange that he can give it adequate attention. Considerable seminar work.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor THOMSON.

Prerequisite, Market Gardening 75.

Pomology.

Professor SEARS, Associate Professor CHENOWETH, Mr. FAGAN.

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. 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.

53. **IV. (Summer.) SMALL FRUITS.** — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.

120 laboratory hours, credit, 5.

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

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

Prerequisite, Pomology 52.

76. **II. SYSTEMATIC POMOLOGY.** — Seniors. As stated under Course 75.

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

Prerequisite, Pomology 75.

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, manufacturing, etc. 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, together with the manufacture of by-products.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor CHENOWETH.

Prerequisite, Pomology 52.

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.
Professor SEARS.

Prerequisite, Pomology 52.

79. **III. GENERAL POMOLOGY.** — For seniors; juniors may elect. This course is planned to meet the needs of those students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. The work will consist 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.

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

Credit, 1.

Professor SEARS and Associate Professor CHENOWETH.

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

Credit, 1.

Professor SEARS and Associate Professor CHENOWETH.

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

Credit, 1.

Professor SEARS and Associate Professor CHENOWETH.

Drawing.

Mr. PAULEY.

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.
Mr. PAULEY.

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.
Mr. PAULEY.

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

3 2-hour laboratory periods, credit, 3.
Mr. PAULEY.

Prerequisite, Drawing 26.

DIVISION OF SCIENCE.

Botany.

Professor OSMUN, Associate Professor ANDERSON, Assistant Professor CLARK, Mr. McLAUGHLIN,
Mr. WHITE.

[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.]

Required Courses.

3. **III.** MORPHOLOGY AND TAXONOMY OF THE HIGHER PLANTS (PHANEROGAMIA). — Freshmen. Seeds and seedlings; types of leaves, stems, roots and flowers. Determination and naming of plants, using Gray's "New Manual of Botany." An herbarium of 75 species of plants is required of each student.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor OSMUN, Mr. McLAUGHLIN and Mr. WHITE.

25. **I.** ANATOMY, PHYSIOLOGY AND ECOLOGY OF THE HIGHER PLANTS. — Sophomores. Structure, functions, metabolism and environmental relations of seed plants.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor OSMUN, Mr. McLAUGHLIN and Mr. WHITE.

Prerequisite, Botany 3.

Elective Courses.

26. **II.** MORPHOLOGY AND TAXONOMY OF THE LOWER PLANTS (CRYPTOGAMIA). — Sophomores. Systematic study of typical forms of bacteria, algae, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are prerequisites of all subsequent work taken in the Department of Botany.)

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor OSMUN, Mr. McLAUGHLIN and Mr. WHITE.

Prerequisite, Botany 25.

50. **I.** DISEASES OF CROPS. — For juniors; seniors may elect. Laboratory and recitations devoted to diseases of the special crops related to the student's major. Arranged in sections for students specializing in (1) agronomy or market gardening; (2) floriculture or landscape gardening; (3) pomology; (4) general; (5) forestry. Students may take the laboratory work in one, two or three sections. The laboratory work for students in entomology is general, and includes the more important diseases studied in the other sections. The class is not sectioned for lectures, which are general.

1 class hour.

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

Associate Professor ANDERSON and Mr. McLAUGHLIN.

Prerequisite, Botany 26.

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.

Associate Professor ANDERSON and Mr. 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.

Associate Professor ANDERSON.

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.

Associate Professor ANDERSON.

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.

Associate Professor ANDERSON.

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.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor OSMUN and Mr. McLAUGHLIN.

Prerequisite, Botany 26.

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

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor OSMUN and Mr. McLAUGHLIN.

Prerequisite, Botany 55.

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.

Professor OSMUN and Associate Professor ANDERSON.

Prerequisite, Botany 54.

76. **II. PLANT PATHOLOGY.** — Seniors. As stated under Course 75.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professor OSMUN and Associate Professor ANDERSON.

Prerequisite, Botany 75.

77. **III. PLANT PATHOLOGY.** — Seniors. As stated under Course 75.
 1 class hour. 4 2-hour laboratory periods, credit, 5.
 Professor OSMUN and Associate Professor ANDERSON.
 Prerequisite, Botany 76.
78. **I. PLANT PHYSIOLOGY.** — Seniors. A general course dealing with such topics as absorption, nutrition, growth and movements of plants; training in laboratory methods and the use of apparatus; collateral reading.
 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.
 1 class hour. 2 2-hour laboratory periods, credit, 3.
 Mr. McLAUGHLIN.
 Prerequisites, Botany 26 and 55.
83. **III. CYTOLOGY AND EMBRYOLOGY.** — Seniors. As stated under Course 82.
 1 class hour. 2 2-hour laboratory periods, credit, 3.
 Mr. McLAUGHLIN.
 Prerequisite, Botany 82.
86. **I. SEMINAR.** — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
 1 class hour. Credit, 1.
 The DEPARTMENT.
87. **II. SEMINAR.** — For seniors and graduate students. As stated under Course 86.
 1 class hour. Credit, 1.
 The DEPARTMENT.
88. **III. SEMINAR.** — For seniors and graduate students. As stated under Course 86.
 1 class hour or 2 laboratory hours. Credit, 1.
 The DEPARTMENT.

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS, Professor ANDERSON,¹ Mr. SEREX, Mr. MACNEIL.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and intending to follow chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take especially graduate work leading to the degree of Master of Science, and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

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

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor PETERS, Mr. SEREX and Mr. JULIAN.

2. **II. GENERAL CHEMISTRY.** — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor PETERS and Assistants.

3. **III. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. As stated under Course 5 **II**.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor PETERS and Assistants.

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, credit, 3.

Professor PETERS and Assistants.

Prerequisite, Entrance Chemistry.

5. **II. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungi-

¹ On leave 1917-19.

cides and insecticides. The laboratory work is divided into three parts, as follows: (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, credit, 3.

Professor CHAMBERLAIN and Assistants.

6. **III. ORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. The course 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 will be 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.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor CHAMBERLAIN and Assistants.

Elective Courses.

7. **I. ELEMENTARY AGRICULTURAL CHEMISTRY.** — Unclassified. This is a special course for unclassified students endeavoring to give in one term the essential facts and ideas of general chemistry and the chemistry of soils and fertilizers so that the student may be able to take up similar special courses in agronomy. The course will consist of a brief study of important elements and compounds, followed by a special study of the chemistry of soils and fertilizers. Textbook, Tottinham & Ince, "Chemistry of the Farm and Home." This will be supplemented by laboratory notes.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor CHAMBERLAIN.

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

1 class hour.

2 2-hour laboratory periods, credit, 3.

Mr. SEREX.

Prerequisite, Chemistry 3 or 6.

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

1 class hour.

2 2-hour laboratory periods, credit, 3.

Mr. SEREX.

27. **III. QUANTITATIVE ANALYSIS.** — For sophomores; juniors and seniors may elect. Instruction in this course includes the gravimetric and volu-

metric 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.

Professor WELLINGTON and Professor PETERS.

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

30. **III. ORGANIC AGRICULTURAL CHEMISTRY.**—For sophomores; juniors and seniors may elect. As stated in Course 6.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor CHAMBERLAIN.

51. **I. ORGANIC CHEMISTRY.**—For juniors; seniors may elect. This course 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 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II. ORGANIC CHEMISTRY.**—For juniors; seniors may elect. As stated under Course 51.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

60. **I. ADVANCED QUANTITATIVE CHEMISTRY.**—For juniors; seniors may elect. Advanced work on subjects as stated under Course 27.

1 class hour.

1 4-hour laboratory period, credit, 3.

Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 27.

61. **II. INSECTICIDE ANALYSIS.**—For juniors; seniors may elect. A study of methods for the analysis of insecticides.

1 class hour.

1 4-hour laboratory period, credit, 3.

Professor WELLINGTON and Professor PETERS.

Prerequisite, Chemistry 27.

62. **III. SOIL AND FERTILIZER ANALYSES.**—For juniors; seniors may elect. A study of methods for analyses of soils and fertilizers.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professor WELLINGTON and Professor 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. 2 2-hour laboratory periods, credit, 5.

Mr. SEREX.

Prerequisite, Chemistry 27.

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

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. A study of methods of analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.

1 class hour. 1 4-hour laboratory period, credit, 3.

Professor PETERS.

Prerequisite, Chemistry 27.

80. **I. PHYSIOLOGICAL CHEMISTRY.** — Seniors. This course is intended to be 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 will give 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.

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.

90. **II. 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.

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

Professor PETERS.

91. **III.** SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.
Professor PETERS.

Prerequisite, Chemistry 90.

92. **II.** SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — Seniors. In this course, as in Courses 90 to 95, the student will be able to 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, 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 will select one line of work and follow it through the course, repeating some of the original work.

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

Prerequisite, Chemistry 65.

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

10 laboratory hours, credit, 5.
Mr. SEREX.

Prerequisite, Chemistry 94.

Entomology.

Professor FERNALD, Professor CRAMPTON, Associate Professor GATES, Dr. REGAN.

Elective Courses.

26. **II.** 27. **III.** GENERAL AND ECONOMIC ENTOMOLOGY. — For sophomores; juniors and seniors may elect. This is a general course in the study of insects intended for students in any line of work, and is directly continuous through two terms. It touches 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. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects.

Credit, 3.
Professor FERNALD.

27. **III. GENERAL AND ECONOMIC ENTOMOLOGY.** — As stated under Course 26. **II.**

2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.
Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

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 majoring 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 and man. This work may be continued in the winter term also. (See 51, **II.**)

51. **II. PESTS OF SPECIAL CROPS.** — As stated in 50, **I.**

53. **I. INSECT MORPHOLOGY.** — For juniors; seniors may elect. For students majoring in entomology. The lectures of this course 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. 1 2-hour laboratory period, credit, 3.
Professor CRAMPTON, Professor FERNALD and Dr. REGAN.

Prerequisites, Entomology 26 and 27.

54. **II. INSECT CLASSIFICATION.** — For juniors; seniors may elect. For students 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.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

Prerequisite, Entomology 53, **I.**

55. **III. ECONOMIC ENTOMOLOGY.** — For juniors; seniors may elect. Special studies on the most serious insect pests, their habits, nature of the injuries they cause and methods of control. In the lectures the composition, preparation and methods of application of the more important insecticides, their merits and defects, and studies of insecticide apparatus and other methods of control are treated. A portion of the laboratory time will be used in practical work on the topics taken up in the lectures.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

Prerequisite, Entomology 51.

60. **III. BEEKEEPING.** — Juniors; seniors may elect. 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 lecture hours.

2 2-hour laboratory periods, credit, 5.

Associate Professor GATES.

75. **III. FOREST AND SHADE-TREE INSECTS.** — For seniors; juniors may elect. A study of the insects injurious to forest and shade trees, and of methods for their control, with laboratory and field work on these insects, together with investigation of what is known about them.

1 class hour.

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

Dr. REGAN.

Prerequisites, Entomology 26 and 27; 53, I., desirable.

76. **I. ADVANCED ENTOMOLOGY.** — For seniors. During this year studies of scale insects (coccidology), life histories of important pests, the preparation of bibliographies, methods of rearing, photography of insects, methods for experimental work and record keeping, and studies of the early stages of insects will be given. Insects as disease carriers, insect bionomics, and a study of the animals not insects with which entomologists are expected to deal, will also be included in this course.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

Prerequisite, Entomology 55.

77. **II. ADVANCED ENTOMOLOGY.** — As stated in Course 76, I.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

Prerequisite, Entomology 76.

78. **III. ADVANCED ENTOMOLOGY.** — As stated in Course 76, I.

1 class hour.

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

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

Prerequisite, Entomology 77.

80. **III. ADVANCED BEEKEEPING.** — Seniors; juniors may elect. This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management, including the principles of queen rearing, is practiced. The course should further qualify for apicultural instruction and inspection service, affording familiarity with the special literature and methods needed in investigation and research. The policy of individual instruction is continued in so far as practicable.

2 lecture hours.

1 2-hour laboratory period, credit, 3.

Associate Professor GATES.

Prerequisite, Course 60.

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. The lectures are supplemented by collateral reading, and monthly seminars will be held for the purpose of demonstration and discussion by the class.

3 class hours.

Credit, 3.

Professor CRAMPTON.

Mathematics and Civil Engineering.

Professor OSTRANDER, Assistant Professor DUNCAN, Assistant Professor MACHMER,¹
Mr. HAZELTINE.¹

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. Fite's "College Algebra."

5 class hours.

Credit, 5.

The DEPARTMENT.

2. **II. HIGHER ALGEBRA.** — As stated under Course 1.

2 class hours.

Credit, 2.

The DEPARTMENT.

¹ Absent on leave.

3. **III. 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.

3 class hours.

Credit, 3.

The DEPARTMENT.

5. **II. PLANE TRIGONOMETRY** (in charge of Department of Physics). — 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.

Credit, 3.

Professor HASBROUCK and Assistant Professor ROBBINS.

6. **III. MENSURATION AND COMPUTATION.** — Freshmen. The course includes 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.

Credit, 2.

The DEPARTMENT.

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.

The DEPARTMENT.

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.

The DEPARTMENT.

Prerequisite, Mathematics 26.

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

3 class hours.

Credit, 3.

The DEPARTMENT.

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. Davis's "Differential and Integral Calculus."

5 class hours.

Credit, 5.

The DEPARTMENT.

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.

The DEPARTMENT.

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.

The DEPARTMENT.

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.

The DEPARTMENT.

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.

The DEPARTMENT.

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.

The DEPARTMENT.

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

3 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Mathematics 77.

79. **I. APPLIED MECHANICS.** — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures.

5 class hours.

Credit, 5.

The DEPARTMENT.

Prerequisite, Mathematics 51, 52.

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. HOOD, Mr. NEILL.

[Courses 50 and 51 are especially adapted to those who wish a general comprehensive, although elementary, survey of agricultural microbiology.]

Elective Courses.

50. **I. and III.** INTRODUCTION AND GENERAL MICROBIOLOGY. — For juniors; seniors may elect. A review of the field of microbiology as a whole, with special reference to hygienic microbiology, will constitute this course. It will be taught by means of lectures, demonstrations and textbooks. Although desirable, it will not be required as a prerequisite to all courses that follow, and may be taken along with Course 51.

5 class hours.

Credit, 5.

Professor MARSHALL and Mr. HOOD.

51. **I., 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 elementary and fundamental to all applied and special microbiological studies, and therefore is made a prerequisite to all courses following. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO and Mr. NEILL.

52. **III.** ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO and Mr. NEILL.

Prerequisite, Microbiology 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. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL, Assistant Professor ITANO and Mr. NEILL
or Mr. HOOD.

Prerequisite, Microbiology 51.

76. **III. AGRICULTURAL MICROBIOLOGY.** — For seniors; juniors may elect. As stated under Course 75. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL, Assistant Professor ITANO and Mr. NEILL
or Mr. HOOD.

Prerequisites, Microbiology 52 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. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisite, Microbiology 51.

81. **I. HYGIENIC MICROBIOLOGY.** — For seniors; juniors may elect. An attempt will be made to select for this course certain material which should be the possession of every individual, and 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. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL and Mr. HOOD, or Assistant Professor ITANO
and Mr. NEILL.

Prerequisites, Microbiology 50 and 51.

82. **I. DAIRY MICROBIOLOGY.** — For seniors; juniors may elect. Special emphasis will be 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, 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 Mr. HOOD.

Prerequisites, Microbiology 51, Dairying 51.

83. **I. FOOD MICROBIOLOGY.** — For seniors; juniors may elect. A study of 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 foods, will receive consideration. Contamination of food supplies by means of water, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL and Mr. HOOD.

Prerequisite, Microbiology 51.

Physics.

Professor HASBROUCK, Associate Professor ROBBINS.

[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, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

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.

Professor HASBROUCK and Associate Professor ROBBINS.

26. **II. ELECTRICITY AND MAGNETISM.**—Sophomores. The work in electricity 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.

2 class hours.

1 2-hour laboratory period, credit, 3.

Associate Professor ROBBINS.

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.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor HASBROUCK and Associate Professor ROBBINS.

50. **I. ELECTRICITY, HEAT AND LIGHT.**—For juniors; seniors may elect.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Associate Professor ROBBINS.

Prerequisite, Physics 27.

51. **II. ELECTRICITY, HEAT AND LIGHT.** — For juniors; seniors may elect. Continuation of Course 50.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Associate Professor ROBBINS.

Prerequisite, Physics 50.

52. **III. ELECTRICITY, HEAT AND LIGHT.** — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Associate Professor ROBBINS.

Prerequisite, Physics 51.

Veterinary Science.

Professor PAIGE, Associate Professor GAGE.

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

50. **I. VETERINARY HYGIENE AND STABLE SANITATION.** — For juniors; seniors may elect. This course is intended to familiarize the student 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.

Professor PAIGE.

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

Professor PAIGE.

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 compared with it where differences exist. This course is essential for those students wishing to elect Course 76.

5 class hours.

Credit, 5.

Professor PAIGE.

76. **II. THEORY AND PRACTICE OF VETERINARY MEDICINE; GENERAL, SPECIAL AND OPERATIVE SURGERY.** — For seniors; juniors may elect. A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technique of simple surgical operations that can with safety be performed by the stock

owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.

5 class hours.

Credit, 5.

Professor PAIGE.

Prerequisite, Veterinary 75.

78. **I. ESSENTIALS OF GENERAL PATHOLOGY.** — For seniors; juniors may elect. This course is planned to introduce the student 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 will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate 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.

Associate Professor GAGE.

79. **II. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.** — For seniors; juniors may elect. This is a continuation of Course 78, and is 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 will be considered.

2 3-hour laboratory periods, credit, 3.

Associate 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.

Associate Professor GAGE.

Prerequisite, Veterinary 79.

85. **I. AVIAN PATHOLOGY.** — For seniors; juniors may elect. A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist 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 will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.

Associate 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 will be 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.

Associate 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.

Associate Professor GAGE.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor GORDON, Dr. BALL.

ZoöLOGY.

Required Courses.

25. **I. GENERAL ZoöLOGY.** — Sophomores. This course gives an outline of the underlying principles of zoölogy and an introduction to animal structure.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor GORDON and Dr. BALL.

Elective Courses.

27. **III. ELEMENTS OF MAMMALIAN OR AVIAN ANATOMY.** — For sophomores; juniors and seniors may elect. This course is offered as a preparation for work in histology, embryology, general vertebrate zoölogy, etc. It also deals briefly with the essentials of physiology. The course is open to prospective students in physiological chemistry, microbiology, animal husbandry, veterinary sciences, etc.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor GORDON and Dr. BALL.

Prerequisite, Zoölogy 25.

50. **I. SYNOPTIC INVERTEBRATE ZoöLOGY.** — For juniors; seniors may elect. This course gives a synopsis of the distinguishing characters of the different phyla and classes of invertebrates.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor GORDON or Dr. BALL.

Prerequisite, Zoölogy 25.

51. **II. SYNOPTIC INVERTEBRATE ZoöLOGY.** — For juniors; seniors may elect. Continuation of Course 50.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor GORDON or Dr. BALL.

Prerequisite, Zoölogy 50.

52. **III. SYNOPTIC INVERTEBRATE ZoöLOGY.** — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor GORDON or Dr. BALL.

Prerequisite, Zoölogy 51.

53. **I. ELEMENTS OF MICROSCOPIC TECHNIQUE.**— For juniors; seniors may elect. This course gives methods of preparing material for microscopic examination.

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

Prerequisite, Zoölogy 25.

54. **II. ELEMENTS OF HISTOLOGY.**— For juniors; seniors may elect. This course involves preparation and study of normal animal tissues.

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

Prerequisites, Zoölogy 27 and 53.

55. **III. ELEMENTS OF HISTOLOGY.**— For juniors; seniors may elect. Continuation of Course 54.

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

Prerequisite, Zoölogy 54.

58. **II. CONSERVATIONAL ZOÖLOGY.**— For juniors; seniors may elect. This course aims to bring before the student the great public problems of the conservation of wild life, especially the natural fauna of the State, and the more complete utilization of various forms of animal life on the farm projects. 2 class hours.

1 2-hour laboratory period, credit, 3.
Dr. BALL.

75. **I. SPECIAL ZOÖLOGY.**¹— Juniors, seniors, graduates, vocational students and others may ask, and in most cases may arrange, for special work in zoölogy. Such work as is desired in connection with an undergraduate major in another department, or in connection with a vocational course, should be formulated in consultation with officers having the major or vocational course in charge before the request for the work is made. For juniors, seniors and graduates who desire to extend their knowledge of zoölogy along more advanced or special lines, and who are adequately prepared, provision will gladly be made when possible. Work taken under this title may extend through the year, or may be for one term only.

1 class hour. 2 2-hour laboratory periods; hours by arrangement, credit, 3.
The DEPARTMENT.

Prerequisites, each case will be decided by itself.

76. **II. SPECIAL ZOÖLOGY.**— As stated under Course 75.

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

Prerequisites, each case will be decided by itself.

¹ Those who desire work in zoölogy as a minor for the degree of master of science or for the degree of doctor of philosophy may elect certain courses offered to juniors or seniors, or may arrange for separate work. The graduate student who elects undergraduate courses must meet the requirements of the graduate standards of work and accomplishment.

77. **III.** SPECIAL ZOÖLOGY. — As stated under Course 75.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisites, each case will be decided by itself.

78. **II.** ECONOMIC ZOÖLOGY. — *Birds in their Relations to Crops, Insects and Man.* — For juniors and seniors; sophomores may elect. This course deals with the broad economic relations of the birds. The student is taught to know the birds and their migrations and distribution.

1 class hour.

2 2-hour periods, credit, 3.

Dr. BALL.

79. **III.** ECONOMIC ZOÖLOGY. — *Birds in their Relations to Crops, Insects and Man.* — For juniors and seniors; sophomores may elect. In this course the student reviews what is known of the specific food habits of our most important economic birds, carries his studies into the field, and gets an intimate acquaintance with our Massachusetts birds and their habits in relation to crops, orchards, woodlands and to each other.

2 class hours.

1 2-hour laboratory period, credit, 3.

Dr. BALL.

GEOLOGY.

Required Courses.

2. **II.** AGRICULTURAL GEOLOGY. — Freshmen. The elements of geology in their application to agriculture.

2 class hours.

Credit, 2.

Professor GORDON.

Elective Courses.

27. **III.** GENERAL GEOLOGY. — For sophomores; juniors and seniors may elect. Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GORDON.

DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

Economics and Sociology.

Professor SPRAGUE.

[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.]

[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.]

Elective Courses.

26. **II. CIVILIZATIONS, ANCIENT AND MODERN.** — For sophomores; others may elect. This course studies 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 SPRAGUE.

50. **II. BUSINESS AND INDUSTRY.** — For juniors and seniors. The forms, organization, administration and labor problems of business. This course is devoted to the following subjects: 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, co-operation 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 SPRAGUE.

51. **I. INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS.** — For juniors. This course is devoted to the study of the following subjects: 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 individual 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 SPRAGUE.

75. **I. SOCIAL INSTITUTIONS AND SOCIAL REFORMS.** — For seniors; juniors by permission. This course is devoted to the study of the social institutions, such as the family, the State, property, religions; and to 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 will be studied in considerable detail.

5 class hours.

Credit, 5.

PROFESSOR SPRAGUE.

77. **III. PUBLIC FINANCE, TAXATION, MONEY AND BANKING.** — For seniors. This course studies 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 SPRAGUE.

History and Government.

Elective Courses.

50. **III. GOVERNMENT.** — For juniors; seniors may elect. This course will cover subjects as follows: 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 over broader interests of the people.

5 class hours.

Credit, 5.

PROFESSOR SPRAGUE.

75. **II. HISTORY OF NEW ENGLAND.** — For seniors; juniors may elect. Treating New England as a geographical and political unit, this course aims to give a survey of its religious, social, economic and political history. The development of its institutions, the growth of its industries, the spread of its population to other sections of the country, its influence upon national character and politics are phases of the subject which will be discussed. Assigned readings and theses will be required.

3 class hours.

Credit, 3.

MISS JEFFERSON.

Languages and Literature.

Professor LEWIS, Associate Professor NEAL, Associate Professor ASHLEY, Associate Professor MACKIMMIE, Assistant Professor PRINCE, Assistant Professor PATTERSON, Miss GOESSMANN, Mr. JULIAN, Mr. RAND.

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.

3 class hours each term.

Credit, 3 each term.

Assistant Professor PRINCE, Assistant Professor PATTERSON and Mr. RAND.

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

Two class hours each term.

Credit, 2 each term.

Professor LEWIS and Miss GOESSMANN.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's understanding and appreciation of literature. Group one (Courses 50, 51, 52, 53, 54 and 55) will, besides introducing the student to individual writers, emphasize the life and thought of the times, political, economic and social, in order that the student may realize literature as the expression of individual genius representing (by leading it or summarizing it) the thought and spirit of a period or a social unit. Group two (Courses 75, 77, 79 and 80) will tend more to emphasize form-characteristics, artistic quality or historical development of literary types, or individual great writers. Courses 50, 51, 55, 75, 79 and 80 are offered in 1918-19, Courses 52, 53, 54, 55, 77 and 80 are offered in 1919-20.]

50. **I.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1919-20). — 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, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron.

3 class hours.

Credit, 3.

Assistant Professor PATTERSON.

51. **II.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1918-19). — Alternates with Course 54. Juniors; seniors may elect. In general conception this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are among the authors to be studied.

3 class hours.

Credit, 3.

Professor LEWIS.

57. **III.** ENGLISH POETRY IN THE NINETEENTH CENTURY. — For juniors; seniors may elect. As stated under Course 51.

2 class hours.

Credit, 2.

Professor LEWIS.

Prerequisite, English 51.

52. **III.** ENGLISH WRITERS FROM MILTON TO POPE (1918-19). — For juniors; seniors may elect. A survey course that will emphasize the leading writers of the periods, including Bacon, Milton, Dryden, Addison and the essayists, Swift and Pope. Given every second year.

3 class hours.

Credit, 3.

Assistant Professor PATTERSON.

53. **I.** ENGLISH PROSE IN THE NINETEENTH CENTURY (1918-19). — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Johnson, Sterne, Goldsmith, Burke, Miss Burney, Coleridge, Landor, Lamb, DeQuincey and Hazlitt.

3 class hours.

Credit, 3.

Assistant Professor PATTERSON.

54. **II.** ENGLISH PROSE IN THE NINETEENTH CENTURY (1919-20). — For juniors; seniors may elect. This course 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. — For juniors; seniors may elect. As stated under Course 54.

2 class hours.

Credit, 2.

Professor LEWIS.

Prerequisite, English 54.

55. **II.** AMERICAN LITERATURE. — For juniors; seniors may elect. Intended to give 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 — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

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

2 class hours.

Credit, 2.

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.

2 class hours.

Credit, 2.
Miss GOESSMANN.

Prerequisite, English 60.

75. **III.** PROSE FICTION. — Alternating courses in the short story and the novel. Seniors; juniors may elect. Readings, reports and discussions. Texts (short story): Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed." [Not given in 1917-18.]

3 class hours.

Credit, 3.
Associate Professor NEAL.

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. Four of his plays will be analyzed in detail, and many others will be read and discussed.

3 class hours.

Credit, 3.
Mr. RAND.

80. **III.** THE DRAMA. — For seniors; juniors may elect. The course will trace the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.

2 class hours.

Credit, 2.
Mr. RAND.

Prerequisite, English 79.

RURAL JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the nonurban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. As practical work, members of the classes supply a feature page for the "Springfield Union," and the "New Bedford Standard." Cordial unofficial relations are maintained with the college paper, "The Massachusetts Collegian."]

Elective Courses.

50. **I.** FOUNDATIONS OF WRITING: EXPOSITION. — For juniors; seniors may elect. Advanced composition; planning expository thought; expository structure; specimens, including contemporary articles from farm and rural life publications; some bulletin writing, including presentation of technical information for nontechnical readers.

3 class hours.

Credit, 3.
Associate Professor NEAL.

51. **II. FOUNDATIONS OF WRITING: NARRATION AND DESCRIPTION.** — For juniors; seniors may elect. The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction.
3 class hours.

Credit, 3.

Associate Professor NEAL.

52. **III. FOUNDATIONS OF WRITING: MAGAZINE WRITING.** — For seniors; juniors may elect. Study and writing of various forms of magazine and similar articles. [Not given in 1918-19.]
3 class hours or equivalent in laboratory.

Credit, 3.

Associate Professor NEAL.

Prerequisite, one or more junior courses in journalism, or experience in journalistic work.

53. **I. NEWS-GATHERING AND NEWS-WRITING.** — For juniors; seniors may elect. The foundation aims and conceptions of journalism. Readings, lectures, quizzes and personal conferences; reporting on runs and on assignment; regular reading of a daily paper and of a weekly review or farm journal, with reports. Central purpose, to develop ability to pick out essentials from essentials, perceive elements of interest, and present facts which appeal to the reader. This course and Courses 54 and 55 are suited to nonmajoring students whose vocation will require the popular presentation of technical or other information; *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, credit, 3.

Associate Professor NEAL.

54. **II. NEWS-GATHERING AND NEWS-WRITING.** — For juniors; seniors may elect. As outlined under Course 53, except that students who have taken Course 53 will be assigned different readings, and may be given a larger amount of reporting or other writing.

6 laboratory hours, credit, 3.

Associate Professor NEAL.

55. **III. NEWS-GATHERING AND NEWS-WRITING.** — For juniors; seniors may elect. As stated under Courses 53 and 54.

6 laboratory hours, credit, 3.

Associate Professor NEAL.

77. **I. EDITORIAL MATERIALS AND METHODS.** — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events or history. Recommended to nonmajoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.

6 laboratory hours, credit, 3.

Associate Professor NEAL.

78. **II.** EDITORIAL MATERIALS AND METHODS. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor NEAL.

79. **III.** EDITORIAL MATERIALS AND METHODS. — For seniors; juniors may elect. As stated under Course 77.

6 laboratory hours, credit, 3.
Associate Professor NEAL.

80. **I.** ADVANCED JOURNALISTIC PRACTICE. — Seniors. Preparation, editing and publication of a rural life page or periodical.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor NEAL.

81. **II.** ADVANCED JOURNALISTIC PRACTICE. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor NEAL.

82. **III.** ADVANCED JOURNALISTIC PRACTICE. — Seniors. As stated under Course 80.

8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor NEAL.

PUBLIC SPEAKING.

Required Courses.

1. **I.** 2. **II.** 3. **III.** PUBLIC SPEAKING. — Freshmen. Freshmen public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches. Textbook, Robinson's "Effective Public Speaking," supplemented by class work and discussions. First, second or third terms, as directed.

1 class hour.

Credit, 1.

Assistant Professor PRINCE, Assistant Professor PATTERSON and
Mr. RAND.

Elective Courses.

50. **I.** ARGUMENTATION. — For juniors; seniors may elect. The course aims to present the fundamental principles of argumentation as applied to oral and written discourse, and intends to develop 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. Textbook, Foster's "Argumentation and Debating." 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. The course involves 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.

Associate Professor MACKIMMIE.

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. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French.
3 class hours each term. Credit, 3 each term.

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 each term. Credit, 3 each term.

Associate Professor MACKIMMIE.

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.

Associate Professor MACKIMMIE.

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.

Associate Professor MACKIMMIE.

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.

Associate Professor MACKIMMIE.

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.

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.

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 will be studied in class. Outside reading will be required.

3 class hours.

Credit, 3.

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

50. **I. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. This course is planned to meet the requirements of the individual student, and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required, and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read.

3 class hours.

Credit, 3.

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.

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.

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 will deal with the drama, and plays by Augier, A. Dumas, fils, Delavigne and some contemporary dramatists will be read and studied.

3 class hours.

Credit, 3.

Associate Professor MACKIMMIE.

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

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

3 class hours.

Credit, 3.

Associate 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 Litterature Française."

3 class hours.

Credit, 3.

Associate 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.

Associate Professor MACKIMMIE.

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

3 class hours.

Credit, 3.

Associate 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.

Associate 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.

3 class hours.

Credit, 3.

Associate Professor MACKIMMIE.

Prerequisite, Spanish 52.

76. **II.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.

Associate Professor MACKIMMIE.

Prerequisite, Spanish 75.

77. **III.** MODERN SPANISH AUTHORS. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.

Associate Professor MACKIMMIE.

Prerequisite, Spanish 76.

German and Music.

Associate Professor ASHLEY, Mr. JULIAN.

GERMAN.

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, each term.

Credit, 3 each term.

Associate Professor ASHLEY and Mr. 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 each term.

Credit, 3 each term.

Associate 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.

Mr. 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.

Mr. 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.

Mr. 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.

Associate 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.

Associate 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.

Associate 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.

Associate 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.

Associate Professor ASHLEY.

Prerequisite, German 50.

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

3 class hours.

Credit, 3.

Associate 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.

Associate Professor ASHLEY.

Prerequisites, German 28, 29 and 30.

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

3 class hours.

Credit, 3.

Associate Professor ASHLEY.

Prerequisite, German 75.

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

Associate 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.

Associate 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.

Associate 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.

Associate 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.

Associate 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.

Associate 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.

Associate 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, Mr. WILKINSON.

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 will be 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.

5 class hours.

Credit, 5.

Professor CANCE and Mr. WILKINSON.

Elective Courses.

50. **I.** ELEMENTS OF AGRICULTURAL ECONOMICS. — For juniors; seniors may elect. This course is designed to accompany or follow the course in elements of economics. It 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 will be 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.

Mr. WILKINSON.

52. **II.** CO-OPERATION IN AGRICULTURE. — For juniors; seniors may elect. The course treats of 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.

Professor CANCE.

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.

76. **II. TRANSPORTATION OF AGRICULTURAL PRODUCTS.**—For seniors and graduate students; juniors may elect. This course deals with transportation in the United States, covering highways, waterways, railways and electric ways, with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work.

5 class hours.

Credit, 5.

Professor CANCE.

77. **I. PROBLEMS IN AGRICULTURAL ECONOMICS.**—For seniors and graduate students; juniors may elect. An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: 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 will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest.

5 class hours.

Credit, 5.

Professor CANCE and Mr. WILKINSON.

78. **III. AGRICULTURAL CREDIT FACILITIES.**—For seniors and juniors. The legitimate use of credit in the production, storing and marketing of agricultural products. A brief survey of the development of credit institutions. National and State rural credit laws. Farm land banks, credit associations, and other means of securing personal credit. The topics will be discussed from the standpoints of dealers in agricultural produce, the landowning farmer, the tenant and the farm laborer; special attention will be given to the credit needs of the college graduate.

3 class hours.

Credit, 3.

Mr. WILKINSON.

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. Hours to be arranged.

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

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

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

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

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

Agricultural Education.

Professor HART.

Elective Courses.

50. **I. MEANING OF EDUCATION (PSYCHOLOGY).** — For juniors; seniors may elect. For teachers and others desiring an introduction to mental science. A study of the development, structure and functions of the nervous system and the sense organs; the development and nature of mental activities; the nature of the learning processes.

5 class hours.

Credit, 5.
Professor HART.

51. **II. TEACHERS' TRAINING COURSE.** — For juniors; seniors may elect. Primarily for teachers. A study of agricultural education; the theory and practice of teaching; rural school organization; methods of instruction; the place and function of agriculture in the course of study for both rural and city schools; planning and practical work in school and home gardens.

2 class hours.

3 2-hour laboratory periods, credit, 5.
Professor HART.

53. **III. HISTORY AND PHILOSOPHY OF EDUCATION.** — For juniors; seniors may elect. For teachers and others desiring an introduction to educational theories. A study of educational ideals and movements as exemplified by leading nations and races; the growth of educational institutions as influenced by science and industry; the history and meaning of industrial and agricultural education.

5 class hours.

Credit, 5.
Professor HART.

80. **I.**, 81. **II.**, 82. **III.**, 83. **IV.** **TEACHERS' TRAINING COURSE.** — For seniors. Supervised apprentice teaching.

1 conference or more.

3 to 5 class periods of teaching, credit, 5.
Professor HART.

75. **I. PROBLEMS IN RURAL EDUCATION.** — For seniors. For teachers or others interested in special phases of education, such as child development, physical and mental; school organization; rural schools; secondary schools; school programs; grading and promotion of pupils; school grounds and school architecture and equipment; normal schools and the preparation of teachers; agricultural teaching and agricultural schools.

4 class hours.

Credit, 4.

Professor HART.

76. **II. PROBLEMS IN RURAL EDUCATION.** — Seniors. As stated under Course 75.

4 class hours.

Credit, 4.

Professor HART.

77. **II. EXTENSION AND COUNTY AGENT WORK.** — For seniors. The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures.

2 class hours.

4 2-hour laboratory periods, credit, 5.

Professor HART.

78. **III. EXTENSION AND COUNTY AGENT WORK.** — For seniors. As stated under Course 77.

2 class hours.

4 2-hour laboratory periods, credit, 5.

Professor HART.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor HART, Mr. NOVITSKI.

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, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

Professor PHELAN and Mr. NOVITSKI.

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 sexual 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 PHELAN.

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, advantages, development of efficiency, 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 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 PHELAN and Mr. NOVITSKI.

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.

3 class hours.

Credit, 3.

President BUTTERFIELD.

75. **I. FARMERS' ORGANIZATIONS.** — For seniors; juniors may elect. The history, purposes and achievements of the grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; 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.

Professor PHELAN.

76. **I. FIELD WORK IN RURAL SOCIOLOGY.** — For seniors; juniors may elect. This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be 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 PHELAN.

78. **II. RURAL AND BUSINESS LAW.** — For seniors; juniors may elect. 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.

Credit, 5.

Professor HART.

79. **I. SEMINAR.** — Credits, 1 to 3.

Professor PHELAN.

80. **II. SEMINAR.** — Credits, 1 to 3.

Professor PHELAN.

81. **III. SEMINAR.** — Credits, 1 to 3.

Professor PHELAN.

GENERAL DEPARTMENTS.**Military Science and Tactics.**

Col. R. H. WILSON, U. S. A., retired; Ordnance Sergeant J. J. LEE, U. S. A., retired.

A Reserve Officers Training Corps was established at this college pursuant to paragraph IX., Bulletin 6, Jan. 29, 1917. Instruction in military science and tactics of an infantry unit of the Reserve Officers Training Corps was begun on April 1, 1917, and has been continued during the year, following the course of training prescribed for infantry units of the senior division in General Orders No. 49, War Department, Sept. 20, 1916.

The department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical courses (drill) in military science are given in the first and third terms; the corresponding courses in physical education in the second term.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor.

Members of the Reserve Officers Training Corps who elect the advanced courses and are recommended by the President and the commandant, may take the course prescribed for the Reserve Officers Corps by entering a training company for six months, being paid at the rate of \$100 per month while attending the camp. They obligate themselves to serve in the Reserve Officers Corps for ten years, receiving pay of their rank when called into the service of the United States for any duty.

The required uniform is of olive drab woolen cloth, costing about \$34, of which \$14 is borne by the government. It is worn by all cadets when on military duty, and may be worn at other times, and will be considered the property of the United States for one scholastic year. Students upon entering college are required to deposit about \$20 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited unless the consent of the commandant be obtained.

[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.]

Required Courses.

1. I. TACTICS. — Freshmen. Theoretical instruction through the school of the soldier, squad and company. Lectures on military subjects.

1 class hour.

Credit, 1.

Colonel WILSON.

2. **II. TACTICS.** — Freshmen. As stated under Course I.
1 class hour. Credit, 1.
Colonel WILSON.
3. **III. TACTICS.** — Freshmen. Theory of target practice, map reading, service of security. Personal hygiene.
1 class hour. Credit, 1.
Colonel WILSON.
4. **I. DRILL.** — Freshmen. Practical instruction in Infantry Drill Regulations, school of the soldier, squad and company, close and extended order. Preliminary instruction, position, sighting and aiming drills. Gallery practice.
1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.
5. **II. DRILL.** — Freshmen. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor HICKS and Sergeant LEE.
6. **III. DRILL.** — Freshmen. As stated under Course 4.
1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.
25. **I. TACTICS.** — Sophomores. United States Infantry Drill Regulations, to include school of the battalion and combat. Small-arms firing regulations. Lectures, map reading, camp sanitation and camping expedients.
1 class hour. Credit, 1.
Colonel WILSON.
26. **II. TACTICS.** — Sophomores. As stated under Course 25.
1 class hour. Credit, 1.
Colonel WILSON.
27. **III. TACTICS.** — Sophomores. Lectures on military history, service of information and security, marches and camps.
1 class hour. Credit, 1.
Colonel WILSON.
28. **I. DRILL.** — Sophomores. Infantry Drill Regulations to include school of the battalion, ceremonies, first-aid instruction. Range and gallery practice, and combat firing.
1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.
29. **II. DRILL.** — Sophomores. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor HICKS and Sergeant LEE.
30. **III. DRILL.** — Sophomores. As stated under Course 28.
1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.

Elective Courses.

50. **I. MILITARY SCIENCE.** — Juniors. Minor tactics; field orders (studies in minor tactics); map maneuvers.
1 class hour.

Credit, 1.
Colonel WILSON.

51. **II. MILITARY SCIENCE.** — Juniors. Minor tactics; elements of international law; property accountability; method of obtaining supplies and equipment.
3 class hours.

Credit, 3.
Colonel WILSON.

52. **III. MILITARY SCIENCE.** — Juniors. As stated under Course 51.
3 class hours.

Credit, 3.
Colonel WILSON.

53. **I. DRILL.** — Juniors. Duties consistent with rank as cadet officers or noncommissioned officers in connection with the practical work and exercises laid down for the unit.
1 class hour.

Credit, 1.
Colonel WILSON and Sergeant LEE.

54. **II. DRILL.** — Juniors. As stated under Course 53.
1 class hour.

Credit, 1.
Colonel WILSON and Sergeant LEE.

55. **III. DRILL.** — Juniors. As stated under Course 53.
1 class hour.

Credit, 1.
Colonel WILSON and Sergeant LEE.

75. **I. MILITARY SCIENCE.** — Seniors. Tactical problems, small forces, all arms combined; map maneuvers; court-martial proceedings.
3 class hours.

Credit, 3.
Colonel WILSON.

76. **II. MILITARY SCIENCE.** — Seniors. International relations of America from discovery to present day, and gradual growth of principles of international law, embodied in American diplomacy, legislation and treaties.
3 class hours.

Credit, 3.
Colonel WILSON.

77. **III. MILITARY SCIENCE.** — Seniors. Lectures on psychology of war and general principles of strategy.
3 class hours.

Credit, 3.
Colonel WILSON.

78. **I. DRILL.** — Seniors. As stated under Course 53.
1 class hour.

Credit, 1.
Colonel WILSON and Sergeant LEE.

79. **II. DRILL.** — Seniors. As stated under Course 53.
 1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.

80. **III. DRILL.** — Seniors. As stated under Course 53.
 1 class hour. Credit, 1.
Colonel WILSON and Sergeant LEE.

Officers and noncommissioned officers conduct drill of lower classes. Field officers and captains are appointed from this class. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets.

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE,¹ Mr. DICKINSON.²

[All classified 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, third term.
Mr. DICKINSON.

3. **III. RECREATION.** — Freshmen. Outdoor games.
 1 laboratory hour. Credit for Nos. 2 and 3, 1.
Mr. DICKINSON.

25. **I. RECREATION.** — Sophomores. Outdoor games.
 1 laboratory hour. Credit, third term.
Mr. DICKINSON.

26. **III. RECREATION.** — Sophomores. Outdoor games.
 1 laboratory hour. Credit for Nos. 25 and 26, 1.
Mr. DICKINSON.

Course Elective during Emergency.

51. **II. GYMNASTICS.** — Juniors not members of Reserve Officers Training Corps.
 2 laboratory hours. 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.

¹ On leave.

² Temporary substitute.

WOMEN.

Required Courses.

4. **I.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
5. **II.** GYMNASTICS. — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
6. **III.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
27. **I.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.
28. **II.** GYMNASTICS. — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
29. **III.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.

Elective Courses.

50. **II.** GYMNASTICS. — Juniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
76. **II.** GYMNASTICS. — Seniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES H. FERNALD, Ph.D., Honorary Director of the Graduate School.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

GRADUATE STAFF, 1916-17.

Associate Professor BEAUMONT, Professor CANCE, Professor CHAMBERLAIN, Assistant Professor O. L. CLARK, Professor CRAMPTON, Professor FERNALD, Professor FOORD, Professor GRAHAM, Assistant Professor HECHT, Dr. ITANO, Assistant Professor JONES, Professor LINDSEY, Professor McNUTT, Professor OSMUN, Professor PETERS, Professor PHELAN, Professor SEARS, Professor WAUGH, Director MARSHALL, President BUTTERFIELD; Mr. WATTS, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established 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; and for numerous other positions requiring a great amount of scientific and professional 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. Besides, each 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 Agricul-

tural 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 *degré*.

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. [Suspended during continuance of the war.]

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 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 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 properly to equip the individual professionally.

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 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 by the student's advisory committee. 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 original study; and must be an actual contribution to knowledge.

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 said copies is to be retained as an official copy by the said 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 master of science, master of agriculture, or master of landscape architecture, final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees 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.

DEGREES CONFERRED.

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 half¹ 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.

¹ All time statements refer to minimum time.

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. The thesis may be waived for the degree of master of agriculture.

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.

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 years 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. 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.

COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy: —

Agricultural economics	Horticulture.
Botany.	Microbiology.
Chemistry.	Rural sociology.
Entomology.	

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 for the degree of doctor of philosophy:—

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.

Entomology.
Horticulture.
Landscape architecture.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

Courses available as minor subjects for the degree of master of science:—

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.

Horticulture.
Landscape architecture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR ADVANCED DEGREES.

AGRICULTURAL ECONOMICS (Major Course).— 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the doctorate, the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 50, the elements of economics, Course 75, the agricultural market and Course 52, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 52, 75, 76 and 77 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the doctor's degree will be required to write a thesis, and candidates for the master's degree a thesis or a report, covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of 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, and markets and marketing.

AGRICULTURAL EDUCATION (Major Course).— Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines:—

1. Massachusetts school legislation.
2. Origin and growth of primary, secondary and higher education in Massachusetts.

3. The origin and growth of normal schools, industrial schools and agricultural schools.

4. Educational literature, fiction, periodicals and reports.

5. The physical and mental development of the individual.

6. School administration.

AGRONOMY (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for investigational work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. *Soil Fertility*. — (a) The humus problem: Effect of different cropping systems on the humus content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(b) The nitrogen question: Losses of nitrogen as occasioned by cropping systems, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(c) Mineral elements of plant food: As above for nitrogen.

(d) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(e) Crop adaptability.

II. *Field Crops*. — (a) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(b) Kinds and varieties.

(c) Cultural methods.

(d) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. *Thesis*. — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

Literature. — It is required that the candidate familiarize himself with the available literature of the various topics studied.

ANIMAL HUSBANDRY (Master of Science). — *Course A. Animal Breeding*. — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding.

Course B. Animal Nutrition. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

Object. — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a

minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

Reading. — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

Practice. — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

Seminar: Regular periods to discuss progress of the work.

ANIMAL PATHOLOGY (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.

4. Laboratory studies in general and special pathology.

5. Pathological technique.

6. Conferences.

BOTANY (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except courses (a) and (b), which will come every year. There will be three lectures a week throughout the fall, winter and spring terms. These lecture courses, outlined below, are designed to cover a period of three years.

(a) *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 dissimulation 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.

(b) *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.

(c) *Normal and Pathogenic Metabolism.* — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

(d) *Plant Evolution.* — Consideration of plant life in its inception; differentiation; origin and evolution of sexual and asexual reproduction; variation;

heredity and adaptation; phylogenetic relationships. One lecture a week for 24 weeks.

(e) *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 will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

(f) *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.

(g) *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.

(h) *History of Botany*.— A historical survey of the science; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization. One lecture a week for 18 weeks.

Seminar: A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required.

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.

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.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

Professor OSMUN, Dr. CHAPMAN, Associate Professor ANDERSON and Assistant Professor CLARK.

CHEMISTRY. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are:—

Organic and Bio-Chemistry. — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (b) and (f), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

Physical Chemistry. — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

Agricultural Chemistry. — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling 54 to 78 hours. This 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 must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 27 and 51 to 80.

The following is a list of the courses:—

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, 6 hours. Professor ANDERSON.¹

102. *Advanced Inorganic Preparations.* — Laboratory. Continuation of Course 101. Any term, 6 hours. Professor ANDERSON.

103. *Advanced Analytical Chemistry.* — Laboratory. This course may be taken in part as follows: (a) electrolytic analysis, 6 hours; (b) ultimate analysis, 6 hours; (c) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 61, 62, 76 and 77 may be taken, as follows: (d) fertilizers, 6 hours; (e) insecticides, 6 hours; (f) milk and butter, 6 hours. (a), (b), (c) may be taken any time; (d), (e), (f) must be taken at the time the undergraduate course is given.

Professor WELLINGTON and Professor 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 glycerinic

¹ On leave of absence, 1917-18.

or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term, 6 hours. Professor ANDERSON.

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 and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term, 6 hours. Professor CHAMBERLAIN.

106. *Advanced Bio-Chemistry.*—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, 6 hours. 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 and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term, 6 hours. 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, 1 hour. Given in 1917-18. Alternates with Course 109. Professor PETERS.

109. *Analytical Chemistry.*—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, 1 hour. Given in 1916-17. Alternates with Course 108. 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, 1 hour. Given in 1916-17. Alternates with Course 111. Professor CHAMBERLAIN.

111. *Bio-Chemistry.*—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 Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Given in 1917-18. Alternates with Course 110. Professor CHAMBERLAIN.

112. *Theoretical and Physical Chemistry.*—Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hin-

drances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Given in 1917-18. Alternates with Course 113.

Professor ANDERSON.

113. *Theoretical and Physical Chemistry*. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Given in 1916-17. Alternates with 112.

Professor ANDERSON.

114. *Seminar*. — Conferences, reports or lectures. Three terms, twice a month, 1½ hours.

Professor LINDSEY.

115. *Research in Organic and Bio-Chemistry*. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor CHAMBERLAIN.

116. *Research in Analytical or Agricultural Industrial Chemistry*. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.

Professor WELLINGTON and Professor PETERS.

117. *Research in Physical Chemistry*. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor ANDERSON.

118. *Research in Agricultural Chemistry*. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor LINDSEY and EXPERIMENT STATION ASSOCIATES.

ENTOMOLOGY (Major Courses, Ph.D. degree). — 1. *Morphology*. — Lectures on all, and laboratory work on a portion of the following subjects: embryology and polyembryology; transformations; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogamy; chemistry of colors; coloration; luminosity; deformities; variation.

2. *Ecology*. — Lectures and laboratory work as above on the following subjects: dimorphism; polymorphism; protective devices; mimicry; psychoses; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology.

3. *Economic*. — Lectures and laboratory work as above on the following subjects: special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

4. *Systematic*. — Lectures and laboratory work as above on the following subjects: history of entomology; classifications and principles of classification; nomenclature and its rules; how to find and use literature; preparing indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections; location of types.

5. Seminar; required readings; thesis.

All of these five courses are required of students taking a Ph.D. in entomology.

Minor Courses. — Such portions of the major courses as are most closely correlated with the other lines of work taken by the student and which can be completed in the time available.

Professor FERNALD, Professor CRAMPTON and Dr. REGAN.

HORTICULTURE. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now 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 Prof. F. A. Waugh, head of the Division of Horticulture.

LANDSCAPE ARCHITECTURE (Major Course). — Every student before receiving his master's degree in landscape gardening 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 gardening.

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.

Qualifications. — 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, and also one year must 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.

Thesis or Project. — Each student before receiving the master's degree with a major in landscape gardening must present a satisfactory thesis or com-

plete 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.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for 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.

Prerequisite Work. — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

MICROBIOLOGY. — I. *Courses leading to the Degree of Doctor of Philosophy.* —

1. The candidate must present twenty-five credits from the undergraduate study as furnished in undergraduate Courses 50, 51, 52, 80, 81 or an equivalent before he can enter upon graduate study.

NOTE. — Twenty-five credits are required of undergraduates majoring in microbiology.

2. The candidate must pursue successfully the following special courses or their equivalent. These courses are designed to give a comprehensive survey of the fields indicated, and are arranged especially for graduate students.

175. Agricultural microbiology,	5 credits.
176. Agricultural microbiology,	5 credits.
182. Dairy microbiology,	5 credits.
183. Food microbiology,	5 credits.

NOTE. — Courses 175, 176, 180, 181, 182, 183 correspond in subject-matter with Courses 75, 76, 80, 81, 82, 83 of undergraduate study; the latter courses are elementary in nature, while the former are arranged for intensive advanced study of graduate character. Candidates will be required not only to perform the exercises of the above courses, but will be expected to assist in teaching the elementary classes covering the same theme as a part of graduate requirements.

3. It will be necessary to complete additionally the following courses or their equivalent, open only to graduate students: —

190. I. 1917. Studies in technique, as photomicrography, laboratory equipment and manipulation.¹
5 to 10 credits. Assistant Professor ITANO.
151. II. 1918. Cytological and morphological studies and technique.¹
5 to 10 credits. Professor MARSHALL and Mr. HOOD.
152. III. 1919. Physiological studies.¹
5 to 10 credits. Assistant Professor ITANO.
177. II. 1919. Microbial studies in agriculture. Specific subjects.¹
5 to 10 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
181. II. 1920. Advanced sanitary or hygienic studies.¹
5 to 10 credits. Professor MARSHALL and Assistant Professor ITANO.
150. I., II., III. Lectures and study of literature.²
10 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
200. I., II., III. Research.³ (Some microbiological problem related to agriculture.)
40 to 50 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.

The thesis prepared must be satisfactory to the department, and the graduate staff and the candidate must be ready to defend it at his public examination. Further, following the presentation of the thesis, the candidate must submit to a written examination covering the entire subject by the department and a public oral examination under the auspices of the graduate staff.

II. *Courses leading to the Degree of Master of Science.* — 1. Prerequisite studies, as in the case of the degree of doctor of philosophy (I., 1).

2. Special studies as represented by courses —

175. Agricultural microbiology, 5 or 10 credits.
176. Agricultural microbiology, 5 or 10 credits.
182. Dairy microbiology, 5 or 10 credits.
183. Food microbiology, 5 or 10 credits.

3. Courses designed for graduate students only.

150. I., II., III. Lectures and study of literature.
5 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.
200. I., II., III. Research.³ (Some microbiological problem related to agriculture.)
15 to 25 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. HOOD.

The thesis submitted must be satisfactory to the department and to the graduate staff.

The candidate will be required to take a written examination and an oral examination by the department.

III. *Minor work in microbiology* may consist of Undergraduate Courses 50, 51, 52, and one other course, designed to support his major work, from among Courses 175, 180, 181, 182, 183. He will also be required to pursue Graduate Course 150 through four terms (see II., 3, 150). In case the candidate has had some of these courses he will be required to take more advanced substitute courses. A written examination over the subject-matter covered will be given at the close of the work.

POULTRY SCIENCE (Major Course for the Degrees of M.S. and M.Agr.) —

1. *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.

¹ Repeated every three years.

² Continues over three years, once each week.

³ Distributed as may be most beneficial for research work. Time and credit by arrangement.

2. *Seminar*. — A critical review and a criticism of the more important experiments carried on at the 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.

3. *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.

4. *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.

5. *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.

6. *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.

7. *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.

8. *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.

9. *Thesis*. — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M.S. degree, and may be required of those working for the M.Agr. degree.

NOTE 1. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

NOTE 2. — Practical poultry work may be required, but no credit will be given for such work.

NOTE 3. — Courses 1 and 2 are designed particularly for minors.

RURAL SOCIOLOGY. — Courses are offered in Rural Sociology as major or minor subjects for the degree of doctor of philosophy.

Candidates for the master's degree will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification. In addition they will be required to select one or more of the divisions of the subject for intensive study and research, as indicated below.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the

material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

TOPICS FOR STUDY AND RESEARCH.

1. The rural community: —
 - (a) Historical development.
 - (b) Influence of modern conditions on family and community life.
 - (c) Problems and methods in community organization.
 - (d) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
 - (a) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
 - (b) History of the development of the rural church, its problems and program for improvement.
 - (c) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
 - (a) The scope and function of rural organization in development of rural life.
 - (b) Work of the national government in rural organization.
 - (c) County and institutional work in rural organization.
 - (d) Leadership in its relation to organization.
4. Rural government and rural law: —
 - (a) Development of rural local government in New England and the west. Progress in efficient local self-government.
 - (b) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
 - (c) Work of the national government in its relation to the social welfare of the farming people.
 - (d) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
 - (a) Social problems underlying farmers' organizations in reference to service and permanency.
 - (b) Principles of organization.
 - (c) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
 - (a) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
 - (b) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
 - (a) Origin and development of rural ideals.
 - (b) The status of the rural people in relation to health, morality, crime, etc.
 - (c) Problems of social psychology arising in rural life.

The course required for candidates offering a minor will be arranged after a conference with the director of the department, and will take into consideration the needs of the student in view of his previous preparation. The amount of time required of the student for his minor work will correspond with the requirements of the graduate school.

VETERINARY SCIENCE. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

ZOOLOGY. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. 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. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

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
AND
THE EXTENSION SERVICE.

THE SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those who cannot come to the college for the regular agricultural courses. They furnish the student with instruction in modern accepted methods, and are designed to help the farmer and the housewife meet the present economic conditions. In the main, the instruction is given by the regular teaching force of the college, the same laboratories and equipment being used as in the regular college work. The short courses may be grouped as follows:—

- A. Winter Schools.
 - 1. Ten Weeks' Course.
 - 2. Spring Beekeeping School.
 - 3. Apple Packing School.
- B. Summer Schools.
 - 1. Summer School of Agriculture and Country Life.
 - 2. School for Rural Social Service.
 - 3. School for Library Workers.
 - 4. Boys' and Girls' Agricultural Camps.

EXPENSES OF THE SHORT COURSES.—The expense of attending any of the short courses is approximately as follows:—

Registration fee (Ten Weeks' Course, Apple Packing and Summer School),	\$5
Furnished rooms in private houses (per week),	\$2 to \$4
Board at college dining hall (per week),	\$6 to \$6.50
Board with private families (per week),	\$7 to \$8

A lunch counter is operated in connection with the dining hall; meals may be obtained there *à la carte* at very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits and caps for use in the practical dairy work. The cost in Amherst is about \$1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES.—No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required, and these are investigated before applicants are accepted.

A. WINTER SCHOOLS, 1918.

1. OUTLINE OF THE TEN WEEKS' COURSES, DECEMBER 31 TO MARCH 9.—The following courses are offered:—

- 1. Soil Fertility. Professor BEAUMONT. Three lectures a week.
- 2. Field Crops. Professor JONES. Two lectures and one two-hour laboratory period a week.

3. Type and Breeds of Live Stock. Professor McNUTT. Three lectures and two two-hour judging periods a week.
4. Live Stock Feeding. Professor McNUTT. Three lectures a week.
5. Animal Breeding. Professor McNUTT. One lecture and one two-hour laboratory period a week.
6. Dairying. Professors LOCKWOOD and JAMISON. Five lectures and five two-hour laboratory periods a week.
7. Dairy Bacteriology. Professor MARSHALL. Two lectures a week, one two-hour laboratory period a week.
8. Animal Diseases and Stable Sanitation. Professor PAIGE. Two lectures a week.
9. Poultry Husbandry. Professors GRAHAM and PAYNE. Five lectures and one two-hour laboratory period a week.
10. Farm Management. Mr. PEACOCK. Two lectures a week.
11. Farm Accounts. Mr. PEACOCK. Two two-hour laboratory periods a week.
12. Fruit Growing. Professor SEARS. Three lectures and one two-hour laboratory period a week.
13. Market Gardening. Professor A. S. THOMSON. Three lectures and two two-hour laboratory periods a week.
14. Landscape Gardening. Professor HARRISON. Two two-hour laboratory periods a week.
15. Rural Improvement. Professor WAUGH. Two lectures a week.
16. Floriculture. Professor HECHT. Five lectures a week and field trip.
17. Forestry. Professor CLARK. Two lectures a week.
18. Botany. Professor ANDERSON. Two lectures a week.
19. Entomology. Dr. REGAN. Three lectures a week.
20. Beekeeping. Professor GATES and Mr. BYARD. Two lectures and one two-hour laboratory period a week.
21. Farm Mechanics. Professor GUNNESS. One lecture and two two-hour laboratory periods a week.
22. Rural Sanitary Science. Professor MARSHALL. Two lectures a week.
23. Problems of Marketing and Distribution. Professors CANCE, DAMON and WILKINSON. Two lectures a week.
24. Junior Club Work. Professor FARLEY. Two lectures a week.
25. Foods and Conservation. Mrs. SMITH. Three lectures and two two-hour laboratory periods a week.

2. **SPRING BEEKEEPING SCHOOL.** — This itinerant school is held in Amherst once in three years, and extension schools are planned for different sections of the State during the intervening years. It is an intensive course, primarily for a limited number of practical beekeepers. The course, conducted by a strong staff of specialists, occupies seven hours daily for two weeks (Saturdays being devoted to excursion), and comprises lectures, laboratory practicums and field excursions. As this school was held at the college in 1916, it will be located in some other section of the State in 1918. Announcement of date and place will be made later. The course is under the direction of Burton N. Gates, associate professor of beekeeping.

3. **APPLE PACKING SCHOOL.** — The work of this school, which is conducted by the Department of Pomology, is of a practical nature, and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs, and will receive sufficient practice to enable them to do good commercial packing. The 1918 school will probably be held in November, on dates to be announced.

B. SUMMER SCHOOLS, 1918.

1. **THE SUMMER SCHOOL OF AGRICULTURE AND COUNTRY LIFE.** — The Summer School of Agriculture and Country Life of the Massachusetts Agricultural College will open July 1, 1918, for a term of four weeks. This will be the eleventh session of this Summer School, those of past years having been

highly successful. The experience of past years will aid in making material improvements in the session of 1918.

The work of the Summer School was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again in 1918. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Practical courses will be offered for the benefit of such persons also.

1. Soil Fertility. Professor JONES. Five exercises a week.
2. Breeds and Livestock Judging. Professor McNUTT. Five exercises a week.
3. Poultry Breeding and Management. Professor PAYNE. Four lectures and 1 laboratory period a week.
4. Dairying. Professor JAMISON. Three lectures and two two-hour laboratory periods a week.
5. Fruit Growing. Professor SEARS. Five exercises a week.
6. Vegetable Gardening. Professor THOMSON. Five exercises a week.
7. Home and School Garden Supervision. Professor HART. Three two-hour periods a week.
8. Boys' and Girls' Club Work. Professor FARLEY. A series of conferences.
9. Amateur Home and Flower Garden. Professor HECHT. Three lectures and two two-hour demonstration periods.
10. Trees and Shrubs. Professor THOMPSON. Five exercises a week.
11. Bird Life. Mr. MAYNARD. Five exercises a week.
12. Insect Life. Dr. REGAN. Five exercises a week.
13. Plant Diseases. Professor OSMUN. Five lectures a week first two weeks.
14. Beekeeping. Professor GATES. Five lectures a week last two weeks.
15. Food Conservation. Professor CHENOWETH. Two lectures and three two-hour laboratory periods a week first two weeks.
16. Foods. Mrs. SMITH. Three lectures and two demonstrations a week last two weeks.
17. Household Management. Mrs. SMITH. Two hours a week.
18. Sewing. Mrs. FRENCH. Five hours a week.
19. Designs and Practical Arts (1). Mr. RIED. Five exercises a week.
20. Practical Arts (2). Mr. RIED. Five exercises a week.
21. Elementary Agriculture. Professor JONES. Five periods a week.
22. Organized Play and Recreation. Miss FULLER. Three lectures and four demonstrations a week.
23. Plays and Pageantry. Miss HALL. Five exercises a week.
24. Conservation of Health. Professor MARSHALL. Ten lectures.
25. First Aid and Home Nursing. Mrs. POMEROY. Five exercises a week last two weeks.
26. Farm Management. Professor FOORD. Five lectures a week first two weeks.

In order to meet the demand brought about by the present emergency, courses will be given in the 1918 Summer School in foods, canning, drying, storing, first aid and Red Cross work. A thorough course in garden supervision will also be offered.

A course of evening lectures on popular topics relating to the work of the school is a feature of the general program. Several able lecturers are engaged for this course each year.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in the country. Any one interested in problems pertaining to country life should not fail to attend. A descriptive circular can be had April 1, 1918.

2. THE SCHOOL FOR RURAL SOCIAL SERVICE. — This year special emphasis will be laid upon the group of courses given particularly for those who might be classed as rural social workers. These courses last year were primarily for clergymen, teachers and workers with women and girls.

The courses offered presented the rural problem from several standpoints, and served to show the relationships of the workers in the different lines to their respective fields and to the larger community problems which are constantly being presented to them.

Courses offered, 1918.

Home and school gardens.	Organization for women and girls.
Redirection of the rural school.	Practical agriculture.
Gardening and canning.	Co-operation and marketing.
The new rural school.	The new rural church.
Health.	Rural community organization.

Several of the courses offered in the regular Summer School of Agriculture and Country Life are also available to those who register in the School for Rural Social Service and pay the required fees.

3. SCHOOL FOR LIBRARY WORKERS.— During the summer of 1917 a very successful school for library workers, of one week's duration, was held at the college. The work was planned especially for those librarians and library assistants in village and rural libraries, whose special training and experience have necessarily been limited. This school will again be offered in July, 1918.

The faculty of the summer schools for 1917 was as follows:—

- KENTON L. BUTTERFIELD, A.M., LL.D., President of the College.
 WILLIAM D. HURD, M.Agr., Director of the Extension Service and Supervisor of Short Courses.
 ANDREW S. THOMSON, A.M., Assistant Professor of Market Gardening, in charge of Summer Schools.
 CHARLES R. GREEN, B.Agr., Librarian of the College.
 F. JOSEPHINE HALL, A.M., Adviser for Women.
 LAURA ELIZABETH BELL, Director of Physical Education, Amagansett, N. Y., Physical Education.
 ANNA L. BROWN, M.D., Secretary for Hygiene, National Board, Y. W. C. A., Physical Education.
 JOHN L. BYARD, Superintendent of Apiary, Beekeeping.
 WALTER J. CAMPBELL, M.A., Director of County Work, Y. M. C. A. College, Springfield, Mass., Rural Sociology.
 ANNA M. CLARK, County Secretary, Northeastern Field Committee, National Board, Y. W. C. A., Work with Girls.
 WILLIAM D. CLARK, A.B., M.F., Professor of Forestry, Forestry.
 LAURA COMSTOCK, Extension Professor of Home Economics, Home Economics.
 ETHEL CUTLER, Secretary for Religious Work, National Board, Y. W. C. A., Story Telling.
 GEORGE L. FARLEY, M.Sc., Supervisor, Junior Extension Club Work, Boys' and Girls' Clubs.
 AGNES BURNS FERGUSON, M.D., Director of Playgrounds, Pittsburg, Pa., Organized Play.
 BURTON N. GATES, Ph.D., Associate Professor of Beekeeping, Beekeeping.
 JOHN C. GRAHAM, B.Sc., Professor of Poultry Husbandry, Poultry Husbandry.
 IDA E. HALL, LL.B., Waltham, Mass., Plays and Pageants.
 EARL JONES, M.Sc., Assistant Professor of Agronomy, Soil Fertility.
 WILLIAM CHAUNCY LANGDON, Pageant Master, M. A. C. Fiftieth Celebration, Community Drama.
 CHARLES J. MAYNARD, Naturalist and Lecturer, West Newton, Mass., Ornithology.
 JOHN C. McNUTT, B.Sc.Agr., Professor of Animal Husbandry, Animal Husbandry.
 EZRA L. MORGAN, A.M., Extension Professor of Local Community Organization, Community Organization.
 HELEN NORRIS, Extension Instructor in Agricultural Education, in charge of Girls' Camp.
 WILLIAM S. REGAN, Ph.D., Instructor in Entomology, Entomology.
 FREDERICK W. RIED, Director of Practical Arts, Framingham (Mass.) Normal School, Handicrafts.
 MARIE SAYLES, B.S., Extension Instructor in Home Economics, Home Economics.
 FRED C. SEARS, M.Sc., Professor of Pomology, Pomology.

F. A. CUSHING SMITH, B.Sc., M.L.A., Extension Professor of Landscape Gardening, Assistant Civic Improvement.

ROBERT J. SPRAGUE, Ph.D., Professor of Economics and Sociology, Sociology.

MABEL S. ULRICH, M.D., Special Lecturer, National Board, Y. W. C. A., Physical Education.

JOHN T. WHEELER, B.S., Assistant Professor of Horticulture, Elementary Agriculture.

JAMES WHITING, Head Gardener, Department of Floriculture, Floriculture.

C. MISCELLANEOUS COURSES.

1. SHORT COURSES FOR SPECIAL GROUPS. — Plans are now under way to provide short courses at Amherst, lasting four or five days, for fertilizer agents, feed agents and dealers, milk inspectors, seed dealers, bankers and other groups desiring such instruction. Information concerning these may be obtained by writing the Supervisor of Short Courses.

2. SPECIAL DAYS FOR FOREIGNERS. — Each year there are provided at the college special days for foreigners. Instruction is given in soil management, co-operation, American citizenship and history. This work for foreigners will be arranged at the college, or in different sections of the State.

3. MEETINGS OF ORGANIZATIONS AT THE COLLEGE. — It is customary for the various State organizations of fruit growers, poultrymen, breeders and others to meet for conventions and picnics at the college. Such gatherings are welcomed by the college authorities, and organizations are cordially invited to meet in Amherst. The Extension Service will assist in arranging programs and other forms of instruction and entertainment.

All requests for announcements or further information regarding any of the short courses should be addressed to the Supervisor of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

THE EXTENSION SERVICE.

The Extension Service of the Massachusetts Agricultural College is an organized effort to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to 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 business it is to present the instruction of the college to individuals and various educational organizations such as extension schools, granges, Y. M. C. A.'s, churches, boards of trade, etc., throughout the State. Because of the peculiar conditions which are presented to all agricultural workers this year the rôle played by the Extension Service assumes greater proportions than ever before. A large amount of effort is given on the part of the extension workers to the war emergency work in food production and the economy of the home. Extension work may be roughly classified under the following general heads: general administration; correspondence studies; itinerant instruction, which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the Extension Service for its accomplishment; co-operative work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are briefly described below.

COURSES GIVEN AT THE COLLEGE.

1. FARMERS' WEEK. — This week has become a very prominent feature of the agriculture of the State. Instruction is presented by means of lectures, demonstrations, exhibits, round tables and conferences, covering a period of five days. The regular college equipment is used, and the work of the college faculty is supplemented by lectures and demonstrations by eminent men and women from our own and other States. The 1918 program will be divided into 3 sections, as follows: —

1. Agriculture.
2. Horticulture.
3. Home Economics.

These sections take up the time from early morning until late afternoon, and in the evening there are lectures given by prominent men and women. Fruit, corn, live stock, dairy and poultry shows and other exhibits present the most recent improvements in these various lines of work that should be brought to the attention of the farmer who hopes to keep his work and equipment modern. No fee is charged.

2. ANNUAL BEEKEEPERS' CONVENTION. — This convention is held during Farmer's Week. Illustrated lectures, practical demonstrations and commercial displays are important features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

3. POLISH FARMERS' DAY. — A special day is set aside in March of each year which is known as Polish Farmers' Day. There are hundreds of Polish farmers in the Connecticut valley, and this day represents a special effort on the part of the college to be of service to them. Instruction is given relative to the crops and animals in which these people are most interested, soil fertility problems, co-operation, American citizenship, Polish and American history, etc. The services of an interpreter make the day's exercises of added interest and value. It will be held on April 8 and 9, 1918.

4. ANNUAL CONFERENCE OF COUNTY AGENTS AND VOCATIONAL AGRICULTURAL INSTRUCTORS. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The next annual conference will probably be held during the third full week in December, 1918.

5. POULTRY CONVENTION. — In the preparation of our sixth annual poultry convention the wishes and needs of the poultrymen and women of the State will be the first and only consideration. It is not often that the poultry public has an opportunity to hear men of national reputation from different parts of the country, and it is such men that we secure for this occasion.

The special features of the program for 1918 will be as follows:—

1. Lectures by the best talent that can be secured.
2. Demonstrations in killing, picking, packing and preparation for retail trade.
3. Demonstrations in grading and judging market eggs.
4. Demonstrations in selection and mating both for utility and exhibition purposes.
5. Demonstrations with poultry equipment.
6. Poultry museum. Samples of feeds, equipment, diseased specimens, charts, etc.
7. A small poultry farm in Massachusetts. This will be made one of the special features of the program.

Program ready June 1. The convention will be held July 24, 25 and 26, inclusive.

6. AGRICULTURAL CAMP. — During July, dates to be announced. These camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. Teachers, clergymen, Y. M. C. A. workers and county agents are especially urged to send boys who will be benefited by the instruction given at these camps.

The main purpose of these camps is fourfold:—

1. To interest the boy in agriculture and country life. This is the primary object.
2. To impress on the boy his responsibilities as a member of society.

3. To teach the boy clean, wholesome sports, recreation and proper spirit in competitive contests.

4. To demonstrate the value of a boys' camp as an educational factor.

The camps are under military discipline. Not more than forty-two boys — reservation being made for three from each county — will be taken at one time, therefore application should be made early. A succession of these camps, each lasting one week, will be arranged during July. The College feels it has a direct duty to the boys of the State whose inclinations draw them toward agricultural pursuits. In addition to instruction along agricultural lines there will be a well-balanced program of instruction in some of the vital problems of life, and periods will be devoted to athletics and other forms of recreation. The cost to each boy has, in the past, been \$8 for the week. This fee helps defray the cost of maintaining the camp, meals, instruction, lectures and so forth.

The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts and photography, evening camp fires, and lectures by men prominent in boys' work. The regular instructors of the college give practical talks on various agricultural specialties, these talks being followed by demonstrations and by inspection of the departmental equipment, such as the dairy, poultry plant, orchards, etc.

Features of the agricultural work are the stock-judging contests, corn-judging contests, operation of the Babcock milk test and similar specialties. The talks by the different instructors are made very practical, and the boys are given every opportunity to participate in the various lines of agriculture which are outlined.

During the past three years the third camp has been composed of the third prize winners in the State-wide boys' and girls' clubs, a separate camp being maintained upon the same general plan for the girl winners. This will undoubtedly be a feature of these camps in the future.

Opportunities are given for those interested to receive instruction under special teachers in basketry, photography, stock-judging, whittling, surveying and map reading, wireless telegraphy, wig-wagging, shop work, first aid, rope tying and splicing, seed testing, military drill, bird study, etc. Other features are the camp newspaper, minstrels and vaudeville, debates and mock trial and the camp circus.

7. CONFERENCE ON RURAL ORGANIZATION. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged. This conference will follow immediately after the summer school.

CORRESPONDENCE COURSES. — The purpose of the correspondence courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

Courses offered. — A number of courses are in process of revision and several are being rewritten. During 1918 courses will be available as follows: —

1. Soils and Soil Fertility. Assistant Professor JONES.
2. Manures, Fertilizers and Soil Amendments. Assistant Professor JONES.
3. Field Crops. Assistant Professor JONES.
4. Farm Dairying. Professor LOCKWOOD.
5. Fruit Growing. Professor SEARS, Associate Professor CHENOWETH.
6. Market Gardening. Assistant Professor A. S. THOMSON.
9. Farm Accounts. Professor FOORD.
10. Entomology. Dr. REGAN.
12. Beekeeping. Associate Professor GATES.
13. Forestry. Professor CLARK.
14. Shade Tree Management. Professor OSMUN.
17. Poultry Husbandry. Professor GRAHAM.
18. Home Economics. Extension Professor COMSTOCK.

Methods of conducting the Work. — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while others combine the two. If books are not required they are usually recommended.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

Enrollment of Correspondence Courses. — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course. It has been found advisable to discontinue the courses through the summer months, as farmers and most other students cannot devote the necessary amount of time to the lessons during this season.

Expenses of the Correspondence Courses. — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at \$2 for each course except where the courses are divided, and it has been found advisable to charge \$2 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

MISCELLANEOUS SHORT COURSES. — For certain such courses, see page 155.

LECTURES AND DEMONSTRATIONS. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

EXTENSION SCHOOLS. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and

selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

EDUCATIONAL EXHIBITS AT FAIRS AND OTHER SHOWS. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

EXTENSION WORK IN SPECIAL FIELDS.

EXTENSION WORK IN FRUIT GROWING. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

EXTENSION WORK IN ANIMAL HUSBANDRY. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

EXTENSION WORK IN DAIRYING. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babeock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

EXTENSION WORK IN POULTRY HUSBANDRY. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry management, diseases, mating, and laying out and planning buildings, this work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

EXTENSION WORK IN FARM MANAGEMENT, FIELD STUDIES AND DEMONSTRATIONS. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth.

EXTENSION WORK IN RURAL CIVIC PLANNING. — This is carried on in connection with the Department of Landscape Gardening at the college. Assistance is rendered in various rural and village improvement enterprises, such as the planting and care of shade and street trees, the planning of playgrounds, school grounds, cemeteries, picnic grounds, the beautifying of waterfronts, the rearrangement and development of town commons and reservations of historic interest, and similar activities. Efforts are made to co-operate with local granges, men's and women's clubs, village improvement societies and like organizations.

EXTENSION WORK IN HOME ECONOMICS AND FOOD CONSERVATION. — This work includes lectures and demonstrations on subjects pertaining to household economy, dietetics and the preservation of foods. Instruction is carried on by means of extension schools in rural and urban communities, and is designed both for the housewife and for leaders and supervisors.

JUNIOR EXTENSION WORK. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn co-operates with the State Board and the United States Department of Agriculture.

EXTENSION WORK IN HOME ECONOMICS. — The Extension Service, through its home economics workers, stands ready to assist in solving problems relative to the household in the same manner as it is endeavoring through other workers to aid in working out problems of the farm. The work, among other things, includes lectures and demonstrations, assistance in forming girls' clubs and home economics clubs for women, and co-operation with existing organizations in the matter of interesting young people in the proper care of the home.

LOCAL COMMUNITY ORGANIZATION. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and

advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

LIBRARY EXTENSION WORK. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

AGRICULTURAL SURVEYS. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

BUSINESS CO-OPERATION AND MARKETING. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

COUNTY OR DISTRICT AGRICULTURAL AGENTS. — The college is co-operating with farm bureaus and improvement leagues in all the counties of the State in carrying on extension work in agriculture and home economics. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being partly supported through the co-operation of the United States Department of Agriculture, the college and the county engaging the agent.

ADVISORY WORK WITH INSTITUTIONS AND INDIVIDUALS. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

PUBLICATIONS OF THE EXTENSION SERVICE. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, publications giving timely information on agricultural subjects are issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

CO-OPERATION WITH OTHER ORGANIZATIONS. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

INFORMATION BY CORRESPONDENCE. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of 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 \$60 a year. The tuition charged persons not citizens of the United States is \$120 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; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified 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 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 \$3 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 about \$6 a week.

Expenses.

The necessary college expenses are estimated as follows:—

Tuition: citizens of Massachusetts, free; other citizens of the United States, \$60 a year; foreigners, \$120 a year.

	Low.	High.
Matriculation fee, first year,	\$5 00	\$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board, \$5 to \$6 per week,	180 00	216 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Military uniform, first year,	19 00	19 00
Laboratory fees,	5 00	20 00
Books, stationery and miscellaneous items,	14 00	25 00
	<hr/>	<hr/>
	\$280 00	\$425 00

¹ This statement applies to those registering as regular or unclassified students.

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 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 \$300 and \$425 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,	24 00	\$24 00	\$24 00
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees,	5 00	5 00	2 00-10 00
Military uniform, ¹	19 00	-	-
Room rent (if in college dormitory),	-	-	12 00-20 00
Student tax for support of athletics, ²	8 00	8 00	8 00
Student tax for support of nonathletic activities, ²	2 50	2 50	2 50

¹ This cost is subject to modification from year to year.

² 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 27, 3,	\$1 50
Course 50, 1,	2 00
Course 51, 3,	2 00
Course 75, 1,	1 50
Course 76, 3,	1 50

	Per Term.
Animal husbandry: —	
Course 1, 1 and 2,	\$1 00
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 50, 2,	1 50
Course 78, 2,	1 00
Dairying: —	
Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 2,	2 00
Course 76, 3,	3 00
Course 77, 1,	2 50
Farm administration: —	
Course 75, 2,	1 50
Course 76, 3,	1 50
Poultry husbandry: —	
Course 51, 1,	2 50
Course 53, 3,	3 00
Course 55, 3,	2 50
Course 76, 1,	2 00
Course 77, 1,	2 00
Rural engineering: —	
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 76, 1,	1 50
Course 77, 2,	1 50
Course 78, 3,	1 50
Floriculture: —	
Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 53, 1,	2 50
Course 75, 1,	2 00
Course 76, 3,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50
Forestry: —	
Course 50, 1,	2 00
Course 51, 2,	3 00
Course 75, 1,	4 00
Landscape gardening: —	
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	4 00
Course 76, 2,	4 00
Course 77, 3,	4 00
Course 79, 3,	2 00
Market gardening: —	
Course 50, 3,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Pomology: —	
Course 75, 1,	3 00
Course 76, 2,	3 00

Drawing: —	Per Term.
Course 25, 1,	\$3 00
Course 26, 2,	3 00
Botany: —	
Course 3, 3,	3 00
Course 25, 1,	3 00
Course 26, 2,	3 00
Course 50, 1,	3 00
Course 51, 2,	5 00
Course 52, 1,	4 00
Course 53, 2,	4 00
Course 54, 3,	4 00
Course 55, 1,	5 00
Course 56, 2,	5 00
Course 75, 1,	5 00
Course 76, 2,	5 00
Course 77, 3,	5 00
Course 78, 1,	5 00
Course 79, 3,	5 00
Course 80, 3,	5 00
Course 82, 2,	5 00
Course 83, 3,	5 00
Course 84, 2,	5 00
Course 85, 3,	5 00
Entomology: —	
Course 75, 3,	2 00
Course 76, 1,	3 00
Course 77, 2,	3 00
Course 78, 3,	3 00
Chemistry: —	
Course 1, 1,	3 00
Course 2, 2,	3 00
Course 3, 3,	3 00
Course 4, 1,	3 00
Course 5, 2,	3 00
Course 6, 3,	3 00
Course 25, 1,	4 00
Course 26, 2,	4 00
Course 27, 3,	5 00
Course 30, 3,	4 00
Course 51, 1,	5 00
Course 52, 2,	5 00
Course 60, 1,	4 00
Course 61, 2,	5 00
Course 62, 3,	5 00
Course 65, 3,	4 00
Course 76, 1,	5 00
Course 77, 2,	5 00
Course 80, 1,	5 00
Course 90, 2,	5 00
Course 91, 3,	5 00
Course 92, 2,	5 00
Course 93, 3,	5 00
Course 94, 2,	5 00
Course 95, 3,	5 00
Mathematics and engineering: —	
Course 27, 3,	2 00
Course 78, 3,	2 00

	Per Term.
Microbiology: —	
Course 51, 2 and 3,	\$5 00
Course 52, 3,	5 00
Course 75, 2,	5 00
Course 76, 3,	5 00
Course 80, 2,	5 00
Course 81, 1,	5 00
Course 82, 1,	5 00
Course 83, 1,	5 00
Physics: —	
Course 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	3 00
Veterinary science: —	
Course 78, 1,	2 00
Course 79, 1,	2 00
Course 80, 3,	2 00
Course 85, 1,	2 00
Course 86, 2,	2 00
Course 87, 3,	2 00
Zoölogy and geology: —	
Course 25, 1,	3 00
Course Zoölogy 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	4 00
Course 52, 3,	4 00
Course 53, 1,	4 00
Course 54, 2,	3 00
Course 55, 3,	3 00
Course 58,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Course 77, 3,	3 00
Course 78,	2 00
Course 79,	2 00
Rural journalism: —	
Course 53, 1,	2 00
Course 54, 2,	2 00
Course 55, 3,	2 00
Course 77, 1,	2 00
Course 78, 2,	2 00
Course 79, 3,	2 00
Course 80, 1,	2 00
Course 81, 2,	2 00
Course 82, 3,	2 00
Music (each course),	3 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. Freshmen will be assigned rooms according to the date of application.

Women students are expected to occupy rooms in the college dormitory and such houses or apartments as the college may provide. No woman student will be allowed to room in a private house without a special written permission from the dean.

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 sixty 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. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment 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 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"). 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 Florence Levensaler the 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 \$1.50 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 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 six years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. 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.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket ball.

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.

The college publications are the "Massachusetts Collegian" published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Clubs also exist in the Departments of French, Entomology, Floriculture, Landscape Gardening, Zoölogy and Agriculture Economics.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

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 fifth 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 1914 were:—

AGRICULTURE.—The Grinnell prizes, given by Hon. William Claflin 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. Applicants should register with the head of the Division of Agriculture before noon, June 2, 1918.

ANIMAL HUSBANDRY.—The F. Lothrop Ames prize, given by F. Lothrop Ames, Langwater Farms, North Easton, Mass., consisting of \$150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

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.

GENERAL IMPROVEMENT.—The Western Alumni Association prize (\$25) is given to that member of the sophomore class who, during his first two

years in college, has shown the greatest improvement in scholarship, character and example.

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, a gold medal and \$20 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.

Equipment.

AGRICULTURAL EDUCATION. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. The department has an office, lecture room and a laboratory in the Veterinary Science building. The laboratory is equipped with a balance, dishes, jars, reagent bottles, test tubes, petri dishes, lenses, a Babcock test, a Wisconsin sediment test, Bunsen burner, hot and cold water, electricity, gas and other appliances for giving demonstration and practice lessons in Secondary Agriculture. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates. At least four courses in the department are required of students preparing for such certificate. The office is supplied with school and college reports, also a large number of pamphlets and bulletins relating to the subject of agriculture in the schools, courses of study, etc. See note relative to teachers' certificates, under major in Agricultural Education.

AGRONOMY. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

ANIMAL HUSBANDRY. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

BOTANY. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for freshman and sophomore work, and one for junior and senior work; a laboratory for plant physiology, which is well supplied with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc.; and three rooms specially fitted for graduate students. The experimentation laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experimental work and for housing material often needed for instruction.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with modern compound microscopes, dissecting microscopes, microtomes and other apparatus, and a large series of charts. In addition to a physiological laboratory the basement contains a seed and soil room, and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe and other tools and appliances. The herbarium contains about 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and over 20,000 specimens of fungi.

CHEMISTRY. — The college Department of Chemistry occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry,

and has desk room and hoods sufficient to accommodate 90 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 56 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

DAIRYING. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

DINING HALL. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

DRAWING. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fire-proof entomological and zoological building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the

same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

ENTOMOLOGY. — *Beekeeping.* — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 900 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

FARM ADMINISTRATION. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, 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.

FLORICULTURE. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent speci-

mens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

FORESTRY. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; 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 located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects. The recent designation of Mt. Toby as a forest reservation provides more than 700 acres of forest, representing nearly every forest growth within the State.

GEOLOGY. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains about 56,090 volumes and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive

due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and department are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 7.30 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying*. — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MICROBIOLOGY. — The department now occupies a newly erected building, and has at command laboratories, research rooms, offices and class-rooms, of thoroughly modern completeness.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

PHYSICS. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

POMOLOGY. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1916-17, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas. From the college fruit plantations the following

fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, one hundred varieties of apples.

POULTRY HUSBANDRY. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, craming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

PUBLIC SPEAKING. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

RURAL ENGINEERING. — 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 building 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. A saw table is available for getting out material. 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 and pumps. 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.

RURAL JOURNALISM. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books, and a considerable "morgue" of indexed pamphlets, monographs and clippings on farming, rural life and rural industry, contemporary events, etc. (loan collection). The news-room and offices are in the recently completed Stockbridge Hall, near the division library of the Division of Agriculture.

VETERINARY SCIENCE. — The department of Veterinary Science 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.

ZOOLOGY. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Professor Gordon.

List of Awards and Prizes, 1917.

Due to the early closing of college in 1917, no contests were held for the Grinnell prizes, the Hills botanical prizes or the public speaking prizes.

GENERAL IMPROVEMENT. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, \$25. Awarded to William Mather, 1919.

MILITARY HONORS. — The following-named cadet officers have been granted the military diploma, and have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Oliver Simeon Flint.
 Cadet Maj. Walter Adams Mack.
 Cadet Maj. Almon Whitney Spaulding.
 Cadet Maj. Lewis Taylor Buckman.
 Cadet Capt. Charles Henry Hagelstein.
 Cadet Capt. Harold Barnard Pierce.
 Cadet Capt. William Saville, Jr.
 Cadet Capt. Albert Briggs Loring.
 Cadet Capt. Monsell Henry Davis.
 Cadet Capt. William Raymond Irving.
 Cadet Capt. Philip Rodney Babcock.

Secretaries of Alumni Associations.

Associate Alumni of the Massachusetts Agricultural College.

Secretary: Dr. CHARLES A. PETERS, 1897, Amherst, Mass.

Alumni Secretaries' Association of the Massachusetts Agricultural College.

Secretary: RALPH J. WATTS, 1907, Amherst, Mass.

Alumni Club of Massachusetts.

Secretary: EDWARD C. EDWARDS, 1914, 50 State Street, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.

Secretary: ROBERT S. FAY, 1913, Monson, Mass.

Massachusetts Agricultural College Club of New York.

Secretary: WALTER L. MORSE, 1895, Grand Central Terminal, New York.

Massachusetts Agricultural College Club of Washington, D. C.

Secretary: G. A. BILLINGS, U. S. D. A., Office of Farm Management, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.

Secretary: THEODORE J. MOREAN, 1912, 815 Steinway Hall, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.

Secretary: THOMAS F. HUNT, 1905, Berkeley, Cal.

Massachusetts Agricultural College Club of Hawaii.

President: ALLEN M. NOWELL, 1897, Honolulu, T. H.

Massachusetts Agricultural College Club of Worcester County.

Secretary: CHARLES H. WHITE, 1909, 11 Foster Street, Worcester, Mass.

Massachusetts Agricultural College Club of Marlborough.

Secretary: WILLIAM L. HOWE, 1908, Marlborough, Mass.

Massachusetts Agricultural College Club of Connecticut.

Secretary: HERBERT J. BAKER, 1911, Storrs, Conn.

Class Secretaries.

Class of —	SECRETARY.	Secretary's Address.
1871	E. E. Thompson, . . .	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball, . . .	17 Harvard Street, Worcester, Mass.
1873	C. Wellington, . . .	Amherst, Mass.
1874	D. G. Hitchcock, . . .	Warren, Mass.
1875	P. M. Harwood, . . .	Room 136, State House, Boston, Mass.
1876	C. Fred Deuel, . . .	Amherst, Mass.
1877	Atherton Clark, . . .	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell, . . .	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan, . . .	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler, . . .	413 Federal Building, Philadelphia, Pa.
1881	J. L. Hills, . . .	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe, . . .	38 Whittier Avenue, Springfield, Mass.
1883	J. B. Lindsey, . . .	Amherst, Mass.
1884	E. A. Jones, . . .	New Canaan, Conn.
1885	E. W. Allen, . . .	1923 Biltmore Street, Washington, D. C.
1886	Winfield Ayres, . . .	616 Madison Avenue, New York City.
1887	F. H. Fowler, . . .	Shirley, Mass.
1888	H. C. Bliss, . . .	14 Mechanic Street, Attleboro, Mass.
1889	F. W. Davis, . . .	85 Colberg Avenue, Roslindale, Mass.
1890	David Barry, . . .	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores, . . .	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson, . . .	Amherst, Mass.
1893	F. A. Smith, . . .	Hathorne, Mass.
1894	S. F. Howard, . . .	Northfield, Vt.
1895	E. A. White, . . .	Ithaca, N. Y.
1896	A. S. Kinney, . . .	South Hadley, Mass.
1897	C. A. Peters, . . .	Amherst, Mass.
1898	W. S. Fisher, . . .	Peace Street Grammar School, Providence, R. I.
1899	Herbert W. Dana, . . .	9 Oliver Street, Salem, Mass.
1900	E. K. Atkins, . . .	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering, . . .	Dover, Mass.
1902	H. L. Knight, . . .	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones, . . .	North Amherst, Mass.
1904	P. F. Staples, . . .	East Holliston, Mass.
1905	A. D. Taylor, . . .	1900 Euclid Avenue, Cleveland, Ohio.
1906	Richard Wellington, . . .	2314 Scudder Street, St. Paul, Minn.
1907	Clinton King, . . .	31 Elm Street, Springfield, Mass.
1908	S. J. Wright, . . .	39 Wall Street, Norwalk, Conn.
1909	O. B. Briggs, . . .	1011 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas, . . .	Auburn, Ala.
1911	L. M. Johnson, . . .	Newtown, Conn.
1912	F. S. Madison, . . .	East Greenwich, R. I.
1913	B. W. Ellis, . . .	575 Main Street, South Weymouth, Mass.
1914	L. Ernest Smith, . . .	Pittsford, Vt.
1915	P. F. Whitmore, . . .	Sunderland, Mass.
1916	Perez Simmons, . . .	34 Boylston Street, Pittsfield, Mass.
1917	John Dizer, . . .	- - -

DEGREES CONFERRED AND
ROLL OF STUDENTS.

DEGREES CONFERRED — 1917.

MASTER OF SCIENCE (M.Sc.).

Bales, Harold Campbell, South Deerfield, Mass., Dartmouth College, A.B.
 Chapin, Edward Albert, Springfield, Mass., Sheffield Scientific School, Ph.B.
 Cobb, J. Stanley, Groton, N. Y., Cornell University, B.Sc.
 Doran, William Leonard, North Dartmouth, Mass., Massachusetts Agricultural College, B.Sc.
 Fish, Ernest Ellsworth, Wyalusing, Pa., Pennsylvania State College, B.Sc.
 Merkle, Frederick Grover, Amherst, Mass., Massachusetts Agricultural College, B.Sc.
 Mutkekar, Satwaji Gundooi, Belgaum, India, Poona Agricultural College, B.Agr.
 Vinal, Stuart Cuninghame, East Weymouth, Mass., Massachusetts Agricultural College, B.Sc.

BACHELOR OF SCIENCE (B.Sc.).

Babeock, Philip Rodney,	Lynn.
Behrend, Oswald,	Natick.
Bell, Alfred Whitney, Jr.,	West Newton.
Blake, Ralph Cedric,	Wollaston.
Boles, Robert Stewart,	Dorchester.
Bonn, Wesley Copeland,	Grafton.
Booth, Alfred,	Campbell Hall, N. Y.
Boyce, Harold Prescott,	Haverhill.
Buckman, Lewis Taylor,	Wilkes-Barre, Pa.
Buttrick, David Herbert,	Arlington.
Carruth, Glenn Howard,	Orange.
Chamberlin, Frank Shirley,	Framingham.
Clough, Charles Henry,	Dedham.
Cross, Walter Irving,	Hingham Center.
Curtin, Charles Warren,	Newton.
Davis, Monsell Henry,	Orange, N. J.
Day, James Harold,	Hatfield.
Dempsey, Paul Wheeler,	Dorchester.
Dickey, Harold Gammell,	Dorchester.
Dillon, Thomas Stevenson,	West Warren.
Dizer, John Thomas,	East Weymouth.
Duffill, Edward Stanley,	Melrose Highlands.
Dunham, Henry Gurney,	West Bridgewater.
Edwards, Franz Gill,	Beverly.
Elliot, Ralph William,	Charley.
Everbeck, George Charles,	Boston.
Fearing, Ralph Watson,	Dorchester.
Fellows, Katharine Adelheid,	Northampton.
Fisher, George Basil,	Millbury.
Flagg, Wayne McCrillis,	Mittineague.
Flint, Oliver Simeon,	Lowell.
Goldstein, Maurice,	Lynn.
Graham, Leland Jenkins,	Amherst.
Grayson, Emory Ellsworth,	Milford.
Gurshin, Carl Alfred,	Lynn.
Hagelstein, Charles Henry,	Dorchester.
Harlow, Frank Edward,	Malden.
Harlow, Paul Goodhue,	Malden.
Henninger, Roswell Woodward,	WilliamSPORT, Pa.
Higginbotham, Harry,	Taunton.
Holden, Richard Lynde,	Haverhill.

Holder, Ralph Clifton,	Farmington, N. H.
Hubbell, Franklin Homer,	Westport, Conn.
Irving, William Raymond,	Taunton.
Kelsey, Edmund Dean,	Amherst.
Kelsey, Lincoln David,	West Hartford, Conn.
Kinsman, Alfred Oberlin, Jr.,	Merrimac.
Larson, Frederick Christian,	Everett.
Latham, Paul Walker,	Norwichtown, Conn.
Lawrence, Milford Robinson,	Falmouth.
Light, Brooks,	Brookline.
Loring, Albert Briggs,	Nantasket Beach.
Lydiard, Harry Crowther,	Hartford, Conn.
Mack, Walter Adams,	Springfield.
MacLeod, Daniel Johnston,	Wakefield.
Marchant, Horace Greenough,	Cambridge.
Mayo, Frank Willard,	Houlton, Me.
Mayo, William Irving, Jr.,	Framingham.
McNamara, Michael Joseph,	Stoughton.
Merrill, Dana Otis,	East Pepperell.
Nash, Herman Beaman,	Amherst.
Nelson, John Brockway,	Newburyport.
Noyes, Samuel Verne,	Georgetown.
Pierce, Harold Barnard,	Hartford, Conn.
Pratt, Harold Arthur,	Shrewsbury.
Quimby, Charles Frederick,	Cape Neddick, Me.
Randall, Earle MacNeill,	Winchester.
Richardson, Lewis Elmer,	Rockville.
Rodger, Raymond Miller,	Everett.
Rogers, Roland Winsor,	Braintree.
Rorstrom, Hans Alfred,	Boston.
Ross, Louis Warren,	Boston.
Saidel, Harry Samuel,	Worcester.
Sargent, George Leonard,	Merrimac.
Saunders, William Putnam,	Lawrence.
Sauter, John Martin,	Turners Falls.
Saville, William, Jr.,	Waban.
Schaefer, Leonard Charles,	Holyoke.
Schwab, Andrew Nathan,	Yalesville, Conn.
Selkregg, Edwin Reimund,	Northeast, Pa.
Smith, Herbert Dwight,	Amherst.
Smith, Richard Woodworth,	Pittsfield.
Spaulding, Almon Whitney,	Newton Highlands.
Squires, Paul Revere,	Belchertown.
Stearns, Carlton McIntyre,	Melrose.
Stiles, Albert Ralph,	Arlington Heights.
Stowell, Harold Thurber,	Amherst.
Thayer, William Wallace,	Somerville.
Tuthill, Samuel Fuller,	Mattapoisett.
Upton, Everett Langdon,	New Britain, Conn.
Walbridge, Henry Blood,	Bennington, Vt.
Warner, Merrill Pomeroy,	Sunderland.
Warren, Harold Manson,	Melrose.
Warren, James Joseph,	North Brookfield.
Webster, Frank Cedric,	Harvard.
Westman, Robert Clayton,	Roslindale.
Whitecomb, Warren Draper,	Waltham.
Whitney, Harold Tichenor,	Mount Vernon, N. Y.
Whitney, Joseph Fradley,	Westminster.
Wies, Calmy,	Malden.
Wilber, Charles Raymond,	Walpole.
Wilcox, Timothy Palmer,	West Andover.
Williams, Arthur Franklin,	Sunderland.
Williams, Herbert Clifton,	South Hadley Falls.

ROLL OF STUDENTS.

GRADUATE STUDENTS.

Allen, Harry W.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Bourne, Arthur I.,	Amherst.
A.B., Dartmouth College.	
Cheplin, Harry A.,	Johnstown, Pa.
B.S.A., Syracuse University.	
DeVault, Samuel Henry,	Amherst.
A.B., Carson-Newman College.	
A.M., University of North Carolina.	
Dougall, Robert,	Pretoria, Transvaal, S. A.
B.S.A., McGill University.	
Fagan, Frank N.,	State College, Pa.
B.Sc., Ohio State University.	
Gordon, Thomas B.,	Lexington, Ky.
B.S.Agr., University of Kentucky.	
Hompe, Louise,	Auburn, N. Y.
B.A., Smith College.	
Hood, Egerton Gibson,	Amherst.
B.S.A., Toronto University.	
Jones, Linus H.,	Milford.
B.Sc., Massachusetts Agricultural College.	
Lieber, Conrad H.,	Jamaica Plain.
B.Sc., Massachusetts Agricultural College.	
MacNeil, Ralph Langdel,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Martin, John Elmer,	Mounds, Okla.
B.S., Oklahoma Agricultural and Mechanical College.	
Morgan, Ezra Leon,	Amherst.
A.B., McKendree College.	
M.A., University of Wisconsin.	
Mutkekar, Satwaji Gundoji,	Belgaum, India.
B.Agr., Poona Agricultural College.	
M.Sc., Massachusetts Agricultural College.	
Neill, James,	Clarion, Pa.
B.S., Alleghany College.	
Pauley, William C.,	Lafayette, Ind.
B.Sc. in Agr., Purdue University.	
Peacock, Walter Miller,	Amherst.
B.Sc., Cornell University.	
M.S.A., Cornell University.	
Pontius, Byron E.,	Amherst.
B.S. in Agr., Ohio State University.	
Porter, Bennet Allen,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Purinton, James A.,	Hopkinton, N. H.
B.Sc., New Hampshire College of Agriculture.	
Ray, George Burrill,	Hingham.
B.Sc., Massachusetts Agricultural College.	
Root, Irving C.,	Kansas City, Kan.
B.Sc., Kansas State Agricultural College.	

Serex, Paul, Jr.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
M.Sc., Massachusetts Agricultural College.	
Stewart, Lloyd Leland,	Amherst.
B.Se. in Agr., Purdue University.	
Thompson, W. Bradley,	Orange, N. J.
A.B., Williams College.	
White, Donald,	Wakefield.
A.B., Harvard College.	
Wildon, Carrick E.,	Melrose Highlands.
B.Sc., Massachusetts Agricultural College.	
Wood, Elwin G.,	Big Fork, Mont.
B.Se., Washington State College.	

CLASS OF 1918.

Additon, Elizabeth Emery,	Newton Center,	Draper Hall.
Babbitt, George King,	Washington, D. C.,	14 South College.
Baker, Henry Raymond, ¹	Amherst,	West Street.
Barton, George Wendell,	North Sudbury,	3 South College.
Boyd, Robert Lucius, ¹	East Lynn,	1 South College.
Bruce, Walter Griffith,	Stafford Springs, Conn.,	21 Fearing Street.
Buchanan, Walter Gray,	Chicopee,	97 Pleasant Street.
Canlett, Franklin Harwood,	Bedford,	36 North Prospect Street.
Carlson, Fred Albert,	Pittsfield,	84 Pleasant Street.
Carter, Thomas Edward,	Andover,	6 South College.
Chapman, John Alden,	Salem,	Phi Sigma Kappa.
Clark, Stewart Sandy,	Holyoke,	Chemistry Laboratory.
Cotton, Elwyn Page,	Woburn,	2 North College.
Davis, Dwight Shaw,	Woburn,	3 South College.
Edes, David Oliver Nourse,	Bolton,	Mathematics Building.
Emmerich, Louis Phillip, ¹	Paterson, N. J.,	Q. T. V. House.
Foley, William Albert,	Palmer,	Alpha Sigma Phi.
Foster, Roy Wentworth,	Lynn,	Lambda Chi Alpha.
Goodwin, William Irving, ¹	Bradford,	Lambda Chi Alpha.
Haines, Foster Kingsley,	Peabody,	15 South College.
Hance, Forrest Sansbury,	Paterson, N. J.,	Theta Chi.
Hayes, Olin Henry, ¹	Lawrence,	M. A. C. Poultry Plant.
Hilliker, Harriett Franklin, ¹	East Lynn,	87 Pleasant Street.
Holmes, George Frederick, ¹	Ipswich,	60 Pleasant Street.
Howes, Donald Francis,	Ashfield,	11 North College.
Hunnell, Paul Fiske,	Winthrop,	Phi Sigma Kappa.
Illman, Margaret Keble,	Schuyler Falls, N. Y.,	Draper Hall.
Johnson, Birger Lars, ¹	Dorchester,	Stockbridge Hall.
Lanphear, Marshall Olin,	Windsor, Conn.,	Kappa Sigma.
Lawrence, Lewis Henry, ¹	Falmouth,	83 Pleasant Street.
Lawton, Ralph Wilber,	Fall River,	3 South College.
Leonard, Ralph Stanley,	Melrose,	Lambda Chi Alpha.
Levine, Darwin Solomon,	Sherborn,	5 South College.
Lipshires, David Mathew,	Roxbury,	South College.
Loring, William Rupert,	Great Barrington,	South College.
Lyons, Louis Martin,	Boston,	East Experiment Station.
Mallorey, Alfred Sidney, ¹	Lynn,	51 Amity Street.
McRae, Herbert Rankin,	Malden,	4 Nutting Avenue.
Millard, Harold Baldwin, ¹	Great Barrington,	Veterinary Laboratory.
Mower, Carl Taft, ¹	Barre, Vt.,	Kappa Sigma.
Newton, Gaylord Arthur,	Durham, Conn.,	10 South College.
Phipps, Clarence Ritchie, ¹	Dorchester,	Theta Chi.
Popp, Edward William,	Albany, N. Y.,	13 South College.
Pratt, Oliver Goodell,	Salem,	Kappa Sigma.
Preble, John Nelson,	Jamaica Plain,	Theta Chi.
Raymond, Clinton Rufus,	Beverly,	Lambda Chi Alpha.

¹ Work incomplete.

Reumann, Theodore Henry,	New Bedford,	12 South College.
Richardson, Stephen Morse, ¹	Wellesley,	Q. T. V. House.
Ritter, Ernest,	New Britain, Conn.,	Theta Chi.
Roberts, Oliver Cousens, ¹	Arlington,	Theta Chi.
Rosequist, Birger Reignold,	Brockton,	14 South College.
Russell, Howard Leigh,	Worcester,	Theta Chi.
St. George, Raymond Alexander,	East Lynn,	Entomology Building.
Sanborn, Dean Waldron,	Conway,	Q. T. V. House.
Sawyer, Wesley Stevens,	Boston,	7 South College.
Schlough, George Hamer,	Waltham,	Lambda Chi Alpha.
Schwartz, Louis,	Melrose,	5 South College.
Smith, Carleton Tower,	West Newton,	6 South College.
Smith, Sidney Summer, ¹	Roslindale,	South College.
Stjernlof, Axel Uno,	Worcester,	15 South College.
Sullivan, Harold Leo,	Lawrence,	13 South College.
Tilton, Arthur Dana,	Wellesley,	Phi Sigma Kappa.
van Alstyne, Lewis Morrell, ¹	Kinderhook, N. Y.,	Phi Sigma Kappa.
Wooding, Paul Bennett, ¹	Yalesville, Conn.,	French Hall.

CLASS OF 1919.

Alden, Dean Watson, ¹	Proctor, Vt.,	82 Pleasant Street.
Bagg, Quincy Austin, ¹	South Hadley,	9 North College.
Baker, William Alphonso, ¹	Melrose,	82 Pleasant Street.
Baker, William Herbert, Jr.,	Chesterfield,	88 Pleasant Street.
Batchelder, Stewart Putnam,	North Reading,	Q. T. V. House.
Blanchard, Carlton Douglas,	Uxbridge,	Kappa Sigma.
Bögholt, Carl Miller, ¹	Newport, R. I.,	Q. T. V. House.
Bond, Herbert Richard,	Needham,	Phi Sigma Kappa.
Bowen, Arthur Newton, ¹	Quincy,	7 South College.
Bowen, Maurice Stetson, ¹	Middleborough,	81 Pleasant Street.
Boyce, Alan Freeman,	Melrose,	83 Pleasant Street.
Boynton, Raymond Woods, ¹	Framingham,	Alpha Sigma Phi.
Brigham, Sylvia Bowen, ¹	Newtonville,	Draper Hall.
Buffum, Eliot Mansfield,	Waban,	College Store.
Burt, Henry John,	Arlington,	66 Pleasant Street.
Burton, Lee Williams,	Plainville,	3 North College.
Callanan, John Edward, ¹	Dorchester,	60 Pleasant Street.
Callanan, Vincent DePaul,	Malden,	Draper Hall.
Carpenter, Hall Bryant,	Somerville,	Kappa Sigma.
Carroll, Olive Evangeline, ¹	Dorchester,	33 East Pleasant Street.
Cassidy, Morton Harding, ¹	East Boston,	Lambda Chi Alpha.
Chandler, Arthur Lincoln,	Leominster,	12 South College.
Chapin, Frederic Charles,	Greenfield,	West Experiment Station.
Chase, Malcolm Willis, ¹	Amesbury,	94 Pleasant Street.
Chisholm, Robert Dudley, ¹	Melrose Highlands,	Phi Sigma Kappa.
Coderre, Ernest Laurier,	Southbridge,	Alpha Sigma Phi.
Collins, Robert Burleigh,	Rockland,	88 Pleasant Street.
Cosby, Alfred Francis,	Westfield,	15 Amity Street.
Crowe, Charles, ¹	Norwich, Conn.,	Kappa Sigma.
Day, Harold Ralph,	Milford,	Alpha Sigma Phi.
Dickinson, Victor Abel, ¹	Amherst,	Mount Pleasant.
Dunbar, Charles Oliver, ¹	Westfield,	84 Pleasant Street.
Erhard, Bena Gertrude, ¹	East Milton,	Draper Hall.
Erickson, Gunnar Emmanuel,	West Lynn,	9 South College.
Evans, Myrton Files,	West Somerville,	Kappa Sigma.
Faneuf, Ambrose Clement, ¹	West Warren,	Chemistry Laboratory.
Farrington, Robert Pierce, ¹	Nantucket,	15 Boston Street.
Faxon, Paul, ¹	Wellesley Hills,	Phi Sigma Kappa.
Ferris, Adaline Lawson,	Ridgefield Park, N. J.,	Draper Hall.
Ferriss, Samuel Boynton, ¹	New Milford, Conn.,	11 North College.
Field, Wilbert Daniel, ¹	Winter Hill,	29 McClellan Street.

¹ Work incomplete.

Fogg, Verne Allen,	Topsfield,	73 Pleasant Street.
French, Willard Kyte,	Worcester,	Q. T. V. House.
Garde, Earl Augustus,	Lynn,	30 North Prospect Street.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Glavin, William Francis,	Wenham,	North College.
Goff, Howard Mason,	Cambridge,	Phi Sigma Kappa.
Green, Lynn, ¹	Schenevus, N. Y.,	53 Lincoln Avenue.
Guba, Emil Frederick,	New Bedford,	Clark Hall.
Hall, Frank Edwin, ¹	Revere,	Lambda Chi Alpha.
Harris, Ethel Lovett, ¹	Beverly,	Draper Hall.
Hartwell, Richard Raymond, ¹	Springfield,	Colonial Inn.
Hastings, Louis Pease,	Springfield,	Kappa Sigma.
Hodgson, Benjamin Earl,	Methuen,	M. A. C. Farm House.
Hopkins, George Randolph Lawrence,	Orleans,	116 Pleasant Street.
Howe, Ralph Thomas,	Melrose Highlands,	120 Pleasant Street.
Hunter, Harold Clayton, ¹	South Hadley Falls,	9 South College.
Jewell, Charles Henry,	Merrimac,	M. A. C. Farm House.
Johnson, Lawrence Wilhelm,	Avon,	Alpha Sigma Phi.
Johnson, Sidney Clarence, ¹	Gloucester,	7 South College.
Jordan, Raymond Douglas, ¹	Springfield,	9 South College.
Knight, Frank Edward, ¹	Brimfield,	3 North College.
Knowlton, Priscilla, ¹	Roxbury,	87 Pleasant Street.
Liebman, Anna,	Dorchester,	Draper Hall.
Mansell, Elton Jessup, ¹	Cambridge,	Phi Sigma Kappa.
Mather, William,	Amherst,	West Experiment Station.
Mattoon, Charles Gordon,	Pittsfield,	2 North College.
McCarthy, Arthur Martin,	Monson,	Q. T. V. House.
Morse, Maurice,	Dorchester,	Entomology Building.
Morton, Elmer Joshua, ¹	Watertown,	Veterinary Laboratory.
Newbold, Douglas Tracy,	Northampton,	16 South College.
O'Hara, Joseph Ernest, ¹	Worcester,	8 Kellogg Avenue.
Parke, Robert Warren,	Winchendon,	1 Allen Street.
Parkhurst, Raymond Thurston,	Fitchburg,	Kappa Sigma.
Parsons, Edward Field,	North Amherst,	North Amherst.
Peck, George Newberry,	Granville,	9 South College.
Peirson, Henry Byron,	New Bedford,	Kappa Sigma.
Perry, Errol Clinton, ¹	Acushnet,	15 Hallock Street.
Peterson, Leroy Duane, ¹	Brooklyn, N. Y.,	85 Pleasant Street.
Pierpont, Frederick Trowbridge,	Stamford, Conn.,	18 Nutting Avenue.
Prée, Karl Julius,	Brookline,	88 Pleasant Street.
Pulley, Marion Gertrude, ¹	Melrose,	2 Allen Street.
Rea, Julian Stuart,	East Weymouth,	15 Beston Street.
Record, Harold Jordan,	West Boylston,	73 Pleasant Street.
Ross, Donald,	Boston,	Phi Sigma Kappa.
Rowe, Clifford Alton, ¹	East Orange, N. J.,	Phi Sigma Kappa.
Sargent, Walter Harriman, ¹	Malden,	4 Chestnut Street.
Sibley, Helen Aramintha, ¹	Longmeadow,	Draper Hall.
Skinner, Everett Hamilton, ¹	West Upton,	Kappa Sigma.
Smith, Wendell Frederick, ¹	Troy, N. Y.,	66 Pleasant Street.
Spaulding, Harold Edwin, ¹	Milford,	Aggie Inn.
Stafford, Irving Boynton,	Fall River,	6 Nutting Avenue.
Stevens, Chester Dillingham,	Reading,	120 Pleasant Street.
Stockwell, Ervin Sidney, Jr., ¹	Sharon,	81 Pleasant Street.
Strack, Edward, ¹	Framingham,	Clark Hall.
Sutherland, Ralph, ¹	Cambridge,	13 South College.
Sweeney, William Joseph,	Dorchester,	North College.
Taylor, Edmund Billings,	Wollaston,	13 Phillips Street.
Thayer, Weston Cushing, ¹	Hingham,	1 South College.
Thomas, Frank DesAutels, ¹	Milford,	1 North College.
Tirrell, Loring Vinson,	South Weymouth,	Theta Chi.
Underwood, Arthur Leslie, ¹	Maynard,	11 North College.

¹ Work incomplete.

Vickers, John, ¹	Amherst,	90 Pleasant Street.
Wells, Marion Nichols,	Springfield,	Draper Hall.
White, Edward Asa,	Providence, R. I.,	11 South College.
Whittle, Clarence Parker, Jr., ¹	Weymouth,	Phi Sigma Kappa.
Williams, Kenneth Sanderson, ¹	Sunderland,	Q. T. V. House.
Window, James Joseph,	Springfield,	5 Allen Street.
Wood, Oliver Wiswell, ¹	Arlington,	81 Pleasant Street.
Woodard, Chester Smith, ¹	Leverett,	Leverett.
Woodbury, Ray Willard, ¹	Newburyport,	Cottage Street.
Woodside, Wilfred Livingstone,	Boston,	73 Pleasant Street.
Yesair, John, ¹	Byfield,	Kappa Sigma.

CLASS OF 1920.

Allen, Harold Kenneth,	Belchertown,	100 Main Street.
Andrews, George Henry, ¹	Farmington, Conn.,	1 School Street.
Apsey, George Wills, Jr.,	Winchester,	85 Pleasant Street.
Armstrong, Philip Brownell,	Rutherford, N. J.,	Phi Sigma Kappa.
Bacon, Milo Roderick, ¹	Leominster,	Draper Hall.
Bailey, William, Jr.,	Williamstown,	M. A. C. Farm House.
Ball, Harry Abraham,	Bridgewater,	16 North College.
Ball, Lorin Earl, ¹	Amherst,	3 Allen Street.
Beauregard, Winfield Scott,	Framingham,	15 North College.
Belcher, Daniel Webster, ¹	North Easton,	120 Pleasant Street.
Berman, Harry, ¹	Holyoke,	5 South College.
Berman, Louis, ¹	Dorchester,	9 Fearing Street.
Bigelow, Henry Charles,	Millville, N. J.,	90 Pleasant Street.
Blanchard, Kenneth, ¹	Highland Falls, N. Y.,	5 Nutting Avenue.
Boardman, Charles Meade,	Amherst,	33 Lincoln Avenue.
Brown, Roy Robertson,	Hudson,	Physics Building.
Bunker, Carroll Wooster,	West Somerville,	Q. T. V. House.
Burns, Allan Melville, Jr.,	Taunton,	88 Pleasant Street.
Campbell, George Murray, ¹	Baltimore, Md.,	Phi Sigma Kappa.
Cande, Robert Parsons,	Pittsfield,	23 East Pleasant Street.
Card, Ralph Hunter,	Somerville,	Cottage Street.
Carleton, John Foxcroft,	East Sandwich,	Draper Hall.
Center, Arthur Edwin,	Springfield,	73 Pleasant Street.
Clarridge, Fred William,	Millford,	88 Pleasant Street.
Clough, Alfred Arnold,	Wollaston,	Physics Building.
Cole, Frederick Eugene, Jr.,	South Portland, Me.,	88 Pleasant Street.
Crafts, Gordon Burnham,	Manchester,	Q. T. V. House.
Crawford, John Alexander,	Allston,	90 Pleasant Street.
Crimmin, Royce Brainerd, ¹	Bradford,	Lambda Chi Alpha.
Daggett, Clinton Jones,	Washington, D. C.,	Kappa Sigma.
Davenport, Frank Semore, ¹	Dorchester,	Alpha Sigma Phi.
Davidson, Donald Gordon,	Amherst,	7 Northampton Road.
Davis, Orrin Chester,	Belchertown,	90 Pleasant Street.
Delahunt, John Kersey,	Boston,	29 McClellan Street.
Derick, Glendon Robert,	Clinton,	13 Phillips Street.
Dewing, Warren Montague,	Kingston,	Kappa Sigma.
Doucette, Charles Felix,	Melrose,	M. A. C. Apiary.
Douglass, Donald Churchill, ¹	Cambridge,	Phi Sigma Kappa.
Dwyer, James Edward,	Sunderland,	Alpha Sigma Phi.
Earley, Marion Edith, ¹	West Newton,	87 Pleasant Street.
Emery, Herbert Martin, ¹	Newburyport,	5 North College.
Faber, Edward Stuart, ¹	Plainfield, N. J.,	77 Pleasant Street.
Farnsworth, Richard Wasgatt, ¹	Lancaster,	1 School Street.
Fuller, Lorenzo,	Lowell,	Lambda Chi Alpha.
Graff, Leland Sprague, ¹	Reading,	66 Pleasant Street.
Graves, Carlisle Ferrin,	Stamford, Conn.,	Alpha Sigma Phi.
Gray, Irving Emery, ¹	Woods Hole,	90 Pleasant Street.
Grout, Nathan, ¹	Sherborn,	60 Pleasant Street.

¹ Work incomplete.

Hale, Frank Thompson Caldwell, ¹	Byfield,	90 Pleasant Street.
Hamlin, Hazen Wolcott, ¹	Amherst,	90 Pleasant Street.
Harrington, Harold Leon,	Lunenburg,	44 Triangle Street.
Haslam, Emerson Francis,	Westwood,	101 Pleasant Street.
Haynes, Charles Francis, ¹	Canton,	13 Phillips Street.
Higgs, John Alden, ¹	Wareham,	120 Pleasant Street.
Hill, John Farren,	Egypt,	29 McClellan Street.
Hill, Theodore, Jr., ¹	Jefferson Valley, N. Y.,	Lambda Chi Alpha.
Holland, Frank Harold,	Shrewsbury,	Plant House.
Holloway, John William,	Taunton,	5 Nutting Avenue.
Holmes, John Foster,	Needham,	Lambda Chi Alpha.
Horne, Robert Sanderson, ¹	Wellesley Farms,	Q. T. V. House.
Hurd, Davis Alden, ¹	Wellesley Hills,	36 North Prospect Street.
Hurd, Gordon Killam, ¹	Millbury,	36 North Prospect Street.
Iorio, Carlo Antonio,	Springfield,	75 Pleasant Street.
Jakeman, Brooks Franklin,	Winchester,	Lambda Chi Alpha.
Johnson, Conrad John,	Campello,	Lambda Chi Alpha.
Jones, Robert Lambert,	North Easton,	Q. T. V. House.
King, William Cutting,	Suffield, Conn.,	120 Pleasant Street.
Lambert, Richard Bowles,	Gleasondale,	Mathematics Building.
Lent, Donald Ashford,	Maynard,	90 Pleasant Street.
Levine, Maurice Eleazer, ¹	Sherborn,	10 North College.
Littlefield, John Edwin,	Lynn,	15 Hallock Street.
Lothrop, Earle Daniel,	West Bridgewater,	90 Pleasant Street.
Luce, William Alan,	West Boylston,	Lambda Chi Alpha.
Lyons, Henry Egmont, ¹	Boston,	East Experiment Station.
MacArdle, Herbert Aloysius, ¹	Worcester,	7 North College.
MacLeod, Guy Franklin, ¹	Lowell,	14 South College.
Mallon, Charles Hugh,	East Braintree,	Phi Sigma Kappa.
Maples, James Comly,	Port Chester, N. Y.,	81 Pleasant Street.
Martin, Laurence Paul,	Malden,	5 Allen Street.
McNulty, Raymond Henry, ¹	Amherst,	6 South East Street.
Meserve, Albert Wadsworth,	Framingham,	6 North College.
Millard, Helen Stanley,	Great Barrington,	Draper Hall.
Newell, Philip Sanger,	West Newton,	Phi Sigma Kappa.
Oppe, Herman DeWitt, ¹	Sandy Hook, Conn.,	94 Pleasant Street.
Peckham, William Harold, ¹	Newport, R. I.,	Alpha Sigma Phi.
Quadland, Howard Preston,	North Adams,	2 North College.
Radio, Philip Adna,	Florence,	90 Pleasant Street.
Redding, George Kenneth,	Melrose,	9 Fearing Street.
Reed, Morris, ¹	Worcester,	77 Pleasant Street.
Richards, George Henry, ¹	Springfield,	Phi Sigma Kappa.
Robertson, William Fenton, ¹	Framingham,	6 North College.
Sanborn, Joseph Raymond,	North Amherst,	North Amherst.
Sanderson, Ralph Hemenway,	Waltham,	18 Nutting Avenue.
Schandelmayer, Ralph Ernest,	Hudson,	Stockbridge Hall.
Scott, Clifton William,	Buckland,	17 Phillips Street.
Shattuck, Carl Winter, ¹	Jamaica Plain,	M. A. C. Farm House.
Shaughnessy, Howard John,	Easthampton,	17 Phillips Street.
Simmons, Lester Winslow,	Dighton,	75 Pleasant Street.
Smith, Donald Hiram,	Pittsfield,	23 East Pleasant Street.
Smith, Fred George,	Gardner,	3 High Street.
Smith, George Alfred,	Whitinsville,	Q. T. V. House.
Smith, Raymond Newton, ¹	Plainville,	3 North College.
Smith, Susan Almira,	Great Barrington,	Care of E. F. Gaskill.
Snow, John Dow, ¹	Arlington,	Phi Sigma Kappa.
Spencer, William, ¹	Worcester,	9 Fearing Street.
Stedman, Ralph Shaw, ¹	Springfield,	Phi Sigma Kappa.
Stiles, William Burling,	Great Barrington,	Lambda Chi Alpha.
Strecker, Edmund Herman, ¹	New York City,	Q. T. V. House.
Sullivan, Walter Mitchell, ¹	Lawrence,	14 South College.

¹ Work incomplete.

Sweeney, Frank Joseph, ¹	Whitman,	35 Hallock Street.
Taylor, Elliot Hubbard, ¹	Shelburne,	Q. T. V. House.
Taylor, Thornton Greenwood, ¹	Winchester,	Lambda Chi Alpha.
Urquhart, John Wardrop,	East Walpole,	29 McClellan Street.
Vigezzi, Mary Theresa, ¹	Great Barrington,	Draper Hall.
Williams, Allan Carruth,	Rockland,	16 North College.
Woodward, Ralph, Jr., ¹	Grafton,	Colonial Inn.
Wright, Stuart Eldridge,	Raynham,	Kappa Sigma.

CLASS OF 1921.

Alexander, Ralph Elmer,	Lynn,	17 Pleasant Street.
Alger, James Warren, ¹	Reading,	120 Pleasant Street.
Allen, Henry Vaughn,	Arlington,	7 Nutting Avenue.
Ames, Nathaniel Jackson,	Peabody,	81 Pleasant Street.
Andersen, Charles Henry,	Medford,	6 Nutting Avenue.
Baker, Louis Eliot, ¹	Salem,	41 Pleasant Street.
Baker, Russell Dexter,	Marshfield,	5 Allen Street.
Bartlett, John Lloyd Burnham, ¹	Westborough,	36 North Prospect Street.
Bennett, James Stanley,	South Meriden, Conn.,	3 Nutting Avenue.
Blackwell, Henrietta,	Boston,	North Amherst.
Blessington, James Bernard,	Lynn,	-
Bowen, Willard Lee, Jr., ¹	Natick,	North Amherst.
Brigham, John Dexter,	Sutton,	75 Pleasant Street.
Brown, Charles Henry,	Winthrop,	77 Pleasant Street.
Brown, Paul Bromby,	Brockton,	116 Pleasant Street.
Brown, Paul Wilfred, ¹	Fiskdale,	75 Pleasant Street.
Buck, Horace Gould,	Easton,	120 Pleasant Street.
Calhoun, Saitean Frederick,	Brookline,	73 Pleasant Street.
Cameron, Viola Mary, ¹	Pelham,	East Pleasant Street.
Cascio, Peter Joseph, ¹	Willimantic, Conn.,	7 Nutting Avenue.
Channell, Frederick Charles, ¹	Winthrop,	35 North Prospect Street.
Chaquarian, George A., ¹	Haverhill,	-
Cook, Donald Homer,	Hadley,	Hadley.
Coombs, Roger Conklin,	Peabody,	M. A. C. Farm House.
Cooper, Lawrence Melville,	Charlemont,	36 North Prospect Street.
Day, Roland Wight,	Medfield,	83 Pleasant Street.
Dean, Herman Nelson,	Oakham,	90 Pleasant Street.
Edman, George William,	Orange,	4 Nutting Avenue.
Evers, Joseph Daniel, ¹	Malden,	Draper Hall.
Fenton, James Francis,	Amherst,	108 Pleasant Street.
Fisher, Leander Winsor,	Lynn,	31 East Pleasant Street.
Fletcher, Francis Summers, ¹	East Lynn,	31 East Pleasant Street.
Fogg, Lloyd Clarke,	Topsfield,	73 Pleasant Street.
Freeman, Stanley Leonard, ¹	Needham,	5 Nutting Avenue.
French, Carroll Brackett,	Lynn,	Corner Fearing Street and Lincoln Avenue.
Galusha, Mark Hampton,	Williamstown,	90 Pleasant Street.
Gaskill, Harland Everett,	Hopedale,	North Pleasant Street.
Geer, Herbert Leroy,	Three Rivers,	23 East Pleasant Street.
Goodstone, Sarah Winthrop,	Springfield,	11 South Prospect Street.
Gould, Robert Meredith,	Shelburne,	6 Nutting Avenue.
Hallett, Melvin Bernard,	Rockland,	5 Fearing Street.
Haskins, Harold Arthur,	North Amherst,	North Amherst.
Hathaway, Warren Sidney, ¹	Somerset,	Draper Hall.
Hayes, Elmer Russell, ¹	Somerville,	-
Hemenway, Rachel Viola, ¹	Williamsburg,	Draper Hall.
Hodgson, Robert Moore, ¹	Newport, R. I.,	The Davenport.
Howard, Frederic,	Needham,	5 Nutting Avenue.
Howard, Winthrop Wilmarth,	South Easton,	29 North Prospect Street.
Kendall, Charles Donald,	Worcester,	83 Pleasant Street.
Kirkland, Lyle Lord, ¹	Chester,	77 Pleasant Street.

¹ Work incomplete.

Kokoski, Frank Joseph, . . .	Hadley, . . .	R. F. D. 3, Box 112.
Labrovitz, Edward Browdy, . . .	Amherst, . . .	11 Amity Street.
Lacroix, Donald Sewall, ¹ . . .	Newbury, . . .	116 Pleasant Street.
Leavitt, Ralph Goodwin, . . .	Melrose, . . .	6 Nutting Avenue.
Lewandowski, John, ¹ . . .	Easthampton, . . .	17 Phillips Street.
Lockwood, George Russell, . . .	Hyde Park, . . .	101 Pleasant Street.
Long, Albert Douglas, . . .	Chicopee, . . .	23 East Pleasant Street.
Lovering, Rolland Frederick, ¹ . . .	Northampton, . . .	283 Prospect Street, Northamp- ton.
Lyon, William Henry, ¹ . . .	Lexington, . . .	120 Pleasant Street.
Mackintosh, Charles Gideon, . . .	Peabody, . . .	81 Pleasant Street.
Marsh, Walter Ashton, ¹ . . .	Holden, . . .	31 East Pleasant Street.
Martin, Edward William, . . .	Amherst, . . .	19 South East Street.
McCarthy, Justin Jeremiah, ¹ . . .	Arlington, . . .	Colonial Inn.
Meister, John Jacob, ¹ . . .	Dorchester, . . .	7 Nutting Avenue.
Mellen, Richard Adams, ¹ . . .	Cambridge, . . .	116 Pleasant Street.
Miller, Charles Norman, ¹ . . .	Chatham, N. J., . . .	16 Nutting Avenue.
Miller, William Henry, . . .	Springfield, . . .	120 Pleasant Street.
Millington, Walter Roy, . . .	Maynard, . . .	21 Amity Street.
Mutty, Allan Victor, . . .	Melrose, . . .	4 Chestnut Street.
Nuber, Ralph Everson, . . .	Washington, D. C., . . .	77 Pleasant Street.
Palmer, Walter Isaiah, ¹ . . .	Amherst, . . .	4 Chestnut Street.
Park, Francis Edwin, Jr., . . .	Stoneham, . . .	Mount Pleasant.
Peck, Richard Charles, . . .	Shelburne, . . .	6 Nutting Avenue.
Platt, Charles Wilbur, ¹ . . .	Newtown, Conn., . . .	94 Pleasant Street.
Pratt, Laurence Francis, . . .	North Weymouth, . . .	75 Pleasant Street.
Preston, Everett Carrol, ¹ . . .	Dorchester, . . .	2 Allen Street.
Quint, Isador Gabriel, . . .	Roxbury, . . .	41 Pleasant Street.
Reed, Paul Malcolm, . . .	Baldwinsville, . . .	75 Pleasant Street.
Reynolds, Francis Curtis, ¹ . . .	Hadley, . . .	9 Phillips Street.
Rice, Henry Lawrence, ¹ . . .	Somerville, . . .	4 Nutting Avenue.
Richardson, Marjory, ¹ . . .	Millis, . . .	Draper Hall.
Richardson, Raymond Bradbury, . . .	Brookline, . . .	Care of Mrs. Fearing, Pleasant Street.
Robertson, Lafayette Janes, . . .	Hartford, Conn., . . .	116 Pleasant Street.
Robinson, Philip Luther, . . .	New Bedford, . . .	66 Pleasant Street.
Rogers, Charles Beatley, . . .	Malden, . . .	21 Fearing Street.
Rosoff, Samuel, . . .	Springfield, . . .	41 Pleasant Street.
Russell, Charles Francis, . . .	Winchendon, . . .	1 Allen Street.
Russert, Marion Ruth, ¹ . . .	Roxbury, . . .	Draper Hall.
Sanford, Richard Herbert, ¹ . . .	Westfield, . . .	29 North Prospect Street.
Slate, George Lewis, ¹ . . .	Bernardston, . . .	4 Chestnut Street.
Sloan, Kenneth Wilson, ¹ . . .	Amherst, . . .	29 North Prospect Street.
Smith, Julian Denton, . . .	Far Rockaway, N. Y., . . .	90 Pleasant Street.
Spencer, Orville Holland, . . .	West Haven, Conn., . . .	101 Butterfield Avenue.
Starkey, Robert Lyman, . . .	Fitchburg, . . .	7 Nutting Avenue.
Stebbins, Frederick Osborne, . . .	Deerfield, . . .	120 Pleasant Street.
Stevens, Ralph Shattuck, ¹ . . .	Arlington, . . .	Colonial Inn.
Stiles, Harry Stephen, . . .	Lynn, . . .	3 Nutting Avenue.
Stinson, Elton Salem, . . .	Nampa, Idaho, . . .	30 North Prospect Street.
Stockbridge, John Sylvester, . . .	Atlanta, Ga., . . .	Kappa Sigma.
Thyberg, George Jonathan, . . .	Springfield, . . .	9 Fearing Street.
Tillson, Reginald Drury, . . .	Whitman, . . .	21 Fearing Street.
Van Lennep, Emily Bird, . . .	Great Barrington, . . .	21 Amity Street.
Webster, Milton Fuller, ¹ . . .	Malden, . . .	73 Pleasant Street.
West, Guy Clifford, . . .	Amesbury, . . .	5½ Tillson Court.
Whittle, Wallace Lovering, . . .	Weymouth, . . .	13 Phillips Street.
Wilson, Charles William Schra- gey, Jr. ¹ . . .	New Rochelle, N. Y., . . .	66 Pleasant Street.
Wood, Clarence Milton, . . .	Somerville, . . .	90 Pleasant Street.
Zercher, Frederick Kaupp, . . .	Jersey City, N. J., . . .	21 Amity Street.

¹ Work incomplete.

Probation.

Davol, Percy Wilfred, ¹	Brockton,	5 Farview Way.
Hastings, John Walter, ¹	Cliftondale,	36 North Prospect Street.
Jacobs, Albert Fullerton, ¹	Webster,	120 Pleasant Street.
Kile, Trueman Eugene, ¹	Providence, R. I.,	77 Pleasant Street.
Kroeck, Julius, Jr., ¹	Brooklyn, N. Y.,	7 Nutting Avenue.
McCormack, Ralph Roby, ¹	West Somerville,	36 North Prospect Street.
Rice, Gordon Alexander, ¹	Jamaica Plain,	7 Nutting Avenue.
Sampson, Howard Jenney, ¹	Fall River,	Butterfield Avenue.
Sandy, Cecil Henry, ¹	Worcester,	60 Pleasant Street.
Vinten, Charles Raymond, ¹	Roxbury,	116 Pleasant Street.

UNCLASSIFIED STUDENTS.

Anderson, Gust William,	Brockton,	9 Fearing Street.
Austin, Walter Patrick,	Pittsfield,	120 Pleasant Street.
Blanchard, Margery Elizabeth,	Linwood,	87 Pleasant Street.
Burt, John Holton,	Hyde Park,	Care of E. M. Dickinson.
Burt, Richard Bartlett,	Hyde Park,	Care of E. M. Dickinson.
Carlson, Walter Mauritz,	Northborough,	Care of C. H. Thompson.
Conant, Luman Binney,	Waltham,	18 Nutting Avenue.
Crosby, Robert Francis,	Methuen,	31 East Pleasant Street.
Culver, Roger Lewis,	Williamsburg,	—
Davis, Edwin John,	Holyoke,	Aggie Inn.
DeCouagne, Alfred Joseph,	Holyoke,	—
Eastwood, John Edgar,	Plymouth,	81 Pleasant Street.
Fox, Stanley Richardson,	Dracut Center,	M. A. C. Farm House.
Fuller, Carroll Edward,	Portland, Me.,	Kappa Sigma.
Geoghegan, James Dewey,	Brighton,	5 Sunset Avenue.
Gerrish, Arthur Hermon,	Lowell,	35 North Prospect Street.
Gidney, Paul Donald,	Orange,	Care of B. F. Waid, Amity Street.
Goodhue, Joseph Gale,	Haydenville,	116 Pleasant Street.
Green, Howard Emery,	Westfield,	31 East Pleasant Street.
Hansen, Ernest,	Worcester,	18 Nutting Avenue.
Hibbard, Harry Benjamin, Jr.,	Dorchester,	4 Chestnut Street.
Hugo, Alvin Ernest,	Worcester,	36 North Prospect Street.
Humeston, Raymond Frederick,	Holyoke,	The Davenport.
Jones, Edward Charles,	Wrentham,	7 Nutting Avenue.
Kimball, Everett Foster,	Littleton,	35 North Prospect Street.
Marquedant, Isabel,	Grass Lake, Mich.,	79 Pleasant Street.
Mattoon, Max Watkins,	Pittsfield,	120 Pleasant Street.
Morris, Earle Leslie,	Springfield,	60 Pleasant Street.
Neill, Fred Alexander,	Clarion, Pa.,	15 Phillips Street.
Noble, Theodoré Kingsbury,	New London, Conn.,	M. A. C. Farm House.
Novitski, Joseph Francis,	Amherst,	30 Cottage Street.
Pollard, Jane Isabel,	North Adams,	Draper Hall.
Prouty, Alfred Howe,	Spencer,	53 Lincoln Avenue.
Robinson, Harry Judson,	Taunton,	Care of E. M. Dickinson.
Robinson, Nathan Hale,	Braintree,	77 Pleasant Street.
Samuel, Dorothea,	Mount Airy, Pa.,	79 Pleasant Street.
Shannon, Mary,	Chester,	39 East Pleasant Street.
Stockbridge, Derry Lamal,	Atlanta, Ga.,	Kappa Sigma.
Strong, John Robert,	Pittsfield,	120 Pleasant Street.
Studley, Joshua,	Rockland,	5 Fearing Street.
Tanner, Willis,	Yokohama, Japan,	3 McClure Street.
Thompson, George Henry, Jr.,	Lenox,	4 Nutting Avenue.
Trulson, George Frederick,	Worcester,	3 Nutting Avenue.
Watson, Hawkesworth Douglas,	Walpole,	23 East Pleasant Street.
Waugh, Dorothy,	Amherst,	M. A. C.
Webber, Karl Durrell,	West Wrentham,	7 Nutting Avenue.

¹ Work incomplete.

Wheeler, William Edwin, . . .	Bolton,	53 Lincoln Avenue.
White, George Edwin, . . .	Worcester,	60 Pleasant Street.
Wing, Philip Henry, . . .	North Grafton,	3 McClure Street.
Wright, Whitecomb Wadleigh, . . .	Lowell,	35 North Prospect Street.

SPECIAL STUDENTS.

Cole, Robert Henry, . . .	Three Rivers,	-
Holland, Dorothy FitzGerald, . . .	Summit, N. J.,	Mount Holyoke College.
Samper, Edward,	Colombia, S. A.,	3 Fearing Street.
Samper, Santiago,	Colombia, S. A.,	3 Fearing Street.

VOCATIONAL POULTRY STUDENTS.

Baker, Howard William, . . .	Wollaston,	5 Allen Street.
Brett, John Edward, . . .	Pittsfield,	Aggie Inn.
Cleaver, Charles Leroy, . . .	Hingham Center,	The Davenport.
Cook, John Herbert, . . .	South Dartmouth,	8 Allen Street.
Tuttle, Kenneth Washburn, . . .	Warren,	4 Chestnut Street.

GEOGRAPHICAL SUMMARY.

Massachusetts,	424
Connecticut,	19
New York,	14
New Jersey,	11
Pennsylvania,	5
Indiana,	1
Rhode Island,	5
District of Columbia,	3
Maine,	2
Vermont,	1
Georgia,	2
Michigan,	1
New Hampshire,	1
Idaho,	1
Kansas,	1
Kentucky,	1
Maryland,	1
Montana,	1
Oklahoma,	1
Colombia, S. A.,	2
Japan,	1
India,	1
South Africa, Transvaal,	1
Total,	500

SUMMARY BY CLASSES.

Graduate students,	29
Senior class, 1918,	64
Junior class, 1919,	113
Sophomore class, 1920,	117
Freshman class, 1921,	108
Probation freshman,	10
Unclassified students,	50
Special students,	4
Vocational poultry students,	5
Total registration,	500

SHORT COURSE STUDENTS, 1917.

THE TEN WEEKS' COURSE.

Aldrich, Leon F.,	Northampton.
Anderson, Ernest E.,	49 Marion Street, Medford.
Andrews, Nelson J.,	Amherst.
Armitage, Martin,	Gardner.
Bates, Richard,	West Medford.
Beal, Francis G.,	West Newton.
Bennett, Rosamond,	Auburndale.
Bent, Lawrence,	Watertown.
Bergmann, Col. C.,	West Toledo, Ohio.
Bergmann, Vincent,	West Toledo, Ohio.
Bradway, J. Leonard,	Monson.
Brett, John E.,	Pittsfield.
Briggs, Kenneth R.,	Wollaston.
Brown, Fred H.,	Melrose.
Brown, Lloyd A.,	Framingham.
Brown, Philip S.,	Swansea.
Buck, Paul T.,	Amherst.
Burcker, Wilhelm J.,	Englewood, N. J.
Butterfield, Wm. H.,	Brimfield.
Capen, Frank H.,	Stoughton.
Carter, Earl,	Boston.
Chamberlin, Marion,	Newton Center.
Churchill, Oliver C.,	West Somerville.
Cobb, Robert C.,	Chestnut Hill.
Coleman, Moses M.,	Mendon.
Cotter, James P.,	Salem.
Crawley, Melita,	Brookline.
Crockatt, Ernest,	Mount Hermon.
Crowley, William,	Suffield, Conn.
Crowell, B. P.,	Claremont, N. H.
Cushman, Burt A.,	Bernardston.
Danziger, Milton,	Washington, D. C.
Davenport, Vernon B.,	Orange.
Dow, Leon F.,	Livermore Falls, Me.
Dunham, B. K.,	Springfield.
Dwyer, J. Marcus,	Sunderland.
Fitzgerald, A. J.,	Braintree.
Foster, Charles H.,	North Andover.
Fox, Archer D.,	Amherst.
Gartin, Arthur,	Chestnut Hill.
Garvin, James,	Wrentham.
Gidney, Donald,	Orange.
Gilcrest, John G.,	Lunenburg.
Green, Howard W.,	Mount Hermon.
Gremmels, Charles E.,	West New Brighton, N. Y.
Gurdy, Elbert O.,	Lawrence.
Gustafson, Gustaf,	Springfield.
Gustafson, Paul E.,	Springfield.
Hallock, Genevieve,	Westborough.
Hammond, Frank,	Brookline.

Hassan, Sam,	Foxborough.
Herzog, Alfred C.,	Jersey City, N. J.
Hires, Linda S.,	Haverford, Pa.
Jackson, Henry T.,	Marlborough.
Jackson, Herbert A.,	North Amherst.
Jauncy, William,	Groton.
Kallis, Onnie S.,	Middlefield.
Kneeland, Karl W.,	Medfield.
La Point, Wilfred J.,	Amherst.
Lawley, Edith S.,	Amherst.
Logan, Nellie A.,	South Sudbury.
Lovenberg, Albert M.,	Putney, Vt.
MacGown, Ralph S.,	Sharon.
Marchant, Arthur L.,	Edgartown.
McIntyre, James B.,	Easthampton.
McWhinnie, John,	Boston.
Millington, Olive E.,	Wilmington, Vt.
Naughton, John,	Springfield.
Neleber, Benjamin,	Colchester, Conn.
Neleber, Louis,	Colchester, Conn.
Nelson, Hilman S.,	Shrondale.
Newton, Ernest L.,	Shrewsbury.
Newton, Orlo W.,	Amherst.
Ogden, Karl B.,	Winchester.
Ortloff, Henry S.,	Newton Center.
Parker, Orlo P.,	Brimfield.
Parks, Leroy B.,	Suffield, Conn.
Pearson, Franklin B.,	Fair Haven, Vt.
Pease, Robert S.,	Chester.
Prentiss, Russell I.,	Lexington.
Putnam, Avery W.,	Rutland.
Randolph, L. Fitz,	Arlington.
Rix, Anson F.,	Lawrence.
Roark, Joseph,	West Chelmsford.
Ryan, Frank J.,	West Newton.
Samaniego, Luis,	Antrim, N. H.
Savage, John B.,	Amherst.
Scott, J. Edmund,	Amherst.
Seaverns, Annie W.,	Jamaica Plain.
Seshong, Harold A.,	Campello.
Shumway, Alvah,	Florence.
Smith, Elmer D.,	Cheshire, Conn.
Smith, Howard C.,	Worcester.
Snow, Richard L.,	Brookton.
Southwick, L. H.,	Williamstown.
Stumpp, Robert E.,	Greenwich, Conn.
Tinker, Arthur A.,	Stamford, Conn.
Totman, Richard J.,	Conway.
Turner, Alfred W.,	Amherst.
Tuttle, Arthur E.,	Turners Falls.
Vincent, Edward,	Amherst.
Whitcher, George S.,	Atlantic.
Whiting, Henry T.,	Berkshire.
Whitney, Edmund,	Maynard.
Wickman, Irving G.,	Springfield.
Wilcox, G. Burton,	Manchester, Vt.
Winter, Oliver A.,	West Roxbury.
Wood, Harry E.,	Beverly.
Woodward, Leslie M.,	Saxonville.
Wright, Daniel H.,	Bartonsville, Vt.
Wright, Warren B.,	Amherst.

SUMMER SCHOOL OF AGRICULTURE AND COUNTRY LIFE.

Armstrong, Anna R.,	Rutherford, N. J.
Armstrong, Marian,	Rutherford, N. J.
Barker, Mary H.,	Worcester.
Barnard, Seymour,	Brooklyn, N. Y.
Barrett, Frances,	Adams.
Bayley, Louise,	Peacham, Vt.
Bealer, Elizabeth R.,	Jamestown, N. Y.
Bell, Mary V.,	Sharon.
Bourne, Edith L.,	Arlington.
Boynton, Anna L.,	Pepperell.
Bradley, Ruth J.,	Springfield.
Buell, Grace,	Wellesley Hills.
Butler, Gertrude M.,	Douglaston, N. Y.
Butler, Marianne E.,	Douglaston, N. Y.
Carlton, Mrs. Josephine,	Springfield.
Clarke, Elizabeth L.,	Williamstown.
Cooper, M. Claire,	South Boston.
Cotton, Edith F.,	Malden.
Cutting, Alice,	Waltham.
Cutting, Miss M. E.,	Middlebury, Conn.
Dame, Daisy G.,	West Medford.
Darrow, Ruth,	Cherokee, Iowa.
Davis, Elizabeth I.,	Taunton.
Davis, Mabel,	Auburndale.
Davis, Martha H.,	Auburndale.
Dodge, Rachel A.,	Grafton.
Eaves, Lucile,	Brookline.
Elder, Blanche,	Amherst.
Elder, Helen,	Amherst.
Farnam, Geraline E.,	Dalton.
Fisherdick, Florence M.,	Ware.
Flaherty, Jane S.,	Hadley.
Flaherty, Mary E.,	Hadley.
Flynn, Elizabeth C.,	Malden.
Frishmuth, Anna B.,	Boston.
Fuller, Edna,	Fredonia, N. Y.
Gavin, Madeline R.,	Roxbury.
Gee, Gretchen,	Fall River.
Gleason, Gertrude,	Newton Highlands.
Gleason, Mrs. Linnette,	Newton Highlands.
Goodnow, Edna M.,	Amherst.
Gould, Walter H.,	West Pelham.
Heatley, Elsie,	Wellesley.
Heatley, Margaret,	Wellesley.
Hitchcock, Caroline J.,	Amherst.
Hodsdon, Villa,	Cambridge.
Holmes, Miss R. M.,	Holyoke.
Hunt, Carrie A.,	Northampton.
Isquierdo, Bernardo,	New York City.
Jackman, Lucia L.,	Cambridge.
Kentfield, Annie L.,	Amherst.
Knox, Eloise,	Springfield.
Krall, Mabel,	Harrisburg, Pa.
Martin, Margaret,	Amherst.
May, Eleanor K.,	Jamaica Plain.
Maynard, Pearl A.,	West Newton.
Merrick, Marie,	Amherst.
Mills, Mrs. Frances Park,	Syracuse, N. Y.
Neal, Esther H.,	Williamstown.
Nelson, Lydia A.,	Jamestown, N. Y.
Newell, Mary W.,	Amherst.

Owen, Sarah,	Beaufort, S. C.
Page, Katherine,	Malden.
Palmer, Alice W.,	Shirley Center.
Pease, Elizabeth D. K.,	Brookline.
Plummer, Emma R.,	Newton.
Prince, Burton A.,	Westfield.
Rafter, Charlotte,	Dorchester Center.
Reed, Mrs. W. Maxwell,	Framingham.
Rice, Winifred,	Pittsfield.
Richardson, Sarah A.,	West Acton.
Robb, Genevieve,	Litchfield, Conn.
Ryan, Mabel F.,	Waltham.
Samper, Edward,	Amherst.
Samper, Santiago,	Amherst.
Sanger, Grace L.,	Boston.
Sargent, Jennette L.,	Boston.
Saunders, Bradford W.,	Cambridge.
Shipman, Julia,	Mattapan.
Smith, Mrs. Gertrude F.,	New Haven, Conn.
Smith, Claire E.,	Athol.
Swan, Annie L.,	Mattapan.
Tallman, Carlisle,	Amherst.
Teng, Shao-Ping,	China.
Turner, Wallace M.,	Providence, R. I.
Turner, Mrs. Wallace,	Providence, R. I.
Towne, Mary E.,	Brookline.
Walker, Mrs. G. S.,	Lexington.
Wright, Alfred E.,	Pittsfield.
Williams, Florence A.,	Pittsfield.

INDEX.

	PAGE
Calendar,	7
Historical statements,	9
Members of the corporation,	12
Faculty, officers, committees,	14-25
Admission,	31-40
Courses of instruction: —	
General course requirements,	41-45
Outline of majors: —	
In Division of Agriculture,	46-50
In Division of Horticulture,	51-54
In Division of Science,	55-58
In Division of the Humanities,	59
In Division of Rural Social Science,	60-62
Undergraduate courses: —	
In Division of Agriculture,	65-73
In Division of Horticulture,	74-82
In Division of Science,	83-103
In Division of the Humanities,	104-116
In Division of Rural Social Science,	117-127
Graduate,	129-147
Extension and short course,	149-163
General information: —	
Financial,	167-174
College activities,	175, 176
Academic and departmental,	176-187
Degrees conferred,	191, 192
Roll of students: —	
Graduate,	193
College,	194
Summaries,	202
Short course,	203

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FIFTY-FIFTH ANNUAL REPORT

OF THE

MASSACHUSETTS

AGRICULTURAL COLLEGE.

PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS
OF ADMINISTRATION

FOR FISCAL YEAR ENDED NOV. 30, 1917.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1918.

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CONTENTS.

	PAGE
Report of the President of the College: —	
The Massachusetts Agricultural College and the War,	7
The Review of the Year,	26
Departments of Undergraduate Instruction,	36
Short Courses,	40
Graduate School,	41
Experiment Station,	42
Extension Service,	47
The Immediate Needs of the College,	55
Tables and Statistics,	64
Financial Report of the Treasurer,	75

The Commonwealth of Massachusetts.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Dec. 1, 1917.

To His Excellency SAMUEL W. McCALL.

SIR:—On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the fifty-fifth annual report of the trustees, for the fiscal year ended Nov. 30, 1917, this being the report of the president of the college and other officers of administration to the corporation.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

REPORT OF THE PRESIDENT OF THE COLLEGE.

Gentlemen of the Corporation.

I herewith submit my annual report as president of the Massachusetts Agricultural College, and with it transmit reports from the other administrative officers of the institution.

The past year has been a notable one for the college for at least two reasons. It has witnessed the completion of fifty years of service by the institution, and it has seen the second half century of its history ushered in by an eager response to the call to the colors, as our country entered the war. Indeed, the war soon became the chief concern of all persons connected with the college. The fact that the college has always had a military establishment led, of course, to a keen personal interest in the war on the part of students and younger alumni who might be eligible to military service. The prompt announcement in Washington that agriculture and the development of an adequate food supply was a prime concern in the war added another reason for intense interest. There is therefore but one subject this year suitable for the customary discussion in which it has become a habit to indulge in my annual report, and that is

THE MASSACHUSETTS AGRICULTURAL COLLEGE AND THE WAR.

On Feb. 9, 1917, the Governor appointed 100 men as a Committee on Public Safety. In the personnel of the committee and in its original subcommittees no place was made for agriculture; evidently the military aspect of the war problem was uppermost in the minds of those responsible for the plan. I immediately corresponded with Mr. James J. Storrow, the chairman of the committee, with reference to the importance of recognizing food supply as a war emergency, with the result that he requested the Massachusetts Federation for Rural Progress to name a committee on food production and conservation.

This action was taken on March 2, and the committee was at once made a subcommittee of the Committee on Public Safety, and on March 5 had organized with Mr. John D. Willard, who had been "loaned" by the Franklin County Farm Bureau, as executive secretary. The personnel of the committee was as follows: —

Kenyon L. Butterfield, <i>Chairman.</i>	Carlton D. Richardson.
Philip R. Allen.	Henry Sterling.
Reginald W. Bird.	Marcus L. Urann.
Nathaniel I. Bowditch.	Wilfrid Wheeler.
Joshua L. Brooks.	John D. Willard, <i>Secretary.</i>

The program of food production adopted by the committee outlined three sources of increased production, — the first and chief, on farms, largely with the staple crops; the second, in boys' and girls' gardens; and the third, through family gardens carried on by residents of cities and villages. Later an auxiliary committee on food conservation was organized, with Dean Arnold of Simmons College as chairman.

The First Steps.

The program that was adopted by this committee and the methods of work put into operation were largely those that had been formulated by Director Hurd, assisted by members of the staff with whom he had counseled individually and in conference.

The college at once placed itself practically at the disposal of the Commonwealth as represented in the Committee on Public Safety, stating that it wished to render every possible service in the emergency. Steps were immediately taken to mobilize the institution fully, as will appear as the report proceeds. Our attitude towards both State and national government is shown by the following vote of the faculty: —

Whereas, The land grant colleges of America, owing their origin to the stern realization of the absolute need and utter unpreparedness of the nation during the darkest period of the great strife, were established in order that the nation might ever be ready to meet victoriously any and every foe that might oppose her at any time during the long future; and

Whereas, To these colleges during all the years since the Morrill Land Grant Act the people of the United States and of the Commonwealth have given generously of their substance and wealth, and ever manifested unflinching loyalty and love to them; and

Whereas, The Massachusetts Agricultural College, as one of the members of this noble sisterhood of colleges, has been bountifully nurtured and blessed by the rare munificence of the government; be it therefore

Resolved, That we, the faculty of the Massachusetts Agricultural College, fully recognizing our peculiar obligations to our beloved country in this hour of her new danger and peril, do pledge anew to her and to her cause our outmost loyalty and devotion, and place at her service without reservation all the strength, influence and resources which God hath vouchsafed to us; and be it further

Resolved, That a copy of this resolution be forwarded to the President of the United States, and to the Governor of this Commonwealth, and that it be placed before the people as the true attitude of the faculty of the Massachusetts Agricultural College.

Campus Mobilization.

A committee on campus mobilization was organized March 5, with the following personnel: Professor Hurd, Dr. Brooks, Professor Sears and Professor Lockwood. This committee immediately started a census of students and alumni with reference to their fitness for, and willingness to perform, either military or agricultural service. The committee also canvassed the entire faculty, and made assignments to different lines of work in accordance with a definite schedule. The committee also acted as a clearing house for students and faculty in agricultural work, approving projects, starting work and assigning members of the staff to special pieces of work as occasion demanded.

The members of the extension staff, of course, carried on their regular work, but in a highly augmented fashion. Their service was performed very largely in co-operation with the county farm bureaus, which soon became the actual centers of operation through the State. Many of the teaching staff, as soon as they were relieved from their regular duties, took up assigned special war service in the field or on the campus. The research work of the experiment station naturally went on about as usual, inasmuch as all this work is concerned with problems of food production.

The Students in War Time.

Acting in accordance with expressions coming from President Wilson, Secretary of War Baker and others, as well as in accordance with our own convictions, every endeavor was made, after war was declared, to keep the teaching work going in normal fashion. It soon developed, however, that not only were the students very uneasy and inclined to neglect class work, but the demand for farm labor in the State was such that their help was greatly needed. As a consequence, the faculty passed a vote on April 20 providing that students who wished to leave before the end of the year to work on farms would receive credit for their work in college if they performed satisfactory farm labor for twelve weeks. Under this plan the large majority of the students left within two weeks, and by the 1st of May the college was practically closed.

Nearly all of the students going into agriculture found their own positions, although the committee on mobilization assisted in many cases. Nearly 400 men found employment in farming, gardening or in supervision of such enterprises as boys' and girls' clubs, community garden plots, etc. About 50 of the men went into military service, so that all told nearly 500 students, or about 95 per cent., were performing war emergency service by the 1st of June, 85 per cent. being in agricultural service and 10 per cent. in military service. This is a remarkable record. Every effort was made to keep in touch with the students in the field. Many of them were visited personally during the summer by members of the staff. Reports came in from the students as well as from their employers. Dean Lewis devoted a large part of the summer to studying these reports, corresponding with both students and employers. Many men who had never before had farm experience soon adapted themselves to the work, and the testimony of employers was uniformly most complimentary to the men.

The year opened with a greatly reduced attendance. Out of 138 men registered in the class of 1918 last fall only 64 returned to college this autumn. In the class of 1919 the attendance is 113 this fall as against 174 registered in the fall

of 1916; 117 men out of 170 in the class of 1920 returned this autumn. This year there are 118 freshmen as compared with a registration of 170 last year.

Students now in Military Service.

The number of students in military service December 1 is indicated in the following table:—

CLASS.	Com- missioned Officers.	Others.	Total.	Per Cent. of Class.	Overseas.
Sophomores,	-	16	16	10	6
Juniors,	3	28	31	15	4
Seniors,	21	45	66	40	11
	24	89	113	-	21

Graduate Students.

In 1916 the enrollment of graduate students was 57. The maximum registration in the fall of 1917 was 29, approximately one-third of whom have since left. This decrease of 60 per cent. in the enrollment of graduate students is undoubtedly due to the war.

The Alumni.

The alumni have responded to the call to military service in the same spirit as have the students. The following table of records will indicate our latest information on this point:—

CLASS.	Com- missioned Officers.	Others.	Total.	Overseas.
1917,	20	58	78	8
1916,	7	29	36	1
1915,	4	16	20	4
1914,	6	18	24	2
1913,	8	11	19	3
1912,	11	7	18	1

There are twenty-five men in military service from the class of 1881 up through the class of 1911.

The total number of staff, students, alumni, and former students in military service at the present time is 355.

Scores of alumni in different parts of the country are rendering public service in connection with voluntary agencies or with agencies already established. Perhaps the two most notable examples of the public service which M. A. C. men are rendering in this connection are those of Mr. Daniel Willard, president of the Baltimore & Ohio Railroad, who is a member of the National Council of Defense, and that of Dr. Joel E. Goldthwaite, who headed a commission of medical experts to France to study problems of disease and physical incapacity.

The College Staff and Military Service.

Soon after the draft went into effect the question arose as to what the policy of the college should be concerning occupational exemption for members of the staff. It seemed unfair to the country to press for exemption of members of the staff as a class; it seemed unfair to the college to make no claims for exemption. Therefore in those cases where it was clear that the man's services were necessary in order to maintain college work the district board was asked to make exemption. But few of these cases arose. Therefore the college staff has been, of course, somewhat depleted, several of the younger men being drafted or volunteering for enlistment. Following is a list of those who have gone into military service:—

Windom A. Allen, Assistant Chemist, Experiment Station, in the draft camp at Ayer.

Wesley H. Bronson, Assistant Extension Professor of Farm Demonstration, United States Naval Reserves.

L. L. Derby, Assistant in Physical Education, Medical Corps.

Harold M. Gore, Assistant Professor of Physical Education, First Lieutenant, United States Reserves.

Burt A. Hazeltine, Instructor in Mathematics, teaching in radio school at Newport, R. I.

Roswell W. Henninger, Extension Instructor in Charge of Poultry Club Work, aviation school, San Antonio, Tex.

John B. Lentz, Assistant in Veterinary Science, Experiment Station, Captain, Medical Corps.

Bernard W. Shaper, Assistant to the Director of the Extension Service, Reserve Officers' Training Camp, Fort Leavenworth, Kans.

Robert S. Scull, Assistant Chemist, Experiment Station, chemical work, Washington, D. C.

F. A. Cushing Smith, Extension Assistant Professor of Landscape Gardening, aviation school, San Antonio, Tex.

John B. Smith, Assistant Chemist, Experiment Station, drafted, Camp Devens, Ayer, Mass.

Is Agriculture a War Service?

It has become almost a truism that agriculture should be regarded as a war service; but thus far it has not been possible to arrange for the definite assignment of men, either members of the staff or college students, to this form of war work. For example, the county agents indicated last summer that they would want at least forty students as agricultural supervisors the coming spring. It will be very difficult, indeed, to supply these men unless the new classification will simplify matters by listing men for specified war work other than strictly military service.

Helping Students to understand the War.

Ever since the severing of relations with Germany efforts have been made at chapel, through assembly speakers and in other ways, to present to the students the real meaning of the war. It has been necessary to handle this matter with considerable caution for fear of overstimulating the men in their attitude toward enlistment. One of the most interesting single aspects of the interest of the students was shown by the remarkable response to the appeal for funds, made here as in all the other colleges of the United States, to assist the Young Men's Christian Association in its war work in the military camps in this country and in Europe. We have no way of knowing what the normal allotment for this college would have been, but we suppose perhaps \$1,500 to \$2,000. The students themselves, through appropriate committees, decided to try to raise \$5,000. As a matter of fact, the pledges amounted to over \$6,000 from students and faculty, the students alone pledging nearly \$4,500. Ninety per cent. of the students pledged something, and their average per capita was approximately \$10. The response from members of the staff was exceedingly good.

A Shortened Year.

The faculty voted to shorten the collegiate year 1917-18 in order that students might remain in farm work as late as possible in the fall, and might be available for farm work early in the spring of 1918. Each of the three terms was shortened from twelve to nine weeks. Commencement will come April 27-29. Every effort is being made to keep up the grade of work.

Athletics.

Probably no department of the college has been obliged on account of the war to depart more widely from its customary program than has the department of physical education. Handicapped by reductions in the staff as well as by the lack of men and the shortened college year, a method was nevertheless devised for keeping up interest in athletic work which has met with a success extremely gratifying both to the department and to the students. Details of this plan will be found upon a succeeding page.

Late Opening.

In order to permit men in agricultural service to complete the season's work, the opening of college was postponed from the middle of September until October 10. Although students in order to receive credit for the full work of the previous semester were obliged to work only twelve weeks on farms, I think a large proportion of them continued work throughout the summer. Some even were not able to return October 10, because of the necessity of completing agricultural enterprises in which they were engaged.

Special Service of Individuals.

It is difficult to praise too highly the spirit of the staff in their relations to war work activities. I think it is fair to say that the entire institution has been almost completely mobilized for war service. In some cases, of course, the regular work constituted the service. For example, the members of the experiment station staff have kept at work on their regular projects, all of which have to do more or less directly with

food production. The members of the extension staff threw themselves into the field work with increased vigor, if that were possible, sparing nothing of time and energy to meet the situation. So long as college classes were maintained, the majority of the teaching staff gave their time to their regular work, but as soon as the college closed in the spring, nearly every teacher took up some special form of war work to which he had been assigned. Quite accurate reports in detail are now available relative to the service thus rendered. It is not necessary to go into details in this report, but I may say that over 50 members of the teaching staff gave more or less time to this service, the amount of time ranging from a number of days to two or three, and in some cases four, months of solid time. The technical men, of course, as in agriculture and horticulture, worked in the line of their specialties, quite largely in the field. The science men either did work in connection with protection of crops and animals, the preservation of food, special investigations in connection with munitions, or occasionally in the work of surveys. The men in the Division of the Humanities engaged in a wide variety of work, some assisting in survey tabulation, others in supervision of garden work. I might specify some instances of types of service: assisting the field staff of the Hampshire County Farm Bureau; service in an information tent on Boston Common; helping in the developing of dairy records and in the poultry drive; community canning and preserving; garden supervision; emergency publicity and publications. A large number of the staff assisted in the surveys of farm labor, food production, consumption and distribution.

Professors Neal, Wheeler, Kilham and Hicks were practically "loaned" to the State Food Production Committee for the season. The last-named spent nearly four months organizing a very complete system of farm labor exchange in the State. His plan was so satisfactory that the United States Department of Agriculture practically took it as a model for their work in other parts of the country.

The emergency also increased very materially the correspondence in all departments of the institution; this was handled satisfactorily without addition to the clerical staff.

It helped, however, to make the year an unusually busy one. The war work, of course, has taken a good deal of the president's time since the 1st of March, as chairman of the State Committee on Food Production, and later as a member of the Massachusetts Board of Food Administration, as well as in various other capacities.

A number of our staff have been "loaned" for practically full time. The United States Department of Agriculture asked for Professor Hurd's services. About the 1st of August Professor Hurd went to Washington and has been there ever since, giving up his plans for his sabbatical year, occupying a very important position as assistant in the office of the Secretary of Agriculture. Professor Machmer has been released from his duties as assistant professor of mathematics in order to take an important position in field work in distribution in the western district of Massachusetts. Prof. W. D. Clark has been "loaned" to the Massachusetts Fuel Administration to assist in carrying on the campaign for the use of wood for fuel. Miss Sayles of the Extension Service has been released for the year for service with the home economics branch of the extension work of the United States Department of Agriculture.

Food Supply Studies.

The college, through its department of agricultural economics, and with the assistance of some eight or ten members of the general teaching staff of the institution, made elaborate surveys of food conditions in three or four counties.

A census of production in the five western counties, including nothing but *farm-grown* products, was conducted by the department of agricultural economics. The data collected covered acreages of farms, woodlots and improved land; number of live stock on hand in 1916 and 1917; acreage and quantity of various farm crops and vegetables produced in 1916 and proposed for 1917. A few facts stand out with special prominence, as revealed by the census, among which are the small number of farms and the small quantities grown on each farm. Although the census was taken in the four western counties before the crops of 1917 were sown, the reports indicate a probable increase in the acreage of several farm products.

The census in Worcester County was taken after the crops were planted, and it is significant that this county shows the greatest increase in acreages. The four western counties show an increase of 46 per cent. in acreage of corn for grain, 46.9 per cent. for potatoes, 150 per cent. for beans and 42.4 per cent. for green vegetables. Worcester County shows the greatest increases, — 110.5 per cent. in corn for grain, 46.5 per cent. for potatoes, 300.6 per cent. for beans and 84.4 per cent. for green vegetables.

A census of food consumption was also conducted by the department of agricultural economics. The territory covered included Hampshire County and a part of Hampden County. The data, secured from wholesale and retail dealers, transportation companies, storages and large consumers, such as hotels, restaurants and boarding houses, took account of certain staple foods, and the figures asked for showed quantities shipped in, reshipped, stored, sold and bought from local producers. The returns have been tabulated by towns, and reveal a notable lack of trade in home-grown products; but 22.4 per cent. of potatoes consumed are home grown, 7.8 per cent. of the beans, 33.2 per cent. of the eggs, 12.1 per cent. of the butter, 57.6 per cent. of the apples and 62.9 per cent. of the milk. Hampshire County produces 27.7 per cent. and Hampden County 18.8 per cent. of the grain needed by the live stock reported in these counties by the census of 1910. The three western counties, however, produce 6.4 per cent. more hay than necessary to feed the stock owned in the counties at that time.

In April, 1917, the milk situation in New England threatened to be very serious. Little usable information relative to cost of production was available. The committee on agriculture of the Boston Chamber of Commerce asked the agricultural colleges in the New England States to make surveys and report to them. Uniform blanks were used in order to make the returns comparable. The farm management demonstrator from M. A. C. supervised this work, not only in Massachusetts but in heading up the work of the other States. The blanks and all questions were passed on by our college dairy committee.

Two hundred and fifty farmers were selected by the farm management demonstrator in consultation with the county

agents. Our college furnished seven men selected from the agronomy, animal husbandry, dairy and farm management departments. Their expenses were furnished by the Public Safety Committee. One man and his expenses were furnished by the Quaker Oats Company of Boston. These men visited the farmers and secured eighty-seven complete records.

The report of this New England work has been used not only in Boston but by milk committees in other cities. The information received in this survey was used and is being used, with changes in cost of variables, to determine the fair price of milk to the producer, thus avoiding a milk strike. Very favorable comments have been made on the results of the survey, both as to figures obtained and good accomplished by their use.

The poultry department co-operated with the county farm bureaus and the Public Safety Committee in a two weeks' "campaign" throughout the State of Massachusetts. The object of this work was, first, to collect accurate information about existing conditions among poultrymen; second, to attempt to check the injudicious sale of hens and pullets, but to encourage intelligent culling of the unprofitable birds; third, to commend the hatching of chicks through the month of June, where conditions warranted late hatching.

Nine men were employed to execute this work. In so far as possible, one man was located in each county, and he was given an outline of the uniform advice and data which had been adopted at a previous staff meeting. Public gatherings, farm visits and the press offered the best means of presenting the poultry doctrine, and these methods were adopted in each county. Accurate data from various sized flocks were used to show poultrymen what they could expect under existing conditions. The work, as a whole, was well received. While it has not been possible to measure results in a definite way, reports from different sections of the State indicate that the effort was worth while.

Vacations.

All the men on the staff, because of the tremendous pressure under which they were working during the spring, were advised to take the full month's vacation. Practically all of the teach-

ing staff, some of whom are entitled to the longer vacation period, surrendered their privilege and gave their energy unreservedly to assistance in some form of agricultural mobilization work.

Publications.

The college agreed to issue, in co-operation with the Committee on Public Safety, special publications bearing on many of the particular problems that farmers would have to meet in speeding up production. A list of about 35 special bulletins was prepared during the year. Director Hurd devised a plan of post-card bulletins printed on both sides, which gave in compact form the best advice that the college could offer on these subjects.

Use of College Land for Food Production.

The trustees decided that all available areas of the college estate should be used in growing more crops. The following table shows what was done as war emergency production besides the regular crops usually grown.

Crop.	Acreage.
Beans,	13
Potatoes,	8
Corn,	7
Oats,	4
Squash,	3
Total emergency acreage,	35

The County Farm Bureaus.

The "projects" of the Committee on Food Production and of the Food Administrator have guided the major efforts upon which the farm bureaus have been spending their energy this year. In March all other plans were laid aside and the work for the season redrafted on the basis of the needs of the State during war times. The county food committees were, in nearly every case, comprised of men and women who were appointed by the advisory board of the farm bureau. The county agents

acted as secretaries of these county committees on food production. When the organization of town food committees was suggested, the farm bureau used its organization to assist in securing the emergency committees in 244 towns. The work of the town committees was explained, and the local people were assisted in securing fertilizers, seed potatoes and land on which special work might be done.

In order to arouse the people of the State to a realization of the needs of this project, the farm bureaus assisted in over 400 meetings during the months of April and May. In one county alone the county agent addressed over 8,000 people in four weeks, urging increased production of food crops. The demand for the services of the county agents was so great that in four months the employees of the farm bureaus increased one-third, and the office force doubled. This was made possible by the appropriation which was made to the various counties by the Committee on Public Safety from its State appropriation, the conclusion being reached that the farm bureaus, having already been organized to direct and use efficiently trained workers, could secure results more rapidly than could be secured by the development of a new system. The farmers of the State, thoroughly aroused, increased their acreage of crops greatly, this increase being particularly noticeable in such crops as corn, beans and potatoes. The work with people other than farmers resulted in an extraordinary increase in home gardens.

The county farm bureaus more than justified themselves all over the country. Massachusetts was peculiarly fortunate in the fact that every agricultural county was fully or nearly organized for farm bureau work when war was declared. The food production and conservation campaign in the field was carried on through these county farm bureaus. On June 20 there were available for this work 20 men, 6 women and 10 clerks. On December 1 these employees numbered 30 men, 14 women and 20 clerks. Aside from these employees there were 14 men and 6 women who were employed for part time during the season.

Federal Aid.

In August Congress passed a law granting extra appropriations for food production and conservation work. Approximately \$70,000 was assigned to Massachusetts, and was apportioned as follows, the work being administered in every case through the college: \$54,500 was apportioned for food conservation from September 1 to June 30, and provided for a State leader for city work, 3 assistant county and city leaders, 9 county home demonstration agents, and also for assistant city organizers and supervisors in perhaps 30 cities, about 10 of these having now been provided. This is the regular educational work in home economics, food thrift, preserving and canning, etc., but carried out not only in all the counties of the State but also in the urban communities. Of course, in this field there are scores of agencies at work, and in all we are co-operating most fully with Mrs. Nathaniel Thayer, who is the official representative of the Federal Food Administration in Massachusetts, and with the State Executive Committee on Food Conservation.

Seven thousand dollars was set aside for junior extension club work for the same period, and permits the employment of an assistant State supervisor and ten county club leaders.

The sum of \$8,000 was set apart for county agent work in marketing. This fund permitted the assignment of Mr. E. Farnham Damon as assistant county agent leader, with four district marketing specialists, in the Connecticut Valley, Worcester County, the area northeast of Boston and the area southeast of Boston. This work is educational in the subjects of marketing and distribution. Added to this sum was \$36,000 granted to the county farm bureaus by the Public Safety Committee.

War Work Problems.

War Work Economies. — In common with other institutions and with individuals, it behooves the college to practice the most rigid economy during this period of stress. But what is economy and how can it be actually achieved? The drop in student attendance by no means indicates the practicability of an equivalent cut in expenditures. As a matter of fact, the

so-called "overhead" expenses can be reduced very little unless whole courses or departments are abolished for the time being. For example, in the matter of the heating of buildings it is practically impossible to reduce coal consumption unless entire buildings are completely closed. What is true of maintenance is in large measure true of instruction costs. It is possible that some radical changes may be necessary for another college year. If we knew more accurately what our attendance would be, it would be much easier to make these adjustments. To what extent, it may be asked, are we justified in dismissing members of the teaching staff? We are holding positions open for those who have gone into military service. Is it not wise, on the whole, to maintain the teaching corps, and if their regular work be reduced because of decreased attendance, make it possible for them to render some form of special war service?

Research. — The staff of the experiment station feel that it would be exceedingly difficult and unwise to give up projects that are under way in research, for the reason that they are all connected more or less intimately with the soil or with animal or crop production, and consequently have an intimate bearing on the whole question of food supply. It is important, moreover, if we can possibly get the funds, to take up some special lines of research bearing upon the food emergency. This is notably true in connection with the canning and preserving of food. Very little scientific work has been done in this field. We are remarkably well equipped, both in material equipment and in men, for this work. Studies in the cost of production of milk have already been made, but more work needs to be done. Food surveys, both as to supply and demand, could be carried on to good advantage through our department of agricultural economics if the money were forthcoming.

Teaching. — We are putting forth every effort to maintain the standard of the institution and to keep intact the course of study. It is very difficult to do this, partly because so many of the students have gone, and because those who are left are more or less uneasy on account of the war situation. It is not an easy problem to keep up the standards, nor to decide what changes can be made in the number of the staff, salaries, courses of study, etc. We have no means of knowing how long

the war will last. As soon as it is over we feel that the college must be prepared for a great influx of students. The interest in food production and supply will be greater than ever.

The Extension Service. — Of course, in one sense, the war service of the institution in the field has been entirely extension work. There has been an enormous increase in this work, and we could have used two or three times as many men as we have had at our disposal. In order to be of the largest service to the State we ought to have practically twice as many workers as we now have in the field.

The Staff. — The depletion in the staff raises an important problem, especially in connection with the younger men. It is almost impossible to get young men to take the places of those who have gone.

The Students. — It has already been indicated that the uncertainty of the situation makes it difficult not only to keep up the student body but to maintain the quality of work. The students, however, are very earnest and are doing their part as well as can be expected. The spirit of the student body is in every way magnificent. Fortunately, the reduction in the number of students does not deprive us of any large income, as it does in the privately supported colleges. On the other hand, it does not help us very much in reducing expenses, unless we deliberately cut out courses and departments; in other words, unless we fail to keep the institution "in trim" for the work it must do when the war is over.

The Food Supply and the College.

The war has not only accentuated the problem of food as a phase of war preparation and service, but it has also called attention to the fact that the question of food supply has a certain unity, and must be considered more fully as a single problem, not only for communities and for nations but for the world as a whole. The producers cannot be unmindful of their obligations to consumers, nor the consumers forgetful of the needs and rights of producers. The duty to save food everywhere, from the field to the table, has new meaning. The need of economies in production and distribution, as well as in use, are understood more clearly than ever before.

All this gives a new significance to the work of the agricultural colleges. It is rather strange, I think, that their function has been regarded as that of dealing only with the production of food and other things that can be grown from the soil. But it is becoming more clear now that they must deal with all the interests of those who till the soil. The work of the college must follow these interests as far as they may go, and it is apparent that they go a long way beyond the matter of production.

But I am wondering if we may not carry this matter even a step farther. Congress has placed in the hands of the Department of Agriculture — and, through this Department, in the hands of the various agricultural colleges — the task of teaching home economics to the people, not alone in the country but also in the city. Why should this not be a permanent function of the college? In this emergency the members of the staff of our college have been called upon to testify as expert witnesses concerning the costs of the production and distribution of milk, — a purely economic and business problem, not primarily a question of technical production. Why should our people be interested in the distribution of milk more than in the distribution of fruit or vegetables or hay? In other words, does not the very logic of events at least, if not a theory as to the work of the agricultural college, justify the statement that hereafter the college must concern itself with all the problems of food supply, and through its research, through field studies, and in its extension work, as well as in its courses of study, cover on the material side the entire problem of food supply? I should like to raise this question in a very definite way, because it has a most intimate bearing upon the work and activities of the institution, and in a State like Massachusetts, which is so thoroughly urban, a very important bearing upon the question of financial support. And this leads me to a few words concerning

Additional Funds for War Service.

I wish to urge the need of special funds for war service. This matter will come before you through the appropriate committees, but I think that we should have money from some

source for special projects of an investigational character already referred to in this report, and that we should also take on, as soon as possible, a number of additional persons as members of the extension staff for service in the field. Now that attention to food has become recognized as a part of the war policy, is it not clear that the agricultural college, if it can serve the Commonwealth in times of peace, can serve her more greatly in this time of war? If agricultural education is worth anything, it is supremely worth while during the period of the war.

REVIEW OF THE YEAR.

CHANGES IN DEPARTMENT HEADS.

In March Arthur B. Beaumont came to the institution to assume the responsibility of head of the department of agronomy, with the rank of associate professor, filling the vacancy caused by the resignation in June, 1916, of Prof. Sidney B. Haskell. Professor Beaumont was born and reared in the south, graduating from the Kentucky State University in 1908; after five years of successful teaching in Oregon Mr. Beaumont returned to Cornell University for graduate study.

After three years of efficient service Associate Prof. Arno H. Nehrling, head of the department of floriculture, resigned in March, 1917, to enter private business in Indiana. Professor Nehrling was exceptionally well trained in floriculture, and continued here the development on a very high plane of the work inaugurated by his predecessor, Prof. Edward A. White. Professor Nehrling was a strong teacher, a good administrator, and enjoyed the complete confidence of the florists of the State. His resignation was a distinct misfortune to the institution. From March until the close of the college year the work of the department was carried on by Mr. Clark L. Thayer of Cornell University. Mr. August G. Hecht was selected for the position of head of the department, and assumed this responsibility in September. Mr. Hecht graduated from the University of Illinois in 1914, at which institution he has for three years been engaged as instructor, while at the same time pursuing graduate work. Professor Hecht is well trained both professionally and in the practical work of floriculture, and is proving to be an acceptable successor to Professor Nehrling.

When the first officers' training camp was opened at Plattsburg in May, 1917, Capt. Henry W. Fleet was ordered by the War Department to assume important responsibilities in connection with the training of officers at Plattsburg. Captain Fleet was in charge of our military work for a little over two years, and in that period won the complete respect and esteem of students and faculty; he elevated the work in military drill to a very high plane of efficiency, while at the same time

correlating it with the other activities of the college in a most acceptable manner. Late in the summer the War Department detailed Col. Richard H. Wilson as commandant at this institution. Colonel Wilson is a graduate of West Point, and has had a very successful career as an army officer. The college is fortunate in having an officer of high rank assigned for the direction of its military work. (A complete list of changes in the various staffs appears as Tables I. to IV.)

MR. HARMOUNT'S DEATH.

During the year death has claimed an active member of our teaching staff; Mr. William L. Harmount, after a serious illness of about four months, passed away at his home in Branford, Conn., July 20. Mr. Harmount came to the college in 1911 as instructor in French, and during the years of his service here gained the admiration of students and faculty alike. Although unassuming and retiring by nature, he won a warm place in the hearts of all his students because of his teaching ability, and because of his genuinely human interest in all who came in contact with him. Among his teaching associates he won high regard as a gentleman, as a teacher, and as a scholar of high intellectual ideals.

ATTENDANCE.

The total registration this autumn is 500 as compared with 680 a year ago, or approximately 75 per cent. of last year's attendance. Doubtless the falling off is due to the war. At least 100 men, who would otherwise have been here in the three upper classes this year, are in the army or with some other branch of the armed forces. The freshman class enrollment is 118 as compared with 170 of last year, and with 211 of two years ago. This decrease in the entering class is probably chargeable to a number of causes, such as the general unrest among young men, the consciousness of the possibility that they may not be able to complete their course before being drafted, and the unusually high wages which they can command in the various industries. (See Table VI. for analysis of enrollment.)

UNCLASSIFIED STUDENTS.

In the spring of 1917 the faculty made more liberal provisions for the admission of so-called "unclassified" students; the new rule allows high school graduates to enter who are interested in the practical work of the college, but who feel that they cannot come for the four years' course. High school graduates of eighteen years of age, or older, will now be admitted without examination or the presentation of the usual certificate required for admission to the regular course. These students may remain in college for not more than two years, and are restricted in their work to the courses in technical agriculture and horticulture. That this ruling will meet a very definite need is evidenced by the fact that this autumn, in spite of war conditions, we have an enrollment of 50 unclassified students as compared with the enrollment of 29 of a year ago. This work is somewhat comparable with the special two years' courses offered at various other agricultural colleges.

RESERVE OFFICERS' TRAINING CORPS.

In harmony with a plan developed by the War Department for the training of reserve army officers, there was established at this institution during the winter of 1917 a branch of the Reserve Officers' Training Corps. Under the requirements of this system all students in the institution will drill and pursue studies in military science for two years; at the end of this time students who so choose may, if approved by the president of the college and the commandant, continue their military training on an intensified basis for the remainder of their college course. These students are required to attend military training camps in the summers, and upon graduation from the college may, provided they meet certain requirements, secure at the expense of the government such further training as will place them as commissioned officers upon a reserved list for a period of ten years. The government will in ordinary times furnish the uniforms for the lower classmen, and to those who are admitted for the advanced training the government will allow a cash payment for rations which will assist materially in meeting their college expenses.

COMMENCEMENT.

On account of the war, members of the senior class began to leave college in March, and all members of the class had by the latter part of May secured positions away from the college, either in military service or in some form of agricultural mobilization. Necessarily the usual plans for Commencement had to be entirely abandoned; it seemed desirable, however, to arrange for simple Commencement exercises, and to secure the attendance of as many as possible of those entitled to diplomas. Saturday evening, June 30, was therefore set aside for Commencement. The degree of bachelor of science was conferred upon 103 men and one woman. Of this number 65 returned to receive their diplomas in person. Nearly all of those who were unable to return were in military camps, although a few were engaged in important agricultural enterprises from which they could not be spared even for a day. To those who could not be present the diploma was mailed. On June 27 the degree of master of science was conferred upon eight members of the graduate school.

The Commencement program consisted of a dinner at Draper Hall, to which all seniors and members of the faculty were invited. The attendance was nearly 100. Following the supper were brief informal speeches by the president, the dean and representatives of the graduating class. At 8 o'clock the formal graduation exercises were held in the auditorium. The program consisted of music, a brief address by the president, and the awarding of the diplomas.

FIFTIETH ANNIVERSARY.

Soon after the outbreak of the war, in the spring, it was decided to postpone the plans for the celebration of the fiftieth anniversary which was to be held in October, 1917. The brief history of the college, on which Mr. L. B. Caswell of the class of 1871 had been working for some months, has recently been completed. Work on the college bibliography is also going forward. The pageant master, Mr. Langdon, was instructed to finish the writing of the pageant, and the pageant music was completed by Mr. Philip G. Clapp of Dartmouth College. The pageant and its music, therefore, are in such condition that

their presentation can be arranged for at such future date as it may be considered expedient on which to have the postponed anniversary celebration.

Before leaving Amherst, Mr. Langdon read before our faculty, students and friends the principal parts of the pageant. Mr. Clapp was present, and gave a piano rendition of the prominent portions of the music. The opinion was unanimous that the pageant, if it could have been presented, would not only have been an attractive feature of the celebration, but would also have portrayed in a most impressive manner the development of New England agriculture, and the relation to it of the Massachusetts Agricultural College. We most earnestly hope that the pageant may be presented at some future date.

THE REUNION OF THE CLASS OF 1871.

October 2 marked the fiftieth anniversary of the coming on to the campus of the pioneer class of 1871. It seemed unwise to allow this anniversary to pass without some suitable recognition. Accordingly, arrangements were made with the class to hold a reunion here; the date selected, however, was October 12, in order that the class might be here after college should open. The following program was arranged and carried out:—

Thursday Evening, October 11.

Informal gathering at "The Davenport."

Friday, October 12.

8.30 A.M. Business meeting of the class at "The Davenport."

10.00 A.M. Class photograph at "The Davenport."

10.30 A.M. Auto tour of the college and environs in charge of campus committee on reception.

1.00 P.M. Dinner at Draper Hall; ladies invited; short addresses as follows:—

Greetings on behalf of the faculty, President Butterfield.

Greetings on behalf of the alumni, Dr. C. A. Peters, Secretary of the Associate Alumni.

Greetings on behalf of the trustees, Charles A. Gleason, Vice-President.

Response by Mr. William D. Russell, class of 1871.

Brief statement concerning pageant, William C. Langdon, Pageant Master.

Brief statement concerning history, Dr. Henry T. Fernald.

Brief statement concerning bibliography, Mr. C. R. Green.

3.30 P.M. Public meeting in auditorium; address by Mr. William Wheeler, subject, "The Half Century Mile Post."

4.30 P.M. Informal reception in Room 114, Stockbridge Hall, to members of the class of 1871.

6.30 P.M. Class dinner at "The Davenport."

Fourteen of the 17 living members of the class were here; in addition, 3 members of the class who did not graduate joined with the others in their anniversary.

THE BOWKER AUDITORIUM.

I desire in this report to record formally the action of the trustees in giving to the auditorium in Stockbridge Hall the name of The Bowker Auditorium in recognition of the efficient and loyal service rendered the institution by William H. Bowker, a member of the class of 1871, and for over thirty years a trustee of the institution.

LEGISLATIVE APPROPRIATIONS.

The college asked the Legislature of 1917 for appropriations totaling \$488,200 for buildings, equipment and improvements to the property. The college also asked for \$35,000 for buildings, equipment and maintenance for the market-garden field station at Lexington. During the winter, as the price of coal and other supplies advanced, and as additional demands were made for an increase in the wages of laborers, it was deemed advisable to ask the Legislature for an emergency appropriation of \$25,000 to help meet these unexpected financial obligations.

The Legislature finally agreed upon the following appropriations: \$40,000 for improvements at the power plant, including a new chimney and an additional boiler; \$33,500 for miscellaneous equipment and improvements; \$10,000 for buildings, equipment and maintenance of the market-garden field station; and \$17,500 to be added to the appropriation for current expenses.

ADDITIONS AND IMPROVEMENTS TO THE PLANT.

Contracts have been let for a new 450-horsepower boiler at the power plant, a new 150-foot radial brick chimney, and testing apparatus that will bring the plant to first-class condition. The roof on the power plant has also been raised. One of the most important improvement items was the rebuilding of the house at Mount Toby; this has been put in first-class condition, and is now occupied by a caretaker of the reservation. An additional glass laboratory for the department of botany has also been built. Numberless small changes have been made to keep the institution in first-class condition.

THE INVESTIGATING COMMISSION.

The investigating commission, appointed under legislative resolve by Governor McCall in the summer of 1916, was originally instructed to report to the Legislature in January, 1917. Finding that the time thus allotted was not adequate to make a thoroughgoing investigation of the work of the college, the commission received authority to postpone the completion of their report until January, 1918. The commission has continued its work during the year, and it is expected that the report will be made early in 1918.

THE WORK OF THE FIELD AGENT.

In July, 1916, a field agent was appointed. At that time there were no established lines of work for an appointee to this new office to take up. The important task of organizing adequate publicity is so new that I wish to quote somewhat from Mr. Gould's report.

The problem in college publicity seems to concern itself with the systematizing, standardizing and centralizing of the publicity resources of the college. The primary function of the office was to collect and disseminate information concerning the Massachusetts Agricultural College. There was also turned over to this office the management of such institutions as high school day, alumni day and various conventions held on the campus.

The High School Project.

The purpose of this campaign was to acquaint Massachusetts high school men with the college. An appeal was made to the students in college to aid in this particular phase of publicity work in high schools. Their response was encouraging. Thirty-nine high schools were visited and 194 individual interviews with students were held. The individual consultations were held with those students who should have been or were seriously interested in M. A. C. Through this work it became evident that —

1. M. A. C. is little known and understood by a large number of high school men.
2. There are many men contemplating M. A. C. who are not really familiar with the work of the college.
3. There are not a few high school principals who are unfamiliar with the work of the institution.

The Project with the Granges.

Following the custom already in vogue, M. A. C. days with Pomona granges were arranged for with most of the Pomonas and a few locals. Illustrated lectures on the work of the college were given at 19 such meetings, reaching 1,505 people. The value of this program is doubtful.

The Excursion Project.

A project for community excursions to the college was prepared and presented to the county agents for their co-operation. No excursions of this special nature ever reached the campus, but 8 distinct organizations and several odd parties, totaling 1,162 persons, visited the college grounds between July 1 and Nov. 1, 1917.

Publications.

Publications issued from the office consisted of a Campus Guide, a booklet for high school men descriptive of the college, and a descriptive booklet for the department of landscape gardening.

THE THREE-TERM PLAN.

The academic year ending last summer was the first year in which the college has operated under the new three-term plan. It is still too early to judge the results. So far as first impressions may be a guide, it may be said that the plan has worked well. One feature of the scheme, which eventually may make it actually a four-term plan, was to have special courses during the summer. Several of these had been planned for this last summer, but had to be given up on account of the war emergency.

THE SMITH-HUGHES ACT.

During the year Congress passed a law known as the Smith-Hughes Act, appropriating Federal money for vocational education of secondary grade in the industries, agriculture and home economics. The law is administered in each State under a board of vocational education, which in the case of Massachusetts is the State Board of Education. The chief interest of the college in the operations of this act is twofold, — first, that we think it fair to assume that the Agricultural College will be the training school for teachers of agriculture under this act; and secondly, it gives a strong impetus to the development of secondary education in agriculture, already well started in Massachusetts under the State Board of Education, and gives added importance to the need of a co-operative plan with reference to the agricultural development of a State system of agricultural education. Your president is in consultation with the Commissioner of Education on all these subjects.

THE ANTI-AID AMENDMENT.

The college has always regarded itself as a public institution, and consequently has not supposed that it would be affected by the passage of the so-called anti-aid amendment to the State Constitution. It may be desirable, however, to have some legislation that will put on the statute books certain definitions of status that heretofore have given rise to some uncertainties in the State House.

It is understood that the method of electing members to the State Board of Agriculture will have to be changed. This is a matter that does not primarily concern the college, except as it bears upon the general question of the intimate relationship between educational and administrative work in such a field as agriculture. Furthermore, the fact that the secretary of the Board and the president of the college are, respectively, ex-officio members of the other Board brings up a detail.

The county farm bureaus, which have developed so rapidly in this State during the past few years, are considered by the United States Department of Agriculture, and by the college as well, as an organic part of the nation-wide system of agri-

cultural extension service inaugurated by the congressional Smith-Lever Act. As a consequence, any legislation affecting these county farm bureaus is of concern to the college. The anti-aid amendment seems to make necessary the organization of these bureaus as public institutions rather than as corporations. We are co-operating, therefore, with the Federation of County Farm Bureaus in the endeavor to work out proposed legislation that will meet the requirements of the amendment, insure the effectiveness of the bureaus, and regard the interests of the college and the Department of Agriculture.

CO-OPERATION WITH THE BOARD OF AGRICULTURE.

During the early part of the year the State Board of Agriculture and the trustees of this college endorsed a statement of principles that should govern a division of labor between the two Boards and the institutions they represent. The statement is as follows:—

- I. The State Board of Agriculture and the Massachusetts Agricultural College are, or should be, regarded as public agencies, to be supported by public funds and to be subject to appropriate State control.
- II. The chief function of the State Board of Agriculture is administrative.
- III. The chief function of the State Agricultural College is educational.
- IV. There should be a standing joint committee on co-operation and adjustment, comprised of two or more members of the Board of Agriculture and a similar number from the Board of Trustees of the college, in addition to the secretary of the Board and the president of the college.
- V. There should be distinct written agreements on the form and method of division of labor in all cases where there is, in the opinion of either institution, any overlapping or duplication of work.
- VI. It is understood that in the matter of employment of members of the college staff as executive officers in the control or other work of the Board there will be definite agreements between the Board and the college.

The gist of this statement lies in the assignment of administrative work to the Board of Agriculture and of educational work to the college. The application of this principle will call for the consideration of some specific questions, such as the inspection of fertilizers and feedstuffs now administered under

the direction of the Board of Trustees, and the Farmers' Institutes now carried on by the Board of Agriculture. Questions will also arise as to just what are administrative and educational activities. As a rule, these are clearly defined, but there will be instances where conference will be necessary to determine the correct assignment. I would recommend, therefore, that the trustees join with the Board of Agriculture in maintaining a joint committee of conference.

It is interesting to note that this autumn the Commissioners of Agriculture of the United States and the Association of American Agricultural Colleges and Experiment Stations joined in a somewhat similar statement of functions, in which this fundamental principle concerning administrative and educational work that we have already adopted in Massachusetts was the main feature.

The Year in the Departments of Undergraduate Instruction.

The dean reports that to the end of April the work of his office concerned itself with the usual routine of attendance, discipline and scholarship. At the beginning of the year the president appointed seven class advisers, three for the freshmen, two for the sophomores, and one each for the upper classes. The work of these advisers, especially the freshman advisers, was helpful to a good many students, not only in respect to scholarship, but in respect to personal problems and other matters. This larger supervision of the men justifies the continuance of the arrangement this year, and will justify the extension of it in the future. After the end of April, when the boys were allowed to go out on mobilization work, giving them credit for the term's work for doing twelve weeks of approved work, the task of following them up and keeping in touch with them devolved upon the dean's office. Inasmuch as there were reports to be received from the 500 odd students at the end of each month's work, and one each from employer and parent at the end of the three months' work, the dean's work was comparatively heavy. The correspondence was necessarily increased, inasmuch as many of the boys were constantly changing their positions and asking for information

along numerous lines. The records were not complete, of course, until towards the end of the summer, so that the last year's work continued right up to the first days of the present school year. In the main, however, it was a pleasant task; the great majority of the boys were intensely earnest and deeply interested in their work. They made a fine record, — a record of which the college should always be proud.

Until the early spring the work of undergraduate teaching went on much as formerly. As a result of the war, however, a number of adjustments have been made. The work of practically all the departments has been modified to some degree better to meet the immediate demands of the hour. At the beginning of the present college year new courses were introduced for the purpose of more adequately preparing our students for supervisory positions another year. Additional work in conversational French has also been undertaken.

For the most part, the department heads have been retained, but a number of men in subordinate positions have left, some to enter the armed forces of the country, and some to take positions of larger responsibility elsewhere. A large number of teachers have been utilized during the spring and summer for special work in connection with the war service which the college has undertaken. One of the most urgent needs growing out of our war work is that of a department of horticultural manufactures. Professor Chenoweth has during the past months undertaken considerable work of this character in connection with his teaching in the department of pomology. For some years we have wished to develop work in this subject, and the emphasis now being placed upon the necessity of proper food conservation and preservation has driven home the importance of the immediate establishment of this department of horticultural manufactures.

The departments of poultry husbandry and agricultural economics in particular made use of the emergency in the spring to give their students field work in their respective subjects.

The department of agricultural education has made an analysis of the M. A. C. men who are engaged in educational work, and has also carried on correspondence with some 300 colleges with regard to secondary school agriculture as a sub-

ject for entrance credits for college. Correspondence has also been carried on with the principals of secondary schools in Massachusetts relative to the introduction of agriculture into the schools as a non-vocational subject.

There have come to practically all departments this year an unusual number of demands for trained men to accept attractive positions as teachers, farm managers and experts in other agricultural vocations. Only a relatively small percentage of these positions have we been able to fill.

Needs of various departments, which have heretofore been emphasized, have during the past year become even more pressing. In general, the teaching staff is adequate for the present demand. Several new buildings are, however, very badly needed. The more important of these are a new drill hall and armory, a library, a chemistry building and poultry houses.

After much study and conference there were developed during the past college year plans for work in technical agriculture and horticulture, designed to give every man entering the institution at the outset a general knowledge of the entire field of agriculture. This work was begun at the beginning of the present college year, and thus far it appears that the work has been conducted in an entirely satisfactory manner, and that it is meeting the hopes of its advocates. Owing to the resignation of Prof. John T. Wheeler, who has been the leader in developing this work, the plans for it are necessarily interfered with. We hope, however, that no serious interruption in the work will result.

In the department of physical education, owing to war conditions, a required course in field games has been introduced this October for freshmen and sophomores. This has been possible by the completion of the athletic field, which gives us ample room for handling large classes in outdoor games. During the winter months all juniors, sophomores and freshmen will be given two hours per week of special exercise prescribed by the War Department for students in colleges having a Reserve Officers' Training Corps. The shortening of the college year has made it necessary to abandon intercollegiate football and baseball. During the months of October and

November we have conducted a series of interclass football and track contests which have been very successful. About 125 different men participated in each Saturday program. The present development of general participation in games is due almost entirely to the completion of the athletic field. This development of outdoor work serves to emphasize more than ever the utterly inadequate indoor equipment. From December 1 to April 1 the drill hall floor is in almost constant use until 9 o'clock at night.

Under the provisions of General Orders No. 49, War Department, dated Sept. 20, 1916, an infantry unit of the Reserve Officers' Training Corps was established at this college on April 1, 1917, and since that date all instruction, both practical and theoretical, has followed strictly the curriculum prescribed in the orders named. The amount of time devoted to military work has generally been far beyond the requirements of the War Department. During the second and third terms last year special classes in junior and senior tactics of five hours per week were given. This training was in preparation for examination for admission to the Officers' Reserve Corps. During the third term seven hours per week were devoted to practical outdoor work, and the satisfactory progress attained was made the subject of favorable report by the officer making the annual inspection directed by the War Department. The military department of this college has co-operated with the Intercollegiate Intelligence Bureau of Washington, D. C., and has furnished to it a number of names of men fitted for special positions, such as agriculturists, chemists, editors, statisticians and draftsmen, etc.

During the year 3,162 volumes have been added to the library, making a total of 56,090. This number of accessions is smaller than for some years, and is largely accounted for by the entire absence of foreign books and periodicals. More work has been done by and for the faculty and others not connected with the institution. Requests by letter and otherwise for information concerning the purchase of books and periodicals, and the use of agricultural literature in general, have increased and become quite a factor in the work of the library. Records concerning the library extension work show an increase above

all previous reports. In answer to requests from 56 libraries in the Commonwealth, 820 books and 170 bulletins were loaned from this department. Library leaflets listing books on better farming, dairying, home economics, farm machinery and vegetable gardening were published during the year. Up to this writing 28 leaflets in editions varying from 1,000 to 3,000 copies each, make a total printing of 36,000 copies. All of this work has been carried on with as much dispatch by the members of the library staff and others as the crowded quarters and disarranged equipment would permit.

Short Courses.

Owing to war conditions several additional short courses were developed. There were 110 pupils registered in the winter school of 1917, representing several States. The eighth farmers' week was held from March 26 to 30, with an attendance of 800. Polish farmers' day was held March 26, the attendance being 300.

In order to meet the demands of production, a series of two-day schools were held at the college during May. The registered attendance was not large, but some of the courses were well attended, and the work well worth while. One and two-day schools were held in 85 communities throughout the State from May 24 to August 22. The attendance was 10,213, with 12 instructors. The beekeeping school was held at Dalton with the usual success. The apple packing school was discontinued. A series of four-day schools for conservation work was held at the college during July. These schools were well attended and unusual enthusiasm was displayed.

A summer school of agriculture and country life was held as usual during July. The attendance of the school was somewhat affected by the pressure of the times. With the summer school was united a school for Y. W. C. A. workers, conducted under the auspices of the northeastern field committee of the National Young Women's Christian Association. This brought into the school several students from various States, who put much enthusiasm into our summer school. Some of the regular courses were discontinued in order to establish new courses along the line of conservation and production. The Poultry

Convention was held in July, and a good deal of enthusiasm was created. To the Ministers' Conference and Conference for Rural Organization were invited the leaders in the emergency war work, and the conference took on quite a successful appearance.

The supervisor of short courses calls attention to the fact that the short courses should have better financial support; the heads of departments are constantly calling for extra instructors and larger appropriations for laboratory supplies; also, one-year technical courses, such as poultry, animal husbandry and horticulture for students not of college grade; continuation courses of one year for graduates of agricultural high schools and departments of agriculture in high schools; a summer school of six or twelve weeks for pupils of college grade, with college credit, should be established.

It is the aim of the college to organize the short course work so that the citizens of the State may have a chance to come to the college for help and assistance, be it for a period of three days, three months or for a year. It is desirable that all the short courses be organized under the supervision of one man who should be given time to do this work.

The Year in the Graduate School.

During the year further progress has been made in the organization of the graduate school, and in the working out of a number of minor problems connected with the direction of this work. The more notable advances during the year are the formulation by the graduate staff of rules governing the theses presented for the graduate degree; a more definite basis has been established for the granting of credits for advanced degrees; the work required of graduate assistants has been standardized. Only half as many graduate students are registered this autumn as a year ago; this may be accounted for by the fact that the demand for trained men is this year almost unprecedented, and that there are most attractive opportunities for all such men who are not in military service.

The Year in the Experiment Station.

The station has been fortunate during the past year in retaining the services of the members of its staff in direct charge of important lines of investigation, with one exception. Dr. Van Suchtelen resigned to accept a position in his native country, Holland, and has been replaced in the department of microbiology by Dr. Itano. We have, however, lost a considerable number of assistants, chiefly through the operation of the selective draft. This in some cases has been followed by considerable interruption in lines of work in progress, as it is found difficult to replace the men thus lost with thoroughly qualified substitutes. Three important additions have been made to the station staff during the year — a field pathologist, an assistant in entomology and an assistant in the department of agricultural economics. The field pathologist has done a large amount of investigational work on the grounds of market gardeners, and experiments have been begun in the spraying of celery for blight and of beans for anthracnose. The new assistant in entomology, besides continuing the observations on the red spider, has undertaken the study of various insects doing serious injury in market gardens of the State, and an effort will be made, both on the pathological and entomological sides, to render the utmost possible assistance to the market-garden interests of the State, with a view to the prevention of injury to our more important food crops.

In the fifty-fourth annual report of the college will be found a somewhat full statement of the various lines of investigation in progress at the time of its preparation, and attention was called to the fact that in most of these continuance for a considerable number of years is essential. A restatement, therefore, of the ground just referred to appears to be unnecessary at this time.

The serious situation as affecting food supply due to the European war suggested the desirability of a careful consideration of the question as to whether lines of investigation in progress should not be modified and new ones undertaken. With a view to getting suggestions from individuals who it was believed are as well qualified to make such suggestions as

any in the State, a meeting of the advisory council was called in June. The investigations in progress were quite comprehensively, though of necessity briefly, described, after which opportunity was given for discussion and suggestions. If we may judge by the fact that no important new investigations were suggested, it would appear that the scope of our work as affecting food production and distribution was regarded by the members of the council present as at least fairly satisfactorily covering the ground.

During the past year, however, we have undertaken a few new lines of investigation. In connection with the cranberry substation in Wareham we have established in co-operation with the Bureau of Plant Industry of the United States Department of Agriculture a plantation of swamp blueberries, with a view to investigating the possibilities of blueberry culture. The very high price of the cereal grains has indicated the probability that under existing conditions Massachusetts may profitably engage in the production of these grains on a much more extensive scale than in recent years. A considerable area on the Tillson farm and a smaller area on the home grounds of the station, therefore, are being used for the trial of nine different varieties of winter wheat and of new varieties of winter rye and winter barley. The chemical department, in co-operation with several other experiment stations, under the general suggestive leadership of Dr. H. P. Armsby, is beginning a series of experiments to determine the minimum protein requirements of growing animals. The solution of this problem should have an important bearing upon the economy of meat production. A number of forage crops new in the agriculture of the State and a considerable number of feeds also relatively unknown, have been under investigation as regards their value and adaptability to local conditions.

Important investigations which should throw light upon the most satisfactory methods of feeding horses have been begun during the year. In these investigations the digestibility by horses of the important foodstuffs and their available energy in the animal economy will be determined.

Experiments having indicated the superior value of the types of rust-resistant asparagus produced in the breeding work in

Concord, a considerable area has been set with plants of the best variety for the purpose of producing seed in such quantities that the demand of growers of the crop for the new varieties may be met.

As the probable value of soy beans in the existing and prospective food emergency has been quite generally recognized, it was felt that there would be a large demand for seed, and a considerable area on the Tillson farm, as well as smaller areas on such of the station plots as could be used for the purpose, have been planted to one of the best varieties.

Fairly satisfactory progress has been made in the investigation into the causes of tobacco sickness, although a hail storm of exceptional severity did much damage to a portion of the plots.

The station has been exceptionally active in publication during the past year. Five important bulletins have been published and distributed, and no less than six others are either in the printer's hands or now ready to go forward.

Several of these are of permanent scientific value, and must ultimately prove useful through pointing the way to a more successful production of some of our important agricultural specialties or to a reduction in the cost of production, while others are of direct practical importance in the existing food emergency. In addition, several of the station workers have prepared for publication in scientific journals important papers dealing with results obtained in station investigations.

The control work of the station has received the usual careful attention. Bulletins reporting the results of the inspection of fertilizers and feeds have been prepared. The high price and scarcity of fertilizers seems to have suggested unusual activity on the part of those engaged in the production and sale of relatively worthless articles. An energetic campaign believed to have been quite successful was carried on with a view to preventing or limiting the amount of such sales.

The blood tests for bacillary white diarrhea, with a view to the elimination of this disease from the State, has been energetically prosecuted, and this is highly appreciated by our poultrymen.

NEEDS OF THE STATION.

Land and Buildings. — The needs of the station were stated with some fullness in the report for last year, and it seems unnecessary to repeat the statement in full at this time. The needs particularly emphasized were the purchase of the Tillson farm and the erection thereon of a barn and dwelling house; the acquisition of land for a poultry farm; the purchase of the land leased for the stock and scion and other orchard experiments; the provision of a small orchard for the special use of the entomological department in connection with its study of spraying problems; the provision of buildings for experimental purposes at the market-garden field station. The purchase of the Tillson farm is the only one of these needs which has been met. For the other purposes indicated it is estimated that the following sums of money will be required: —

Buildings on the Tillson farm,	\$10,000
Land for the poultry farm,	8,000
The purchase of the Tuxbury land, used for the orchard experiments,	12,000

It is believed that the small orchard needed for the work of the entomological department should be located upon land now the property of the institution and near the headquarters of the department.

Increases in the Staff. — Attention was called in the last annual report of the station to the fact that there is decided need for experimental work in rural engineering, in floriculture and in forestry. Provision for this work should be made at as early a date as possible. Particularly urgent are investigations in rural engineering and in forestry. Owing to the unusual conditions affecting the finances of the State, provision for these investigations may of necessity be somewhat deferred, but it is hoped that it may be possible to provide for increased work along lines of investigations particularly important in the present emergency within the limits of our present appropriations. The plan which seems to promise most important results of immediate and practical value is the employment of graduate assistants who will study, under heads

of existing departments, some of the problems most urgently demanding prompt solution. Food conservation and canning are among the more important of the subjects which should be thus provided for.

The experiment station is carefully inspected every year by a member of the staff of the office of experiment stations. The inspection this year was carried out by Dr. E. W. Allen, chief of the office, and it may not be out of place to call attention to the fact that after finishing his inspection, and just before leaving, Dr. Allen expressed his hearty satisfaction with the conditions he found. He stated that he felt that the administration was carefully looked after, and that we were accomplishing a very large amount of highly valuable investigational work. He added that it seemed to him that the scope and amount of work must be regarded as extremely satisfactory.

MARKET-GARDEN FIELD STATION.

In 1916 Mr. H. F. Arnold, then president of the Boston Market Gardeners' Association, introduced into the Legislature a bill requesting \$20,000 for land and buildings and \$10,000 for equipment and maintenance for a market-garden field station, which would be under the general direction of the Massachusetts Agricultural College. The Legislature of 1916 appropriated \$8,000 to cover all purposes above mentioned. The final location of the property was decided by the trustees Nov. 9, 1916, and the following month the purchase was consummated. The parcel of land selected is located in East Lexington, and comprises 12 acres. The purchase price was \$400 per acre. As weather permitted during the winter of 1916 and during the spring of 1917, the land selected was improved by the construction of roads, drainage, the removal of rocks, etc. The cost per acre for these improvements was \$167.48, making the final cost per acre \$567.48. In 1917 the trustees of the college requested \$25,000 for buildings and equipment and \$10,000 for maintenance to Dec. 1, 1918. The Legislature appropriated \$10,000, to be expended as follows: \$3,500 for a service building, \$1 500 for equipment, and \$5,000 for maintenance to July 1, 1918. Work on the service building was begun Aug. 7, 1917, and is now practically completed.

The appropriation for equipment and for maintenance is being spent as planned.

The farm operations of 1917 were confined to the growing of cabbages. Ten acres were set to this crop. The yield was fair, and the sales up to December 1 approximated \$1,500.

As yet the field station is not adequately equipped to meet the expectations of those most interested in it, and accordingly the direct beneficial results are not greatly in evidence. The market gardeners, however, are interested in this project, and it is expected that, with their co-operation, the work may speedily become organized on an entirely satisfactory basis.

The results of the farming operations in 1917 have put the soil in good condition and resulted in the practical extermination of witch grass. While the land will not be in ideal condition for all garden crops in 1918, much more can be done with it than during the past season. Plans are under way to carry on several demonstrations, which should be of immediate value to vegetable growers in Massachusetts, and to start several experiments of fundamental importance to this type of Massachusetts agriculture.

The Extension Service.

The war has brought many changes in the personnel and the work of the extension service, and these began long before war was declared. Every effort has been made to meet the ever-changing conditions that have confronted us. The work developed so rapidly and the changes came so fast that it was very hard to do things in as substantial a way as might have been desired. In reviewing the year's work, however, we feel that in the main the work was well done, and that every worker did as well as possible under the conditions.

Changes in Staff. — Both permanent and temporary changes have been made in our staff in the past year. Director Hurd, who is on leave of absence until next July, is serving in Washington as special assistant in the office of the Secretary of Agriculture. Prof. Austin D. Kilham is serving very acceptably as acting director. The assistant director resigned early in the year and his place was taken by an assistant to the director. Four members of our staff have been granted leave of absence

to enable them to do war work. Capable extension workers are becoming very scarce, and it is becoming more and more difficult to fill either temporary or permanent positions.

Co-operation with Other Agencies. — During the past year very pleasing co-operative relationships have been maintained with all of the organizations mentioned in the annual report of last year. The most noteworthy additions to this list are the Massachusetts Committee on Public Safety and the State Food Administration with their subordinate committees. Immediately upon the formation of the committee on food production and conservation of the Massachusetts Committee on Public Safety, the extension service as a part of the college was placed at the disposal of the committee. Every member of the extension service helped the work of the committee in some way. A few members of the extension service devoted several months of their time entirely to the work with the Committee on Public Safety. The relationships have been most pleasing and gratifying.

There is now time to work out the relationships and methods of work for 1918 more carefully than was possible last year.

Co-operative Work with the United States Department of Agriculture. — Relationships with the United States Department of Agriculture have been strengthened. Several new co-operative projects have been undertaken with the Department. Many of these projects are temporary in character because they are maintained on emergency funds which may not be available after June 30, 1918. New projects are: (1) urban emergency home demonstration work; (2) rural emergency home demonstration work; (3) emergency county agricultural agent work; (4) emergency junior extension work; (5) truck crops disease work; (6) soft cheese demonstration work; (7) sheep production.

County Agent Work. — There is now completed the skeleton organization of the farm bureau work, as every agricultural county of the State now has its farm bureau organization. The farm bureaus in Middlesex, Dukes and Nantucket counties have been organized in the past year. The Middlesex County farm bureau has a staff consisting of a secretary, a county agricultural agent, a home demonstration agent and a boys' and

girls' club worker. The Dukes and Nantucket farm bureaus have joined to employ two workers, — a county agricultural agent and a home demonstration agent. The organizations and the preliminary work of the farm bureaus in Dukes and Nantucket were materially aided by the Massachusetts Committee on Public Safety.

Practically all of the farm bureaus have been strengthened by the additions of permanent or emergency workers. The Massachusetts Committee on Public Safety helped at a time during the summer when pressure was urgent and when funds could not be obtained elsewhere, by furnishing funds to carry on temporary work. Soon after the emergency funds of the United States Department of Agriculture became available, in August, some of this support was dropped. A very important portion of the county agent work is still supported by the Massachusetts Committee on Public Safety.

The development of local leadership, both for adult and junior extension work, was a very important part of the year's work in most counties.

The regular projects were followed during the early part of the year. Emphasis was placed on the organization of the dairy industry until that situation was relieved by the organization of the New England Milk Producers' Association. Later, the county agents assisted with the special survey on the cost of milk production.

Early in March came the call for assistance in a nation-wide campaign for increased food production. The regular projects of the farm bureaus were suspended and a large part of the time of our county workers was devoted to special work. The organization of the town committees on public safety and food production necessitated some quick and exacting work on the part of the county agents and others to arrange matters satisfactorily and without friction.

Four emergency agricultural agents at large have been employed under a co-operative agreement with the United States Department of Agriculture and the State Food Administration. These special agents work in close co-operation with the regular county agents on marketing problems. They have been placed in the following districts: —

District 1, Essex and Middlesex counties.

District 2, Barnstable, Plymouth, Bristol and Norfolk counties.

District 3, Worcester County.

District 4, Berkshire, Franklin, Hampden and Hampshire counties.

Agents are now at work in all districts except District 2.

Rural Home Economics. — The regular rural home economics work has been speeded up in an endeavor to meet the present emergency. Early in the year three emergency workers were employed throughout the State. The work was somewhat disorganized by the absence of Miss Comstock during the summer, and the loss of Miss Sayles after the 1st of October.

Upon the passage of the emergency food bill the three temporary workers were placed on United States Department of Agriculture funds, and were made assistants to Miss Comstock as State leader of rural home demonstration work.

The organization of the county home demonstration work now takes the greater part of the State leader's time. With the emergency work that is now on, it is not possible for all of the organization work to be done. It is highly important, with the development of home demonstration work in the farm bureaus, that we obtain high-class specialists to work in various lines. A specialist is needed in sewing and one in household management.

Urban Home Demonstration Work. — Immediately upon the passage of this bill Miss Antoinette Roof was appointed State leader of home demonstration agents urban. Three assistants were also appointed. Two difficulties at once presented themselves — first, to find properly qualified city leaders; second, to secure co-operation and financial support in the various cities. More than 50 candidates were interviewed to secure the present force of 17 workers. Of this number, 2 are assistants to the State leader, 11 are city leaders, and 3 are assistant city leaders. The fact that 11 cities have been found in so short a time that are willing to give financial aid to this work indicates that there is a real demand for it. Special attention has been given to the organization of the work in each city. In most cases an executive committee has been appointed for each city, with local committees in each district. The city leader finds many organizations with which to co-operate, and

in most cases finds many volunteer leaders who have had training in home economics or who have special qualifications because of their nationality.

The organization of the work in the cities should be strengthened and better co-operation secured with all existing agencies. Better financial arrangements will have to be made if the work is to be permanent. Extension schools should be held to train local leaders.

Junior Extension Work. — After the appointment of the Public Safety Committee in the early spring, work was begun to interest the young people in food production and conservation through the agency of public meetings, lectures at schools and school organizations. Four workers were employed permanently, and at certain times, when increased pressure demanded a greater force, the number was increased to eight. The Massachusetts Public Safety Committee financed a large part of the additional work. After the passage of the emergency agricultural bill an assistant State leader was appointed. This made a permanent staff at the college of five members, consisting of a State leader, an assistant State leader, a pig club agent, a poultry club agent and a home economics and canning agent. Since Dec. 1, 1916, approximately 58,664 people have attended demonstrations and meetings held in connection with their work. During the past year emphasis has been especially placed upon organization. Effort has been made to work through the county farm bureaus as far as possible. In a majority of the counties club workers were employed for the first time. These county workers endeavored to find local leaders in the various communities who would take charge of the work in smaller groups. In Hampden County 18 of the 20 towns appropriated money for local leadership as a result of the effort of the county club leader. In Franklin and Hampshire counties several towns at their annual meeting appropriated money for this work. In many cities the school departments appropriated money for club work. In most cases this money was used to pay the salary of a supervisor or a supervisor and assistants. Our records show that there have been at least 230 paid local leaders and 240 volunteer local leaders who have conducted work during the past year.

At the suggestion of the Norfolk County agricultural agent a new form of work is being tried out under the direction of the assistant State leader. Junior extension schools are being developed in which it is hoped that a larger amount of thorough instruction will be given than has been possible in the past.

Boys and girls in many instances did canning work in units. As many as 3,500 jars were canned by some of these groups, and several records were made by individual boys and girls who canned from 500 to 800 jars of fruits, vegetables and greens. The figures at hand show great increase in interest, not only on the part of the children but also adults.

Special Extension Schools. — As a part of the emergency work three four-day training schools for leaders were held at the college July 10 to 13, 17 to 20, 24 to 27, to which 83 persons came, representing 45 towns in the State. Five instructors conducted these meetings. Food conservation schools of one and two days' length were held May 24 to August 22 in 85 communities throughout the State. Five of these covered a period of two days, while the remainder were one-day sessions.

Aside from these well-recognized projects, 49 members of the college staff, experiment station and extension service delivered 897 lectures before various organizations and communities at which there was an estimated attendance of 58,305.

Horticultural Manufactures. — Previous to 1917 this very important line of work was carried on in a very meager way under the pomology extension project. Early in the present year Professor Chenoweth developed this as part of the campus mobilization work. Material aid was given to community canning and evaporating centers. Schools were held for leaders at the college, and schools and lectures were given throughout the State. Plans are under way to carry this work on in a very practical way during the next year.

Special Campaigns. — In order to meet the unusual situations the past year several special campaigns were carried on. Among the most successful was the poultry campaign which was developed by our poultry department in co-operation with the Massachusetts Committee on Public Safety and several other organizations. Reports indicate that these campaigns have been very successful.

Summary of Recommendations. — The results of the extension work showed very clearly during the past year that the extension staff, including the county agricultural agents, has been ready to meet emergencies. It has also been shown that it is very inadvisable to take the men off their regular lines of work to do a large amount of special work, even in so great an emergency as last year. Each of our workers is developing a special project which is just as important in time of war as in time of peace. Material harm was done to some of our permanent projects by the emergency work last year. It would seem advisable, therefore, to increase the staff, so far as possible, to meet the emergency rather than to take our specialists away from their regular and important work.

Budgets which will soon be presented will indicate the needs for the coming year in regular work and for emergency work. Special mention is made by the acting director of the following: —

1. More help should be obtained from the United States Department of Agriculture in correlation of our work both with the Department and with the farm bureaus.

2. More money should be obtained from the State treasury to be used through us by the county farm bureaus.

3. The rural home economics work should be better developed, to include, in addition to the State leader, highly trained specialists in food, clothing and household management.

4. Appropriation should be made for the maintenance of the urban home economics work.

5. Well-trained men should be secured to work out better methods for our itinerant instruction. This should be done whether the man is called assistant director or a specialist in this work. It may be advisable to reorganize our present scheme and place the administrative work along these lines in the hands of one of our present force, but it is very necessary that we have a man who is really a specialist on itinerant instruction. This is very important.

6. More money should be given us for printing and publicity. A great deal more could be done in this line.

7. Correspondence course work should be further developed. This cannot be done until further funds are secured.

8. Library extension work should be developed. This will require a part-time worker.

9. This seems to be the time to do some rapid work in community and county organization.

10. Plans should be made to carry on the present co-operative organization and marketing work in case the United States Department of Agriculture funds are not available after June 30.

11. The specialist in pomology should devote practically all his time to the demonstration orchards. Other work should only be done when it is possible to secure another worker.

12. There should be a full-time worker in dairying.

13. Civic improvement work should be dropped until the end of the war.

Most of the college teachers have responded to the call and given a great deal of their time and attention to the work off the college grounds as well as to special work on the campus. We expect a similar response another year. The extension staff, including the clerical force, has met the many unusual situations of the past year in a fine spirit of service.

THE IMMEDIATE NEEDS OF THE COLLEGE.

LEGISLATIVE BUDGET, 1918.

Because of the abnormally high cost of building materials and of labor, and also because both of these are in such demand for the more adequate prosecution of the war, the trustees at their October meeting decided not to ask the forthcoming Legislature for appropriations for any new buildings, although the need for the library, armory, chemistry laboratory and the dormitory is as urgent as ever. There are, however, several miscellaneous projects for improvements and equipment which have been pressing for some years, many of which are absolutely essential for the most efficient conduct of our work at this time. After careful consideration of these projects the trustees have prepared a budget which includes the following items: —

Improvements at the power plant, including coal-handling apparatus, turbine house and equipment, and residence for engineer,	\$59,700
Improvements at dining hall,	12,000
Poultry buildings,	7,500
Potting shed and bulb cellar at greenhouses,	6,659
Miscellaneous improvements in buildings and grounds,	30,306
Miscellaneous teaching, operating and office equipment,	20,680
	<hr/>
	\$136,845
Buildings, equipment and maintenance of market-garden field station at Lexington: —	
Greenhouses and heating plant,	\$13,500
Foreman's cottage,	4,500
Administration building,	7,500
Maintenance,	3,000
	<hr/>
	\$28,500

Following is a brief explanation of the need for the appropriation requested: —

Improvements at the Power Plant, \$59,700.

The equipment for furnishing electricity for the institution is inadequate for the present demand. There is now in use one 100-kilowatt Curtis General Electric turbine, and one

50-kilowatt Terry generator. The institution is now using in excess of 400 kilowatts. We are asking, therefore, for an additional 300-kilowatt Curtis turbine and exciter, to cost \$9,000. The following equipment will be necessary for this turbine: switchboard, \$3,200; piping, valves, fittings and labor to connect turbine house machines with the boiler house, \$5,000; a 5-ton crane for turbine house, \$1,000; moving old machines to the turbine house, and connecting switchboard with old electrical lines, \$1,000; the cost of the new turbine house to care for this equipment is estimated at \$14,000.

For economy in operation we desire to install additional coal-handling apparatus to cost \$22,000; this equipment will make possible a saving of 75 per cent. of the cost of labor of handling coal.

At the present time the chief engineer lives over a half a mile away from the power plant. Without question it is desirable, if not imperative, that the engineer should live near the plant. We are, accordingly, requesting an appropriation of \$4,500 to provide a suitable house for the engineer, to be located close to the power plant.

Improvements at the Dining Hall, \$12,000.

This appropriation has been asked for in previous years, and the need is now even greater than formerly. The amount specified would be used for installing suitable toilet facilities in the basement; for constructing a cold-storage plant for potatoes and other vegetables; and also to provide adequate storage for the coal used for cooking purposes. In addition to the cold-storage plant for vegetables a complete refrigeration plant is required, furnishing separate compartments for meat, milk, butter, fruit, eggs and miscellaneous left-over foods.

Poultry Building, \$7,500.

The poultry department is inadequately equipped with buildings necessary for the proper conduct of its teaching and investigational work. This is due in part to the fact that the department has been established only a comparatively short time, and the equipment has been added gradually. The present request is for funds to provide a poultry house for

stock and for use as a laboratory. The building proposed will contain twenty-four pens, a laboratory for general demonstrations, and a large room on the second floor to accommodate 25 to 50 students.

Potting Shed and Bulb Cellar at the Greenhouses, \$6,659.

In order to facilitate the work of the department of floriculture we propose to build a potting shed and manure tanks. The potting shed will have a basement for bulb storage.

Miscellaneous Improvements and Equipment, \$50,986.

Each year we are obliged to seek an appropriation for miscellaneous improvements in buildings and grounds, and for miscellaneous teaching, operating and office equipment. Inasmuch as our requirements are never met by the Legislature, the list of improvements and equipment presented this year is, therefore, somewhat of an accumulation of needs of long standing. The total of projects approved by the trustees is indicated by the above figures, divided as follows: improvements, \$30,306; equipment, \$20,680.

Equipment, Improvements and Maintenance at the Market-garden Field Station, \$28,500.

In order properly to develop the work of the market-garden field station at Lexington additional buildings and equipment are necessary, and the appropriation for maintenance must be renewed. The estimated gross expense for maintenance is \$3,000 to Dec. 1, 1918. An appropriation of \$7,500 is asked for an administration building to provide offices, storage for records, a small laboratory to take care of the work which must be done immediately on the grounds, a committee room, a dark room for photographic work, accommodations for the heating plant for the administration and service buildings and the foreman's cottage. The sum of \$4,500 is requested for the construction of a cottage for the resident foreman. An appropriation for greenhouses and heating plant was asked for last year, but not granted. This request is renewed at \$13,500; this will provide four greenhouses, each 40 by 75 feet, and a heating plant to care for the same.

GENERAL FINANCIAL NEEDS.

The five years' appropriation for maintenance of the college granted in 1913 expires Nov. 30, 1918, unless renewed. The commission to investigate the college will soon make its report, and our action as a Board will have to be governed to a large extent by the character of the recommendations of this commission relative to financial support of the institution. At this time, therefore, I cannot make specific suggestions, and can only reiterate the statements and arguments attempted in my report of one year ago, relative to the general question of method of supporting the institution.

Your Board of Trustees have agreed that it was unwise to ask for large buildings at this time, partly because the resources of the State are taxed to an unusual degree on account of the war, and partly because the excessive cost of building materials seems to make the erection of expensive buildings at this time rather unwise.

The question of financial support for the coming year is, however, somewhat acute. In spite of the reduced attendance of students, the cost of maintenance of the institution is not greatly reduced. Wherever it has been possible to carry on the work persons have not been appointed to vacancies made by resignations due to war work or other causes. This policy will to some degree reduce the salary pay roll. On the other hand, the very rapid increase in the cost of living during the past two years raises an exceedingly important question relative to the salaries of members of the staff. This question is peculiarly important in the cases of those members of the staff who are receiving moderate incomes, both in teaching and in experimental work, and perhaps presses, if possible, with even greater force upon the clerical staff, who, in my judgment, are not sufficiently paid anyway. I am inclined to think that it would be wise, as it certainly would be only fair, to grant a bonus or temporary increase of salary to certain members of the staff for the coming fiscal year.

The treasurer thinks that coal will be higher rather than lower. We are doing all in our power to reduce the consumption of coal, but the gain here is more than offset by the

extra cost of coal. Labor, of course, is high, as well as supplies, so that the maintenance cost of the institution, even under reduced sail, is not materially lessened.

Moreover, there are good reasons why certain emergency enterprises should be undertaken. During the past year the college spent at least \$8,000 — entirely apart from any question of salaries or services of men — in travel, correspondence, publications and clerical help — work that was entirely abnormal and wholly war emergency service. This type of expense is bound to continue so long as the war lasts.

Furthermore, I believe it to be the duty of the institution to do everything in its power to contribute to the problem of food supply. There are certain investigations that ought to be made. There are certain phases of expert service that we cannot render because we have no men on the staff to do the work, so that we could spend considerably more money in our extension service while the war is on. One of the most important aspects of war service that could be rendered would be to establish on a sound foundation our new department of horticultural manufactures. This has such an intimate relation to the saving of wastes, the canning, drying and preserving of foods, the rendering of unsalable but clean product into a multiform variety of juices, jellies, etc., that it could make a contribution of utmost consequence at this time.

WOMEN AT THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Women were first admitted to the Agricultural College for college grade work in 1899. Since that date there have always been a few in attendance for degree courses, and, including the class of 1917, 10 women have received the diploma of the institution. Of course, during all these years many women have attended the winter short course, and the summer school attendance has been composed largely of women. There was never any prohibition of women attending the college, and so far as I can discover there has been no real prejudice against it, at least in recent years. Neither from students nor from faculty have I heard of serious objection to the attendance of women. On the other hand, no encouragement has been given women to attend. There has been no special provision for their housing

nor for their college life and activities. There are several reasons why it seems necessary at this time to give special attention to this phase of our work.

1. There has been a notable recent increase in the enrollment of women. During the collegiate year 1912-13 there were 5 women here; last year there were 25; this year there are 30 women, 6 of these being freshmen.

2. The Massachusetts Agricultural College is the only land-grant college in New England, and I think I am correct in saying the only one in the north, that does not have special courses and provision for women. This fact is not necessarily conclusive as to our own policy; it does, however, indicate that we stand alone in the policy, and consequently must justify it if it is to be maintained.

3. The development of woman's interest in agriculture is rather notable. The number of women farmers in the east seems to be increasing. The organization of women interested in agriculture, started some years ago, has been fostered by the war and has become a strong movement. The mere fact that girls are taking courses in agriculture, short and long, in rapidly increasing numbers, is of utmost significance. It is worth noting that before the war European as well as British agricultural educational systems were providing increasingly for women.

4. The emphasis upon the importance of food thrift in this war has increased immeasurably the need of providing for the education of women in certain lines of endeavor for which there is now wholly inadequate preparation. Questions as to the use of food, the saving of food, the preserving of food — to a large extent matters in charge of women — raise nothing less than an issue.

5. There is a fundamental reason why an agricultural college should provide courses for women. For fifty years we have been endeavoring, through research and teaching and extension service, to enable the farmer to make more money from his farm. As already noted, many of the land-grant colleges have courses in home economics. It is doubtful, however, if any college has yet adequately provided for the training of women for rural home making in the same sense that they have

attempted to train the men for farm making. But however that may be, and whatever may be the difficulties in the way of carrying out such an ideal, the fact remains that the whole field of rural home making needs to be developed, and can be developed adequately only in the atmosphere of an agricultural college.

6. There is a growing demand for the training of women for positions in social service in connection with country life. While the normal schools are training teachers for the rural towns, still some aspects of this training can better be carried on at an agricultural college than anywhere else. We already have calls for community nurses, for directors of recreation and for Y. W. C. A. secretaries in the country. These calls are likely to increase, and they need trained women.

Some Considerations.

1. This plea for the recognition of women raises at once the question as to whether the college should enter upon a scheme of coeducation. Personally, I am convinced that this question is largely one of habit. The men's colleges of the east and south are very loath to change their policy and admit women, and I think the women's colleges of the east rather pride themselves in their plan of segregating women. On the other hand, the State colleges and universities of the north have practically always been coeducational. So far as I can discover there is no tendency to change their policy. I have come to feel that the best plan for a college situated as we are, and with its history and practice, would be to develop work for women in a way that would combine in a measure the advantages of both plans. I think, in other words, we should have on the campus what would virtually be an affiliated institution where the women would be considerably segregated, and would in large measure have their own teachers, their own buildings and their own social life. At the same time, there would be no artificial barriers of isolation. Mixed classes would prevail wherever they were economical, separate classes wherever the numbers warranted. So far as practicable, all the resources of classroom, laboratory equipment and teaching force now available for the men would be made available for

the women. There would be no duplication. There would, however, be an institutional *esprit de corps*.

2. I do not think that the policy of the college should be to inaugurate a course designed chiefly to prepare teachers of home economics. Opportunities for this sort of training are already in existence. Probably graduates of the college would enter this field, but I should think it wise to build the whole course on the idea that this outcome would be only an incident.

3. If work for women is started it ought to include at the outset some provision for investigational work. So far as food is concerned this would be partially taken care of in existing departments of the institution. But, of course, there is a vast field to be explored in lines that are of specific interest to the education of women.

4. We have for a number of years maintained effective work in the Extension Service in relation to home economics and other interests of women. This work, of course, should correlate intimately with the campus work of teaching and investigation, and should in itself be enlarged in scope and amount.

5. I have no set notions relative to the course of study that should be provided. This should be worked out by competent women on the ground. In general, however, I think the work should have for its backbone the vocational element; that it should at the same time give a large measure of attention to the humanistic or cultural subjects; and that it should also insist upon a proportion of work leading the students to an understanding of the relation of women, both as home makers and as citizens, to the needs of the community, to the State and to the nation. In other words, we should follow with the women practically the same principles of course building that we follow with the men.

Equipment.

The immediate requirements for starting this work for women would be the employment of a director of women's work, and probably at least two additional teachers. There should be provided quarters for administration and teaching. These may not be very extensive at first, but we have at present absolutely no place for even office room for such members of

our faculty. As soon as possible, a women's dormitory should be erected.

I speak of these as important necessities. I do not see that we can hope for any adequate development of this work unless these minimum needs are met. Once we have the nucleus of a working corps and a place for them to work in, we will then develop adequate plans for the building of an institution as rapidly as demands are made upon us.

The Time is Opportune.

I believe that we should not longer delay the inauguration of this type of work. The students are coming to us, the percentage of attendance increasing very rapidly in spite of the fact that we offer no special encouragement. Moreover, this very war emergency that is reducing our attendance of men increases the call for special work for women. Particularly in relation to the food question as a practical contribution to the war, both in production and in conservation, we find the need for educational work.

Recommendation.

I therefore recommend that we ask the Legislature for \$30,000 to be available from July 1, 1918, to June 30, 1920, for salaries and maintenance of a woman's department; also the appropriation of \$70,000 for an administration building, the money to be available and the contract let when the Governor and Council have approved plans and specifications for the building and consented to its erection.

TABLES AND STATISTICS.

TABLE I. — *Resignations.*

POSITION.	Name.
Clerk, division of horticulture,	Eleanor Barker.
Assistant in veterinary science,	C. Theodore Buchholz.
Inventory clerk, treasurer's office,	Maude B. Chambers.
Stenographer, junior extension,	Doris Clark.
Instructor in dairying,	Samuel Coons.
Clerk, department of poultry husbandry,	Marcella P. Curry.
Telephone operator, Stockbridge Hall,	Louise G. Davidson.
Stenographer, department of dairying,	Katherine L. Fenton.
Professor of military science and tactics,	Henry W. Fleet.
Supervisor of correspondence courses,	Erwin H. Forbush.
Clerk, department of beekeeping,	Marion Guertin.
Bookkeeper, treasurer's office,	Alice E. Gustafson.
Instructor in French,	William L. Harmount. ¹
Stenographer, extension service,	Helena Keiber.
Instructor in botany,	George W. Martin.
Stenographer, department of entomology,	Helen A. Martin.
Stenographer, division of rural social science,	Nell C. Milton.
Extension instructor in agricultural education,	Ethel H. Nash.
Associate professor of floriculture,	Arno H. Nehrling.
Curator, department of botany,	Grace B. Nutting.
Assistant in English,	Philip W. Payne.
Assistant professor of animal husbandry,	Elvin L. Quaife.
Library assistant,	Vivian L. Roy.
Instructor in poultry husbandry,	Everett H. Rucker.
Instructor in agricultural economics,	Ralph M. Rutledge.
Bookkeeper, treasurer's office,	Edna M. Sanders.
Assistant to director of extension service,	Bernard W. Shaper.
Stenographer, extension service,	Elsa Slattery.
Assistant to the commandant,	Alexander Smart.
Assistant in physics,	Harry C. Thompson.
Associate professor of microbiology,	F. H. H. VanSuchtelen.
Assistant director, extension service,	Earnest D. Waid.
First clerk, treasurer's office,	Henrietta L. Webster.
Assistant professor of horticulture,	John T. Wheeler. ²

¹ Deceased.² Effective Dec. 15, 1917.

TABLE II. — *New Appointments.**A. In the Academic Departments.*

POSITION.	Name.	Institution from which graduated and Degrees.
Associate professor of agronomy, .	Arthur B. Beaumont,	B.Sc., Kentucky State University, 1908.
Assistant professor of floriculture, .	August G. Hecht, .	B.Sc., University of Illinois, 1914.
Instructor in microbiology, . . .	Egerton G. Hood, .	B.S.A., Toronto University, 1913.
Assistant professor of animal husbandry.	Byron E. Pontius, .	B.Sc., Ohio State University, 1914.
Instructor in poultry husbandry, .	Lloyd L. Stewart, .	B.Sc., Purdue University, 1915.
Instructor in dairying,	Stanley E. VanHorn,	- - -
Instructor in agricultural economics,	Otto F. Wilkinson, .	B.A., Ohio State University, 1914; M.A., Ohio State University, 1915.
Professor of military science and tactics.	Richard H. Wilson, .	United States Military Academy, West Point.

B. In the Experiment Station.

Assistant in veterinary science, .	C.Theodore Buchholz,	V.M.D., University of Pennsylvania, 1917.
Assistant in agricultural economics, .	Samuel H. DeVault, .	A.B., Carson-Newman College, 1912; A.M., University of North Carolina, 1915.
Field pathologist, department of botany.	Webster S. Krout, .	B.Sc. and M.A., Ohio State University, 1915.
Assistant chemist,	Bernard L. Peables, ¹	B.Sc., Bates College, 1917.
Assistant in entomology,	Stuart C. Vinal, .	B.Sc., Massachusetts Agricultural College, 1915; M.Sc., Massachusetts Agricultural College, 1917.

C. In the Extension Service.

Supervisor of correspondence courses and editor of extension service publications.	L. Wayne Army, .	B.Sc., Pennsylvania State College, 1910.
Instructor in charge of poultry club work.	A. Lawrence Dean, ¹	- - -
Instructor in agricultural education,	Helen M. Norris, .	Framingham Normal School.
Instructor in charge of pig club work,	Victor A. Rice, .	B.Sc., N. C. A. and E. College, 1917.
Instructor in pomology,	Ralph A. VanMeter, ¹	B.Sc.Agr., Ohio State University, 1917.
Assistant to the director,	Bernard W. Shaper, .	B.Sc., Cornell University, 1914.

¹ Temporary appointment.

TABLE II. *New Appointments* — Concluded.*D. In the Clerical Staff.*

POSITION.	Name.
Clerk, extension service,	Ella B. Baldwin.
Stenographer, Division of rural social science,	Bertha E. Connelly.
Telephone operator, Stockbridge Hall,	Emily Davidson.
Clerk, power plant,	Noella Duval.
Stenographer, extension service,	Margaret Evens.
Curator, department of botany,	Mae F. Holden.
Mailing clerk, extension service,	Clarence A. Kendall.
Clerk, treasurer's office,	Marion E. Kelsey.
Clerk, department of poultry husbandry,	Rachael G. Leslie.
Clerk, department of poultry husbandry,	Grace MacMullen.
Library assistant,	Marion Norton.
Stenographer, division of horticulture,	Hazel Parker.
Stenographer, department of dairying,	Frances Powers.
Clerk, department of beekeeping,	Edith Robinson.
Clerk, treasurer's office,	Elizabeth Strachan.

TABLE III. — *Change in Title of Officers of the Institution.*

* NAME.	Former Title.	Present Title.
Eleanor Bishop, . . .	Clerk, treasurer's office, . . .	Bookkeeper, treasurer's office.
Wesley H. Bronson, . . .	Extension instructor in farm demonstration.	Extension assistant professor of farm demonstration.
F. Ethel Felton, . . .	Clerk, experiment station, . . .	Clerk and editorial assistant experiment station.
Clarence E. Gordon, . . .	Associate professor of zoölogy and geology.	Professor of zoölogy and geology.
Harold M. Gore, . . .	Instructor in physical education,	Assistant professor of physical education.
Arao Itano, . . .	Instructor in microbiology, . . .	Assistant professor of microbiology.
Austin D. Kilham, . . .	Extension instructor in pomology.	Extension assistant professor of pomology.
Alfred G. Lunn, . . .	Extension instructor in poultry husbandry.	Extension professor of poultry husbandry.
Frederick G. Merkle, . . .	Assistant in agronomy, . . .	Instructor in agronomy.
Marie Sayles, . . .	Extension instructor in home economics.	Extension assistant professor of home economics.
F. A. Cushing Smith, . . .	Extension instructor in civic improvement.	Extension assistant professor of landscape gardening.
Ethelyn Streeter, . . .	Stenographer, division of horticulture.	Clerk, division of horticulture.
William F. Turner, . . .	Extension instructor in animal husbandry.	Extension assistant professor of animal husbandry.

TABLE IV. — *Leaves of Absence.*

POSITION.	Name.	Cause of Leave.
Assistant chemist, experiment station.	Windom A. Allen,	War service.
Professor of general and physical chemistry.	Ernest Anderson,	One year, from Sept. 1, 1917; at Transvaal University, South Africa.
Extension assistant professor of farm demonstration.	Wesley H. Bronson,	War service.
Professor of forestry,	William D. Clark,	With State Fuel Administrator.
Assistant in physical education,	Llewelyn L. Derby,	War service from Dec. 8, 1917.
Head of division of agriculture and professor of farm administration.	James A. Foord,	One year, from Jan. 15, 1917; sabbatical leave.
Assistant professor of physical education.	Harold M. Gore,	War service.
Field agent,	Charles H. Gould,	With Hampshire County Farm Bureau.
Professor of agricultural education,	William R. Hart,	Six months, from April 1, 1917; sabbatical leave.
Instructor in mathematics,	Burt A. Hazeltine,	War service.
Extension instructor in charge of poultry club work.	Roswell W. Henninger,	War service.
Director of extension service and supervisor of short courses.	William D. Hurd,	Ten months from Nov. 1, 1917; sabbatical leave.
Assistant in veterinary science, experiment station.	John B. Lentz,	War service.
Assistant professor of mathematics,	William L. Machmer,	Work with the United States Department of Agriculture.
Extension assistant professor of home economics.	Marie Sayles,	Work with United States Department of Agriculture.
Assistant chemist, experiment station.	Robert S. Scull,	Chemical work with government.
Assistant chemist, experiment station.	John B. Smith,	War service.
Head of division of horticulture and professor of landscape gardening.	Frank A. Waugh,	Six months, from April 1, 1917; sabbatical leave.
Extension assistant professor of landscape gardening.	F. A. Cushing Smith,	War service from Jan. 1, 1918.

TABLE V. — *Speakers for the Year.**A. Speakers at Wednesday Assembly for Year ending Nov. 30, 1917.*

1916.

Dec. 6. — Hon. George D. Chamberlain, Springfield, Mass.

Dec. 13. — Mr. Charles H. Gould, M. A. C.

1917.

Jan. 3. — Prof. Curry S. Hicks, M. A. C.

Jan. 10. — Mr. William C. Langdon, New York City.

Jan. 17. — Dr. W. D. Weatherford, International Y. M. C. A., Nashville, Tenn.

Jan. 24. — Pres. Kenyon L. Butterfield.

Jan. 31. — Mr. Denis A. McCarthy, Boston, Mass.

Feb. 7. — Pres. Kenyon L. Butterfield.

Feb. 14. — Mr. Joseph Novitski, M. A. C.

Feb. 21. — Hon. Marcus M. Marks, New York City.

Feb. 28. — Mr. Ralph S. Bauer, Lynn, Mass.

Mar. 7. — Capt. Henry W. Fleet, M. A. C.

Mar. 14. — Mr. George L. Farley, M. A. C.

Apr. 4. — Preparedness program: Judge Michael J. Murray, Boston, Mass.; Mr. Herbert S. Carruth, Amherst, Mass.; Mr. David H. Buttrick, M. A. C., 1917.

Apr. 11. — Prof. John T. Wheeler, M. A. C.

Apr. 18. — Prof. Robert Frost, Amherst College, Amherst, Mass.

TABLE V. — *Speakers for the Year — Concluded.*A. *Speakers at Wednesday Assembly for Year ending Nov. 30, 1917 — Concluded.*

1917.

- Apr. 25. — Pres. Kenyon L. Butterfield.
 Oct. 24. — Prof. George G. Wilson, Harvard University, Cambridge, Mass.
 Oct. 31. — Dr. Kokichi Morimoto, Johns Hopkins University, Baltimore, Md.
 Nov. 7. — Student forum.
 Nov. 14. — Mr. D. Brewer Eddy, Boston, Mass.
 Nov. 21. — Dr. Harvey W. Wiley, Washington, D. C.

B. *Speakers at Sunday Chapel for Year ending Nov. 30, 1917.*

1916.

- Dec. 3. — Bishop Thomas F. Davies, Springfield, Mass.
 Dec. 10. — Rev. Albert C. Knudson, Boston, Mass.
 Dec. 17. — Mr. Daniel A. Poling, Boston, Mass.

1917.

- Jan. 7. — Mr. Charles Stelzle, New York City.
 Jan. 14. — Pres. John M. Thomas, Middlebury College, Middlebury, Vt.
 Jan. 21. — Dr. Sidney E. Goldstein, New York City.
 Jan. 28. — Rev. Philip S. Schenck, Framingham, Mass.
 Feb. 4. — Rev. F. H. Decker, Providence, R. I.
 Feb. 11. — Rev. Abraham M. Rihbany, Boston, Mass.
 Feb. 18. — Rev. Archibald Black, Concord, N. H.
 Feb. 25. — Rev. Daniel A. Evens, Cambridge, Mass.
 Mar. 4. — Bishop Edwin H. Hughes, Boston, Mass.
 Mar. 11. — Mr. Owen R. Lovejoy, New York City.
 Mar. 18. — Pres. W. H. P. Faunce, Brown University, Providence, R. I.
 Apr. 8. — Mr. Thomas Mott Osborne, Auburn, N. Y.
 Apr. 15. — Rev. Harold Marshall, Melrose, Mass.
 Apr. 22. — Dr. Ernest Abbott, New York City.
 Apr. 29. — Rev. Nehemiah Boynton, Brooklyn, N. Y.

TABLE VI. — *Attendance.*A. *In Work of College Grade.*

	Registration Nov. 30, 1916.	Registration Nov. 30, 1917.
Senior class,	104	64
Junior class,	138	113
Sophomore class,	174	117
Freshman class,	159	108
Probationary freshmen,	11	10
	586	412
Graduate students,	57	29
Unclassified students,	29	50
Vocational poultry students,	8	5
Special students,	—	4
	680	500

TABLE VI. — *Attendance — Concluded.**B. Short-course Enrollment and Convention Registration.*

	1916.	1917.
Winter school,	153	110 -
Farmers' week,	980	800
Beekeepers' school,	10	50 -
Polish farmers' day,	220	300
Apple packing school,	8	-
County agents' conference,	55	120
Bankers' conference,	28	-
Summer school of agriculture and country life,	170	90
Conference on rural organization,	38	121
School for rural social service,	35	20 -
Ministers' conference,	-	8
Poultry convention,	268	176
Boys' camps,	88	102
Girls' camp,	27	17
	2,080	1,914

TABLE VII. — *Legislative Budget, 1917.*

ITEMS.	Amount asked.	Amount granted.
Library and equipment,	\$250,000	-
Equipment and improvements,	75,000	\$33,500
Poultry building,	4,200	-
Student dormitory,	50,000	-
Dining hall improvements,	10,000	-
Rural engineering shops,	9,000	-
Power plant, turbine house and steam line tunnels,	90,000	40,000
	\$488,200	\$73,500
Buildings, equipment and maintenance for market-garden field station,	\$35,000	\$10,000
Emergency appropriation for current expenses,	\$25,000	\$17,500

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1917.*A. *Home Addresses of Students (classified by Towns and Cities).*

Amesbury, 1	Hopedale, 1	Rowley, 1
Amherst, 7	Jefferson, 1	SALEM, 1
Arlington, 3	Lexington, 1	Shelburne, 2
ATLANTA, GA., 1	LYNN, 7	Somerset, 1
Bernardston, 1	MALDEN, 3	SOMERVILLE, 4
Bethel, Conn., 1	Marshfield, 1	South Meriden, Conn., 1
Boston, 8	Maynard, 1	SPRINGFIELD, 4
BROCKTON, 2	Medfield, 1	Stoneham, 1
Brookline, 2	MEDFORD, 1	Sturbridge, 1
BROOKLYN, N. Y., 1	MELROSE, 2	Sutton, 1
CAMBRIDGE, 1	Millis, 1	Templeton, 1
Charlemont, 1	Nampa, Idaho, 1	Topsfield, 1
Chatham, N. J., 1	Natick, 1	WASHINGTON, D. C., 1
Chester, 1	Needham, 2	Webster, 1
CHICOPEE, 1	NEW BEDFORD, 1	Westborough, 1
Deerfield, 1	NEWPORT, R. I., 1	Westfield, 1
Easthampton, 1	NEW ROCHELLE, N. Y., 1	West Haven, Conn., 1
Easton, 2	NEW YORK CITY, N. Y., 1	Weymouth, 2
Enfield, 1	NORTHAMPTON, 1	Whitman, 1
FALL RIVER, 1	Oakham, 1	Williamsburg, 1
Far Rockaway, N. J., 1	Orange, 1	Williamstown, 1
FITCHBURG, 1	Palmer, 1	WILLIMANTIC, CONN., 1
Great Barrington, 1	PEABODY, 3	Winchendon, 1
Hadley, 2	PROVIDENCE, R. I., 1	Winthrop, 2
HARTFORD, CONN., 1	Reading, 1	WORCESTER, 2
HAVERRILL, 1	Rockland, 1	

B. *Home Addresses (classified by States).*

	Number.	Per Cent.		Number.	Per Cent.
Connecticut,	5	4.23	New Jersey,	2	1.69
District of Columbia,	1	.85	New York,	3	2.54
Georgia,	1	.85	Rhode Island,	2	1.69
Idaho,	1	.85		118	99.99
Massachusetts,	103	87.29			

C. *Home Addresses (classified by Counties of Massachusetts).*

	Number.	Per Cent.		Number.	Per Cent.
Berkshire,	2	1.94	Middlesex,	19	18.45
Bristol,	5	4.85	Norfolk,	8	7.77
Essex,	15	14.56	Plymouth,	5	4.85
Franklin,	6	5.83	Suffolk,	10	9.71
Hampden,	8	7.77	Worcester,	12	11.65
Hampshire,	13	12.62		103	100.00

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1917 — Continued.**D. Nativity of Parents.*

	Number.	Per Cent.
Neither parent foreign born,	85	72.03
Both parents foreign born,	24	20.33
Father (only) foreign born,	3	2.54
Mother (only) foreign born,	6	5.09
	118	99.99

E. Education of Father.

	Number.	Per Cent.
Common school,	45	38.13
High school,	41	34.75
Business school,	13	11.02
College or university,	16	13.56
No statistics,	3	2.54
	118	100.00

F. Religious Census.

	MEMBERSHIP.		PREFERENCE.		TOTALS.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist,	7	5.93	5	4.24	12	10.17
Catholic,	7	5.93	1	.85	6	6.78
Congregationalist,	28	23.73	14	11.86	42	35.59
Episcopal,	9	7.63	1	.85	10	8.47
Hebrew,	5	4.24	—	—	5	4.24
Methodist,	11	9.32	1	.85	12	10.17
Presbyterian,	3	2.54	—	—	3	2.54
Unitarian,	6	5.09	2	1.70	8	6.78
Universalist,	3	2.54	3	2.54	6	5.09
Miscellaneous,	6	5.09	5	4.24	11	9.32
No statistics,	—	—	—	—	1	.85
	85	72.03	32	27.12	118	100.00

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1917 — Concluded.**G. Occupation of Father.*

	Number.	Per Cent.
Agriculture and horticulture,	24	20.33
Artisans,	30	25.42
Business,	36	30.51
Deceased or no statistics,	8	6.78
Miscellaneous,	11	9.32
Professional,	9	7.63
	118	99.99

H. Intended Vocation of Student.

	Number.	Per Cent.
Agriculture or horticulture (practical),	53	44.92
Agriculture or horticulture (professional),	43	36.44
Miscellaneous,	1	.85
Professions,	3	2.54
Undecided or no statistics,	18	15.25
	118	100.00

I. Farm Experience.

	Number.	Per Cent.
Brought up on a farm,	34	28.81
Not brought up on a farm and having had no or practically no farm experience.	23	19.49
Not brought up on a farm but having had some farm experience.	61	51.70
	118	100.00

J. Miscellaneous Statistics.

Average age,	19.08 years.
Number signifying their intention to seek student labor,	73 (61.86 per cent.).
Number boarding at the college dining hall,	63 (53.39 per cent.).

TABLE IX. — *Entrance Statistics of Freshman Class.*

Number of applications (preliminary applications number 41),	197
Admitted,	130
Matriculated,	108
Allowed probationary entrance,	10
Failed to report,	22
Rejected,	67
Total,	197
Matriculated on certificate,	43
Matriculated on certificate and examination,	49
Matriculated on examination,	3
Matriculated on credentials from other colleges,	5
Matriculated on regents' credentials,	2
Re-entered,	6
Entered on probation,	10
Total,	118
Entered with conditions,	51
Entered without conditions,	67
Total,	118

TABLE X. — *Cases treated at the Infirmary, Dec. 1, 1916, to Nov. 30, 1917.*

	Daily Count.	Individual Count.
December 1, 1916, to January 1, 1917: —		
House cases,	4	1
Out-patients,	31	31
January 1 to February 1: —		
House cases,	31	6
Out-patients,	47	41
February 1 to March 1: —		
House cases,	20	6
Out-patients,	83	38
March 1 to April 1: —		
House cases,	38	7
Out-patients,	107	36
April 1 to May 1: —		
House cases,	141	22
Out-patients,	65	37
May 1 to June 3: —		
House cases,	45	4
Out-patients,	15	4
June 3 to June 15: —		
House cases,	9	1
Out-patients,	-	-
October 10 to November 1: —		
House cases,	27	4
Out-patients,	30	17
November 1 to December 1: —		
House cases,	43	7
Out-patients,	77	26

TABLE X. — *Cases treated at the Infirmary, Dec. 1, 1916, to Nov. 30, 1917*
— Concluded.

Number of house cases,	358
Number of out-patients,	455
	<hr/>
Total,	813
Number cared for in the house,	58
Number cared for as out-patients,	230
	<hr/>
Total,	288

REPORT OF THE TREASURER

FOR THE FISCAL YEAR ENDING NOV. 30, 1917.

BALANCE SHEET.

	DR.	CR.
1916.		
Dec. 1. To balance on hand,	\$41,854 54	
1917.		
Nov. 30. To receipts for fiscal year,	656,653 90	
Expenditures for fiscal year,		\$675,746 92
Balance on hand,		22,761 52
	\$698,508 44	\$698,508 44

SCHEDULE A. — INCOME.

	Items.	Totals.
Income from students and others,		\$96,972 93
Tuition,	\$2,845 00	
Laboratory fees,	7,517 75	
Rents,	5,538 73	
Department sales,	69,052 87	
Department transfers,	6,430 90	
Miscellaneous,	5,587 68	
Income from grants by nation and State: —		
State aid,		434,296 47
Income from endowment,	\$3,313 32	
Appropriation for current expenses,	273,500 00	
Administration,	\$39,000 00	
Maintenance,	121,500 00	
Instruction,	105,000 00	
Graduate school,	3,000 00	
Additional land,	5,000 00	
Appropriation for extension service,	50,000 00	
Appropriation for experiment station,	41,000 00	
Maintenance,	\$35,000 00	
Feed law,	6,000 00	
Receipts from special appropriation,	66,483 15	
Federal aid,		87,227 51
Income from land grant of 1862,	\$7,300 00	
Income from Hatch fund of 1887,	15,000 00	
Income from Adams fund of 1906,	15,000 00	
Income from Morrill fund of 1890,	16,666 67	
Income from Nelson fund of 1907,	16,666 66	
Income from Smith-Lever fund of 1914,	16,594 18	

¹ \$17,500 of this amount granted as emergency maintenance appropriation.

SCHEDULE A. — INCOME — *Concluded.*

	Items.	Totals.
Income from other sources: —		
Income from experiment station,		\$30,826 61
Fertilizer receipts,	\$9,040 00	
Agricultural receipts,	4,810 22	
Cranberry receipts,	3,172 02	
Chemical receipts,	11,939 54	
Miscellaneous receipts,	1,864 83	
Income from extension service,		7,330 38
Winter school,	\$480 00	
Summer school,	3,058 68	
Correspondence courses receipts,	661 64	
Exhibits,	575 00	
Civic improvements,	340 91	
Miscellaneous receipts,	2,214 15	
Total,	\$656,653 90	\$656,653 90

CLASSIFICATION OF INCOME FROM STUDENTS AND OTHERS.

	Laboratory Fees.	Department Sales.	Transfers.	Rent.	Miscellaneous.	Tuition.	Totals.
Agricultural education,	-	-	-	-	\$10 70	-	\$10 70
Agronomy,	\$432 50	\$37 80	\$10 80	-	-	-	481 10
Animal husbandry,	276 50	-	-	-	2 46	-	278 96
Beekeeping,	-	463 00	4 83	-	-	-	467 83
Botany,	1,077 50	15 29	4 30	\$15 43	-	-	1,112 52
Chemistry,	2,632 00	12 56	3 05	-	160 85	-	2,808 46
Dairying,	268 00	20,397 31	786 44	-	-	-	21,451 75
Entomology,	99 00	27 44	-	-	-	-	126 44
Farm administration,	139 00	28 02	36	-	3 67	-	171 05
Floriculture,	169 25	3,333 92	40 41	-	-	-	3,543 58
Farm,	-	27,570 28	3,432 65	-	-	-	31,002 93
Forestry,	50 00	-	33 00	-	26 00	-	109 00
Freshman agriculture,	115 00	-	-	-	-	-	115 00
General agriculture,	-	-	11	-	12 15	-	12 26
General horticulture,	-	2,006 77	1,997 63	-	288 83	-	4,293 23
Graduate school,	3 00	-	-	-	-	-	3 00
Grounds,	-	-	40 04	-	69 53	-	109 57
Hospital,	-	-	-	-	90 00	-	90 00
Landscape gardening,	263 00	3 73	2 24	-	-	-	268 97
Language and literature,	232 00	-	-	-	-	-	232 00

CLASSIFICATION OF INCOME FROM STUDENTS AND OTHERS — *Concluded.*

	Laboratory Fees.	Department Sales.	Transfers.	Rent.	Miscellaneous.	Tuition.	Totals.
Library,	-	\$34 74	-	-	\$466 36	-	\$501 10
Market gardening,	\$104 00	2,715 25	\$66 19	-	-	-	2,885 44
Mathematics,	107 75	-	-	-	-	-	107 75
Microbiology,	322 50	-	1 50	-	323 50	-	647 50
Military,	-	-	-	-	4 40	-	4 40
Miscellaneous,	-	-	-	-	157 00	-	157 00
Physics,	63 00	-	-	\$9 00	-	-	72 00
Pomology,	102 00	1,986 68	80	-	-	-	2,089 48
Poultry husbandry,	158 50	10,258 76	4 90	-	-	-	10,422 16
Rural engineering,	350 25	10 00	-	-	7 21	-	367 46
Veterinary,	35 00	55 14	-	-	-	-	90 14
Zoology and geology,	518 00	-	-	-	-	-	518 00
War emergency,	-	81 55	-	-	-	-	81 55
Operating and maintenance,	-	-	-	-	3,954 52	\$2,845 00	6,799 52
North dormitory,	-	-	-	1,579 67	-	-	1,579 67
South dormitory,	-	-	-	2,257 17	-	-	2,257 17
College residence,	-	-	-	583 21	-	-	583 21
President's office,	-	14 63	1 65	-	-	-	16 28
Executive order,	-	-	-	-	10 50	-	10 50
Draper Hall,	-	-	-	1,094 25	-	-	1,094 25
Totals,	\$7,517 75	\$69,052 87	\$6,430 90	\$5,538 73	\$5,587 68	\$2,845 00	\$96,972 93

SCHEDULE B. — EXPENDITURES FOR FISCAL YEAR.

	Items.	Totals.
College expenses,		\$416,399 99
Administration,	\$35,956 38	
Maintenance,	229,531 36	
Instruction,	150,912 25	
Experiment station,		101,661 67
Administration,	\$1,234 51	
Feed inspection,	6,772 57	
Fertilizer law,	9,287 40	
Salaries,	45,271 80	
Department,	39,095 39	
Extension service, ¹		81,952 97
Salaries,	\$48,097 39	
Travel,	13,009 99	
Departments,	20,845 59	
Special appropriation,		75,732 29
1914, agricultural building,	\$140 11	
1915, microbiology building,	2,760 66	
1916, improvements and equipment,	2,663 23	
1916, rural engineering shop,	2,379 90	
1916, market-garden field station,	7,968 52	
1916, Mount Toby demonstration forest,	30,000 00	
1917, improvements and equipment,	15,218 12	
1917, market-garden field station,	6,825 86	
1917, power plant improvements,	7,417 71	
Special architect,	358 18	
Total,	\$675,746 92	\$675,746 92

¹ Made up from State extension service and Smith-Lever funds.

ANALYSIS OF COLLEGE EXPENDITURES.

ADMINISTRATION.	Office Supplies.	Labor.	Laboratory Supplies.	Refunds.	Minor Equipment.	Building Supplies.	Publicity and Lectures.	Student Activity.	Comme-ment.	Miscel-laneous.	Totals.
Dean's office.		\$297 50	\$262 24		\$4 36			\$572 50	\$137 36		\$564 10
Executive order.				\$1,899 77			\$1,452 61			\$2,107 58	6,169 82
President's office.		968 19	155 42	49 42	45 00	\$1 97				110 99	1,330 99
Registrar's office.		482 05	52 30	53 24	2 43						590 92
Treasurer's office.		578 76	322 23	145 60	6 41	8 40				18 61	1,080 01
Administration (salaries).			26,220 54								26,220 54
Totals.		\$2,327 40	\$27,012 73	\$2,148 03	\$58 20	\$10 37	\$1,452 61	\$572 50	\$137 36	\$2,237 18	\$35,956 38

MAINTENANCE.	Office Supplies.	Labor.	Laboratory Supplies.	Refunds.	Minor Equipment.	Building Supplies.	Travel.	General Expense.	Miscel-laneous.	Salaries.	Totals.
Academic maintenance:—											
Agricultural economics.	\$126 66	\$38 10	\$15 40		\$4 67		\$39 20				\$254 12
Agricultural education.	124 89	11 32	5 67				64 69				206 57
Agromony.	196 88	115 98	211 89	\$155 50	99 26		25 65				805 16
Animal husbandry.	112 84	70 09	114 50	4 50	15 10		271 88				588 91
Beekeeping.	110 44	1,114 62	254 80		294 67	\$58 26	32 40				1,865 19
Botany.	109 02	514 81	431 21	187 95	33 56						1,415 68
Chemistry.	133 65	932 63	2,773 24	697 23	39 77	63 20					4,639 72
Dairying.	165 94	2,963 35	22,061 36	63 04	566 24	93 32					26,006 60
Economics and sociology.	10 43		20 02		15 27		93 35				45 82
Entomology.	97 33	215 10	77 42	16 25		111 45					517 83
Farm administration.	122 44	51 92	75 34	24 00	5 21		6 57				285 48
Floriculture.	93 40	4,460 78	1,339 54	36 25	23 66	93 10	72 84				6,119 57
Forestry.	18 00	66 16	26 19	3 00	127 14		43 50				283 99
Freshman agriculture.		85	15 69	4 00							20 54
General agriculture.		1,144 79			70 95	185 72		\$137 75	\$0 45		1,539 66

CURRENT ACCOUNTS.

Disbursements and Receipts.

ACCOUNTS.	Disbursements from Nov. 30, 1916, to Nov. 30, 1917.	Receipts from Nov. 30, 1916, to Nov. 30, 1917.	Apportionment for Year ending Nov. 30, 1917.	Balance to Credit.
Administration:—				
Dean's office,	\$564 10	-	\$600 00	\$35 90
Executive order,	6,169 82	\$10 50	7,800 00	1,640 68
President's office,	1,330 99	16 28	1,250 00	-64 71
Registrar's office,	590 92	-	600 00	9 08
Salaries,	26,220 54	-	28,000 00	1,779 46
Treasurer's office,	1,080 01	-	1,000 00	-80 01
State Treasurer,	-	39,000 00	-	-
Maintenance, academic:—				
Agricultural economics,	224 12	-	200 00	-24 12
Agricultural education,	206 57	10 70	500 00	304 13
Agronomy,	805 16	481 10	450 00	125 94
Animal husbandry,	588 91	275 96	400 00	90 05
Beekeeping,	1,865 19	467 83	1,500 00	102 64
Botany,	1,415 68	1,112 52	800 00	496 84
Chemistry,	4,639 72	2,808 46	2,000 00	168 74
Dairying,	26,006 60	21,451 75	5,000 00	445 15
Economics and sociology,	45 82	-	50 00	4 18
Entomology,	517 83	126 44	750 00	358 61
Farm administration,	285 48	171 05	250 00	135 57
Floriculture,	6,119 57	3,543 58	2,740 00	164 01
Forestry,	283 99	109 00	375 00	200 01
Freshman agriculture,	20 54	115 00	-	94 46
General agriculture,	1,539 66	12 26	1,500 00	-27 40
History and government,	4 03	-	25 00	20 97
Hospital,	1,848 25	90 00	1,700 00	-58 25
Landscape gardening,	344 43	268 97	-	-75 46
Language and literature,	287 42	232 00	350 00	294 58
Market gardening,	4,116 42	2,885 44	1,600 00	369 02
Mathematics,	215 45	107 75	150 00	42 30
Microbiology,	1,417 04	647 50	1,200 00	430 46
Military science,	1,521 24	4 40	1,450 00	-66 84
Mount Toby,	52 96	-	500 00	447 04
Physical education,	880 65	-	700 00	-180 65
Physics,	527 12	72 00	600 00	144 88
Pomology,	3,402 54	2,089 48	1,875 00	561 94
Poultry husbandry,	14,540 68	10,422 16	2,800 00	-1,318 52
Rural engineering,	583 74	367 46	400 00	183 72
Rural sociology,	149 72	-	175 00	25 28
Veterinary science,	1,076 31	90 14	1,300 00	313 83
War emergency,	1,540 32	81 55	-	-1,458 77
Zoölogy and geology,	527 60	518 00	333 00	323 40
1917 celebration,	2,106 67	-	5,000 00	2,893 33
Maintenance, general:—				
Equipment,	3,604 43	-	-	-3,604 43
Farm,	42,767 91	31,002 93	3,500 00	-8,264 98
General horticulture,	8,185 28	4,293 23	4,000 00	107 95
Graduate school,	273 55	3 00	400 00	129 45
Grounds,	4,360 68	109 57	4,900 00	648 89
Library,	6,844 99	501 10	6,560 00	216 11
Operating and maintenance,	76,537 09	12,313 82	59,040 00	-17,547 09
State Treasurer, maintenance,	-	121,500 00	-	-
Land,	7,200 00	5,000 00	1,650 00	-550 00
Endowment fund,	-	10,613 32	-	-
Instruction:—				
Salaries,	150,912 25	157 00	157,000 00	6,244 75
United States Treasurer, Morrill fund,	-	10,666 67	-	-
United States Treasurer, Nelson fund,	-	16,666 66	-	-
State Treasurer, instruction,	-	105,000 00	-	-
Graduate school,	-	3,000 00	-	-
Totals,	\$416,399 99	\$414,419 58	\$312,973 00	-
Balance beginning fiscal year Dec. 1, 1916,	-	19,696 41	-	-
Balance on hand Nov. 30, 1917,	17,716 00	-	-	-
Totals,	\$434,115 99	\$434,115 99	-	-

COLLEGE ACCOUNTS.

Comparative Disbursements and Receipts for 1916-17.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1916.	1917.	1916.	1917.
Agricultural economics,	\$228 28	\$224 12	\$21 00	-
Agricultural education,	493 27	206 57	70 00	\$10 70
Agronomy,	738 69	805 16	137 75	481 10
Animal husbandry,	398 51	588 91	280 88	278 96
Beekeeping,	1,682 36	1,865 19	288 05	467 83
Botany,	1,490 06	1,415 68	1,123 95	1,112 52
Chemistry,	5,019 78	4,639 72	2,551 16	2,808 46
Dairying,	24,845 24	26,006 60	20,678 17	21,451 75
Dean's office,	529 78	564 10	-	-
Economics and sociology,	39 61	45 82	-	-
Entomology,	615 75	517 83	91 26	126 44
Equipment,	1,789 65	3,604 43	-	-
Executive order,	8,421 77	6,169 82	37 88	10 50
Farm administration,	394 84	285 48	102 05	171 05
Farm,	35,143 56	42,767 91	28,986 93	31,002 93
Floriculture,	6,320 55	6,119 57	3,517 05	3,543 58
Forestry,	314 48	283 99	10 50	109 00
Freshman agriculture,	-	20 54	-	115 00
General agriculture,	1,610 14	1,539 66	124 64	12 26
General horticulture,	8,586 92	8,185 28	4,067 29	4,293 23
Graduate school,	134 61	273 55	2 00	3 00
Grounds,	5,092 93	4,360 68	25 32	109 57
History and government,	1 40	4 03	-	-
Hospital,	1,209 06	1,848 25	25 73	90 00
Improvements,	2,001 47	-	670 06	-
Land,	8,350 00	7,200 00	-	5,000 00
Landscape gardening,	388 94	344 43	254 92	268 97
Language and literature,	368 86	287 42	46 25	232 00
Library,	7,269 08	6,844 99	540 46	501 10
Market gardening,	3,620 35	4,116 42	2,144 94	2,885 44
Mathematics,	204 37	215 45	65 00	107 75
Military,	1,598 58	1,521 24	44 23	4 40
Microbiology,	1,177 81	1,417 04	446 93	647 50
Miscellaneous,	5,434 41	-	2,881 15	-
Mount Toby,	-	52 96	-	-
Physical education,	1,020 96	880 65	98 50	-
Physics,	659 80	527 12	14 96	72 00
Pomology,	3,411 79	3,402 54	1,652 05	2,089 48
Poultry husbandry,	9,403 41	14,540 68	6,470 41	10,422 16
President's office,	1,107 51	1,330 99	-	16 28
Registrar's office,	578 92	590 92	-	-
Rural engineering,	660 07	583 74	215 23	367 46
Rural sociology,	129 99	149 72	1 59	-
Salaries,	167,564 58	177,132 79	-	157 00
Treasurer's office,	1,070 76	1,080 01	-	-
Veterinary science,	1,339 60	1,076 31	22 32	90 14
Zoology and geology,	555 17	527 60	449 18	518 00
War emergency,	-	1,540 32	-	81 55
1917 celebration,	-	2,106 67	-	-
Operating and maintenance,	71,665 52	76,587 09	15,915 50	12,313 82
State Treasurer:—	-	-	-	-
Endowment fund,	-	-	10,613 32	10,613 32
Graduate school,	-	-	3,000 00	3,000 00
Maintenance,	-	-	107,000 00	121,500 00
Instruction,	-	-	100,000 00	105,000 00
Administration,	-	-	35,000 00	39,000 00
United States Treasurer:—	-	-	-	-
Morrill fund,	-	-	16,666 66	16,666 67
Nelson fund,	-	-	16,666 67	16,666 66
Totals,	\$394,683 19	\$416,399 99	\$383,021 94	\$414,419 58
Balance beginning fiscal year,	-	-	31,357 66	19,696 41
Balance on hand at close of fiscal year,	19,696 41	17,716 00	-	-
Totals,	\$414,379 60	\$434,115 99	\$414,379 60	\$434,115 99

COLLEGE ACCOUNTS — *Concluded.**Summary.*

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1916,		\$19,696 41
Institution receipts Nov. 30, 1917,		96,972 93
State Treasurer's receipts Nov. 30, 1917,		284,113 32
United States Treasurer's receipts Nov. 30, 1917,		33,333 33
Total disbursements,	\$416,399 99	-
	\$416,399 99	\$434,115 99
Bills receivable Dec. 1, 1916, deducted,		8,077 39
Bills payable Dec. 1, 1916, deducted,	6,250 83	
	\$410,149 16	\$426,038 60
Bills receivable Nov. 30, 1917,	-	10,034 55
Bills payable Nov. 30, 1917,	3,781 30	-
Balance,	22,142 69	-
	\$436,073 15	\$436,073 15

FARM DISBURSEMENTS.

	Labor.	Equipment.	Feed.	Fertilizer.	Seeds.	Supplies.	Improvements.	Totals.
Cattle,	\$6,520 52	-	\$9,149 80	-	-	\$681 05	-	\$16,351 37
Dairy,	2,178 19	\$541 52	-	-	-	2,795 40	-	5,515 11
Horses,	2,070 47	-	2,863 72	-	-	448 13	-	5,382 31
Sheep,	239 89	-	529 02	-	-	20 60	-	789 51
Swine,	810 85	-	1,735 29	-	-	102 50	-	2,648 64
Field crops,	5,119 63	-	-	\$1,038 61	\$732 54	52 97	-	6,943 75
Miscellaneous,	1,793 50	-	-	-	-	125 56	\$2,265 56	4,184 62
Tools and machinery,	-	-	-	-	-	952 60	-	952 60
Live stock,	-	-	-	-	-	-	-	-
Totals,	\$18,733 05	\$541 52	\$14,277 83	\$1,038 61	\$732 54	\$5,178 80	\$2,265 56	\$42,767 91

FARM CREDITS.

	Onions.	Milk.	Stock.	Sundry.	Hay.	Roots.	Labor.	Potatoes.	Totals.
Cattle,	-	\$16,287 07	\$2,223 85	\$105 17	-	-	-	-	\$18,706 09
Dairy,	-	6,299 34	-	124 74	-	-	-	-	6,424 08
Horses,	-	-	453 50	913 71	-	-	-	-	1,367 21
Sheep,	-	-	246 36	188 56	-	-	-	-	431 92
Swine,	-	-	2,445 22	4 00	-	-	-	-	2,449 22
Field crops,	\$305 50	-	-	-	\$77 92	\$1 79	-	\$292 93	668 14
Miscellaneous,	-	-	-	332 82	-	-	\$623 45	-	956 27
Totals,	\$305 50	\$22,586 41	\$5,368 93	\$1,756 00	\$77 92	\$1 79	\$623 45	\$282 93	\$31,002 93

AGRICULTURAL DIVISION.
Disbursements and Receipts.

	Disbursements.	Receipts.
Agronomy,	\$805 16	\$481 10
Animal husbandry,	588 91	278 96
Dairying,	26,006 60	21,451 75
Farm,	42,767 91	31,002 93
Farm administration,	285 48	171 05
Poultry husbandry,	14,540 68	10,422 16
Rural engineering,	583 74	367 46
Division totals,	\$85,578 48	\$64,175 41

Summary.

	DR.	CR.
By total division receipts,		\$64,175 41
By bills receivable,		7,287 68
By net apportionment,		12,800 00
To total disbursements,	\$85,578 48	
To bills payable,	2,324 32	
Balance,		3,639 71
	\$87,902 80	\$87,902 80

Inventory of Quick Assets.

	Nov. 30, 1916.	Nov. 30, 1917.
Inventory of produce,	\$8,533 40	\$12,668 84
Inventory of cattle,	14,200 00	17,485 00
Inventory of swine,	1,505 00	1,495 00
Inventory of horses,	6,765 00	6,440 00
Inventory of poultry,	2,277 00	2,531 75
Inventory of sheep,	668 00	1,013 00
	\$33,948 40	\$41,633 59

HORTICULTURAL DIVISION.
Disbursements and Receipts.

	Disbursements.	Receipts.
Floriculture,	\$6,119 57	\$3,543 58
Forestry,	283 99	109 00
General horticulture,	8,185 28	4,293 23
Grounds,	4,360 68	109 57
Landscape gardening,	344 43	268 97
Market gardening,	4,116 42	2,885 44
Pomology,	3,402 54	2,089 48
Division totals,	\$26,812 91	\$13,299 27

HORTICULTURAL DIVISION — *Concluded.**Summary.*

	DR.	CR.
By total division receipts,		\$13,299 27
By bills receivable,		1,363 72
By net apportionment,		15,490 00
To total division disbursement,	\$26,812 91	
To bills payable,	129 22	
By balance,	3,210 86	
	\$30,152 99	\$30,152 99

Inventory of Quick Assets.

	Nov. 30, 1916.	Nov. 30, 1917.
Floriculture,	\$500 00	\$1,200 00
Market gardening,	150 00	917 50
Pomology,	575 00	419 00
General horticulture (live stock),	1,750 50	1,810 00
	\$2,975 50	\$4,346 50

EXPENSE OPERATING AND MAINTENANCE.

	Salaries.	Labor.	Fuel and Water.	Repairs.	Supplies.	Tools.	Architect.	Engineer.	Miscellaneous.	Totals.
General:—	\$2,319 97									\$2,319 97
General superintendent,		\$771 37								771 37
Office,					\$5,284 67					5,284 67
General expense,										
Power plant:—										
Heat,		6,745 03	\$41,216 83	\$694 26	48 02					48,704 14
Light,		1,069 61	8 72	185 95	60 71					1,324 99
Tools,						\$688 85				688 85
Gas mains,		2 77								2 77
Amherst Water Company,			2,100 27							2,100 27
Night watchman,		1,426 01								1,426 01
Milk service,		407 90								407 90
Water mains,		65 97								65 97
Steam mains,		462 90								462 90
Electric light circuit,		188 83								188 83
Washing station,		1 02								1 02
Miscellaneous sundry,										
Sewers and cesspools,		62 42								62 42
Walks,		12 52								12 52
Emergency maintenance,		767 66					\$1,064 84			1,837 50
Expert service,								\$825 57		825 57
Fire department,		12 99			70 73					83 72
Totals,	\$2,319 97	\$11,997 19	\$43,325 82	\$880 21	\$5,464 13	\$688 85	\$1,064 84	\$825 57	\$2,826 10	\$69,392 68

EXPENSE OPERATING AND MAINTENANCE — Continued.

	Electric Repairs.	Plumbing Repairs.	Heat Repairs.	C. and M. Repairs.	Janitor.	Bell Ringing.	Sundry.	Totals.
College buildings:—								
Animal husbandry building,		\$4 70	\$25 31	\$1 69	—	—	—	\$31 70
Horse barn,	\$1 35	5 52	5 52	21 26	—	—	—	28 79
Dairy barn,	3 34	19 95	9 26	20 26	—	—	—	52 41
Young stock barn,	—	—	—	6 69	—	—	—	6 69
Power building,	32 11	1 43	16 20	62 43	\$190 52	—	—	302 69
Chemical building,	6 70	72 69	10 25	257 82	—	—	—	347 46
Poultry building,	3 72	6 28	5 59	32 79	—	—	—	48 38
Dairy building,	21 33	113 60	88 51	214 20	—	—	—	437 64
Drill hall,	90	51 82	5 18	122 01	—	—	—	179 91
Veterinary building,	58	1 18	7 91	1 10	—	—	—	10 77
Apiary building,	5 66	3 56	5 31	10 91	—	—	—	25 44
Mathematics building,	86	26 72	37 12	141 66	—	—	—	206 36
Entomology building,	10 83	23 99	44 37	76 04	—	—	—	155 23
Clark hall,	51	88 64	25 46	21 43	—	—	—	136 04
French hall,	61 04	4 30	13 53	1 85	—	—	—	80 72
Wilder hall,	7 71	23 98	19 31	18 47	—	—	—	62 47
Upper plant house,	—	47	8 64	2 32	—	—	—	11 43
Old Dunfee range,	—	17 40	5 20	—	—	—	—	22 69
Horticulture barn,	1 12	3 65	—	39 99	—	—	—	44 76
Physics building,	—	3 99	—	16 16	—	—	—	21 06
East experiment station,	—	3 65	17 18	16 49	—	—	—	37 32
West experiment station,	2 23	39 33	6 22	34 33	—	—	—	82 11
East experiment station barn,	—	—	—	4 18	—	—	—	4 18
West experiment station barn,	—	8 62	6 59	65 37	—	—	—	80 58
Rural engineering building,	1 02	2 67	—	103 92	—	—	—	107 61
Microbiology building,	49 28	26 87	58 93	34 07	—	—	—	169 25
Draper hall,	32 29	114 37	28 26	369 24	—	—	\$430 68	974 74
Hospital,	1 63	10 87	1 75	11 29	—	—	—	25 54
Stockbridge hall,	17 96	19 35	64 02	367 95	—	—	—	469 28
Cold-storage building,	—	—	—	33 11	—	—	—	33 11
Machine barn,	—	—	1 24	2 02	—	—	—	3 26
Poultry storage building,	51	1 71	—	—	—	—	—	2 22
Poultry demonstration house,	—	1 71	—	—	—	—	—	2 02

EXPERIMENT STATION.
Disbursements and Receipts.

ACCOUNTS.	Disbursements from Dec. 1, 1916, to Nov. 30, 1917.	Receipts from Dec. 1, 1916, to Nov. 30, 1917.	Apportionment for Year ending Nov. 30, 1917.	Balance to Credit.
Administration,	\$1,234 51	\$3 48	\$1,200 00	—\$31 03
Agricultural economics,	368 21	-	750 00	381 79
Agriculture,	8,490 16	4,810 22	3,100 00	—579 94
Apiculture,	51 12	-	120 00	68 88
Botanical,	2,103 43	32 90	2,080 00	9 47
Chemical,	12,970 28	11,939 54	1,000 00	—30 74
Cranberry,	3,528 49	3,172 02	3,000 00	2,643 53
Entomological,	413 18	75	625 00	212 57
Equipment,	197 72	-	750 00	552 28
Feed inspection,	6,772 57	6,000 00	2,048 07 ¹	1,275 50
Fertilizer inspection,	9,287 40	9,040 00	859 81 ¹	612 41
Freight and express,	256 70	5 51	400 00	148 81
Graves' orchard,	533 64	133 48	700 00	299 84
Horticultural,	1,832 30	7 85	1,800 00	—24 45
Library,	518 51	-	700 00	181 49
Meteorology,	358 22	-	400 00	41 78
Microbiology,	1,704 14	-	1,725 00	20 86
Poultry,	1,907 25	-	2,000 00	92 75
Publications,	735 22	-	1,000 00	264 78
Salaries,	45,271 80	-	47,400 00	2,128 20
Tillson farm,	1,666 66	1,120 55	1,400 00	853 89
Treasurer's office,	336 59	-	350 00	13 41
Veterinary,	1,123 57	560 31	725 00	161 74
Hatch fund,	-	15,000 00	-	-
Adams fund,	-	15,000 00	-	-
State fund,	-	35,000 00	-	-
Totals,	\$101,661 67	\$101,826 61	\$74,132 88	-
Balance beginning fiscal year Dec. 1, 1916.	-	8,523 40	-	-
Balance on hand Nov. 30, 1917,	8,688 34	-	-	-
Totals,	\$110,350 01	\$110,350 01	-	-

¹ Balance from previous year.

EXPERIMENT STATION — *Continued.*
Comparative Disbursements and Receipts, 1916-17.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1916.	1917.	1916.	1917.
Administration,	\$1,029 25	\$1,234 51	\$13 46	\$3 48
Agricultural economics,	650 24	368 21	-	-
Agriculture,	7,417 23	8,490 16	5,080 69	4,810 22
Apiculture,	102 73	51 12	-	-
Asparagus,	12 26	-	-	-
Botanical,	1,589 04	2,103 43	30 00	32 90
Chemical,	12,069 86	12,970 28	12,002 98	11,939 54
Cranberry,	3,106 97	3,528 49	2,771 12	3,172 02
Entomological,	452 21	413 18	-	75
Equipment,	717 02	197 72	-	-
Feed inspection,	5,632 53	6,772 57	6,000 00	6,000 00
Fertilizer inspection,	11,434 88	9,287 40	9,400 00	9,040 00
Freight and express,	382 33	256 70	91 26	5 51
Graves' orchard,	658 13	533 64	1,131 15	133 48
Horticultural,	1,700 83	1,832 30	53 08	7 85
Library,	682 10	518 51	-	-
Meteorology,	369 11	358 22	-	-
Microbiology,	273 80	1,704 14	-	-
Poultry,	1,811 21	1,907 25	-	-
Publications,	795 14	735 22	-	-
Salaries,	42,986 41	45,271 80	-	-
Tillson farm,	1,921 78	1,666 66	320 96	1,120 55
Treasurer's office,	181 70	336 59	-	-
Veterinary, ¹	977 83	1,123 57	506 00	560 31
Hatch fund,	-	-	15,000 00	15,000 00
Adams fund,	-	-	15,000 00	15,000 00
State fund,	-	-	30,000 00	35,000 00
Totals,	\$96,954 59	\$101,661 67	\$97,400 70	\$101,826 61
Balance beginning of fiscal year,	-	-	8,077 29	8,523 40
Balance on hand at close of fiscal year,	8,523 40	8,688 34	-	-
Totals,	\$105,477 99	\$110,350 01	\$105,477 99	\$110,350 01

¹ This includes blood test.

EXPERIMENT STATION — *Concluded.*
Analysis of Experiment Station Accounts.

	Adams Fund.	Feed Law.	Fertilizer Law.	Hatch Fund.	State Fund.	Totals.
Salaries,	\$14,647 06	\$3,890 99	\$6,253 32	\$15,001 27	\$15,623 47	\$55,416 11
Labor,	-	277 81	500 85	-	23,900 71	24,679 37
Publications,	-	784 20	872 70	-	690 72	2,347 62
Postage and stationery,	-	73 23	81 33	-	1,462 76	1,617 32
Freight and express,	-	6 57	24 67	-	304 78	336 02
Heat, light, water and power,	-	35 13	131 26	-	397 89	564 28
Chemical and laboratory supplies,	-	235 51	508 09	-	1,525 04	2,268 64
Seeds, plants and sundry supplies,	-	18 70	51 00	-	2,411 71	2,481 41
Fertilizers,	-	-	2 00	-	973 40	975 40
Feed stuffs,	-	-	-	-	1,671 76	1,671 76
Library,	-	-	-	-	522 60	522 60
Tools, machinery and ap- pliances,	-	39 35	-	-	242 99	282 34
Furniture and fixtures,	-	-	-	-	729 74	729 74
Scientific apparatus and specimens,	-	-	11 98	-	555 06	567 04
Live stock,	-	-	-	-	236 72	236 72
Traveling expenses,	-	534 25	845 25	-	3,373 05	4,752 55
Contingent expenses,	-	5 00	-	-	20 00	25 00
Buildings and land,	-	871 83	4 95	-	1,145 47	2,022 25
Equipment,	-	-	-	-	165 50	165 50
Totals,	\$14,647 06	\$6,772 57	\$9,287 40	\$15,001 27	\$55,953 37	\$101,661 67

Summary.

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1916,	-	\$8,523 40
Receipts from State Treasurer,	-	41,000 00
Receipts from United States Treasurer,	-	30,000 00
Receipts from other sources,	-	30,826 61
Total disbursements,	\$101,661 67	-
Bills receivable Dec. 1, 1916, deducted,	\$101,661 67	\$110,350 01
Bills payable Dec. 1, 1916, deducted,	865 00	2,776 06
Bills receivable Nov. 30, 1917,	\$100,796 67	\$107,573 95
Bills payable Nov. 30, 1917,	-	4,452 97
Balance,	218 78	-
	11,011 47	-
	\$112,026 92	\$112,026 92

EXTENSION SERVICE.
Disbursements and Receipts.

CLASSIFICATION.	Disbursements.	Receipts.	Apportionment.	Balance.
Administration,	\$1,420 55	\$63 41	\$1,600 00	\$242 86
Director's office,	1,646 89	193 10	1,800 00	346 21
Salaries,	31,467 10	-	33,371 66	1,904 56
Correspondence courses,	1,374 53	661 64	400 00	-312 89
Rural civic planning,	732 73	340 91	700 00	308 18
Local community organization,	782 78	-	700 00	-82 78
Home economics,	702 07	-	500 00	-202 07
Co-operative marketing,	885 24	6 96	800 00	-78 28
County agents' work,	461 69	-	200 00	-261 69
Animal husbandry,	476 41	13 56	400 00	-62 85
Junior extension work,	2,383 06	13 02	1,800 00	-570 04
Dairying,	196 92	-	200 00	3 08
Exhibits,	1,136 78	575 00	500 00	-61 78
Lectures,	165 36	36 00	300 00	170 64
Farm management demonstration,	129 69	46 90	100 00	17 21
Pomology,	487 54	87 49	500 00	99 95
Poultry husbandry,	465 52	179 73	300 00	14 21
Library extension,	165 55	-	200 00	34 45
Printing,	2,868 70	1,535 50	1,800 00	-33 20
War emergency,	6,603 91	33 48	-	-6,565 43
Short courses,	12,194 22	3,538 68	9,680 00	1,024 46
Reserve and emergency,	-	-	6,578 23	-
State Treasurer,	-	50,000 00	-	-
Totals,	\$66,747 24	\$57,330 38	\$61,929 89	-
Balance beginning fiscal year Dec. 1, 1916,	-	12,039 70	-	-
Balance on hand Nov. 30, 1917,	2,622 84	-	-	-
Totals,	\$69,370 08	\$69,370 08	-	-

Summary.

	Disbursements.	Receipts.
Balance Dec. 1, 1916, ¹	-	\$13,634 73
Receipts Nov. 30, 1917,	-	7,330 38
Received from State Treasurer,	-	50,000 00
Received from United States Treasurer,	-	16,594 18
Disbursements to Nov. 30, 1917, ¹	\$81,952 97	-
Bills receivable Dec. 1, 1916, deducted,	\$81,952 97	\$87,559 29
Bills payable Dec. 1, 1916, deducted,	116 87	-
Bills receivable Nov. 30, 1917,	\$81,836 10	\$86,937 17
Bills payable Nov. 30, 1917,	139 72	776 12
Balance,	5,737 47	-
	\$87,713 29	\$87,713 29

¹ Includes Federal Smith-Lever fund.

EXTENSION SERVICE — Concluded.
 Analysis of Extension Service Disbursements.

	Travel.	Equipment.	Supplies.	Instruction and Lectures.	Salaries.	Miscellaneous.	Labor.	Totals.
Administration,	\$1,059 90	-	\$235 27	-	-	-	\$125 38	\$1,420 55
Animal husbandry,	409 73	-	66 68	-	-	-	470 41	3,585 60
Agricultural camps,	135 16	-	2,327 84	\$1,000 00	-	-	122 60	166 12
Beekeeping,	52 69	-	115 43	-	-	-	-	257 00
Conference rural community planning,	141 07	-	115 43	-	-	-	-	1,374 53
Correspondence courses,	119 09	\$2 50	1,168 89	-	-	-	84 05	885 24
Co-operative marketing,	816 83	-	68 41	-	-	-	-	461 69
County agents' work,	329 10	-	132 69	-	-	-	-	65 93
County agents' conference,	17 95	-	47 98	-	-	-	-	196 92
Dairying,	143 60	-	53 32	-	-	-	-	1,646 89
Director's office,	4 92	106 25	1,306 10	-	-	-	229 62	1,136 78
Exhibits,	50 96	-	1,015 83	-	-	-	69 99	129 69
Farm management demonstration,	-	25 00	104 69	-	-	-	-	1,065 94
Farmers week,	306 60	-	552 34	197 00	-	-	-	702 07
Home economics,	336 82	44 50	317 07	-	-	-	3 68	2,383 06
Junior extension work,	1,450 51	32 25	837 99	-	-	-	62 31	185 36
Lectures,	66 37	-	98 99	-	-	-	-	165 55
Library extension,	-	33 53	132 02	-	-	-	-	782 73
Local community organization,	597 45	-	153 96	-	-	-	31 37	487 54
Pomology,	423 16	-	64 38	-	-	-	-	465 52
Poultry convention,	396 35	-	69 17	-	-	-	-	301 51
Poultry husbandry,	122 52	-	158 99	20 00	-	-	-	2,868 70
Printing,	85 38	-	2,783 42	-	-	-	-	732 73
Rural civic planning,	403 51	-	84 86	-	-	-	244 34	33,554 52
Salaries,	-	-	-	-	\$33,554 52	-	-	2,976 15
Summer school,	45 54	-	527 07	2,051 00	-	\$352 54	-	1,698 55
Ten weeks' course,	11 04	-	1,038 02	561 25	-	87 64	-	6,603 91
War emergency,	1,990 44	100 79	2,505 20	-	1,304 15	-	703 33	\$66,747 24
Totals,	\$9,517 19	\$344 82	\$16,080 46	\$3,829 25	\$34,858 07	\$440 18	\$1,070 67	

SMITH-LEVER FUND (FEDERAL).

	Disbursements.	Receipts.
Pomology,	\$73 02	-
Printing,	421 84	-
Animal husbandry,	62 46	-
Junior extension work,	1,513 26	-
Farm management,	330 91	-
Poultry husbandry,	362 00	-
Home economics,	395 08	-
Dairying,	110 04	-
Extension schools,	489 19	-
Plant diseases,	22 50	-
Sheep husbandry,	62 06	-
Salaries,	10,930 62	-
State leader,	432 75	-
State Treasurer,	-	\$16,594 18
Totals,	\$15,205 73	\$16,594 18
Balance at beginning of fiscal year Dec. 1, 1916,	-	1,595 03
Balance on hand Nov. 30, 1917,	2,983 48	-
	\$18,189 21	\$18,189 21

SPECIAL APPROPRIATIONS.

	Date made.	Appropriation.	Amount expended to Date.	Unexpended Balance.
Agricultural building,	1914	\$210,000 00	\$209,074 65	\$925 35
Microbiology building,	1915	67,500 00	65,450 31	2,049 69
Improvement and equipment,	1916	20,000 00	20,000 00	-
Agricultural building,	1916	13,732 34	12,243 49	1,488 85
Rural engineering building,	1916	12,000 00	11,997 57	2 43
Market-gardening field station,	1916	8,000 00	7,968 52	31 48
Mount Toby demonstration forest,	1916	30,000 00	30,000 00	-
Improvement and equipment,	1917	33,500 00	15,218 12	18,281 88
Market-garden field station,	1917	10,000 00	6,825 86	3,174 14
Power plant improvements,	1917	40,000 00	7,417 71	32,582 29
Special architect,	1917	358 18	358 18	-
Totals,	-	\$445,090 52	\$386,554 41	\$58,536 11
Amount spent previous to Dec. 1, 1916,	-	-	-	310,822 12
Amount expended during fiscal year,	-	-	-	75,732 29
Unexpended balance Nov. 30, 1917,	-	-	58,536 11	-
	-	\$445,090 52	\$445,090 52	\$445,090 52

INVENTORY — REAL ESTATE.

Land (Estimated Value).

Angus land,	\$800 00
Allen place,	500 00
Baker place,	2,500 00
Bangs place,	2,350 00
Brown land,	500 00
Charmbury place,	450 00
Clark place,	4,500 00
College farm,	37,000 00
Cranberry land,	10,975 50
Geo. Cutler, Jr., trustee,	2,700 00
Dickinson land,	7,850 00
Harlow farm,	1,584 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
Westcott place,	2,250 00
Total,	\$127,518 58

College Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent.	Value at Beginning of Year less Per Cent. De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Apiary,	\$3,042 49	2	\$2,981 64	\$108 12	\$3,089 76
Animal husbandry building,	9,639 33	2	9,446 54	131 70	9,578 24
Chemical laboratory,	8,363 13	5	7,944 97	372 93	8,317 90
Clark hall,	65,671 16	2	64,357 74	136 04	64,493 78
Cold-storage laboratory,	11,617 21	2	11,384 87	33 11	11,417 98
Dairy building,	73,198 22	2	71,734 26	574 45	72,308 71
Dairy barn and storage,	28,722 00	3	27,860 34	409 88	28,270 22
Dining hall,	57,709 05	3	55,977 78	1,018 10	56,995 88
Drill hall and gun shed,	9,383 24	5	8,914 08	252 53	9,166 61
Durfee glass houses, old,	9,122 25	5	8,666 14	315 48	8,981 62
Durfee glass houses, new,	13,847 88	5	13,155 49	-	13,155 49
Entomology building,	77,558 22	2	76,007 06	205 23	76,212 29
Farm bungalow,	2,059 88	3	1,998 08	51 77	2,049 85
Farmhouse,	2,578 19	3	2,500 84	37 56	2,538 40
Farmhouse No. 2,	4,500 00	8	4,140 00	27 34	4,167 34
French hall,	48,839 03	2	47,862 25	80 72	47,942 97
Harlow house,	1,700 00	5	1,615 00	-	1,615 00
Horse barn,	4,858 16	3	4,712 42	28 79	4,741 21
Head of division of horticulture,	2,523 00	5	2,396 85	44 89	2,441 74
Horticultural barn,	2,515 60	3	2,440 13	44 76	2,484 89
Horticultural tool shed,	1,881 80	3	1,825 35	-	1,825 35
Hospital,	15,282 28	2	14,927 63	25 54	14,953 17
Kellogg house,	2,500 00	5	2,375 00	9 09	2,384 09
Machinery barn,	3,779 26	3	3,665 88	3 26	3,669 14
Market-garden field station barn,	-	-	-	-	3,500 00

College Buildings (Estimated Value) — Concluded.

	Inventory at Beginning of Year.	Per Cent.	Value at Beginning of Year less Per Cent. De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Mathematical building,	\$5,521 88	5	\$5,245 79	\$206 36	\$5,452 15
Microbiology building,	62,144 41	2	60,901 52	169 25	61,070 77
Mount Toby house,	4,000 00	5	3,800 00	-	3,800 00
North dormitory,	24,566 17	2	24,074 85	706 25	24,781 10
Physics laboratory,	5,140 22	5	4,883 21	21 06	4,904 27
Piggery,	2,833 14	3	2,748 15	2 44	2,750 59
Poultry department:—					
No. 1 demonstration building,	1,387 33	2	1,359 58	2 02	1,361 60
No. 2 oil house,	73 50	2	72 03	-	72 03
No. 3 brooder, killing and fattening laboratory,	2,412 18	2	2,363 94	52 49	2,416 43
No. 4 mechanics, storage building and incubator cellar,	3,447 36	2	3,378 41	105 10	3,483 51
No. 5 laying house,	1,728 72	2	1,694 15	-	1,694 15
No. 6 manure shed,	98 00	2	96 04	-	96 04
No. 7 small henhouse,	49 00	2	48 02	-	48 02
No. 8 breeding house,	1,536 64	2	1,505 91	18 00	1,523 91
No. 9 experimental breeding house,	600 00	2	588 00	-	588 00
No. 10 duck house,	98 00	2	96 04	-	96 04
No. 11 unit house for 200 hens,	504 60	2	494 51	8 00	502 51
No. 12 unit house for 100 hens,	400 00	2	392 00	13 00	405 00
Power plant and storage building, in- cluding coal pocket,	35,279 72	2	34,574 13	4,022 75	38,596 88
President's house,	11,782 83	3	11,429 35	712 78	12,142 13
Quarantine barn,	517 49	3	501 97	-	501 97
Registrar's house,	1,000 00	5	950 00	4 47	954 47
Rural engineering building,	3,606 06	2	3,533 94	107 61	3,641 55
Sheep barn,	1,432 27	3	1,389 30	30 02	1,419 32
South dormitory,	35,525 35	2	34,814 84	531 45	35,346 29
Stockbridge hall,	181,456 73	2	177,827 60	479 28	178,306 88
Agronomy greenhouse,	2,107 00	2	2,064 86	-	2,064 86
Stockbridge house,	1,500 00	5	1,425 00	1 66	1,426 66
Stone chapel,	29,068 01	2	28,486 65	90 03	28,576 68
Vegetable plant house,	4,392 72	5	4,173 08	11 43	4,184 51
Veterinary laboratory and stable,	23,423 87	2	22,955 39	10 77	22,966 16
Waiting station,	491 78	2	481 94	1 02	482 96
Wilder hall,	36,159 16	2	35,435 98	62 47	35,498 45
Young stock barn,	6,235 54	3	6,048 47	6 69	6,055 16
Totals,	\$951,361 06	-	\$928,724 99	\$11,287 69	\$943,512 68

College Equipment (Estimated Value).

Administrative division:—

Dean's office,	\$527 60
President's office,	1,691 00
Registrar's office,	1,020 01
Treasurer's office,	2,638 75

Agricultural division:—

Agronomy,	6,112 93
Animal husbandry,	855 80
Dairy,	17,916 32
Farm administration,	47,241 56
Farm management,	1,091 66
General agriculture,	4,221 86
Poultry,	6,120 47
Rural engineering,	3,207 00
Dining hall,	5,567 68
Extension,	8,274 55

General science: —	
Apiary,	-1
Botanical,	\$20,511 15
Chemical,	11,450 28
Entomology,	6,189 92
Microbiology,	7,947 06
Mathematics,	2,533 50
Physics,	6,056 82
Veterinary,	10,636 47
Zoölogical and geological,	17,071 53
Graduate school,	76 34
Horticultural division: —	
Floriculture,	29,524 61
Forestry,	2,286 72
General horticulture,	6,934 12
Grounds,	1,648 82
Landscape gardening,	5,019 56
Market gardening,	2,144 40
Pomology,	5,571 77
Hospital,	907 32
Humanities division: —	
Economics and sociology,	160 57
Language and literature,	421 00
Library,	95,943 00
Military,	1,506 07
Operating and maintenance: —	
College supply,	1,877 16
Fire apparatus,	1,851 15
General maintenance,	123,609 36
Equipment,	\$105,631 29
Carpentry and masonry supplies,	6,398 20
Electrical supplies,	2,581 06
Heating and plumbing supplies,	7,687 52
Painting supplies,	1,311 29
Janitor's supplies,	939 29
Sewer line,	12,137 79
Water mains,	10,584 31
Physical education,	2,196 75
Rural social science: —	
Agricultural economics,	694 65
Agricultural education,	622 15
Rural sociology,	248 81
Textbooks,	1,733 59
Trophy room,	1,564 74
Total,	\$499,087 97

¹ Not received on time.

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,	\$14,966 50	2	\$14,667 17	\$37 32	\$14,704 49
Agricultural barns,	4,777 47	3	4,634 15	50 50	4,684 65
Agricultural farmhouse,	1,412 47	3	1,370 10	5 30	1,375 40
Agricultural glass house,	451 25	5	428 69	-	428 69
Cranberry buildings,	2,490 00	5	2,365 50	-	2,365 50
Plant and animal chemistry laboratory,	29,160 71	2	28,577 50	82 11	28,659 61
Plant and animal chemistry barns,	3,920 98	3	3,803 35	161 64	3,964 99
Plant and animal chemistry dairy,	1,881 80	3	1,825 35	-	1,825 35
Six poultry houses,	576 24	2	564 72	21 00	585 72
Entomological glass houses,	744 56	5	707 33	75 00	782 33
Totals,	\$60,381 98	-	\$58,943 86	\$432 87	\$59,376 73

Experiment Station Equipment (Estimated Value).

Agricultural economics department,	\$57 14
Agricultural laboratory,	7,310 93
Botanical laboratory,	5,471 09
Chemical laboratory,	22,161 01
Cranberry station,	16,314 52
Director's office,	5,696 64
Entomological laboratory,	23,550 24
Horticultural laboratory,	4,707 63
Meteorology laboratory,	855 00
Microbiology laboratory,	1,479 55
Poultry department,	4,517 78
Treasurer's office,	1,130 25
Tillson farm,	451 75
Graves' orchard,	45 00
Total,	\$93,748 53

Inventory Summary.

Land,	\$122,718 58
College buildings,	940,012 68
College equipment,	499,087 97
Experiment station buildings,	59,376 73
Experiment station equipment,	93,748 53
Total,	\$1,714,944 49

Acres.

College estate, area,	567.79
Cranberry station, Wareham, area,	23.67
Market-garden field station, Lexington, area,	12.00
Mount Toby demonstration forest, area,	755.27
Rifle range,	46.2
Pelham quarry, . . . . .	.5
Total acreage,	1,405.43

STUDENT'S TRUST FUND ACCOUNT.

	Disbursements, Year ending Nov. 30, 1917.	Receipts, Year ending Nov. 30, 1917.	Balance on Hand.	Balance brought forward Dec. 1, 1916.
Athletics,	\$5,928 80	\$6,415 72	\$2,291 43	\$1,804 51
Dining hall,	52,349 19	47,140 28	-17,214 10	-12,005 19
Keys,	56 50	54 50	33 75	35 75
Student deposits,	16,298 18	18,569 49	10,328 55	8,057 24
Social union,	947 48	962 94	949 86	934 40
Textbooks,	5,443 08	5,039 27	778 06	1,181 87
Athletic field,	1,675 98	1,554 99	-373 21	-252 22
Uniforms,	2,710 15	2,215 15	1,928 64	2,423 64
Totals,	\$85,409 36	\$81,952 34	-\$1,277 02	\$2,180 00
Balance on hand Dec. 1, 1916,	-	2,180 00	-	-
Balance on hand Nov. 30, 1917,	-1,277 02	-	-	-
	\$84,132 34	\$84,132 34	-	-

CONDENSED OPERATING STATEMENT OF THE DINING HALL.

	Operating charges.	Income.
1916.		
Dec. 1. Balance,	\$12,005 19	
1917.		
Nov. 30. Total disbursements,	52,349 19	
Outstanding bills,	2,116 27	
Total collections,		\$47,140 28
Accounts outstanding,		432 46
Inventory,		4,798 75
Balance,		14,099 16
	\$66,470 65	\$66,470 65

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	3,313 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, 1917.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at \$830.	\$1,660 00	\$2,000 00	\$80 00
Two bonds Western Electric Company 5s, at \$971, . . .	1,942 00	2,000 00	100 00
	\$3,602 00	\$4,000 00	\$180 00
Unexpended balance Dec. 1, 1916,	-	-	500 55
Cash on hand Nov. 30, 1917,	-	-	\$680 55

LIBRARY FUND.

Five bonds New York Central & Hudson River Railroad Company 4s, at \$768.75,	\$3,843 75	\$5,000 00	\$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$850,	4,250 00	5,000 00	200 00
Two shares New York Central & Hudson River Railroad Company stock, at \$680,	1,360 00	200 00	10 00
Amherst Savings Bank, deposit,	167 77	167 77	7 09
	\$9,621 52	\$10,367 77	\$417 09
Nov. 20, 1917, transferred to college library account, . . .	-	-	417 09

SPECIAL FUNDS.

Endowed Labor Fund (the Gift of a Friend of the College).

Two bonds American Telephone and Telegraph Company 4s, at \$830,	\$1,660 00	\$2,000 00	\$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$850,	1,700 00	2,000 00	80 00
One bond New York Central Railroad debenture 4s,	786 33	1,000 00	40 00
Amherst Savings Bank, deposit,	143 39	143 39	6 07
One bond Kansas City Street Railway 5½s,	980 00	1,000 00	55 00
	\$5,269 72	\$6,143 39	\$261 07
Unexpended balance Dec. 1, 1916,	-	-	537 04
Cash on hand Nov. 30, 1917,	-	-	\$798 11

Whiting Street Scholarship Fund.

One bond New York Central debenture 4s,	\$786 33	\$1,000 00	\$40 00
Amherst Savings Bank, deposit,	271 64	271 64	11 51
	\$1,057 97	\$1,271 64	\$51 51
Unexpended balance Dec. 1, 1916,	-	-	239 18
Cash on hand Nov. 30, 1917,	-	-	\$290 69

SPECIAL FUNDS — *Continued.**Hills Fund.*

	Market Value Dec. 1, 1917.	Par Value.	Income.
One bond American Telephone and Telegraph Company 4s, at	\$830 00	\$1,000 00	\$40 00
One bond New York Central & Hudson River Railroad debenture 4s, at	786 33	1,000 00	40 00
One bond New York Central Railroad debenture 4s,	786 33	1,000 00	40 00
Three bonds Pacific Telephone and Telegraph Company 5s, at \$920,	2,760 00	3,000 00	150 00
One bond Western Electric Company 5s, at	971 00	1,000 00	50 00
Boston & Albany Railroad stocks, 3½ shares, at \$126,	456 75	362 50	31 68
Amherst Savings Bank, deposit,	72 75	72 75	3 06
Electric Securities Company bonds, 1½ shares, at \$965,	1,138 70	1,180 00	59 00
Kansas City Street Railway 5½,	980 00	2,000 00	110 00
	\$8,781 86	\$10,615 25	\$523 74
Unexpended balance Dec. 1, 1916,	-	-	1,380 41
	-	-	\$1,904 15
Disbursements for fiscal year ending Nov. 30, 1917,	-	-	1,013 00
Cash on hand Nov. 30, 1917,	-	-	\$891 15

Mary Robinson Fund.

Amherst Savings Bank, deposit,	\$142 00	\$142 00	\$6 03
Boston & Albany Railroad stock, ¼ share, at \$126,	47 25	38 00	3 32
Electric Securities Company bonds, ¼ share, at \$965,	791 30	820 00	41 00
	\$980 55	\$1,000 00	\$50 35
Unexpended balance Dec. 1, 1916,	-	-	138 68
Cash on hand Nov. 30, 1917,	-	-	\$189 03

Grinnell Prize Fund.

Ten shares New York Central & Hudson River Railroad stock, at \$69,	\$690 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1916,	-	-	195 74
	\$690 00	\$1,000 00	\$245 74
Disbursements for prizes,	-	-	-
Cash on hand Nov. 30, 1917,	-	-	\$245 74

Gassett Scholarship Fund.

One bond New York Central & Hudson River Railroad debenture 4s,	\$786 33	\$1,000 00	\$40 00
Amherst Savings Bank, deposit,	11 64	11 64	46
	\$797 97	\$1,011 64	\$40 46
Unexpended balance Dec. 1, 1916,	-	-	182 77
Cash on hand Nov. 30, 1917,	-	-	\$223 23

SPECIAL FUNDS — *Concluded.**Massachusetts Agricultural College (Investment).*

	Market Value Dec. 1, 1917.	Par Value.	Income.
One share New York Central & Hudson River Railroad stock,	\$69 00	\$100 00	\$5 00
Unexpended balance Dec. 1, 1916,	-	-	80 45
Cash on hand Nov. 30, 1917,	-	-	\$85 45

Danforth Keyes Bangs Fund.

Two bonds Pacific Telephone and Telegraph Company 5s, at \$920,	\$1,840 00	\$2,000 00	\$100 00
Two bonds Union Electric Light and Power Company 5s, at \$930,	1,860 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s, at \$830,	1,660 00	2,000 00	80 00
Interest from student loans,	-	-	44 88
	\$5,360 00	\$6,000 00	\$324 88
Unexpended balance Dec. 1, 1916,	-	-	1,000 25
	-	-	\$1,325 13
Total loans made to students during fiscal year, \$1,794 00			
Cash received on account of student loans, 1,669 00			
Excess of loans made over accounts paid by students,	-	-	125 00
Cash on hand Nov. 30, 1917,	-	-	\$1,200 13

John C. Cutter Fund.

One bond Pacific Telephone and Telegraph Company 5s,	\$920 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1916,	-	-	68 17
	\$920 00	\$1,000 00	\$118 17
Disbursements for fiscal year to date,	-	-	22 64
Cash on hand Nov. 30, 1917,	-	-	\$95 53

William R. Sessions Fund.

One bond New York Central & Hudson River Railroad stock 6s,	\$465 00	\$500 00	\$30 00
Amherst Savings Bank, deposit,	4,500 00	4,500 00	191 25
	\$4,965 00	\$5,000 00	\$221 25
Disbursements for fiscal year to date,	-	-	46 10
	-	-	\$175 15
Cash on hand Nov. 30, 1916,	-	-	100 56
Cash on hand Nov. 30, 1917,	-	-	\$275 71

Alvord Dairy Scholarship Fund.

Amherst Savings Bank, deposit,	\$4,000 00	\$4,000 00	\$170 00
Overdraft Dec. 1, 1916, \$430 00	-	-	-
Less amount of receipts, 170 00	-	-	-
Overdraft Nov. 30, 1917,	-	-	\$260 00

SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN
TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Burnham emergency fund,	\$680 55
Endowed labor fund,	798 11
Whiting Street scholarship fund,	290 69
Hills fund,	891 15
Mary Robinson fund,	189 03
Grinnell prize fund,	245 74
Gassett scholarship fund,	223 23
Massachusetts Agricultural College investment fund,	85 45
Danforth Keyes Bangs fund,	1,200 13
John C. Cutter fund,	95 53
William R. Sessions fund,	275 71
	<hr/>
	\$4,975 32
Alvord dairy scholarship fund overdraft,	260 00
	<hr/>
	\$4,715 32
Angus land,	\$800 00
Liberty Loan,	800 00
	<hr/>
	1,600 00
	<hr/>
	\$3,115 32

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 Nov. 30, 1917. 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.

DEC. 19, 1917.

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 56,090 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 post-graduate, 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

\$49,100 00

FRED C. KENNEY,
Treasurer.

The M. A. C. Bulletin

Vol. X

MARCH, 1918

No. 3

SUMMER SCHOOLS 1918

MASSACHUSETTS AGRICULTURAL
COLLEGE



AMHERST, MASSACHUSETTS

Published six times a year by the MASSACHUSETTS AGRICULTURAL COLLEGE,
January, February, March, May, September and October.

Entered as second class matter at the Post-office, Amherst, Mass.

The M. A. C. Bulletin

AMHERST, MASS.

Volume X

MARCH, 1918

Number 3

THE MASSACHUSETTS AGRICULTURAL COLLEGE SUMMER SCHOOLS 1918

The Summer School of Agriculture and Country Life

July 1 to 30

(See page 7)



Agricultural Camps

Boys' Camp, for Prize Winners July 19-July 27 (inc.)

Girls' Camp, for Prize Winners July 19-July 27 (inc.)

The Poultry Convention

July 25, 26, 27

(See page 24)

Conference on Rural Organization

July 30-Aug. 2 (inc.)

(See page 23)

Published six times a year by the MASSACHUSETTS AGRICULTURAL COLLEGE, January, February, March, May, September and October

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FACULTY OF THE SUMMER SCHOOLS

1918

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

WILLIAM D. HURD, M.AGR.
Director of Extension Service and Supervisor of Short Courses

ANDREW S. THOMSON, A.M.
*Assistant Professor of Market Gardening
In Charge of Summer Schools*

CHARELS R. GREEN, B.AGR.
Librarian of the College

F. JOSEPHINE HALL, A.M.
Adviser for Women

RUTH BRADLEY
In Charge of Music

- | | |
|--|-------------------------------|
| W. W. CHENOWETH, A.B., M.Sc.
Associate Professor of Pomology | <i>Food Conservation</i> |
| GEORGE L. FARLEY, M.Sc.
Supervisor, Junior Extension Work | <i>Boys' and Girls' Clubs</i> |
| MRS. MARTHA H. FRENCH | <i>Sewing</i> |
| EDNA FULLER
Department of Physical Education, Fredonia Normal School, N. Y. | <i>Physical Education</i> |
| BURTON N. GATES, Ph.D.
Associate Professor of Beekeeping. | <i>Beekeeping</i> |
| IDA E. HALL, LL.B.
Waltham, Mass. | <i>Plays and Pageants</i> |
| WILLIAM R. HART, A.M., LL.B.
Professor of Agricultural Education. | <i>Garden Supervision</i> |

- A. G. HECHT, B.Sc. *Floriculture*
Assistant Professor of Floriculture.
- O. A. JAMISON, M.Sc. *Dairying*
Assistant Professor of Dairying.
- EARL JONES, M.Sc. *Soil Fertility and
Elementary Agriculture*
Assistant Professor of Agronomy.
- C. E. MARSHALL, Ph.D. *Physical Education*
Professor of Microbiology.
- CHARLES J. MAYNARD *Ornithology*
Naturalist and Lecturer, West Newton, Mass.
- EZRA L. MORGAN, A.M. *Community Organization*
Extension Professor of Community Organization.
- JOHN C. McNUTT, B.Sc.AGR. *Animal Husbandry*
Professor of Animal Husbandry.
- HELEN NORRIS *In charge of Girls' Camps*
Assistant State Club Leader.
- A. VINCENT OSMUN, M.Sc. *Plant Diseases*
Professor of Botany.
- LOYAL F. PAYNE, B.Sc. *Poultry Husbandry*
Assistant Professor of Poultry Husbandry.
- MRS. ELIZABETH POMEROY, R.N. *First Aid and Home Nursing*
Haydenville, Mass.
- WILLIAM S. REGAN, Ph.D. *Entomology*
Instructor in Entomology.
- FREDERICK W. RIED *Handicrafts*
Director of Practical Arts, Framingham (Mass.) Normal School.
- FRED C. SEARS, M.Sc. *Pomology*
Professor of Pomology.
- MRS. HELENA C. SMITH *Home Economics*
Extension Instructor in Home Economics.
- C. H. THOMPSON, M.Sc. *Trees and Shrubs*
Assistant Professor of Horticulture.
- A. S. THOMSON, A.M. *Market Gardening*
Assistant Professor of Market Gardening.

COMMITTEES OF THE FACULTY OF THE SUMMER SCHOOL
OF AGRICULTURE AND COUNTRY LIFE

Course of Study

PROFESSORS GRAHAM, JONES and THOMSON

Excursions

PROFESSORS A. S. THOMSON, SEARS and C. H. THOMPSON

Social Evenings

PROFESSOR THOMSON, MISS F. JOSEPHINE HALL and MR. RIED

So far as possible, the members of the faculty of the Summer Schools are selected from the regular faculty of the College. Where instructors are engaged from other institutions, great care is taken to secure men and women eminent in their respective lines of work.



CALENDAR FOR 1918 SUMMER SCHOOLS

- Monday, July 1.** Registration and assignment of rooms for Summer School of Agriculture and Country Life.
- July 2.** Classes begin.
Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 7.00-8.00, Informal Reception to Summer School Students.
8.00-10.00, Social Evening, Drill Hall.
- July 3.** Afternoon excursion to Orient Springs. Picnic supper.
- July 4.** Amherst Community Fourth of July Celebration; Summer School participates in the Program.
- July 5.** Afternoon, 3.00, Seminar: The State-and Nationwide Extension Work Movement. Leader, Acting Director A. D. Kilham.
Afternoon class excursions.
Evening, 8.00-11.00, Social Evening, Drill Hall.
- July 6.** Excursion: to Mt. Holyoke College, Smith College, and Mt. Tom.
- Monday, July 8.** Afternoon, 3.00, Seminar: Boys' and Girls' Agricultural and Home Economics Clubs. George L. Farley, Supervisor of Junior Extension Club Work.
Afternoon class excursions.
- July 9.** Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8.00-10.00, Social Evening, Drill Hall.
- July 10.** Afternoon excursion: to Mt. Sugar Loaf. Picnic supper.



The College Barns

- July 11.** Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation on Campus.
Evening, 8.00, Reading: "Enoch Arden," Dean E. M. Lewis.
- July 12.** Afternoon class excursions.
Evening, 8.00-11.00, Social Evening, Drill Hall.
- July 13.** Classes in forenoon.
Excursion to Mt. Holyoke, Picnic Supper.
- Monday, July 15.** Afternoon, 3.00, Seminar: Rural Social Organization. Leader, Prof. E. L. Morgan.
Afternoon class excursions.
- July 16.** Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8.00-10.00, Social Evening, Drill Hall.
- July 17.** Afternoon excursion. (To be announced.)
- July 18.** Afternoon 3.00-5.00, Organized Play.
Evening, 8.00, Reading, "American Character and Humor," Prof. Charles H. Patterson.
- July 19.** Boys' Camp for prize winners begins, Girls' Camp for prize winners begins.
Afternoon class excursions.
Evening, 8.00-11.00, Social Evening, Drill Hall.
- July 20.** All-day excursion: to "Old Deerfield."
- Monday, July 22.** Afternoon, 3.00, Seminar: (Subject and Leader to be announced).
Afternoon class excursions.
- July 23.** Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8.00-10.00, Social Evening, Drill Hall.
- July 24.** Afternoon excursion. (To be announced.)
- July 25.** Poultry Convention begins.
Afternoon, 3.00-5.00, Demonstration of Organized Play and Recreation, on Campus.
Evening, 8.00, Entertainment, Prof. A. A. Mackimmie.
- July 26.** Evening, 8.00-11.00, Social Evening, Drill Hall.
- July 27.** All-day excursion to Mt. Toby.
Poultry convention ends.
Boys' and Girls' Camps for prize winners end.
- Monday, July 29.** Afternoon excursions.
- July 30.** Summer School ends at 12 m.
Conference on Rural Organization begins at 2.00 p. m.
- Aug. 2.** Conference on Rural Organization ends.

SUMMER SCHOOL OF AGRICULTURE AND COUNTRY LIFE

ANNOUNCEMENT



Summer School of Agriculture and Country Life of the Massachusetts Agricultural College will open July 1, for a term of four weeks, closing July 30. This will be the eleventh session of the Summer School. The experience of the past ten years will aid in making material improvements in the session of 1918. The work of the Summer School was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture who can come to the college conveniently during the summer season. Practical courses will be offered for the benefit of such persons. Owing to the demands of the

times several courses are being offered which prepare for garden supervisors and club workers of various kinds. The courses offered for the current year may be grouped as follows:

1. Courses in practical agriculture and horticulture.
2. Courses in elementary sciences bearing on agriculture and horticulture.
3. Courses in rural sociology.
4. Courses in play and recreation, and conservation of health.
5. Courses in domestic economy, household science, and food conservation.

From these courses it will be possible to make up programs of work especially suitable to the needs of school teachers, principals, superintendents, school committeemen, farm owners, suburban residents, clergymen, social workers, and those trying to prepare themselves to do their part in war work. Persons who are in doubt as to what courses will best suit their needs should correspond with Professor Andrew S. Thomson, in charge of Summer Schools, who will gladly advise in all such matters. No course will be given unless elected by five or more students.

COURSES

GROUP A

GENERAL AGRICULTURE, ANIMAL HUSBANDRY, DAIRYING

1. Soil Fertility.

Professor Jones

A systematic study of the factors governing crop production. This course includes a field study of soils of different formations and different textures; a study of tillage, tillage methods, and tillage implements; a study of soil fertility as affected by crop rotations and green manures; and of the economical use of manures, lime and commercial fertilizer. A large part of the work consists of field exercises. Five exercises a week; four weeks.

2. Breeds and Livestock Judging.

Professor McNutt

As detailed a study as is possible of the different breeds and types of farm animals. The characteristics of draft, coach, roadster and saddle horses are studied with a brief review of the several breeds adapted to each class. The history, characteristics and adaptations of the leading dairy and beef breeds of cattle are discussed. Feeding, especially of dairy cattle for economic milk production and care and management consistent with the successful growing of live stock, receive attention. Time is given to the judging of horses and dairy cattle. The work is made practical throughout. Five exercises a week; four weeks.



3. Poultry Breeding and Management.

Professor Payne

This covers: types and breeds; incubation and brooding; housing; feeding; marketing eggs and poultry; diseases and management. Laboratory work consists of caring for incubators, killing, picking, drawing, trussing, disjointing, packing and caponizing. As much practical work as possible is given; this includes crate fattening or caring for the layers; poultry judging or house construction. Four lectures and one laboratory period a week; four weeks.

4. Dairying.

Professor Jamison

This course covers briefly the composition and properties of milk; food value of milk; relation of milk to the public health; care and use of milk in the home; methods used in the production of clean milk; the Babcock test for fat in milk and cream; cream separating; cream ripening; butter making. Laboratories consist of testing milk and cream for fat by the Babcock method; separating cream; and butter making. Three lectures and two two-hour laboratory periods a week; four weeks.

GROUP B

HORTICULTURE, GARDEN SUPERVISION AND CLUB WORK



An Orchard Demonstration

5. Fruit Growing.

*Professor
Sears*

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.

6. Vegetable Gardening.

Professor Thomson

This course consists almost wholly of practical field exercises in planting, training and cultivating vegetables, and while no special effort is made to put the work into common school form, the exercises are especially valuable to school garden teachers. Limited to twenty-five pupils. Five exercises a week; four weeks.



7. Home and School Garden Supervision. Professor Hart

The work of this course is planned to train teachers and others in the work of Garden Supervision. It will consist of lectures, readings, and discussions on methods of teaching garden work to children, methods of organization of the community for garden work and methods of supervising the same in connection with the public schools and with the homes. It will include supervision of Junior Extension projects. The class will be limited to those who are taking practical gardening or who have had considerable experience in gardening. Three two-hour periods a week; one period for discussions, two periods for practice in supervision; four weeks.

8. Boys' and Girls' Club Work. Professor Farley

A course intended for those who expect to act as directors of Junior Extension Club work. It will cover the history and present scope of the work, its relation to community activities, and methods of organization. The work will be given in a series of conferences conducted by the Junior Extension leaders.

9. Amateur Home and Flower Gardening. Prof. Hecht

Covers the growing of flowers for the home garden or school garden without the use of greenhouses. The course is designed to familiarize the student with *what to do, how to do it, and when*, in order to have a supply of flowers for the home. The course will include a discussion of soils, fertilizers, insects and preventives, propagation of annuals, perennials, and bedding plants by seeds, cuttings and division. Culture of bulbs. Planting and care of the garden. Three lectures and two two-hour demonstration periods a week; four weeks.

10. Trees and Shrubs. Professor Thompson

A study of our cultivated trees and shrubs and such of our native material as may well be introduced into home planting. Special consideration will be given to their identification, propagation and care. Five exercises a week; four weeks.

GROUP C

SCIENCES RELATED TO AGRICULTURE

11. Bird Life. Mr. Maynard

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.

12. Insect Life.

Dr. Regan

An introductory course which has been arranged with particular reference to the needs of teachers in grade schools and high schools who are expected to treat of insects in their classes, either as a part of nature study or in their relation to agriculture. The course is also planned for persons, not teachers, who wish a general knowledge of insect pests and methods of control. A part of the time is spent in the field, studying living insects, their habits, the injuries they cause, and their identification. Five exercises a week; four weeks.



The Entomology Building

13. Plant Diseases.

Professor Osmun

The more common diseases of vegetable, fruit and flower crops are considered, together with methods of control. The course is planned to meet the needs of teachers and others interested in gardening and garden supervision. Diseased plant materials are used for illustrative purposes. Five lectures a week; first two weeks.

14. Beekeeping.

Professor Gates

This brief course is designed particularly for school teachers or beginners in beekeeping. It comprises the elementary and practical features of the beekeeping industry, including equipment, handling and manipulation of bees, a discussion of the diseases, races of the honey bee, and the utilization of bees as nature study material in the lecture and schoolroom, as well as for pleasure. The lectures are illustrated with the actual objects under discussion and laboratory periods are supplemented with demonstrations. Five lectures a week or such laboratory periods as can be arranged; last two weeks.

GROUP D
HOME ECONOMICS, FOOD CONSERVATION, AND
PRACTICAL ARTS

15. Food Conservation.

Professor Chenoweth

A study of the fundamental principles underlying the various methods of evaporating and canning. Application of these principles in the actual work of evaporating and canning all available products. No demonstrations. Students are expected to do the work. Two lectures and three two-hour laboratory periods a week; first two weeks.

16 Foods.

Mrs. Smith

This is a general course including a study of food principles, body requirements and general nutrition followed by detailed work in menu planning as related to the present situation. The course is planned to meet the needs of those who wish general information concerning food conservation and also for those who wish to assist in food conservation as leaders in their communities. Demonstrations are given in the preparation of war foods (and in canning and drying fruits and vegetables). Three lectures and two demonstrations a week; last two weeks.



Class in Home Economics

17. Household Management.

Mrs. Smith

A general course which deals with the organization of the household and such specific problems as budget making; household accounts; general scheme of work; labor-saving devices; laundry problems; removal of stains; care of metals and woodwork; and household insects. Two hours a week; four weeks.

18. Sewing.

Mrs. French

This course is offered to meet the needs at the present time in

clothing conservation. The course consists of work in selection of fabrics; simple household tests to detect adulterations in fabrics; pattern cutting and adjustment; care and repair of clothing; and the renovating and remodelling of garments. A special course will be offered to teachers of sewing and leaders of club work and others who wish material for instructional work. Time to be arranged. Five hours a week; four weeks.

19. Design and Practical Arts. (1). Mr. Ried

Lectures and laboratory work developing the value of design as a rural school asset. Work in binding and its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, bagging projects and rural dyeing; also other phases of rural pre-vocational subject matter, also rural avocational craft-work. Those taking this work should bring 9" x 12" drawing paper, carbon paper, scissors, ruler, eraser, knife and pencils. Five exercises a week; four weeks.

20. Practical Arts (2). Mr. Ried

An interpretation of the new state course in drawing and hand-work with laboratory periods. This course has been especially outlined for country schools and has already made radical changes in school arts. Given if ten or more call for it. Classes limited to twenty. Five exercises a week; four weeks.

GROUP E

ELEMENTARY AGRICULTURE FOR TEACHERS

21. Elementary Agriculture. Professor Jones

This course is designed primarily to meet the needs of teachers, school officers, and others who are interested in making agricultural instruction in our public schools function directly in personal and community life. The laboratory work and closely correlated lectures cover the most important aspects of agriculture, and special emphasis is placed upon materials and methods of presentation. Five periods a week; four weeks.

GROUP F

RURAL HEALTH AND RECREATION

22. Organized Play and Recreation. Miss Fuller

The theory and demonstration of play as a creative force developing in the individual social consciousness and in the group individual responsibility for standards of living in the home and the community. There will be special emphasis on methods of organizing and directing games. An effort will be made to work out games that will contribute to the social life of the community. Demonstrations form a prominent feature of the work. Three lectures and four afternoon demonstrations a week; four weeks.

(Continued on page 16)

Summer School

8.25—9.15

9.25—10.15

Monday	2. Soil Fertility	4 weeks	5. Fruit Growing	4 weeks
	3. Poultry	4 weeks	2. Breeds and Judging of Livestock	4 weeks
	9. Amateur Flower Growing	4 weeks	7. Garden Supervision	4 weeks
	7. Garden Supervision	4 weeks	18. Sewing	4 weeks
	13. Plant Diseases		21. Elementary Agriculture	4 weeks
	22. Organized Play and Recreation		23. Plays and Pageantry	First 2 weeks

Tuesday	2. Soil Fertility	4 weeks	2. Breeds and Judging of Livestock	
	3. Poultry		5. Fruit Growing	
	9. Amateur Flower Growing		9. Amateur Flower Growing	
	13. Plant Diseases		18. Sewing	
			21. Elementary Agriculture	
			23. Plays and Pageantry	

Wednesday	1. Soil Fertility		2. Breeds and Judging of Livestock	
	3. Poultry		5. Fruit Growing	
	9. Amateur Flower Growing		7. Garden Supervision	
	7. Garden Supervision		18. Sewing	
	13. Plant Diseases		21. Elementary Agriculture	
	22. Organized Play and Recreation		23. Plays and Pageantry	

Thursday	1. Soil Fertility		2. Breeds and Judging of Livestock	
	3. Poultry		5. Fruit Growing	
	9. Amateur Flower Growing		9. Amateur Flower Growing	
	13. Plant Diseases		18. Sewing	
			21. Elementary Agriculture	
			23. Plays and Pageantry	

Friday	1. Soil Fertility		2. Breeds and Judging of Livestock	
	3. Poultry		5. Fruit Growing	
	7. Garden Supervision		7. Garden Supervision	
	9. Amateur Flower Growing		18. Sewing	
	13. Plant Diseases		21. Elementary Agriculture	
	22. Organized Play and Recreation		23. Plays and Pageantry	

Saturday Forenoon classes will be held on Saturday, July 13.
All-day excursions on other Saturdays.

Schedule 1918

10.25—11.15	11.25—12.15	Afternoon and Evening
1. Dairying 4 weeks 2. Vegetable Gardening 4 weeks 3. Beekeeping Last 2 weeks 4. Food Conservation First 2 weeks 5. Foods Last 2 weeks 6. Design and Practical Arts 4 weeks	10. Trees and Shrubs 4 weeks 11. Bird Life 4 weeks 12. Insect Life 4 weeks 15. Food Conservation First 2 weeks 16. Foods Last 2 weeks 24. Conservation of Health First 2 weeks 25. First Aid Last 2 weeks 20. Practical Arts 4 weeks 26. Farm Management First 2 weeks	Class Excursions
Dairying (Lab.) Vegetable Gardening Beekeeping Food Conservation Foods Design and Practical Arts	4. Dairying (Lab.) 10. Trees and Shrub 11. Bird Life 12. Insect Life 17. Household Management 4 weeks 20. Practical Arts 24. Conservation of Health 25. First Aid 26. Farm Management	3.00—Organized Play and Recreation 8.00—10.00—Social Evening
Dairying Vegetable Gardening Beekeeping Food Conservation Foods Design and Practical Arts	10. Trees and Shrubs 11. Bird Life 12. Insect Life 15. Food Conservation 16. Foods 20. Practical Arts 24. Conservation of Health 25. First Aid 26. Farm Management	Regular Mid-Week Excur- sions
Dairying (Lab.) Vegetable Gardening Beekeeping Food Conservation Foods Design and Practical Arts	4. Dairying (Lab.) 10. Trees and Shrubs 11. Birds Life 12. Insect Life 17. Household Management 20. Practical Arts 24. Conservation of Health 25. First Aid 26. Farm Management	3.00—Organized Play and Recreation 7.30—Regular Evening Lecture
Dairying Vegetable Gardening Beekeeping Food Conservation Foods Design and Practical Arts	10. Trees and Shrubs 11. Bird Life 12. Insect Life 15. Food Conservation 16. Foods 24. Conservation of Health 25. First Aid 20. Practical Arts 26. Farm Management	Class Excursions 8.00—11.00—Social Evening



Organized Play and Recreation

23. Plays and Pageantry.

Miss Ida Hall

A course to meet the demand of teachers and social workers for simple methods of applying dramatic principles to school and neighborhood work. Opportunities to present short dramas will be offered to members of this class. Five exercises a week; first two weeks.

24. Conservation of Health.

Professor Marshall

Health consists in controlling the agents which give rise to disease. There are those which find their origin in the improper functioning of the body, those which may be regarded as external forces directed against the body's normal operations, and those which as living organisms incite disturbances by their presence and growth. Ten lectures will be given as follows:—(1) The normal and the abnormal body; (2) the elements of growth and energy; (3) normal functioning conditioned by physical and mental disturbances; (4) environmental dangers; (5) our water supply; (6) sewage disposal; (7) how microorganisms cause disease; (8) the use of vaccines and antiserums; (9) control of disease and the public attitude; (10) health—a private and public asset.

25. First Aid and Home Nursing.

Mrs. Pomeroy

This course covers briefly—causes and transmission of disease;

beds and bedmaking; general considerations of care of sick in their homes; general care of patient; use of simple appliances; local applications; the medicine closet; simple sick room diet. Five exercises a week; last two weeks.

26. Farm Management.

Professor Foord

A discussion of some of the problems that confront the modern farmer and the factors that influence his success; the choice of a farm and region, kind of farming, size of farm, rotation of crops, labor problems. Five lectures a week; first two weeks.

SEMINARS

In order that those who attend the Summer School may obtain some idea of present-day organized movements in agriculture Seminars have been arranged. These will be held between the hours of 3.00 and 5.00 on the days mentioned, and, weather permitting, will be held in the open air. The Seminars are open to the public as well as to Summer School students.

GENERAL PLAN OF THE SUMMER SCHOOL WORK

The formal instruction in the Summer School is given in definite courses herein described. From these each pupil may elect schedules of not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work is especially allowed by the supervisor. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises are frequently arranged. These are arranged by instructors in the different courses. Excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are planned for every Saturday. All excursions are in charge of an instructor.



1917 Summer School Group

Round table and special discussions are arranged by various instructors as their courses require.

The management of the Summer School provides several evening lectures. These lectures are usually given on Thursday evening by men of repute and deal with literary and social subjects. Their aim is to please and instruct. Everyone is cordially invited.

One or two social evenings are arranged for each week. These social evenings are under the direction of a committee of the faculty, working with the Summer School students. These events together with evening lectures, the regularly scheduled Wednesday and Saturday excursions, the afternoon field trips for study, make life at the Summer School extremely enjoyable as well as profitable.

COLLEGE EQUIPMENT

The Massachusetts Agricultural College is maintained by the Federal government and by the State of Massachusetts for teaching and investigation in agriculture in the broadest sense. 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; in addition, a good school garden, maintained cooperatively by the College and the Amherst schools, will be in operation. 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. All of this equipment (much more than can be described or even named) is placed at the service of the Summer Schools.

THE LIBRARY

The college library occupies the entire lower floor of the Chapel building and contains over 50,000 volumes in addition to a large number of pamphlets. The library ranks extremely well with the agricultural libraries of the country. Summer School students are able to find splendid material in every line of college work, especially in agriculture, horticulture, botany, entomology, and sociology. The reading room is provided with a variety of magazines, encyclopedias, and reference books, in addition to the newspapers and agricultural weeklies.

The library hours are from eight a. m. to twelve m. and from one to five p. m. every week day, and from nine a. m. to two p. m. on Sundays. The librarian and his assistants are constantly on hand, ready and willing to be of assistance to Summer School students.

ELECTION OF COURSES

Election of courses should be made at the time of registration. Every election is subject to the approval of the supervisor and of the instructor whose course is elected. As it is necessary to schedule several courses against each other, certain combinations of courses are made unavailable. It should be specially noticed that certain courses are offered to a limited number of pupils only, and as a rule pupils are accepted in these courses in the order of application. Each pupil should choose such combinations of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each one must take at least ten and not more than fifteen exercises a week, unless permitted to take more or less by special order of the supervisor. See Schedule of Courses and hours at which they come on pages 14 and 15.



Amherst Commons

GROUPING OF COURSES

- Group A**—GENERAL AGRICULTURE, ANIMAL HUSBANDRY, DAIRYING.
Nos. 1, 2, 3, 4, 14.
- Group B**—HORTICULTURE, GARDEN SUPERVISION AND CLUB WORK.
Nos. 5, 6, 7, 9, 10, 12, 13.
- Group C**—SCIENCES RELATED TO AGRICULTURE.
Nos. 11-14 inclusive.
- Group D**—HOME ECONOMICS, FOOD CONSERVATION AND PRACTICAL ARTS.
Nos. 15-20 inclusive.
- Group E**—ELEMENTARY AGRICULTURE.
No. 21.
- Group F**—RURAL HEALTH AND RECREATION.
Nos. 22-26 inclusive.

REGISTRATION, ATTENDANCE, ETC.

Those who expect to attend should register as early as possible. **Registration fee for the Summer School is \$5, payable at the time application is made.** Remittance should accompany application blank and should be made payable to the College Treasurer. A Summer School registration blank will be found in the back part of this bulletin. Registration fees will be refunded to those who find it impossible to attend the school.

Attendance is required in the courses elected. Some sort of examination, test or permanent note book will be required in each course. Those who complete at least three courses in a satisfactory manner, including practically perfect attendance, will be given a statement showing work accomplished at the close of the term.

There are no rules or regulations. This absence of rules has worked admirably in the past, and it gives everyone a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

Tuition is absolutely free, and there are no incidental charges. The College is supported by the State and the Federal governments, and receives no payments whatever from Summer School pupils except for room, board, and the registration fee.

ROOMS, BOARD, ETC.

Rooms will be provided in the College dormitories and in private homes adjoining the College grounds. In general, the dormitory



The College Pond

rooms are in suites of two bedrooms, opening into one study room; the bedrooms are furnished with single beds. These rooms are located in two dormitories known as North College and South College and are reserved for women students exclusively. The toilet and bathrooms are in the basements; water is not provided in the rooms. While the appointments in general are not those of a high-priced summer hotel, they are sanitary and comfortable, and have been found pleasant by men students for many years and by the women students of the Summer School during the summer. A uniform rate of \$1.25 a week for each person will be charged for these rooms, and each pupil will be expected to supply her own blankets, sheets, pillow cases, towels, etc. Convenient arrangements for laundry work may be made in Amherst.

All requests for dormitory rooms must be made to, and rooms will be assigned by, the College Treasurer. A deposit of \$2.00 is required in order to have a room in a dormitory reserved. This deposit is not refunded to those who find it impossible to attend.

The College will also supply a limited number of first-class United States army tents for those who wish them. Each tent will accommodate two persons. The tents will be placed in a pleasant and convenient location on the College campus, and every reasonable provision will be made for the comfort of the occupants. This form of domicile has been found very acceptable in other summer schools, chautauquas and camps. Those who care for real outdoor life at its best will find these arrangements genuinely enjoyable. The charge for these tents will be \$1.25 a week for each person.

Rooms outside the College vary considerably in their accommodations and somewhat in price, the charge ranging from \$2.00 to \$3.00 a week for each person. **A list of available rooms in the village will be furnished Summer School students at the time of registration. Every effort will be made by those in charge to see that everyone has comfortable accommodations.**

A few furnished houses are usually available in Amherst during July and August at reasonable rentals.

Meals are served in Draper Hall on the College grounds on the a la carte basis, ranging from \$4.00 to \$6.00 per week. The College also maintains a cafeteria on self-service plan. Good boarding places can also be secured outside of the College if desired.

ATHLETICS AND RECREATION

Athletics and sports of various kinds occupy a prominent place in the Summer School. Tennis tournaments for both men and women are held and baseball teams are organized. Contests with teams from nearby towns are held, subject to the approval of the proper committee. This year, under competent supervision, demonstrations of organized play, recreation, folk dancing, and so forth will be given. Late afternoon and early evening periods will be used for this purpose.

The region around Amherst is especially rich in attractive places

for tramping, excursions and picnics. The management of the Summer School usually arranges a suitable amount of this form of recreation.

(For Summer School application blank see last page of bulletin.)
(For Schedule see pages 14 and 15.)



THE CONFERENCE ON RURAL ORGANIZATION

JULY 30 TO AUG. 2, Inclusive

The Conference on Rural Organization which has been held for the past eight years as a closing feature of the Summer School will take place as usual under the auspices of the following organizations and others:

- The Massachusetts Agricultural College
- The Massachusetts Federation of Churches
- The Massachusetts State Board of Education
- The Massachusetts Civic League
- The Free Public Library Commission
- The State Board of Health
- The New England Home Economics Association
- The Massachusetts State Grange
- The Massachusetts Federation of Women's Clubs
- The Massachusetts Anti-Tuberculosis League
- The Massachusetts Society for the Prevention of Cruelty to Children
- The Massachusetts Branch, National Congress of Mothers and Parent-Teacher's Association

Sectional group conferences take up specific subjects each morning. The afternoons are given up entirely to special and general conferences on what seem to be the most important subjects in our rural life, demonstrations of organized play, recreation, etc. The evenings are given over to music and lectures by eminent students of rural sociology, economics and education.

Conservation will be the keynote of the Conference.

The first day will be devoted to actual achievements in Massachusetts towns; the second day to the conservation problem; the third day to our conservation forces and the fourth day to state, county and town conservation programs.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts, but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts at this time of special national stress.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. and Y. W. C. A. workers, town officers, boards of health, officers of village improvement societies, Parent-Teachers' associations, homemakers, school officers and all others interested in rural progress, are cordially invited to attend this Conference. The expenses for board and room are low.

A complete program will be published June 1st and can be had by making application to E. L. MORGAN, in Charge of Conference, M. A. C., Amherst, Mass.

THE POULTRY CONVENTION

JULY 25, 26 and 27

Preparation is now being made for our Sixth Annual Poultry Convention. It is being developed along such lines as to make it of greatest interest and value to all interested in poultry keeping. There will be three full days of lectures and demonstrations with special features in the evenings. Men and women who have specialized along various lines and have national reputations as successful poultry keepers will be on the program. The Convention will be a clearing house for the latest and best in poultry-keeping information. If you are interested in poultry you cannot afford to miss the Convention.

Special features will be as follows:

1. Lectures by specialists of national reputation.
2. Demonstrations of the best methods of preparing poultry and poultry products for market.
3. Demonstrations of poultry houses and equipment.
4. Educational exhibit showing methods of successful poultry keeping.
5. An opportunity to visit the College poultry plant as well as the new museums.

Separate complete Program will be ready June 1 and may be secured by writing

AUSTIN D. KILHAM, Acting Director of the Extension Service, or
J. C. GRAHAM, Professor of Poultry Husbandry.

M. A. C., Amherst, Mass.

ANNOUNCEMENT OF THE WINTER SCHOOL

The Massachusetts Agricultural College offers a ten weeks' course each year in practical agriculture in January, February, and March, to meet the needs of those who desire to study principles and modern methods of agriculture. Owing to the shortness of the time, the courses are necessarily extremely concentrated and practical. Instruction is given largely by the regular faculty of the college by means of lectures, recitations and laboratory exercises. The work of the class room is supplemented by demonstrations in the laboratory, dairy, orchards, greenhouse, and stables.

THE REGION SURROUNDING AMHERST

Amherst is one of the most delightful towns in New England, and has long been noted for the natural scenic beauties surrounding it, and as an educational center. It is located in the heart of the Connecticut valley. The Holyoke range, Mt. Tom, Mt. Holyoke, Mt. Toby, the Orient, the Connecticut River, Rattlesnake Gutter, Whately Glen, Old Deerfield and other places of great scenic beauty

and historic interest are within easy walking, trolley or driving distance. The Berkshire and Hampshire Hills country is easily accessible.

The climate is good and usually not excessively warm during July.

The surroundings of the Summer Schools, the organization and methods of work, are such as to make a stay of two to four weeks enjoyable in every way. It furnishes the pleasantest sort of outdoor life, with just enough of work and recreation, under the simplest possible organization. From the first, special attention has been given to the outdoor exercises and recreation features of the program, and these will be still further emphasized in 1918.

LOCATION OF AND DIRECTIONS FOR REACHING AMHERST

Amherst is ninety-eight miles west of Boston and twenty-five miles from Springfield. It can be reached from Boston over the Boston and Maine Railroad (Southern Division from North Station) or by the Boston and Albany Railroad from South Terminal Station via Palmer, thence to Amherst over the Central Vermont Railroad.

It may also be reached from Springfield or Greenfield by the Boston and Maine Railroad via Northampton, or by trolley from Springfield via Holyoke or Northampton.

From New York, take New York, New Haven and Hartford Railroad to Springfield, then to Amherst by train or trolley as already stated.

Persons coming from Albany, Buffalo and the West would best come to Springfield and then to Amherst as stated above.

For further information concerning the Summer School of Agriculture and Country Life, write

ANDREW S. THOMSON, in charge of Summer Schools,
Massachusetts Agricultural College, Amherst, Mass.

The Commonwealth of Massachusetts.

THE MASSACHUSETTS
AGRICULTURAL COLLEGE
AND THE WAR.

REPRINT FROM THE FIFTY-FIFTH ANNUAL REPORT OF THE COLLEGE, YEAR
ENDED NOVEMBER 30, 1917.



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32 DERNE STREET.
1918.

THE MASSACHUSETTS AGRICULTURAL COLLEGE AND THE WAR.

On Feb. 9, 1917, the Governor appointed 100 men as a Committee on Public Safety. In the personnel of the committee and in its original subcommittees no place was made for agriculture; evidently the military aspect of the war problem was uppermost in the minds of those responsible for the plan. I immediately corresponded with Mr. James J. Storrow, the chairman of the committee, with reference to the importance of recognizing food supply as a war emergency, with the result that he requested the Massachusetts Federation for Rural Progress to name a committee on food production and conservation. This action was taken on March 2, and the committee was at once made a subcommittee of the Committee on Public Safety, and on March 5 had organized with Mr. John D. Willard, who had been "loaned" by the Franklin County Farm Bureau, as executive secretary. The personnel of the committee was as follows:—

Kenyon L. Butterfield, <i>Chairman.</i>	Carlton D. Richardson.
Philip R. Allen.	Henry Sterling.
Reginald W. Bird.	Marcus L. Urann.
Nathaniel I. Bowditch.	Wilfrid Wheeler.
Joshua L. Brooks.	John D. Willard, <i>Secretary.</i>

The program of food production adopted by the committee outlined three sources of increased production, — the first and chief, on farms, largely with the staple crops; the second, in boys' and girls' gardens; and the third, through family gardens carried on by residents of cities and villages. Later an auxiliary committee on food conservation was organized, with Dean Arnold of Simmons College as chairman.

The First Steps.

The program that was adopted by this committee and the methods of work put into operation were largely those that had been formulated by Director Hurd, assisted by members of the staff with whom he had counseled individually and in conference.

The college at once placed itself practically at the disposal of the Commonwealth as represented in the Committee on Public Safety, stating that it wished to render every possible service in the emergency. Steps were immediately taken to mobilize the institution fully, as will appear as the report proceeds. Our attitude towards both State and national government is shown by the following vote of the faculty: —

Whereas, The land grant colleges of America, owing their origin to the stern realization of the absolute need and utter unpreparedness of the nation during the darkest period of the great strife, were established in order that the nation might ever be ready to meet victoriously any and every foe that might oppose her at any time during the long future; and

Whereas, To these colleges during all the years since the Morrill Land Grant Act the people of the United States and of the Commonwealth have given generously of their substance and wealth, and ever manifested unflinching loyalty and love to them; and

Whereas, The Massachusetts Agricultural College, as one of the members of this noble sisterhood of colleges, has been bountifully nurtured and blessed by the rare munificence of the government; be it therefore

Resolved, That we, the faculty of the Massachusetts Agricultural College, fully recognizing our peculiar obligations to our beloved country in this hour of her new danger and peril, do pledge anew to her and to her cause our outmost loyalty and devotion, and place at her service without reservation all the strength, influence and resources which God hath vouchsafed to us; and be it further

Resolved, That a copy of this resolution be forwarded to the President of the United States, and to the Governor of this Commonwealth, and that it be placed before the people as the true attitude of the faculty of the Massachusetts Agricultural College.

Campus Mobilization.

A committee on campus mobilization was organized March 5, with the following personnel: Professor Hurd, Dr. Brooks, Professor Sears and Professor Lockwood. This committee immediately started a census of students and alumni with refer-

ence to their fitness for, and willingness to perform, either military or agricultural service. The committee also canvassed the entire faculty, and made assignments to different lines of work in accordance with a definite schedule. The committee also acted as a clearing house for students and faculty in agricultural work, approving projects, starting work and assigning members of the staff to special pieces of work as occasion demanded.

The members of the extension staff, of course, carried on their regular work, but in a highly augmented fashion. Their service was performed very largely in co-operation with the county farm bureaus, which soon became the actual centers of operation through the State. Many of the teaching staff, as soon as they were relieved from their regular duties, took up assigned special war service in the field or on the campus. The research work of the experiment station naturally went on about as usual, inasmuch as all this work is concerned with problems of food production.

The Students in War Time.

Acting in accordance with expressions coming from President Wilson, Secretary of War Baker and others, as well as in accordance with our own convictions, every endeavor was made, after war was declared, to keep the teaching work going in normal fashion. It soon developed, however, that not only were the students very uneasy and inclined to neglect class work, but the demand for farm labor in the State was such that their help was greatly needed. As a consequence, the faculty passed a vote on April 20 providing that students who wished to leave before the end of the year to work on farms would receive credit for their work in college if they performed satisfactory farm labor for twelve weeks. Under this plan the large majority of the students left within two weeks, and by the 1st of May the college was practically closed.

Nearly all of the students going into agriculture found their own positions, although the committee on mobilization assisted in many cases. Nearly 400 men found employment in farming, gardening or in supervision of such enterprises as boys' and girls' clubs, community garden plots, etc. About 50 of

the men went into military service, so that all told nearly 500 students, or about 95 per cent., were performing war emergency service by the 1st of June, 85 per cent. being in agricultural service and 10 per cent. in military service. This is a remarkable record. Every effort was made to keep in touch with the students in the field. Many of them were visited personally during the summer by members of the staff. Reports came in from the students as well as from their employers. Dean Lewis devoted a large part of the summer to studying these reports, corresponding with both students and employers. Many men who had never before had farm experience soon adapted themselves to the work, and the testimony of employers was uniformly most complimentary to the men.

The year opened with a greatly reduced attendance. Out of 138 men registered in the class of 1918 last fall only 64 returned to college this autumn. In the class of 1919 the attendance is 113 this fall as against 174 registered in the fall of 1916; 117 men out of 170 in the class of 1920 returned this autumn. This year there are 118 freshmen as compared with a registration of 170 last year.

Students now in Military Service.

The number of students in military service December 1 is indicated in the following table: —

CLASS.	Com- missioned Officers.	Others.	Total.	Per Cent. of Class.	Overseas.
Sophomores,	-	16	16	10	6
Juniors,	3	28	31	15	4
Seniors,	21	45	66	40	11
	24	89	113	-	21

Graduate Students.

In 1916 the enrollment of graduate students was 57. The maximum registration in the fall of 1917 was 29, approximately one-third of whom have since left. This decrease of 60 per cent. in the enrollment of graduate students is undoubtedly due to the war.

The Alumni.

The alumni have responded to the call to military service in the same spirit as have the students. The following table of records will indicate our latest information on this point:—

CLASS.	Com- missioned Officers.	Others.	Total.	Overseas.
1917,	20	58	78	8
1916,	7	29	36	1
1915,	4	16	20	4
1914,	6	18	24	2
1913,	8	11	19	3
1912,	11	7	18	1

There are twenty-five men in military service from the class of 1881 up through the class of 1911.

The total number of staff, students, alumni, and former students in military service at the present time is 355.

Scores of alumni in different parts of the country are rendering public service in connection with voluntary agencies or with agencies already established. Perhaps the two most notable examples of the public service which M. A. C. men are rendering in this connection are those of Mr. Daniel Willard, president of the Baltimore & Ohio Railroad, who is a member of the National Council of Defense, and that of Dr. Joel E. Goldthwaite, who headed a commission of medical experts to France to study problems of disease and physical incapacity.

The College Staff and Military Service.

Soon after the draft went into effect the question arose as to what the policy of the college should be concerning occupational exemption for members of the staff. It seemed unfair to the country to press for exemption of members of the staff as a class; it seemed unfair to the college to make no claims for exemption. Therefore in those cases where it was clear that the man's services were necessary in order to maintain college work the district board was asked to make exemption.

But few of these cases arose. Therefore the college staff has been, of course, somewhat depleted, several of the younger men being drafted or volunteering for enlistment. Following is a list of those who have gone into military service:—

Windom A. Allen, Assistant Chemist, Experiment Station, in the draft camp at Ayer.

Wesley H. Bronson, Assistant Extension Professor of Farm Demonstration, United States Naval Reserves.

L. L. Derby, Assistant in Physical Education, Medical Corps.

Harold M. Gore, Assistant Professor of Physical Education, First Lieutenant, United States Reserves.

Burt A. Hazeltine, Instructor in Mathematics, teaching in radio school at Newport, R. I.

Roswell W. Henninger, Extension Instructor in Charge of Poultry Club Work, aviation school, San Antonio, Tex.

John B. Lentz, Assistant in Veterinary Science, Experiment Station, Captain, Medical Corps.

Bernard W. Shaper, Assistant to the Director of the Extension Service, Reserve Officers' Training Camp, Fort Leavenworth, Kans.

Robert S. Scull, Assistant Chemist, Experiment Station, chemical work, Washington, D. C.

F. A. Cushing Smith, Extension Assistant Professor of Landscape Gardening, aviation school, San Antonio, Tex.

John B. Smith, Assistant Chemist, Experiment Station, drafted, Camp Devens, Ayer, Mass.

Is Agriculture a War Service?

It has become almost a truism that agriculture should be regarded as a war service; but thus far it has not been possible to arrange for the definite assignment of men, either members of the staff or college students, to this form of war work. For example, the county agents indicated last summer that they would want at least forty students as agricultural supervisors the coming spring. It will be very difficult, indeed, to supply these men unless the new classification will simplify matters by listing men for specified war work other than strictly military service.

Helping Students to understand the War.

Ever since the severing of relations with Germany efforts have been made at chapel, through assembly speakers and in other ways, to present to the students the real meaning of the

war. It has been necessary to handle this matter with considerable caution for fear of overstimulating the men in their attitude toward enlistment. One of the most interesting single aspects of the interest of the students was shown by the remarkable response to the appeal for funds, made here as in all the other colleges of the United States, to assist the Young Men's Christian Association in its war work in the military camps in this country and in Europe. We have no way of knowing what the normal allotment for this college would have been, but we suppose perhaps \$1,500 to \$2,000. The students themselves, through appropriate committees, decided to try to raise \$5,000. As a matter of fact, the pledges amounted to over \$6,000 from students and faculty, the students alone pledging nearly \$4,500. Ninety per cent. of the students pledged something, and their average per capita was approximately \$10. The response from members of the staff was exceedingly good.

A Shortened Year.

The faculty voted to shorten the collegiate year 1917-18 in order that students might remain in farm work as late as possible in the fall, and might be available for farm work early in the spring of 1918. Each of the three terms was shortened from twelve to nine weeks. Commencement will come April 27-29. Every effort is being made to keep up the grade of work.

Athletics.

Probably no department of the college has been obliged on account of the war to depart more widely from its customary program than has the department of physical education. Handicapped by reductions in the staff as well as by the lack of men and the shortened college year, a method was nevertheless devised for keeping up interest in athletic work which has met with a success extremely gratifying both to the department and to the students. Details of this plan will be found upon a succeeding page.

Late Opening.

In order to permit men in agricultural service to complete the season's work, the opening of college was postponed from the middle of September until October 10. Although students in order to receive credit for the full work of the previous semester were obliged to work only twelve weeks on farms, I think a large proportion of them continued work throughout the summer. Some even were not able to return October 10, because of the necessity of completing agricultural enterprises in which they were engaged.

Special Service of Individuals.

It is difficult to praise too highly the spirit of the staff in their relations to war work activities. I think it is fair to say that the entire institution has been almost completely mobilized for war service. In some cases, of course, the regular work constituted the service. For example, the members of the experiment station staff have kept at work on their regular projects, all of which have to do more or less directly with food production. The members of the extension staff threw themselves into the field work with increased vigor, if that were possible, sparing nothing of time and energy to meet the situation. So long as college classes were maintained, the majority of the teaching staff gave their time to their regular work, but as soon as the college closed in the spring, nearly every teacher took up some special form of war work to which he had been assigned. Quite accurate reports in detail are now available relative to the service thus rendered. It is not necessary to go into details in this report, but I may say that over 50 members of the teaching staff gave more or less time to this service, the amount of time ranging from a number of days to two or three, and in some cases four, months of solid time. The technical men, of course, as in agriculture and horticulture, worked in the line of their specialties, quite largely in the field. The science men either did work in connection with protection of crops and animals, the preservation of food, special investigations in connection with munitions, or occasionally in the work of surveys. The men in

the Division of the Humanities engaged in a wide variety of work, some assisting in survey tabulation, others in supervision of garden work. I might specify some instances of types of service: assisting the field staff of the Hampshire County Farm Bureau; service in an information tent on Boston Common; helping in the developing of dairy records and in the poultry drive; community canning and preserving; garden supervision; emergency publicity and publications. A large number of the staff assisted in the surveys of farm labor, food production, consumption and distribution.

Professors Neal, Wheeler, Kilham and Hicks were practically "loaned" to the State Food Production Committee for the season. The last-named spent nearly four months organizing a very complete system of farm labor exchange in the State. His plan was so satisfactory that the United States Department of Agriculture practically took it as a model for their work in other parts of the country.

The emergency also increased very materially the correspondence in all departments of the institution; this was handled satisfactorily without addition to the clerical staff. It helped, however, to make the year an unusually busy one. The war work, of course, has taken a good deal of the president's time since the 1st of March, as chairman of the State Committee on Food Production, and later as a member of the Massachusetts Board of Food Administration, as well as in various other capacities.

A number of our staff have been "loaned" for practically full time. The United States Department of Agriculture asked for Professor Hurd's services. About the 1st of August Professor Hurd went to Washington and has been there ever since, giving up his plans for his sabbatical year, occupying a very important position as assistant in the office of the Secretary of Agriculture. Professor Machmer has been released from his duties as assistant professor of mathematics in order to take an important position in field work in distribution in the western district of Massachusetts. Prof. W. D. Clark has been "loaned" to the Massachusetts Fuel Administration to assist in carrying on the campaign for the use of wood for fuel. Miss Sayles of the Extension Service has been released for the year

for service with the home economics branch of the extension work of the United States Department of Agriculture.

Food Supply Studies.

The college, through its department of agricultural economics, and with the assistance of some eight or ten members of the general teaching staff of the institution, made elaborate surveys of food conditions in three or four counties.

A census of production in the five western counties, including nothing but *farm-grown* products, was conducted by the department of agricultural economics. The data collected covered acreages of farms, woodlots and improved land; number of live stock on hand in 1916 and 1917; acreage and quantity of various farm crops and vegetables produced in 1916 and proposed for 1917. A few facts stand out with special prominence, as revealed by the census, among which are the small number of farms and the small quantities grown on each farm. Although the census was taken in the four western counties before the crops of 1917 were sown, the reports indicate a probable increase in the acreage of several farm products. The census in Worcester County was taken after the crops were planted, and it is significant that this county shows the greatest increase in acreages. The four western counties show an increase of 46 per cent. in acreage of corn for grain, 46.9 per cent. for potatoes, 150 per cent. for beans and 42.4 per cent. for green vegetables. Worcester County shows the greatest increases, — 110.5 per cent. in corn for grain, 46.5 per cent. for potatoes, 300.6 per cent. for beans and 84.4 per cent. for green vegetables.

A census of food consumption was also conducted by the department of agricultural economics. The territory covered included Hampshire County and a part of Hampden County. The data, secured from wholesale and retail dealers, transportation companies, storages and large consumers, such as hotels, restaurants and boarding houses, took account of certain staple foods, and the figures asked for showed quantities shipped in, reshipped, stored, sold and bought from local producers. The returns have been tabulated by towns, and reveal a notable lack of trade in home-grown products; but 22.4 per cent. of

potatoes consumed are home grown, 7.8 per cent. of the beans, 33.2 per cent. of the eggs, 12.1 per cent. of the butter, 57.6 per cent. of the apples and 62.9 per cent. of the milk. Hampshire County produces 27.7 per cent. and Hampden County 18.8 per cent. of the grain needed by the live stock reported in these counties by the census of 1910. The three western counties, however, produce 6.4 per cent. more hay than necessary to feed the stock owned in the counties at that time.

In April, 1917, the milk situation in New England threatened to be very serious. Little usable information relative to cost of production was available. The committee on agriculture of the Boston Chamber of Commerce asked the agricultural colleges in the New England States to make surveys and report to them. Uniform blanks were used in order to make the returns comparable. The farm management demonstrator from M. A. C. supervised this work, not only in Massachusetts but in heading up the work of the other States. The blanks and all questions were passed on by our college dairy committee.

Two hundred and fifty farmers were selected by the farm management demonstrator in consultation with the county agents. Our college furnished seven men selected from the agronomy, animal husbandry, dairy and farm management departments. Their expenses were furnished by the Public Safety Committee. One man and his expenses were furnished by the Quaker Oats Company of Boston. These men visited the farmers and secured eighty-seven complete records.

The report of this New England work has been used not only in Boston but by milk committees in other cities. The information received in this survey was used and is being used, with changes in cost of variables, to determine the fair price of milk to the producer, thus avoiding a milk strike. Very favorable comments have been made on the results of the survey, both as to figures obtained and good accomplished by their use.

The poultry department co-operated with the county farm bureaus and the Public Safety Committee in a two weeks' "campaign" throughout the State of Massachusetts. The object of this work was, first, to collect accurate information about existing conditions among poultrymen; second, to attempt to

check the injudicious sale of hens and pullets, but to encourage intelligent culling of the unprofitable birds; third, to commend the hatching of chicks through the month of June, where conditions warranted late hatching.

Nine men were employed to execute this work. In so far as possible, one man was located in each county, and he was given an outline of the uniform advice and data which had been adopted at a previous staff meeting. Public gatherings, farm visits and the press offered the best means of presenting the poultry doctrine, and these methods were adopted in each county. Accurate data from various sized flocks were used to show poultrymen what they could expect under existing conditions. The work, as a whole, was well received. While it has not been possible to measure results in a definite way, reports from different sections of the State indicate that the effort was worth while.

Vacations.

All the men on the staff, because of the tremendous pressure under which they were working during the spring, were advised to take the full month's vacation. Practically all of the teaching staff, some of whom are entitled to the longer vacation period, surrendered their privilege and gave their energy unreservedly to assistance in some form of agricultural mobilization work.

Publications.

The college agreed to issue, in co-operation with the Committee on Public Safety, special publications bearing on many of the particular problems that farmers would have to meet in speeding up production. A list of about 35 special bulletins was prepared during the year. Director Hurd devised a plan of post-card bulletins printed on both sides, which gave in compact form the best advice that the college could offer on these subjects.

Use of College Land for Food Production.

The trustees decided that all available areas of the college estate should be used in growing more crops. The following table shows what was done as war emergency production besides the regular crops usually grown.

CROP.	Acreage.
Beans,	13
Potatoes,	8
Corn,	7
Oats,	4
Squash,	3
Total emergency acreage,	35

The County Farm Bureaus.

The "projects" of the Committee on Food Production and of the Food Administrator have guided the major efforts upon which the farm bureaus have been spending their energy this year. In March all other plans were laid aside and the work for the season redrafted on the basis of the needs of the State during war times. The county food committees were, in nearly every case, comprised of men and women who were appointed by the advisory board of the farm bureau. The county agents acted as secretaries of these county committees on food production. When the organization of town food committees was suggested, the farm bureau used its organization to assist in securing the emergency committees in 244 towns. The work of the town committees was explained, and the local people were assisted in securing fertilizers, seed potatoes and land on which special work might be done.

In order to arouse the people of the State to a realization of the needs of this project, the farm bureaus assisted in over 400 meetings during the months of April and May. In one county alone the county agent addressed over 8,000 people in four weeks, urging increased production of food crops. The demand for the services of the county agents was so great that in four months the employees of the farm bureaus increased one-third, and the office force doubled. This was made possible by the appropriation which was made to the various counties by the Committee on Public Safety from its State appropriation, the conclusion being reached that the farm bureaus, having already been organized to direct and use efficiently trained workers, could secure results more rapidly than could be secured by the development of a new system. The farmers

of the State, thoroughly aroused, increased their acreage of crops greatly, this increase being particularly noticeable in such crops as corn, beans and potatoes. The work with people other than farmers resulted in an extraordinary increase in home gardens.

The county farm bureaus more than justified themselves all over the country. Massachusetts was peculiarly fortunate in the fact that every agricultural county was fully or nearly organized for farm bureau work when war was declared. The food production and conservation campaign in the field was carried on through these county farm bureaus. On June 20 there were available for this work 20 men, 6 women and 10 clerks. On December 1 these employees numbered 30 men, 14 women and 20 clerks. Aside from these employees there were 14 men and 6 women who were employed for part time during the season.

Federal Aid.

In August Congress passed a law granting extra appropriations for food production and conservation work. Approximately \$70,000 was assigned to Massachusetts, and was apportioned as follows, the work being administered in every case through the college: \$54,500 was apportioned for food conservation from September 1 to June 30, and provided for a State leader for city work, 3 assistant county and city leaders, 9 county home demonstration agents, and also for assistant city organizers and supervisors in perhaps 30 cities, about 10 of these having now been provided. This is the regular educational work in home economics, food thrift, preserving and canning, etc., but carried out not only in all the counties of the State but also in the urban communities. Of course, in this field there are scores of agencies at work, and in all we are co-operating most fully with Mrs. Nathaniel Thayer, who is the official representative of the Federal Food Administration in Massachusetts, and with the State Executive Committee on Food Conservation.

Seven thousand dollars was set aside for junior extension club work for the same period, and permits the employment of an assistant State supervisor and ten county club leaders.

The sum of \$8,000 was set apart for county agent work in marketing. This fund permitted the assignment of Mr E. Farnham Damon as assistant county agent leader, with four district marketing specialists, in the Connecticut Valley, Worcester County, the area northeast of Boston and the area southeast of Boston. This work is educational in the subjects of marketing and distribution. Added to this sum was \$36,000 granted to the county farm bureaus by the Public Safety Committee.

War Work Problems.

War Work Economies. — In common with other institutions and with individuals, it behooves the college to practice the most rigid economy during this period of stress. But what is economy and how can it be actually achieved? The drop in student attendance by no means indicates the practicability of an equivalent cut in expenditures. As a matter of fact, the so-called "overhead" expenses can be reduced very little unless whole courses or departments are abolished for the time being. For example, in the matter of the heating of buildings it is practically impossible to reduce coal consumption unless entire buildings are completely closed. What is true of maintenance is in large measure true of instruction costs. It is possible that some radical changes may be necessary for another college year. If we knew more accurately what our attendance would be, it would be much easier to make these adjustments. To what extent, it may be asked, are we justified in dismissing members of the teaching staff? We are holding positions open for those who have gone into military service. Is it not wise, on the whole, to maintain the teaching corps, and if their regular work be reduced because of decreased attendance, make it possible for them to render some form of special war service?

Research. — The staff of the experiment station feel that it would be exceedingly difficult and unwise to give up projects that are under way in research, for the reason that they are all connected more or less intimately with the soil or with animal or crop production, and consequently have an intimate bearing on the whole question of food supply. It is important, moreover, if we can possibly get the funds, to take up some special lines of research bearing upon the food emergency.

This is notably true in connection with the canning and preserving of food. Very little scientific work has been done in this field. We are remarkably well equipped, both in material equipment and in men, for this work. Studies in the cost of production of milk have already been made, but more work needs to be done. Food surveys, both as to supply and demand, could be carried on to good advantage through our department of agricultural economics if the money were forthcoming.

Teaching. — We are putting forth every effort to maintain the standard of the institution and to keep intact the course of study. It is very difficult to do this, partly because so many of the students have gone, and because those who are left are more or less uneasy on account of the war situation. It is not an easy problem to keep up the standards, nor to decide what changes can be made in the number of the staff, salaries, courses of study, etc. We have no means of knowing how long the war will last. As soon as it is over we feel that the college must be prepared for a great influx of students. The interest in food production and supply will be greater than ever.

The Extension Service. — Of course, in one sense, the war service of the institution in the field has been entirely extension work. There has been an enormous increase in this work, and we could have used two or three times as many men as we have had at our disposal. In order to be of the largest service to the State we ought to have practically twice as many workers as we now have in the field.

The Staff. — The depletion in the staff raises an important problem, especially in connection with the younger men. It is almost impossible to get young men to take the places of those who have gone.

The Students. — It has already been indicated that the uncertainty of the situation makes it difficult not only to keep up the student body but to maintain the quality of work. The students, however, are very earnest and are doing their part as well as can be expected. The spirit of the student body is in every way magnificent. Fortunately, the reduction in the number of students does not deprive us of any large income, as it does in the privately supported colleges. On the other hand, it does not help us very much in reducing expenses, unless

we deliberately cut out courses and departments; in other words, unless we fail to keep the institution "in trim" for the work it must do when the war is over.

The Food Supply and the College.

The war has not only accentuated the problem of food as a phase of war preparation and service, but it has also called attention to the fact that the question of food supply has a certain unity, and must be considered more fully as a single problem, not only for communities and for nations but for the world as a whole. The producers cannot be unmindful of their obligations to consumers, nor the consumers forgetful of the needs and rights of producers. The duty to save food everywhere, from the field to the table, has new meaning. The need of economies in production and distribution, as well as in use, are understood more clearly than ever before.

All this gives a new significance to the work of the agricultural colleges. It is rather strange, I think, that their function has been regarded as that of dealing only with the production of food and other things that can be grown from the soil. But it is becoming more clear now that they must deal with all the interests of those who till the soil. The work of the college must follow these interests as far as they may go, and it is apparent that they go a long way beyond the matter of production.

But I am wondering if we may not carry this matter even a step farther. Congress has placed in the hands of the Department of Agriculture — and, through this Department, in the hands of the various agricultural colleges — the task of teaching home economics to the people, not alone in the country but also in the city. Why should this not be a permanent function of the college? In this emergency the members of the staff of our college have been called upon to testify as expert witnesses concerning the costs of the production and distribution of milk, — a purely economic and business problem, not primarily a question of technical production. Why should our people be interested in the distribution of milk more than in the distribution of fruit or vegetables or hay? In other words, does not the very logic of events at least, if not a

theory as to the work of the agricultural college, justify the statement that hereafter the college must concern itself with all the problems of food supply, and through its research, through field studies, and in its extension work, as well as in its courses of study, cover on the material side the entire problem of food supply? I should like to raise this question in a very definite way, because it has a most intimate bearing upon the work and activities of the institution, and in a State like Massachusetts, which is so thoroughly urban, a very important bearing upon the question of financial support. And this leads me to a few words concerning

Additional Funds for War Service.

I wish to urge the need of special funds for war service. This matter will come before you through the appropriate committees, but I think that we should have money from some source for special projects of an investigational character already referred to in this report, and that we should also take on, as soon as possible, a number of additional persons as members of the extension staff for service in the field. Now that attention to food has become recognized as a part of the war policy, is it not clear that the agricultural college, if it can serve the Commonwealth in times of peace, can serve her more greatly in this time of war? If agricultural education is worth anything, it is supremely worth while during the period of the war.

THE M. A. C. BULLETIN

AMHERST, MASS.

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NUMBER 5

AGRICULTURAL EDUCATION

The Training of Teachers for
A New and Attractive Field

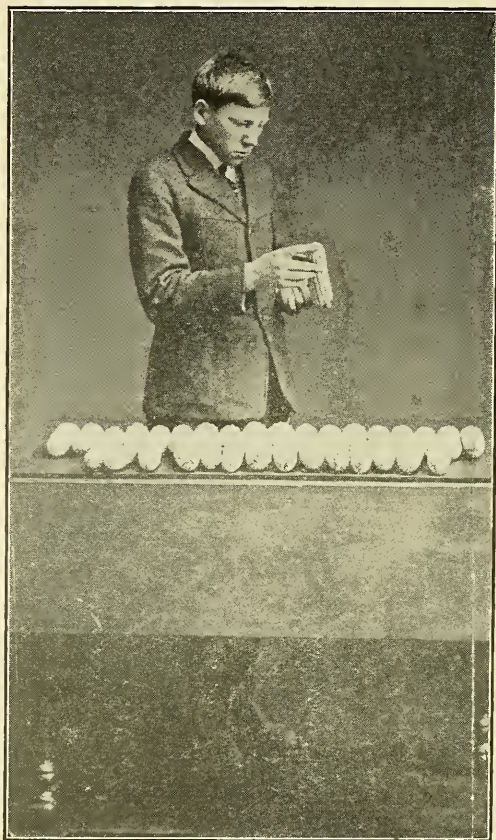


GET RECRUITS EARLY

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Massachusetts Agricultural College

Department of Agricultural Education



CURIOSITY THE MOTHER OF LEARNING

AGRICULTURAL EDUCATION

The Training of Teachers for
Secondary School Agriculture

W. R. HART

AMHERST, MAY, 1918

AGRICULTURAL EDUCATION

AT THE

Massachusetts Agricultural College

MEANING OF THE SUBJECT

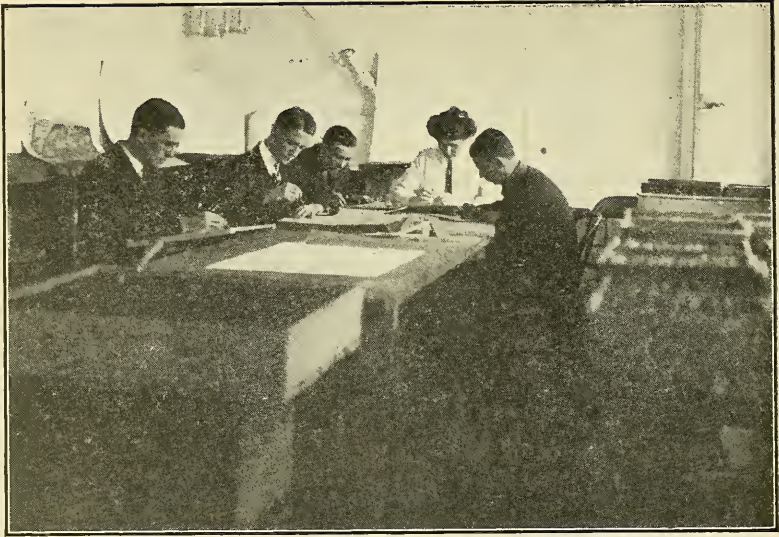
Agricultural education is used in two senses. It is a species of equipment acquired by an individual for the attainment of his life work as a citizen. It is also a division of educational theory and practice. When regarded as an equipment for one's livelihood it deals with instruction which looks toward agricultural pursuits, gives skill and knowledge necessary for the economic production of plants and animals, and articulates with such other forms of education as tend to promote a desirable type of rural life. As a division or branch of educational theory and practice it treats of the theory and practice of teaching agriculture in both its technical, scientific, and social aspects, as well as the preparation of teachers of agriculture. In the broad sense of endowing one with an equipment for successful rural life, agricultural education is a function of the entire Agricultural College. In so far as agricultural education relates to the theory and practice of agricultural teaching and the preparation of teachers, it is a function of the Department of Agricultural Education.

AGRICULTURAL TEACHING

The teaching of agriculture has taken on a number of forms. Its introduction into the elementary and high schools is one of the most prominent features in the development of modern education. Many strong men and women with an instinct for service have been drawn into this attractive field. Some become teachers in the schools and colleges. Others become teachers of adults thru the extension work of the colleges and farm bureaus. Still others with some genius for organization become directors of teachers. All of these lines of effort are remunerative for those properly equipped.

AIMS OF THE DEPARTMENT

Three well defined aims have actuated all the work of the Department. First, what education means for society; second, the



TRAINING IN THE PREPARATION OF LESSONS

function of agriculture in the education of an individual, and third, what it means to direct the activities of the mind in the process of learning. These aims furnish the basis for three classes of courses, namely, educational theory, mental attitudes in the process of learning, and methods of teaching accompanied by practice in the art of teaching.

COURSES OFFERED

The courses now offered cover the following aspects of the subject:

- a. Psychology as it is related to the genesis, growth and normal activity of the mind of the individual.
- b. The history and philosophy of educational theory as related to the progress of thought in the race, educational practice as influenced by agricultural industries.
- c. The theory and practice of teaching agriculture and agricultural science.

Any student may find in "a" and "b" valuable material supplementing the other work of his college course as a basis for a well rounded education.

The student looking toward some phase of education as a profession will find in "c" the essential principles which underlie and guide sound practice in the art of teaching, in organization, and in supervision.

Collateral work in the general field of sociology is a concomitant part of the teacher's professional equipment. This equipment is obtained in the Department of Rural Sociology.

DEMAND FOR TEACHERS

Calls for teachers began to be made within a year after the Department was established. These calls came from school authorities as well as from teachers' agencies. The number of calls has uniformly been from three to five times as large as the number of available candidates.

TRAINING APPRENTICES

There is a widespread dissatisfaction with the practice of sending persons into the field of education without adequate preparation. There is also grave distrust of a method of preparation which deals entirely with its theoretical to the exclusion of its practical aspects. It is generally recognized that teaching under guidance or supervision should accompany at least some portions of the theoretical study of teaching; and further, that such teaching should be done under usual school conditions. This method makes the preparation of the teacher resemble in some degree the training of an apprentice under the guidance of a master of the art. Such a procedure is amply justified by two outstanding considerations. The apprentice teacher discovers at first hand the nature of the problems of teaching freed from



TRAINING IN THE PRESENTATION OF A LESSON

the flavor of artificiality. He is also guided towards a solution of the problems by the assistance of his master or supervisor. This cooperation of master and apprentice has three worth while outcomes. It prevents wasteful experimentation. It saves time. It stimulates the apprentice to solve his teaching problems in the light of educational principles rather than by rule of thumb.



A STUDENT DIRECTING A CLASS EXERCISE

The principle underlying the suggestions in the foregoing paragraph is fundamental to all rational learning. The principle may be summed up briefly. The learner must approach the theme with his mind in an attitude of inquiry. The inquiry to be fruitful must come from within the learner. The inquiry must have direct reference to some experienced difficulty rather keenly felt. The difficulty to be settled furnishes the mind with its problem. In the case of the teacher, the problem is not of his own choosing. It is forced upon him by some practical situation. Its solution is not optional, but imperative. The teacher stands or falls as a result of his solution.

The problems which confront every beginner as well as the most experienced teacher arise from three fairly well defined sources. The problem may grow out of an inadequate knowledge of the matter to be taught. It may be due to a failure to understand the mental attitudes and capability of the person to be instructed. It may be inherent in the method of presentation itself. The right sort of guidance at this point by an experienced supervisor may prevent a failure on the part of the young teacher.

PHASES OF APPRENTICE TEACHING

There are three phases of apprentice teaching: first, instruction by someone in the college in the principles of teaching; second, selection and arrangement of subject matter by the apprentice teacher; third, supervision of the teaching processes by someone to whom the



A STUDENT DIRECTING A CLASS EXERCISE

apprentice is responsible in the school where the teaching is done. This plan involves a well-defined relationship between the Department of Agricultural Education and the authorities in charge of the cooperating school. It also involves close coordination of the subject-matter arranged by the apprentice and the course of instruction in the cooperating school. Its success depends upon a frank interchange of reports and constructive criticism.

The final step in training consists in presenting the subject to pupils under ordinary school conditions. This is the crucial test of ability.

The accompanying cuts are intended to show some features of the work described in the above paragraph. They represent actual occurrences in the process of training undergraduates. They typify the method of procedure in developing ability in the student to arrange and present what he knows. His success depends on two things, a clear knowledge of practical agriculture and a high degree of aptness in presenting what he knows.

VALUES TO THE INDIVIDUAL CHOOSING EDUCATION AS A LIFE WORK

These values may be thought of as personal, social and financial. For personal direction and growth of the individual, education affords opportunities unsurpassed by any other vocation. Stated briefly, these opportunities may lie in the field of teaching, where mind meets mind, and where the mature nurtures the immature. They may lie in the region of supervision, where organizing ability has unlimited scope for exercise, where the human touch is not so close, but where the exertion of influence in guiding the conduct of others has free play. Or, again, these opportunities for personal development may lie in the realm of philosophy, where the problems of society relating

to childhood give the widest scope to the highest powers of the mind. It involves not merely instructing the young in a few arbitrary symbols, but the place and function of infant life in civilization, the function of the family and the school in organized society, the part played by the great men of the race, the influences of religion, forms of government, industries, and wars, upon human progress.

From the standpoint of the social values of education as a life career, the opportunities are attractive in a high degree. The successful teacher, or successful educational administrator, becomes cosmopolitan in spirit. He must be broadly sympathetic. He lives in an ever widening field of endeavor. His spirit reaches into ever widening fields of interest. The interests of humanity become his by absorption. The problems of individuals as well as of communities become his problems.



APPRENTICES IN TRAINING FOR GARDEN SUPERVISION

Financially speaking, the career of education is coming to be recognized as worth while for a person with ambition to do his share of the world's work, even for the money there may be in it. The general public has come to recognize that money spent in education is an investment rather than a burden. There is a growing belief in the efficacy of experience in the management of education as a great community enterprise. Positions are being created and capable men are being drawn into them at salaries undreamed of a generation ago.

The larger colleges and universities are now paying ten and twelve thousand dollars a year for presidents, and five and six thousand dollars a year for some professors. Individual states are paying eight and ten thousand dollars a year for the administrative head of their school systems. Hundreds of schools and smaller colleges are

now paying five thousand a year, which a few years ago paid less than half that sum. However, the beginner must be content with a beginner's compensation at the start. But the capable and the ambitious need not remain beginners long. The ranks of the profession are flexible. Avenues of advancement are numerous. Opportunities for promotion are opening almost every day. The coming pressure of Federal aid to vocational education is destined to be felt in every part of the country. Its influence will bring about a type of education not fully comprehended in the United States. It will demand a new type of teacher as well as a new type of administrator. The outlook for a career in education was never more alluring.



APPRENTICES IN CHARGE OF GARDEN SUPERVISION

The following tables have been compiled from the Department records and the Alumni Bulletin of 1915.

TABLE I
Summary of "Calls for Teachers," 1909—1917, inclusive.

	POSITIONS.					Average Salary	Av. Sal. for Normal
	High Schools	Normal Schools	Colleges	Super-inten- ten- cy	Total Calls	for all.	and High Schools
1909	25	1	3	2	31	\$966.88	\$889.96
1910	22	1	3	6	32	893.57	883.52
1911	36	6	7	5	54	1,026.43	1,021.50
1912	34	9	4	10	57	1,293.57	1,247.92
1913	44	5	4	4	57	1,109.61	1,033.61
1914	17	1	7	7	32	1,458.91	1,184.17
1915	33	—	3	13	49	1,228.20	1,111.44
1916	23	2	2	7	34	997.70	1,002.90
1917	29	3	3	12	49	1,085.71	1,281.25.

TABLE II

Showing the number of M. A. C. men who have entered the various lines of educational work, from classes 1908 to 1916, inclusive.

College Administration,	2
College Teaching,	43
College Research,	34
United States Department of Agriculture,	22
Secondary School Agriculture,	36
Extension Teaching,	18
Miscellaneous Educational Positions,	76
Estimated for 1916, but not distributed,	20
	—251
Counted twice,	30
	—221

TABLE III

Miscellaneous educational work other than teaching agriculture, including M. A. C. men from all classes between 1871 and 1916, inclusive.

Non-Agricultural Teaching,	46
School Principals,	13
School Superintendents,	5
Graduate Students (1915),	35
U. S. Bureau of Education,	1
Preaching,	6
Newspaper Work,	12
Y. M. C. A. Work,	6
Estimated for 1916,	10
	—139
Counted twice,	17
	—122

TABLE IV

Showing the number of M. A. C. men teaching the various branches.

TECHNICAL					
Agriculture,	36	Engineering,	2	Market Gardening,	2
Agronomy,	5	Floriculture,	6	Military Science,	1
Animal Husb.	8	Forestry,	1	Pomology,	4
Architecture,	1	Horticulture,	7	Poultry,	2
Dairy,	2	Landscape,	7	Total,	84
SCIENTIFIC					
Bacteriology,	2	Geology,	1	Vet. Science,	2
Biology,	4	Mathematics,	2	Voice Culture,	7
Botany,	16	Phys. Education,	3	Zoology,	5
Chemistry,	14	Physics,	4	Total,	74
Entomology,	7	Science,	7		
NON-SCIENTIFIC					
Economics,	3	Law,	1		
English,	1	Manual Training,	4		
Nature Study,	1	Total,	10		

TABLE V

Geographical Locations of Teachers.

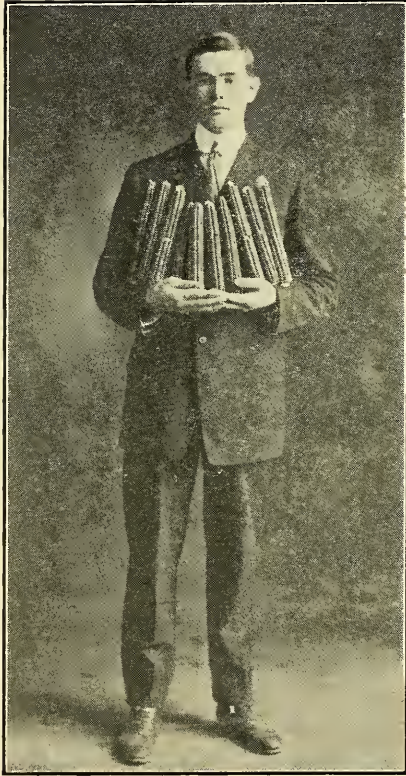
In Massachusetts,	82
Other States Represented by One or More,	36
Foreign Countries Represented,	7
States Represented by Eight or More Teachers :	
California 10, Illinois 8, New Hampshire 9, New York 8, Pennsylvania 9.	



APPRENTICE IN CHARGE OF CLASS IN AN AGRICULTURAL SCHOOL

TRAINING TEACHERS OF VOCATIONAL AGRICULTURE

The Massachusetts Agricultural College and the State Board of Education are arranging a cooperative agreement for the training of teachers of vocational agriculture. The supervision of this work will be in charge of an employee of the State Board, who will deal directly with some of the professional aspects of training in connection with the Department of Agricultural Education. The scientific and technical departments of the college will be availed of for training in the subject matter of agriculture. This cooperative arrangement grows out of the grants made by the Smith-Hughes Act of 1917, for the promotion of agricultural teaching, the training of teachers of agriculture, and for the supervision of such teaching. It is planned to have the scheme in operation during the coming year. Details as to the aims and scope of this work will be available in the near future.



TWO PRODUCTS : ONE FOR SUSTENANCE,
ONE FOR SERVICE

THE M. A. C. BULLETIN

AMHERST, MASS.

VOLUME X

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WAR SERVICE ROLL

OF THE

Massachusetts Agricultural College



OCTOBER, 1918

MASSACHUSETTS AGRICULTURAL COLLEGE

WAR SERVICE ROLL

The following list of Aggie men in service has been prepared from the most authentic information which has been placed at our disposal. Without question, there are omissions from and errors in this list. In order to make it complete and accurate we must rely upon the co-operation and assistance of the men in the service and members of their families.

This list covers inductions of which we have record up to September 1, 1918. Many more names will be added to this list as a result of the new draft regulations, and we are anxious to have these reported as soon as possible.

We wish to make the following specific requests :

1. That men in service notify us promptly of any change in address or rank, or that they arrange with members of their families to so inform us.

2. That men who may enter the service during the next few months may so inform us.

3. That we be informed of any omission or error that may be noted in this list.

Cards convenient for reporting information will be found next to the cover of this booklet.

A copy of this list is being sent to all men known to be in the service, to members of their families and to all other graduates.

In common with nearly all other American colleges, this institution will now become a military training center, giving preliminary training to officers.

RALPH J. WATTS, Secretary.

CHARLES R. GREEN, Librarian.

M. A. C. Graduates, Former Students, and Members of the Faculty Serving with the Armed Forces of the United States or Her Allies.

Class.	Total in Service,	Com. Officers.	Overseas.
1873	1	1	0
1876	1	1	0
1878	1	1	0
1885	2	2	1
1886	1	1	0
1890	1	1	0
1891	1	0	1
1892	5	0	1
1894	1	1	1
1895	4	1	3
1896	3	2	0
1897	4	4	4
1898	1	0	0
1899	1	0	0
1900	2	1	1
1901	1	0	0
1903	2	2	1
1905	2	2	1
1906	5	4	1
1907	4	2	1
1908	6	5	2
1909	6	2	3
1910	9	3	3
1911	13	3	7
1912	33	15	9
1913	35	16	14
1914	51	18	20
1915	55	10	19
1916	88	22	24
1917	121	33	47
1918	115	42	52
1919	72	12	32
1920	39	5	16
1921	6	0	0
Unclassified,	10	0	3
Graduate Students,	12	2	6
Faculty,	17	7	1
Totals,	731	221	274

INTRODUCTORY

We saw not clearly nor understood,
But, yielding ourselves to the master hand,
Each in his part as best he could,
We played it through as the author planned.

—*Alan Seeger.*

Over 700 men in the service of the country! Our hearts burn within us with joy and pride as we repeat the handsome figure, and we can not help whispering to ourselves again and again—"700 Aggie boys in the Service."

We know that this splendid number will be excelled by none in the quality of service [rendered, and we are confident, beyond question, that it will write a record as fine and big as anything to be found upon the fair pages of American college history—and the wonderful page of it that is today in the making.

You men are enlisted in the greatest cause that has engaged the energies of men at any time in the history of the race. From the beginning of time, the whole urge of this old world of ours has been from darkness to light, from tyranny to liberty, from autocracy to democracy, from barbarism and cruelty to kindness and brotherhood. This grand sweep toward the better day, for which men have always yearned and hoped, our enemy would not only block but reverse. The Hun aims—blindly, perhaps, but surely and inevitably—to re-establish some of the old world's outworn and impossible arrangements and institutions—old things and evils which through long suffering and a bitter agony of spirit it has long since and forever shuffled off. For the light as we see it, he would substitute his light; the old tyranny for our new liberty; cruelty and frightfulness (*Schrecklichkeit*) for the strong Christian virtues and graces. But America will not have it so; our allies will not have it so; you will not have it so; and the Power that makes for righteousness, the Infinite Power that holds the destinies of mankind in His hand, will not have it so. And it will not be so, thank God!

You American men and boys in plain khaki, then, are more than soldiers; you are veritably crusaders. You are not only to fight to make the world safe for democracy, but to fight to keep the Beatitudes, the Sermon on the Mount, all that we know by Christian ideas and ideals dominant as well as safe in the world. You men are fighting for His Kingdom and His Righteousness, if men anywhere at any time fought for it. When this terrific struggle is stripped of all its verbiage and confusion, history will not fail to write that it was a struggle of progress against reaction, of Right against Might, of the forces of good against the forces of evil.

Consciously or unconsciously, you are aware of this tremendous fact, everyone of you. Therefore you will "quit you like men and be strong." Therefore you will royally and completely share in the Great Victory. You will bring a new Glory to the fair name of "Old Aggie." It cannot be otherwise. Congratulations to each one of you, and God's blessing abide with you always.

EDWARD M. LEWIS, Dean.

That Liberty be not betrayed and sold,
And that her sons prove worthy of the breed ;
That Freedom's flag may shelter as of old,
Nor decorate the shrines of Gold and Greed,
We come; and on our consecrated sword
We ask Thy blessing, Lord.

—*Barry.*

Life is no life to him that dares not die;
And Death no death to him that dares not live.

—*Newbolt.*

We saw not clearly nor understood,
But, yielding ourselves to the master hand
Each in his part as best he could,
We played it through as the author planned.

—*Seeger.*

God rest you, happy gentleman
Who laid your good lives down
Who took the khaki and the gun
Instead of cap and gown.
God bring you to a fairer place
Than ever Oxford town.

—*Letts.*

This let us pray for, this implore
That all base dreams thrust out at door.
We may in loftier aims excel
And, like men waking from a spell,
Grow stronger, nobler than before,
When there is peace.

—*Dobson.*

MILITARY HONOR ROLL

OFFICERS OF THE INSTITUTION

- Windom A. Allen, Amherst, Mass., Military Hospital, West Haven, Conn.
Wesley H. Bronson, 160 Davis St., Wollaston, Mass., Ensign, U. S. N. R. F.
Harry D. Drain, Amherst, Mass., 11th Co., Depot Brigade, Camp Sherman, Ohio.
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Burt A. Hazeltine, 4 North Prospect St., Amherst, Mass., Ensign U. S. N. R. F.
A. G. Hecht, Amherst, Mass., 1st Lieut., Camp Taylor, Ky.
Egerton C. Hood, Amherst, Mass., Sanitary Corps, Yale Army Laboratory, New Haven, Conn.
John B. Lentz, Amherst, Mass., Captain, Medical Corps, Newport News, Va.
Frank P. Rand, Base Hospital 16, New Haven, Conn.
Robert S. Scull, Amherst, Mass., American University Experiment Station, Washington, D. C.
John B. Smith, Amherst, Mass., Sergeant, Food Division, Sanitary Corps, War Dept., Mills Bldg., Washington, D. C.
F. A. Cushing Smith, Amherst, Mass., Lieut. Aviation, Carlstrom Field, Arcadia, Florida.
Lloyd L. Stewart, Amherst, Mass., Co. C., 309th Field Signal Bat'n, Camp Sherman, Ohio.
Ralph A. Van Meter, Amherst, Mass., Co. C., 317th Field Signal Bat'n, A. E. F.
Frank A. Waugh, Amherst, Mass., Captain, Sanitary Corps, General Hospital No. 16, New Haven, Conn.

GRADUATE STUDENTS.

- Roy C. Avery, Sergeant, Bellevue Base Hospital No. 1, A. E. F.
Harry A. Cheplin, Base Hospital Laboratory, Camp Dix, N. J.
J. Stanley Cobb, 1st Co., Camp Devens Casuals, A. E. F.
Ernest L. Davies, Lieutenant in Canadian Army. Killed October, 1916.
Arthur Edward Etter, U. S. Naval Aviation Forces, Pasuillac, Gironde, France.
John Elmer Martin, Evacuation Hospital No. 8, Camp Greenleaf, Fort Oglethorpe, Ga.
Carl F. Oberhelman, Co. C., 29th Engineers, A. E. F.
W. C. Pauley, 1st Co., Infantry, 4th O. T. S., Camp Sherman, Chillicothe, Ohio.
Arthur W. Phillips, Ensign, Asst. Naval Inspector of Powder, East Coast, 206 Broadway, N. Y.
Arthur L. Prince, Base Hospital Detachment, Camp Devens, Mass.
James A. Purington, Co. F. 6th Battalion, 20th Engineers (Foresters) A. E. F.
W. Bradley Thompson, U. S. Naval Reserve Force, New York City.

UNCLASSIFIED STUDENTS

- Walter P. Austin, 79 Taylor St., Pittsfield, Mass., Base Hospital Corps.
 Ralph S. Bridgman, Westhampton, Mass., 19th Co. Depot Brigade, Camp Devens, Mass.
 E. R. Critchett, Amherst, Mass., 8th Co., 4th Regiment, Sec. 2. U. S. N. Training School, Charleston, N. C.
 Solomon Denowitz, 13th Service Co., Camp Vail, N. Y.
 Llewelyn L. Derby, Amherst, Mass., Sergeant, Supply Dept., Hospital Corps, Medical Dept., A. E. F.
 John Farrar Giles, 58 Thoreau St., Concord Mass. (Killed in action in France Apr. 20, 1918.)
 Howard E. Green, Westfield, Mass., 13th Cavalry, Brownsville, Texas.
 Ernest Hanson, Worcester, Mass., U. S. Naval Band, Deer Island, Mass.
 Henry G. Winter, Co. C. 301st M. R. S., Q. M. C., A. E. F.

CLASS OF 1873.

- George Westgate Mills, 60 Salem St., Medford, Mass., Lieut. Colonel, Mass. State Guard.

CLASS OF 1876.

- Joseph E. Root, Hartford, Conn., Regimental Surgeon, Conn. State Guard.

CLASS OF 1878.

- Josiah N. Hall, 1344 Elizabeth St., Denver, Colo., Major, Medical Reserve Corps, Base Hospital, Camp Logan, Houston, Tex.

CLASS OF 1885.

- George H. Barber, Rear Admiral, U. S. Naval Hospital, Fort Lyon, Colo.
 Joel E. Goldthwait, 372 Marlboro St., Boston, Mass., Lieutenant Colonel, Director of Military Orthopedics for the American Expeditionary Forces.

CLASS OF 1886.

- George S. Stone, [Otter River, Mass., Capt. Co. C., 18th Inf., Mass. State Guard,

CLASS OF 1890.

- Lee C. Stillings, 120 Broadway, New York City, Captain, U. S. A. Ft. Ethan Allen, Vt.

CLASS OF 1892.

- A. T. Beals, 4 W. 28th St., New York City. (Photographer)
 R. O. Davidson, Lake Geneva, Wis., Supt. of Military & Normal Academy.
 Henry B. Emerson, c/o Arlington Mills, Lawrence, Mass., Mass. State Guard.
 Richard P. Lyman, East Lansing, Mich., Veterinary Examiner for Officers Reserve Corps.

CLASS OF 1894.

- Charles H. Higgins, 179 Frank St. Ottawa, Can., Major, Canadian Army Vet. Corps.

CLASS OF 1895.

- Harry E. Clark, Middlebury, Conn., Sergt. Co. C., Conn. State Guard.
 Ralph W. Drury, War Dept., Washington, D. C., Lieut. Col. Inf., A. P. O.
 710, A. E. F.
 Daniel C. Potter, Fairhaven, Mass., Volunteer Observer on the coast.

CLASS OF 1896.

- Allen B. Cook, Middlebury, Conn, Captain, Conn. State Guard.
 W. L. Pentacost, Taconic, Conn., Sergt. Co. I., Conn. State Guard.
 Erford W. Poole, North Dartmouth, Mass., 1st. Lieut. and Adjutant, 17th
 Reg't, Mass. State Guard.

CLASS OF 1897.

- John R. Eddy, Oceanic Hotel, Wrightsville Beach, N. C., 1st. Lieut., 39th
 Inf., A. E. F.
 Allen M. Nowell, 3079 Diamond Head Road, Honolulu, Capt., Quarter-
 master Corps.
 Charles A. Ranlett, Box 3046, Boston, Mass., Major, 303rd Inf., A. E. F.
 Harold E. Stearns, 496 Chestnut St., Arlington, N. J., 1st. Lieut., Vet.
 Corps, A. P. O., 717, A. E. F.

CLASS OF 1898.

- Willard Q. Kinsman, 23 Fellows Rd., Ipswich, Mass., Sergt., U. S. Fed. Guard,
 Commonwealth Armory, Allston, Mass.

CLASS OF 1899.

- J. Alden Davis, 36 Groveland St., Springfield, Mass., Sergt., Co. M.;
 Mass. State Guard.

CLASS OF 1900.

- Arthur C. Monahan, Major, Surgeon General's Office, War Dept., Wash-
 ington, D. C.

CLASS OF 1901.

- Cyrus W. Jones, 69 Conduit St., Annapolis, Md., Instructor, U. S. Naval
 Academy.

CLASS OF 1903.

- Edward B. Snell, 24 High St., New Haven, Conn., 1st Lieut., Engineers.
 C. A. Tinker, Stafford Springs, Conn., Lieut., Naval Aviation, A. E. F.

CLASS OF 1905.

- Augustus R. Paul, Market St., Belvidere, N. J., Captain New Jersey Mili-
 tary Reserve.

CLASS OF 1906.

- Samuel C. Foster, 100 Chestnut St., Boston, Mass., 1st Lieut., Co. D., 41st
 Engineers, A. E. F.
 Benjamin Strain, Mt. Carmel, Conn., 2nd Lieut., 55th Engineers, Camp
 Custer, Mich.
 William O. Taft, Sterling, Mass., Captain, Mass. State Guard.

Willard C. Tannatt, Easthampton, Mass., Captain, Engineering Corps,
Camp Humphreys, Va.

CLASS OF 1907.

Wayland F. Chase.

Milford H. Clark, City Hall, Buffalo, N. Y., 1st Lieut., Ordnance, Aber-
deen, Md.

Fred C. Peters, Y. M. C. A., Ardmore, Pa., Lieut., 320th Field Artillery, A. E. F.

CLASS OF 1908.

Thomas A. Barry, 162 Lowell Ave., Newtonville, Mass., Capt. Field Artillery,
Fort Myers, Va.

William L. Howe, Fair View Farm, Marlboro, Mass., Co. L., 13th Reg't,
Mass. State Guard.

F. F. Hutchings, South Amherst, Mass., 2nd Lieut., General Engineer Depot,
A. E. F.

William F. Sawyer, Sterling, Mass., 2nd Lieut., Hdqs., 3rd Bat'n, 804th
Inf., Camp Dodge, Iowa.

Rowland H. Verbeck, 318 Acorn St., Malden, Mass., 1st Lieut., 281st Aero
Squad. A. E. F.

Raymond D. Whitmarsh, Wooster, Ohio., Capt. Troop B., 311th Cavalry,
Fort Riley, Kansas.

CLASS OF 1909.

T. W. Bean, Turners Falls, Mass., Co. C., 301st Engineers, A. E. F.

George F. Bent, 236 Eliot St., Milton, Mass., Corp., Co. E., 101st Engineers,
A. E. F.

Harold J. Neale, 12 Clearview Ave., Worcester, Mass., 1st Lieut., Mass State
Guard.

H. G. Noble, 108 Buckingham St., Springfield, Mass., Sergt. Major., 63rd
Service Aero Squadron, Gerstner Field, Lake Charles, La.

John W. Noyes, 466 Washington St., Chelsea, Mass., Corporal, Co. D., 101st
Engineers, A. E. F.

Jared B. Thomson, Monterey, Mass., 2nd Lieut., Co. B., M. G. S., M. G. T.
S., Camp Hancock, Ga.

CLASS OF 1910.

J. P. Blaney, Swampscott, Mass., Corp. U. S. Radio School, College Park,
Md.

Louis C. Brown, 613 Parker Ave., Toledo, Ohio., 1st Lieut., Engineers,
A. E. F.

Almon E. Call, 1684 Hague Ave., St. Paul, Minn., Capt., 313th Engineers,
Camp Dodge, Iowa.

Joseph C. Drohan, 43 East School St., South Hadley Falls, Mass., Co. B.,
104th Infantry, A. E. F.

Horace W. French, East Charlemont, Mass., 1st Lieut., Co. D., 303rd In-
fantry, A. E. F.

Frank T. Haynes, Sturbridge, Mass., Sergt., Mass. State Guard.

William C. Johnson, 10 Arlington St., Framingham, Mass., Sergt., Medical
Dept., General Hospital No. 5, Fort Ontario, Oswego, N. Y.

- Albert C. Kelley, Robbinston, Me., Chief Boatswain's Mate, U. S. N. R. F.,
Pelham Bay Park, N. Y.
Harold I. Moore, 154 Grove Ave., Leominster, Mass., Troop I, 310th Cavalry,
Ft. Ethan Allen, Vt.

CLASS OF 1911.

- Ralph H. Armstrong, 27 Fairfield Ave., Holyoke, Mass., Corp. Co. D, 104th
Infantry A. E. F.
Irving W. Davis, Danielson, Conn., 43rd Co., U. S. M. C., Paris Island, S. C.
Harold H. Howe, 38 Lyndale St., Springfield, Mass., Co. B, 25th Engineers,
A. E. F.
Edward A. Larabee, 37 Bowen Ave., Medford, Mass., 308th Infantry, Head-
quarters Co., A. E. F. A. P. O. 739B
Gustaf A. Neilson, Webster St., W. Newton, Mass., 2nd Lieut. Eberts Field,
Lonoke, Ark.
George P. Nickerson, Major, 343rd Field Artillery, Camp Mills, L. I.
Roland Patch, Wenham, Mass., 3rd Co. 302nd Ammunition Train, 77th
Div., A. E. F.
Herman A. Pauly, Lexington, Mass., Co. D., 30th Engineers, A. E. F.
P. A. Racicot, 842 Moody St., Lowell, Mass., 1st Lieut, E. R. C., Camp
Humphreys, Washington, D. C.
Raymond G. Smith, 97 Lafayette Park, Lynn, Mass., 4th O. T. S.
C. W. Stockwell, Athol, Mass., Corp., 639th Aero Supply Squadron, A. E. F.
Israel H. Taylor, Leverett, Mass., Battery A, 4th B'n, F. A. R. D., Camp
Jackson, S. C.
Alton P. Wood, Tech Chambers, Boston, Mass., 2nd Lieut., Co F., 167th Inf.,
A. E. F., Died from wounds in France May 4, 1918.

CLASS OF 1912.

- Horace M. Baker, Farm School, Pa., 1st Lieut. Medical Corps, Base Hos-
pital, Camp Lee, Petersburg, Va.
Roland T. Beers, Cromwell, Conn., Lieut. Co. A. 302nd Infantry, A. E. F.
William R. Bent, 139 Lincoln St., Marlboro, Mass., 1st Lieut., A. E. F.
Edward H. Bodfish, W. Barnstable, Mass., Co. K., 330th Infantry, Camp
Sherman, Ohio.
Daniel J. Curran, 299 Church St., Marlboro, Mass., 2nd Lieut., Infantry.
Winfred G. Deming, Wethersfield, Conn., Corp. Conn. State Guard.
Albert W. Dodge, Wenham, Mass., 1st Lieut., 302nd Infantry. A. E. F.
Warren F. Fisherdkick, Amherst, Mass., Corp. Co. F., 16th Eng'rs., A. E. F.
G. Scott Fowler, Shirley, Mass., Naval Proving Ground, Indian Head,
Md.
Lewis W. Gaskill, Hopedale, Mass., Corp. Co. C., 110th Field Signal B'n,
35th Div., A. E. F.
Louis E. Gelinas, 17 Holbrook St., No. Adams, Mass., Lieut., Supply Officer
30th Field Artillery, Camp Funston, Kansas.
P. S. Hamilton, St. Johnsbury, Vt., Inspector of Airplanes & Airplane
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David B. Heatly, Box 173, Oak Bluffs, Mass., Co. C., 23rd Engineers, A. E. F.
Frank B. Hills, Bernardston, Mass., 1st Lieut., Co. C., 1st Inf., Camp Lee, Va.

- Werner Hiltbold, 1 Clark St., Easthampton, Mass., 1st Lieut., M. R. C., Fort Benjamin Harrison, Ind.
- Robert W. Lamson, 2 Tyler Pl., Amherst, Mass., 1st Lieut. Base Hospital, Camp Sheridan, Montgomery, Ala.
- Charles A. Lodge, Alberta, Can., 2nd Lieut., A. S. S. R. C., 2nd Regt. Aviation, Camp Charlotte, N. C.
- George B. O'Flynn, 790 Pleasant St., Worcester, Mass., Aviation Corps.
- E. I. Oppel, 589 Monroe St., Little Falls, N. Y., 3rd Inf., Camp Eagle Pass, Texas.
- Charles C. Pearson, 260 Broadway, Arlington, Mass., Corp., Co. C., 101st M. G. B'n, A. E. F.
- William E. Philbrick, 1225 Hawthorn Ave., Minneapolis, Minn., Bat. 2, R. O. T. C., Fort Snelling, Minnesota.
- John E. Pierpont, Williamsburg, Mass., 2nd Heavy Mobile Ordnance Repair shop, Camp Hancock, Augusta, Ga.
- Marshall C. Pratt, Littleton, Mass., Co. A., 101st Military Police, 26th Division, A. E. F.
- Arthur N. Raymond, 41 Union St., Leominster, Mass., Trade test Section, Depot Brigade, Camp Devens, Mass.
- William Sanctuary, Amherst, Mass., 2nd Lieut. S. C., Little Silver, N. J.
- Lewis R. Sellew, 38 Worcester St., Natick, Mass., Co. E., 23rd Engineers, A. E. F.
- Ezra I. Shaw, Amherst, Mass., Marines.
- Isaac Springer, 15 Cotting St., Boston, Mass., 130th Aero Squadron, Carnegie Tech, Pittsburgh, Pa.
- Herbert J. Stack, Conway, Mass., 1st Lieut., Aviation Corps, Camp Dick, Dallas, Tex.
- George W. Tupper, 155 Armory St., Roxbury, Mass., 2nd Lieut. Inf., Depot Brigade, Camp Devens, Mass.
- Robert W. Wales, 130 Wales St., No. Abington, Mass., Sergt., 376th Aero Squadron, Field No. 2, Garden City, L. I.
- Silas Williams, 30 Cochran St., Chicopee Falls, Mass., 1st Lieut. Ordnance.

CLASS OF 1913.

- Harry W. Allen, Pelham, Mass., Dept. Lab., M. R. C., Yale Army Laboratory, New Haven, Ct.
- Herbert A. Brown, Geneva, Ohio., 1st Lieut., Co. D., 353rd Inf., A. E. F.
- Alvan H. Bullard, 10 Alexander St., Framingham, Mass., Camp Devens, Mass.
- Norman R. Clark, Millbury, Mass., Captain, Detention Camp, Camp Mills, Long Island, N. Y.
- Edward S. C. Daniel, Osterville, Mass., Corp. 101st Engineers, A. E. F.
- James W. Dayton, Georgetown, Conn., 2nd Lieut., R. M. A., Payne Field, West Point, Miss.
- Senekerim M. Dohanian, 42 Cedar St., Somerville, Mass., Aviation School, San Antonio, Tex.
- Gordon W. Ells, Haverhill, Mass., Captain, Philippine Constabulary, U. S. Army, P. I.
- W. C. Forbush, Rutland, Mass., Infantry.
- James D. French, 38 Pleasant St., Hyde Park, Mass., 1st Lieut, 304th French Mortar, A. E. F.

- H. E. Goodenough, Chicopee Falls, Mass., Lieut., 101st Inf., 51st Brig., 26th Div., A. E. F.
- Harold M. Gore, Amherst, Mass., 1st Lieut., Infantry, A. E. F.
- Louis F. Guild, 15 Barker St., Keene, N. H., 1st Sergt., 1st Army Hdqs. Regt., A. E. F.
- Willard H. Hasey, 34 Market St., Campello, Mass., 1st Lieut., Co. E., 26th Inf., A. E. F. Killed in Action.
- Herbert W. Headle, Bolton, Mass., Sergt., Co. E., 23rd Engineers, A. E. F.
- Marshall Headle, Bolton, Mass., 1st Lieut., Air Service, A. E. F.
- Roswell E. Hubbard, 8 Elm St., Hatfield, Mass., Lieut. Med. Dept., U. S. N. R. F., 2146 Penn Ave. N. W., Washington, D. C.
- Samuel P. Huntington, Grand Isle, Vt., U. S. S. Pueblo, c/o Postmaster, N. Y. City.
- Robert B. Hutchison, 18 Sewall St., Winter Hill, Mass., Bat. E., 107th F. A. 28th Div., A. E. F.
- Harold W. Hyland, 47 King Ave., Weymouth, Mass., 2nd Lieut., Inf., 33rd Div., A. E. F.
- S. Miller Jordan, 10 Mortimer Ave., Rutherford, N. J., 6th Co. Central Officers Training School. Camp Lee, Va.
- Nils P. Larsen, 7 Ogden Ave., West Englewood, N. J., 1st Lieut. 106th Infantry, Camp Wadsworth, Spartansburg, S. C.
- John W. T. Lesure, Whalam Rd., Fitchburg, Mass., 2nd Lieut. 60th Co., 5th Repl. Reg., Camp Gordon, Atlanta, Ga.
- Harold Lyon, 392 Broadway, Winter Hill, Mass., Meteorological Section, A. & M. College, College Station, Texas.
- John L. Mayer, 258 Gold St., So. Boston, Mass., Quartermaster, 2nd U. S. Naval Air Station, Bay Shore, L. I.
- H. H. Miller, Marathon, N. Y., Infantry.
- Ralph T. Neal, 7 Palmer St., Watertown Mass., 2nd Lieut. Inf., 2nd Div., A. E. F.
- Norman J. Nichols, 78 Waverly St., Everett, Mass., 4th O. T. C.
- Herman T. Roehrs, 165 E. 176th St., N. Y. City, 1st Lieut., Ordnance O. R. C.
- Harold W. Ryder, Wilbraham, Mass., Sergt., Co. F., 307th Ammunition Train, Camp Gordon, Atlanta, Ga.
- Charles M. Streeter, Brimfield, Mass., Battery B., 102nd Field Artillery, A. E. F.
- L. Bennett Turner, 48 Dartmouth St., Belmont, Mass., Infantry.
- Henry L. Wheeler, 3 Howard St., Salem, Mass., 40th Co., Depot Brigade, Camp Devens, Mass.
- Francis W. Whitney, Needham, Mass., 2nd Lieut. Inf., 33rd Div., A. E. F.

CLASS OF 1914.

- Carl M. Allen, 16 Fairfield Ave., Holyoke, Mass., Amer. Red Cross Military Hospital, No. 1, A. E. F.
- Leslie O. Anderson, 2 Willow St., Concord, Mass., Sergt. Med. Dept. Base Hospital Unit 117, A. E. F.
- Sidney S. Besser, Gilbertville, Mass., Battery B., 103rd Regt., F. A., A. E. F.
- C. H. Bokelund, 45 Perry Ave., Worcester, Mass., 58th Co., Marine Barracks, Paris Island, S. C.

- J. W. Bradley, Groton, Mass., Lieut. Aviation. Killed at Wilbur Wright Field, Dayton, O. July 4, 1918.
- R. S. Bragg, Braggville, Mass., Co. A., 23rd Engineers, A. E. F.
- Harold W. Brewer, 37 North Fulton Ave., Mount Vernon, N. Y., U. S. N. R. F., Pelham Bay Naval Training Station, Pelham Bay, N. Y.
- Harry D. Brown, 54 Hanks St., Lowell, Mass., 1st Lieut., 3rd Bat'n Hdqs., Inf., A. E. F.
- Robert H. Chapon, Killed in French Army, Dec. 1914.
- Edward W. Christie, North Adams, Mass., Lieut. A. E. F.
- Ernest S. Clark, Jr., Tolland, Mass., 2nd Lieut., 42nd Co., 11th Training Bat'n, Inf., Replacement Camp, Camp Lee, Va.
- D. A. Coleman, 111 French St., New Brunswick, N. J., Medical Corps, Yale Medical School, New Haven, Conn.
- Robert H. Demond, North Adams, Mass., Corp., Headquarters Co., Classification Camp, A. P. O. 727, A. E. F.
- Henry W. Earle, 39 Whiting St., Roxbury, Mass., 2nd Lieut., 6th Bat'n, Depot Brigade, Camp Devens, Mass.
- Almon M. Edgerton, Chagrin Falls, Ohio., O. T. S., F. A. Camp Taylor, Louisville, Ky.
- Edward C. Edwards, 72 Lothrop St., Beverly, Mass., 1st Lieut., Q. M. C., Camp Devens, Mass.
- Harold L. Eldridge, 51 Chambers St., New York City, Ensign, U. S. N. R.
- Stuart B. Foster, 53 Court St., Westfield, Mass., 1st Lieut., Sanitary Corps, 26th Div., A. E. F.
- Stanley B. Freeborn, 817 Indian Rock Ave., Berkeley, Calif., 1st Lieut., S. C., Med. Dept., U. S. Army.
- George Fuller, Deerfield, Mass., U. S. N. R. F., Armed Guard Barracks, City Park, Brooklyn, N. Y.
- William G. Griffin, 316 High St., Holyoke, Mass., 1st Lieut., Dental Sec., O. R. Corps.
- Harold Hadfield, North Adams, Mass., Naval Aviation Flying Corps, Receiving Ship, M. I. T., Cambridge, Mass.
- Ralph E. Handy, Cataumet, Mass., 3rd Co., 301st Supply Train, A. E. F.
- Willard A. Haskell, 306 Davis St., Greenfield, Mass., 4th Reg't., Pelham Bay Park, N. Y.
- Emory B. Hebard, Southbridge, Mass., 16th Co., Depot Brigade, Camp Dix, N. J.
- Frederick Heffron, Sherborn, Mass., Corp. Co. I, 302nd Inf., A. E. F.
- J. G. Hutchinson, 659 Massachusetts Ave., Arlington, Mass., Naval Reserve, Charlestown Navy Yard, Boston, Mass.
- L. H. Jacobs, Benvenue St., Wellesley, Mass., Chief Quartermaster, U. S. N. R. F., Curtiss A. & M. Co., Buffalo, N. Y.
- Rollin E. Johnson, Templeton, Mass., Corp., Co. A., 22nd Inf., Fort Jay, N. Y.
- Henry W. Levine, 138 Zeigler St., Roxbury, Mass., U. S. N. R. F., Roxbury, Mass.
- H. D. Lucas, 364 W. 54th St., New York City., Sergt., Gas Defence Service Sanitary Corps, Astoria, L. I.
- Owen A. McNiff, Harvard, Mass., Corp. 28th Service Co., Carnegie Inst., Pittsburgh, Pa.

- Joseph Major, 319 Monroe St., Carlstadt, N. J., Cadet, Aviation Section, S. C., A. E. F.
- Ralph R. Mellon, 1688 Middlesex St., Lowell, Mass., Lieut. Infantry.
- Harold J. Morse, Townsend, Mass., Ensign, Ass't Paymaster, U. S. N. R. F., Pay Officers School, Catholic University, Washington, D. C.
- Donald W. Munroe, 192 Central St., Springfield, Mass., Lieut. Headquarters Supply Co., 20th Reg't, Mass. State Guard.
- Tell W. Nicolet, Fall River, Mass., Captain, Engineering Div., Q. M. C., Cantonment Div., Washington, D. C.
- John Philip Palmer, Portsmouth, N. H., Ordnance Sergt., Ordnance Depot, Camp Sherman, Ohio.
- Peverell O. Peterson, Concord, Mass., 302nd Wagon Co., Camp Johnston, Jacksonville, Fla.
- Fred Y. Presley, 296 Ferry St., Malden, Mass., Base Hospital No. 6, A. E. F.
- Walter E. Rosebrooks, R. F. D. No. 2, Box 64, Millbury, Mass., Co. G, 306th Inf., A. E. F.
- Francis W. Small, North Truro, Mass., Permanent Detach., Overseas Casuals, Camp Merritt, N. J.
- Arthur E. Stevens, Box 585, Lawrence, Mass., Lieut. 13 Aero Squadron, A. S. S. C., A. E. F.
- A. Leigh Tower, Sheffield, Mass., 2nd Lieut. C. A. C., A. E. F.
- Arthur C. Tucker, Nyack-on-Hudson, N. Y., Corp. Co. L., 107th Inf., 27th Div., A. E. F.
- Arthur S. Tupper, 75 Atherton St., Jamaica Plain, Mass., Co. E., 15th Engineers, A. E. F.
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- C. W. Whippen, Lynn, Mass., Corp. Battery C., 302nd Field Artillery, A. E. F.
- Henry J. Wood, Mendon, Mass., 2nd Lieut. Infantry, 2nd Div., A. E. F.

CLASS OF 1915

- Seth W. Bannister, Westford, Mass., Aero Squadron, Wilbur Wright Field, Fairfield, Ohio.
- Edward R. Bartlett, Newburyport, Mass., Infantry, A. E. F.
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- Chester A. Bishop, Peterboro, N. H., Infantry, A. E. F.
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- J. W. Buttrick, 81 Essex St., Melrose, Mass., U. S. S. Wakefield.
- Donald H. Cande, Pittsfield, Mass., Bat. D., 102nd F. A., Div. 26, A. E. F.
- Alexander B. Chase, Jr., West Yarmouth, Mass., 5th Co., Supply Train, 76th Div. A. E. F.
- W. A. Cleveland, Baldwinsville, Mass., Cadet Pilot, S. M. A. Austin, Texas.

- L. R. Damon, Kingston, R. I., 2nd Lieut., F. A., O. R. C., A. P. O. 718., A. E. F.
George Donnell, Burlington, Mass.
- Daniel J. Fitzgerald, 20 Providence St., Worcester, Mass., 225 Aero Service Squadron, Hazelhurst Field, No. 1., Hempstead, L. I.
- William P. Fitzgerald, 3 Walcott St., Providence, R. I., 1st Lieut., 101st Inf., A. E. F.
- Alpha J. Flebut, Amherst, Mass., Lieut. Infantry, A. E. F.
- Richard Fuller, 30 Essex St., Salem, Mass., 4th O. T. S.
- Harold D. Grant, Methuen, Mass., Co. A., 301st Engineers, A. E. F.
- Raymond B. Griggs, 386 Grove St., Chicopee Falls, Mass., Lieut. Co. M., 101st Infantry, A. E. F.
- George M. Hall, Brookline, Mass., c/o Surgeon General, Base Hospital No. 1, A. E. F.
- Willis H. Haskell, Jr., 534 Delamore Pl., Brooklyn, N. Y., Co. G., 305th Inf., A. E. F.
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- James E. Harper, 1028 Whalley Ave., New Haven, Conn., 20th Co., Machine Gun School, Camp Hancock, Ga.
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- Roger H. Moore, 34 Appleton Ave., Beverly, Mass., Co. F., Med. Dept., Ft. Ethan Allen, Vt.
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- Paul W. Rhoades, Malden, Mass., Q. M. C. School.
 William R. Sears, Woburn, Mass., 2nd Lieut. Inf., 2nd Div., A. E. F.
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CLASS OF 1916.

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 Raymond Chamberlain, Rutherford, N. J., Co. A., 102nd M. G. B'n, A. E. F.
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- Albert S. Coleman, Milford, Mass., Sergt., 34th Ambulance Co., Camp Greenleaf, Fort Oglethorpe, Ga.
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- George M. Danforth, Foxcroft, Me., 2nd Lieut. F. A., A. E. F.
- Homer C. Darling, Mendon, Mass., Lieut. 33rd Div. Inf., A. E. F.
- Wm. C. Dickinson, North Amherst, Mass., Med. Det., Camp John Wise, San Antonio, Texas.
- Walter Dodge, Geneva, Ohio, Aviation.
- Raymond C. Eldridge, North Abington, Mass., Headquarters 76th Div. Inf., A. E. F.
- Ralph C. Estes, Box 99, Framingham, Mass., Sergt. Hdqs., Co., 119th Inf., 30th Div. A. E. F.
- Charles H. Fernald, 2nd., Amherst, Mass., Merchant Marine.
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- Charles D. Francis, 25 Holly St., Cranford, N. J., U. S. Army Ambulance Service, Section 596, A. E. F. (with Italian Army, Italy.)
- Benj. A. Gilmore, Acushnet, Mass., 2nd Lieut., 23rd Co., 2nd Inf., Rep. Reg., Camp Gordon, Atlanta, Ga.
- Burton N. Googins, Jersey City, N. J., Infantry.
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- Stanley W. Hall, 24 Central St., Saxonville, Mass., 2nd Lieut. 2nd Div., A. E. F.
- William L. Harris, Jr., Deerfield, Mass. Infantry.
- Thomas L. Harrocks, Westminster, Mass., Chief Chemist, Inspection Sec., U. S. A. Aetna Explosive Co., Emporium, Pa.
- Frank E. Haskell, Northborough, Mass., Capt., Co. B., 13th M. G. B'n, A. E. F.
- Charles E. Hathaway, Jr., Somerset, Mass., 1st Lieut., Co. B., 45th Inf., Camp Zachary Taylor, Ky.
- Justin S. Hemenway, Williamsburg, Mass., Capt., 37th Inf., Laredo, Tex.
- Arthur E. Hendry, Harold St., Milton, Mass., Sergt. Co. C., 307th Engrs., A. E. F.
- Ralph Hobart, North Amherst, Mass., Q. M. C., Camp Johnston, Jacksonville, Fla.
- Allan L. Hulsizer, Flemington, N. J., 2nd Lieut., A. S. S. C., 627th Aero Squadron, Military Corps, Camp Greene, N. C.
- Reginald S. Hunt, Bridgewater, Mass., 101st Inf., A. E. F.
- Charles A. Huntington, Jr., Poquonock, Conn., Lieut. 153rd Depot Brigade, Camp Dix, N. J.
- William W. Jenna, 70 Water St., Leominster, Mass., 1st Lieut. U. S. Inf., Aide-de-Camp to General Bartlett, American Legation, Athens, Greece, via State Dept., Washington, D. C.
- Frank C. Keegan, Turners Falls, Mass., Sergt., 17th Co., Depot Brig., Camp Devens, Mass.

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David Potter, 9 Church Green, Concord, Mass., 2nd Lt., Development B'n., Camp Devens, Mass.
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Everett S. Richards, Hatfield, Mass., Lieut. U. S. A. Constabulary Service, Manila, P. I.
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- Perez Simmons, 34 Boylston St., Pittsfield, Mass., Corp. 11th Co., 20th Engineers., A. E. F.
- Frederick C. Stearns, 36 Harris St., Waltham, Mass., Sergt., Supply Co., 5th Pioneer Inf., Camp Wadsworth, Spartansburg, S. C.
- Richard Stoughton, Montague, Mass., 14th Co., Depot Brigade, Camp Devens, Mass.
- Richard C. Taft, Oxford, Mass., Block H., Bldg. 23, Camp Johnston, Jacksonville, Fla.
- H. H. Tarbell, Warren, Mass., 28th Co., Depot Brigade, Camp Devens, Mass.
- Alfred Topham, 182 Bailey St., Lawrence, Mass., 4th Co., 1st Inf. A. E. F.
- Howard G. Verbeck, 31 Acorn St., Malden, Mass., 1st Lieut. Army Balloon School, R. C. A. S., Supply Officer, Arcadia, Cal.
- Herbert H. Walkden, Chelmsford, Mass., Supply Sergt. Co. F., 301st Ammunition Train, A. E. F.
- H. M. Walker, 26 Winchester St., Brookline, Mass., Sergt. 22nd Co., 6th B'n, 2nd Provisional Inf., Replacement Regt., Camp Gordon, Ga.
- Everett Wentworth, East Dover, Vt., Corp. Co. H., 103rd Inf., 26th Div., A. E. F.
- Robert K. Wheeler, Great Barrington, Mass., Sergt. 10th Co., 3rd M. G. Regt., Camp Greene, Charlotte, N. C.
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CLASS OF 1917.

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- Hazelton S. Avery, Box 175, San Juan, P. R., Headquarters Co., 9th M.G. B'n, A. E. F.
- P. R. Babcock, 11 Mansfield Pl., Lynn, Mass., Aviation Sec., Signal Corps, A. E. F.
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- Alfred Booth, 149 Highland Ave., Middletown, N. Y., U. S. Naval Operating Base Hosp., No. 10, Aviation Regt., Hampton Rds., Va.
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- David H. Buttrick, 15 Swan St., Arlington, Mass., Lieut. Q. M. C., Coca Cola Bldg., Baltimore, Md.

- Carlisle E. Choate, 41 Pleasant St., Framingham, Mass., Sergt. Co. B, 311th Tank Center, A. P. O. 714, A. E. F.
- Charles H. Clough, Dedham, Mass. (Died of disease in England).
- Walter I. Cross, Hingham Center, Mass., Co. C., 61st Inf., Camp Greene, Charlotte, N. C.
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- Edmund Kelsey, Amherst, Mass., Depot Brigade, Camp Devens, Mass.
- Clifford S. Lancey, Townsend, Mass., Medical Enlisted Reserve Corps.
- Frederic C. Larson, Everett, Mass., Ordnance Corps, San Antonio Tex.
- Paul W. Latham, Norwichtown, Conn., Aviation.
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- James A. Leigh, 17 King St., Worcester, Mass., Clerk, Reg. Hdq., 104th Inf., 52nd Brigade, 26th Div., A. E. F.
- Brooks Light, Milton, Mass., Naval Reserve, Bumbkin Island, Boston, Mass.
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- Dana O. Merrill, Pepperell, Mass., 12th Military Police, Camp Devens, Mass.
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- Roger Priest, Littleton, Mass., 317th S. B., A. E. F.
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- Paul W. Rhodes, 99 Walnut St., Malden, Mass., 101st Engrs., 26th Div., A. E. F.
- L. E. Richardson, Rockville, Mass., Corporal, Co. F., 302nd Inf., A. E. F.
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- Paul R. Squires, Belchertown, Mass., 1st Lieut., S. O. Barracks, Post Field, Fort Sill, Okla.
- Carleton M. Stearns, 143 Rowe St., Melrose, Mass., No. 116 Base Hospital, Med. Dpt., A. E. F.
- Albert R. Stiles, 161 Westminster Ave., Arlington Heights, Mass., Corp., 21st Co. Depot Brigade, Camp Devens, Mass.
- Harold Stowell, Amherst, Mass., Seaman, Barracks 4-F, Pelham Bay Park, N. Y.
- Warner B. Sturtevant, 1063 Worthington St., Springfield, Mass., Lieut. Ord. R. C. Room 4-324 6th & B St., Washington, D. C.
- F. W. Swett, Randolph, Vt., Lieut. Infantry.
- Herbert W. Terrill, 36 Mott St., Ansonia, Ct., Co. D., 113th Inf.
- William W. Thayer, 7 Farview Terrace, Somerville, Mass., 2nd Lieut., U. S. N. A., (Died of disease April 19, 1918.)

- Arthur C. Tucker, Mamaroneck, N. Y., Infantry.
 Lee H. Tucker, Ware, Mass., Lieut. 74th Inf. Camp Devens, Mass.
 Willis Turner, North Reading, Mass., Seaman, U. S. S. Governor Cobb,
 East Boston, Mass., c/o Merchant Marine.
 Samuel F. Tuthill, Atkinson, N. H., Lieut., 74th Inf., Camp Devens, Mass.
 Everett L. Upson, 267 Shuttle Meadow Ave., New Britain, Ct., 1st Lieut.,
 62nd Inf., Camp Fremont, Palo Alto, Cal.
 Henry B. Walbridge, Bennington, Vt., Corp. Battery C., 302 F. A., A. E. F.
 J. J. Warren, North Brookfield, Mass., Co. C, 317th Field Sig. B'n, A. E. F.
 Frank C. Webster, Harvard, Mass., 1st Serg., Co. F., 301st Ammunition
 Train, A. E. F.
 Robert C. Westman, 25 Cotton St., Roslindale, Mass., Lieut. 33rd Div.,
 Inf., A. E. F.
 Chester W. Wheeler, Southboro, Mass., Railway Machinist, Co. F., 14th
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 Joseph F. Whitney, Westminster, Mass., 126th Co., 9th Regt., M. C.,
 c/o Postmaster, New York City.
 Charles R. Wilber, Walpole, Mass., Lieut. 32nd Div. Inf., A. E. F.
 Arthur F. Williams, Sunderland, Mass., Capt. Co. M., 30th Inf., A. E. F.
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CLASS OF 1918.

- Leland C. Allen, 16 Fairfield Ave., Holyoke, Mass., Sergt., Base Hospital,
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 Fort Ethan Allen, Vt.
 George W. Barton, North Sudbury, Mass., O. T. S., Camp Grant, Ill.
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 Stuart, Newport News, Va.
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 Franklin H. Canlett, Bedford, Mass., Field Artillery, O. T. S., Camp Tay-
 lor, Ky.
 Howard B. Capen, Canton, Mass., 302nd Inf., A. E. F.
 Fred A. Carlson, Pittsfield, Mass., M. E. R. C., Harvard Univ., Cambridge,
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 Thomas E. Carter, West Andover, Mass., Lieut. 308th Inf., A. E. F.
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- Elwyn P. Cotton, Woburn, Mass., U. S. Naval Hospital, Newport, R. I.
- Albert N. Davis, Somers, Conn., Cadet, Camp Dick, Dallas, Tex.
- Dwight S. Davis, Woburn, Mass., Naval Aviation Detach., M. I. T., Receiving Ship, Cambridge, Mass.
- William L. Dowd, North Amherst, Mass., U. S. Naval Tr. Station, Charleston, S. C.
- Norman C. Durfee, 727 Madison St., Fall River, Mass., 104th Inf., A. E. F.
- David O. N. Edes, Bolton, Mass., Lieut, 33rd Div. Inf., A. E. F.
- Ralph C. Ellis, 1245 Commonwealth Ave., W. Newton, Mass., Hdqs. Co. 8th Regt. U. S. M. C. c/o Postmaster, New York City.
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- George E. Erickson, 49 Carl Ave., Campello, Mass., 4th O. T. S.
- Leo J. Faneuf, West Warren, Mass., Flying Cadet, Love Field, Dallas, Texas.
- Delwin B. Farrar, Amherst, Mass., 2nd Lieut. Aviation, Pilots Barracks, Fort Sill, Okla.
- Harold C. Fellows, 309 Lowell St., Peabody, Mass., Div. Sanitary Squad, No. 2, 82nd Div., A. E. F.
- William A. Foley, Palmer, Mass., 2nd Lieut. Inf., Camp Lee, Va.
- H. K. Foster, New Rochelle, N. Y., Capt., U. S. Inf., B'n. Adj., 26th Inf., A. E. F.
- Roy W. Foster, 7 Nichols St., Lynn, Mass., Sergt. Med. Detach., 601st Engrs. Glenborne, Md.
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- Arthur L. Frellick, 47 Morris St., Everett, Mass., Corp. Co. B, 101st Amm. Train, A. E. F.
- C. B. Fuller, 80 Hall Pl., West Quincy, Mass., 102nd Aero Squad., A. E. F.
- Thomas J. Gasser, Uxbridge, Mass., Lieut., Hdqs. 3rd Section Casual Detach., 155 Depot Brigade, Camp Lee, Va.
- Flavel M. Gifford, W. Tisbury, Mass., Q. M. C., A. P. O. 717, A. E. F.
- Nathan W. Gillette, 113 Fernwood Ave., Revere, Mass., 2nd Lieut. Battery B., 16th Field Artillery, A. E. F.
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- William I. Goodwin, 95 Colby St., Bradford, Mass., Lieut. 32nd Div. Inf., A. E. F.
- Frederick G. Gordon, Summer St., Plymouth, Mass., Supply Co., 101st Inf., A. E. F.
- Milton B. Gray, Woods Hole, Mass., Boatswain's Mate, U. S. S. C. 92, U. S. Naval Force, c/o Postmaster, N. Y. City.
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N. J.
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- Ralph W. Harwood, Barre, Mass., 2nd Lieut., Co. K, 102nd Inf., 51st Brig.,
26th Div., A. E. F.
- Robert D. Hawley, 42 Chase Ave., Springfield, Mass., 2nd Lieut., Inf.,
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- Paul J. Heffron, Sherborn, Mass., Co. F., 302nd Inf. Camp Devens, Mass.
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- Edmund Hill, 25 Ridge Rd., Rutherford, N. J., 78th Div. Hdqs., Intelligence
Section, A. E. F.
- Robert P. Holmes, Box 144, Wakefield, Mass., 2nd Lieut., Co. G., 103rd
Inf., 26th Div., A. E. F.
- Arthur M. Howard, 47 Howard St., Pittsfield, Mass., Co. C., 301st Ammu.
Train, A. E. F.
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Reed, c/o Sect. Base No. 1, New Haven, Conn.
- George C. Howe, 34 Hudson St., Worcester, Mass., 2nd Lieut., Co. L., 328th
Inf., A. E. F.
- Paul F. Hunnewell, Winthrop, Mass., Lieut. 33rd Div. Inf., A. E. F.
- D. H. Huntoon, 23 Everett Ave., Norwood, Mass., Sergt., Co. B., 302nd
B'n., T. C., Camp Colt, Gettysburg, Pa.
- Ralph W. Hurlburt, Ashley Falls, Mass., 16th Co., C. A. C., Fort Revere,
Hull, Mass.
- Charles H. Jackson, Lexington, Mass., Sergt. Co. E, 101st Engrs., A. E. F.
- B. L. Johnson, 44th Co., Depot Brigade, Camp Dodge, Iowa.
- Forrest D. Jones, 15 Ferdinand St., Worcester, Mass. (Killed at Houston,
Tex., April 16, 1918.)
- Leon D. Jones, 15 Ferdinand St., Worcester, Mass., Corp., Co. C., 104th
Inf., A. E. F.
- Carl F. Kennedy, 70 High St., Milford, Mass., 2nd Lieut. Aviation, Brooks
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- Marshall O. Lamphear, Windsor, Conn., 2nd Lieut. Inf.
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F. A., 4th Div., A. E. F.
- John B. Minor, Jr., Plainville, Conn., 2nd Lieut., Co. H., 61st Inf., A. E. F.
- Edward N. Mitchell, W. Medford, Mass., 1st Lieut., Hdqs. Co. 9th Inf.
A. E. F.
- Theo. B. Mitchell, 61 Grant St., Needham, Mass., Corp. Hdqs. Co. Band,
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 Lieut. Inf.
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 Inf., 77th Div. A. E. F.
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 A. P. O. 721, A. E. F.,
 Arthur J. Seavey, New Braintree, Mass., Pharmacists' Mate, U. S. S.
 Comfort, c/o Postmaster, New York City.
 M. H. Seavey, Westford, Mass., Co. E., 301st Amm. Train, A. E. F.
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 Medical Corps, 110 Wall St., New Haven, Conn.
 Sidney S. Smith, 485 Poplar St., Roslindale, Mass., A. E. F.
 Lewis W. Spaulding, 44 Federal St., Boston, Mass., 2nd Lieut. 18th Inf.,
 A. E. F.
 Frank C. Stackpole, 37 Oliver St., Somerville, Mass., 2nd Lieut., Reserve
 Military Aviator, Gerstner Field, Lake Charles, La.
 Raymond T. Stowe, Scitico, Conn., Corp., Co. A., 303rd M. G. Bn., A. E. F.
 Hubbard Swift, West Falmouth, Mass., Sergt. Co. H., 302nd Inf., A. E. F.
 Raymond W. Swift, North Amherst, Mass., Musician, Hdqs. Co., 104th
 Inf., A. E. F.

- Wells N. Thompson, 8 East St., Adams, Mass., 2nd Lieut., Inf. 56th Co., 5th Repl. Regt., Inf., Camp Gordon, Ga.
- Richard W. Thorpe, 280 High St., West Medford, Mass., Harvard Radio School, Cambridge, Mass.
- Roger W. Weeks, 48 Summer St., Hyde Park, Mass., Capt. 73rd Inf. Camp Devens, Mass.
- Laurence W. Wilbur, So. Middleboro, Mass., Yeoman, Naval Training Station, Pelham Bay, N. Y.
- Raymond B. Willoughby, R. F. D. No. 2, Box 71, New Britain, Conn., 2nd Lieut., 20th Co., 5th Repl. Bn., Camp Gordon, Ga.
- Brooks Woodworth, 19 Hawthorn St., Lowell, Mass., 2nd Lieut. Co. A, 10th B'n, Camp Lee, Va.
- Harlan N. Worthley, Greenwood, Mass., 1st Lieut., Co. G., 166th Inf., A. E. F.

CLASS OF 1919.

- Dean W. Alden, Proctor, Vt., Apprentice Seaman, U. S. S. Geo. Washington, c/o Postmaster, New York City.
- George Anderson.
- Samuel C. Bartlett, Colrain, Mass., Battery C., 103rd F. A., A. E. F.
- Stewart P. Batchelder, North Reading, Mass., Marine Corps, Paris Island, S. C.
- Herbert H. Baxter, 184 Foster St., Brighton, Mass., 2nd Lieut., 27th Co., 156th Depot Brigade, Camp Jackson, S. C.
- Herbert O. Beadle, Lima, N. Y., Sergt., Hdqrs. Co. 307th F. A., 78th Div. A. E. F.
- George S. Bigelow, 917 Columbia Ave., Millville, N. J., San. Dept., 104th Engrs., Camp McClellan, Anniston, Ala.
- George K. Blanchard, 308 Linwood St., Arlington, Mass., Lieut.
- Kells S. Boland, 609 Broadway, So. Boston, Mass., Hdqrs. Co. Band, 101st Engineers, A. E. F.
- Raymond W. Boynton, Framingham, Mass., Lieut. 33rd Div. Inf., A. E. F.
- Lee W. Burton, Plainville, Mass., 6th Cadet Squadron, Camp Dick, Dallas, Tex.
- Morton H. Cassidy, 50 Princeton St., East Boston, Mass., Cadet, 6th Aero Squad., Camp Dick, Dallas, Tex.
- F. C. Chapin, 258 Chapman St., Greenfield, Mass., Hdqs. Co., 308th Inf., A. E. F.
- Arthur L. Chandler, 48 Nelson St., Leominster, Mass., Naval Aviation.
- Chester I. Chase, 20 Trenton St., Melrose, Mass., S. M. A., M. I. T., Cambridge, Mass.
- A. Warren Clapp, Commercial St., E. Braintree, Mass., 3rd Class Radio Officer, Harvard University, Cambridge, Mass.
- Ernest L. Coderre, 15 Coombs St., Southbridge, Mass., 4th O. T. S., 3rd Co. Camp Lee, Va.
- Edwin P. Cooley, Sunderland, Mass., Co. G. 306th Inf., A. E. F.
- James P. Davies, 382 Huron Ave., Cambridge, Mass., Radio Mechanic Dept., Camp Vail, Little Silver, N. J.
- Harold R. Day, Milford, Mass., Lieut. 2nd Div. Inf., A. E. F.
- Thomas W. Desmond, Randolph, Mass., (Killed in France.)

- Robert P. Farrington, 15 Quince St., Nantucket, Mass., 4th O. T. S.
- J. B. Field, Sharon, Mass., Flying Cadet, Hazelhurst Field No. 1, Mineola, L. I.
- Gerald M. Gilligan, West Warren, Mass., Q. M. C., A. P. O. No. 717, A. E. F.
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- Frank D. Leary, 15 Smith Ave., Brockton, Mass., 2nd Class Pharmacists' Mate, U. S. Naval Station, Pauillac, Gironde, France.
- M. H. Leiper, Blauvelt, N. Y., Corp., Co. A., 307th Inf. A. E. F.
- W. Alan Luce, West Boylston, Mass., U. S. Naval Hospital.
- Arthur M. McCarthy, Monson, Mass., Marine Corps., Paris Island, S. C.
- John J. Mahon, New Canaan, Conn., Aviation Corps.
- Elton J. Mansell, Cambridge, Mass., Lieut. Inf., 33rd Div., A. E. F.
- Adams N. McClellan, Keene, N. H., Sergt., Hdqrs., Co., 306th F. A., A. E. F.
- A. B. Montgomery, Roslindale, Mass., Camp Devens, Mass.
- John R. Moore, Tolland, Mass., Sergt., Co. C., 326th Inf., A. E. F.
- Earl A. Morgan, Amherst, Mass., Sergt. Co. H., 38th Inf., A. E. F.
- Maurice Morse, Dorchester, Mass., Lieut., Fort Leavenworth, Kansas.
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- Joseph E. O'Hara, 19 Northboro St., Worcester, Mass., Lieut. 77th Div. Inf., A. E. F.
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- Allan L. Pond, Holliston, Mass., Corp., Hdqrs. Co. 14th Engineers (Ry.) A. E. F.
- Harold W. Poole, 42 Cottage St., Hudson, Mass., Hdqrs. Detach., Selfridge Field, Mount Clemens, Mich.

- Karl J. Pree, Brookline, Mass., Merchant Marine.
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 Alfred Sedgwick, 39 Massasoit St., Fall River, Mass., Flying Cadet, Aviation
 Section, 1st provisional squad., Ellington Field, Houston, Tex.
 Ernest F. Sexton, Darien, Conn. Killed in France.
 Everett H. Skinner, West Upton, Mass., Lieut. 33rd Div. Inf., A. E. F.
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 A. E. F.
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 Bn. 157th D. B., Camp Gordon, Ga.
 Walter D. Sproul, South Hanover, Mass., U. S. Ambulance Service, A. E. F.
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 Frank A. Woods, Groton, Mass., Hdqrs. Co., 101st Field Artillery, A. E. F.
 Livingston Wright, 86 Goffe St., Quincy, Mass., S. S. U., 641 Convois Autos,
 A. E. F.

CLASS OF 1920.

- George Andrews, Farmington, Conn., Wagoner, Ambulance Corps, 6th
 Co., Allentown, Pa.
 Winfield S. Beauregard, 59 Irving St., Framingham, Mass., U. S. N. R. F.
 Ralph B. Bowmar, R. F. D., Canton, Mass., Medical Dept., 1st Engineers,
 A. E. F.
 Wm. G. Bradley, Groton, Mass., Aviation, Kelly Field, San Antonio, Tex.
 Paul L. Burnett, Leicester, Mass., Medical Detach., 55th Artillery, A. E. F.
 Robert P. Cande, Pittsfield, Mass., Lieut. 2nd Div Inf., A. E. F.
 Francis C. Chase, Royalston, Mass., Hdqrs. Det., Depot Div., 1st Corps,
 Stat. Sec. A. P. O. 727, A. E. F.
 Alexander G. Crawford, 592 Trapelo Rd., Waverly, Mass., U. S. Base
 Hospital No. 5, c/o General Hospital No. 13, A. P. O. No. 3, A. E. F.
 Royce B. Crimmin, Bradford, Mass., Cadet S. M. A., M. I. T., Cambridge,
 Mass.
 Donald G. Davidson, Amherst, Mass., Machine Co. 305th Inf. A. E. F.
 Donald C. Douglass, 985 Charles River Rd., Cambridge, Mass., S. M. A.,
 M. I. T., Cambridge, Mass.
 Richard Gorwaiz, Newburyport, Mass., Co. C., M. S. T., Baltimore, Md.
 Irving E. Gray, Woods Hole, Mass., S. M. A., Princeton Univ., Princeton,
 N. J.
 Richmond H. Hathaway, Warren, Mass., Navy.
 Warren S. Hathaway, Somerset, Mass., Lieut. 2nd Div. Inf., A. E. F.

- Carl M. Hemenway, Williamsburg, Mass., Co. I., 104th Inf., A. E. F.
 Carlo A. Iorio, 87½ Margaret St., Springfield, Mass., Corp., Co. D. 1st Repl.,
 Reg. of Engrs., Washington Barracks, Washington, D. C.
 Starr M. King, Pittsfield, Mass., 4th Co. O. T. S.
 Harry C. Lindquist, Holden, Mass., Co. M., 102nd Inf., A. E. F.
 William A. Luce, West Boylston, Mass., Marine Corps, Paris Island, S. C.
 Charles H. Mallon, 25 Sheppard Ave., E. Braintree, Mass., 2nd cl. Seaman,
 U. S. N. Radio School, Co. 8, Cambridge, Mass.
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 Autos, A. E. F. par B. C. M.
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 Inf., A. E. F.
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 Signal Corps.
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 racks, Navy Yard, Charleston, S. C.
 Frederick V. Waugh, Amherst, Mass., S. S. U. 539, Convois Autos, A. E. F.
 par B. C. M.
 Kenneth Y. Wright, 29 Bartlett Ave., Arlington, Mass., 1st Lieut., Machine
 Gun Co. 303rd Inf. A. E. F.

CLASS OF 1921.

- Nathaniel J. Ames, Peabody, Mass., Marine Corps, Paris Island, S. C.
 Julius Kroeck, Jr., 266 Vermont St., Brooklyn, N. Y., Camp Upton,
 Yaphank, L. I.
 Ralph R. McCormack, West Somerville, Mass., Naval Aviatio Station, Keyn
 West, Fla.
 Allan V. Mutty, 45 Francis St., Melrose, Mass.
 C. Raymond Vinton, 451 Walnut Ave., Roxbury, Mass., Navy.
 Milton F. Webster, Malden, Mass., Bat. F, F. A. R. S., Camp Jackson, S. C.

WELFARE WORKERS

- F. Howard Brown, 1900, Ferncroft Rd., Marlboro, Mass., Transport Officer, Amer. Red Cross, 5 Rue de la Concorde, Paris, France.
- Harold W. Curtis, 1913, Belchertown, Mass., Y. M. C. A. Sec., Fort Constitution, Portsmouth, N. H.
- Allen D. Farrar, 1906, Y. M. C. A., Camp Devens, Mass.
- Howard B. Fiske, (Unclassified) 196 High St., Passaic, N. J., Y. M. C. A. Social Sec., Y. M. C. A. No. 2, Camp Dix, N. J.
- Harold L. Frost, 1895, Arlington, Mass., Garden Supervisor, American Red Cross, Base Hospital 6, A. P. O. 705, A. E. F.
- Frank L. Gray, 1912. 51 Page St., New Bedford, Mass., Secretary Y. M. C. A., Fort Rodman, New Bedford, Mass.
- Charles R. Green, Amherst, Mass., Acting Librarian, June-Aug., 1918, Camp Library, Camp Johnston, Jacksonville, Fla.
- George R. Haley, 1892, Stonington, Conn., Y. M. C. A. Secretary, 12 Rue d'Aguesseau, Paris, France.
- W. C. Paige, 1891, Y. M. C. A., Houston, Tex., Y. M. C. A. Sec., U. S. Naval Aviation Station, Pauillac, Gironde, France.
- John Phelan, Amherst, Mass., Educational Work, May-June, 1918, Y. M. C. A., Camp Devens, Mass.
- Allen Newman Swain, 1903, Roxbury, Mass., Lieut. American Red Cross, 4 Rue de Lysee, Paris, France.
- Ralph J. Watts, 1907, Amherst, Mass., Educational work, July 1918, Y. M. C. A., Camp Devens, Mass.

Oh, it's home again, and home again, America for me !
I want a ship that's westward bound to plough the rolling sea,
To the blessed Land of Room Enough beyond the ocean bare,
Where the air is full of sunlight and the flag is full of stars.

—*Van Dyke.*

Post Card

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Amherst, Mass.

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Amherst, Mass.

Date

Name: Class:
Military Rank
and Address:

Permanent
Home Address:

Notes about yourself or other M. A. C. men in the service:

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Date

Name: Class:
Military Rank
and Address:

Permanent
Home Address:

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THE M. A. C. BULLETIN

Amherst, Mass.

Volume X

NOVEMBER, 1918

Number 7

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

ANNOUNCEMENT

OF THE

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE



BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1918

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

OF THE

Massachusetts Agricultural College

TERM BEGINS . . . DECEMBER 2, 1918

TERM ENDS . . . MARCH 22, 1919

**OWING TO WAR CONDITIONS BUT ONE TERM OF
THE TWO-YEAR COURSE WILL BE
OFFERED THIS YEAR**

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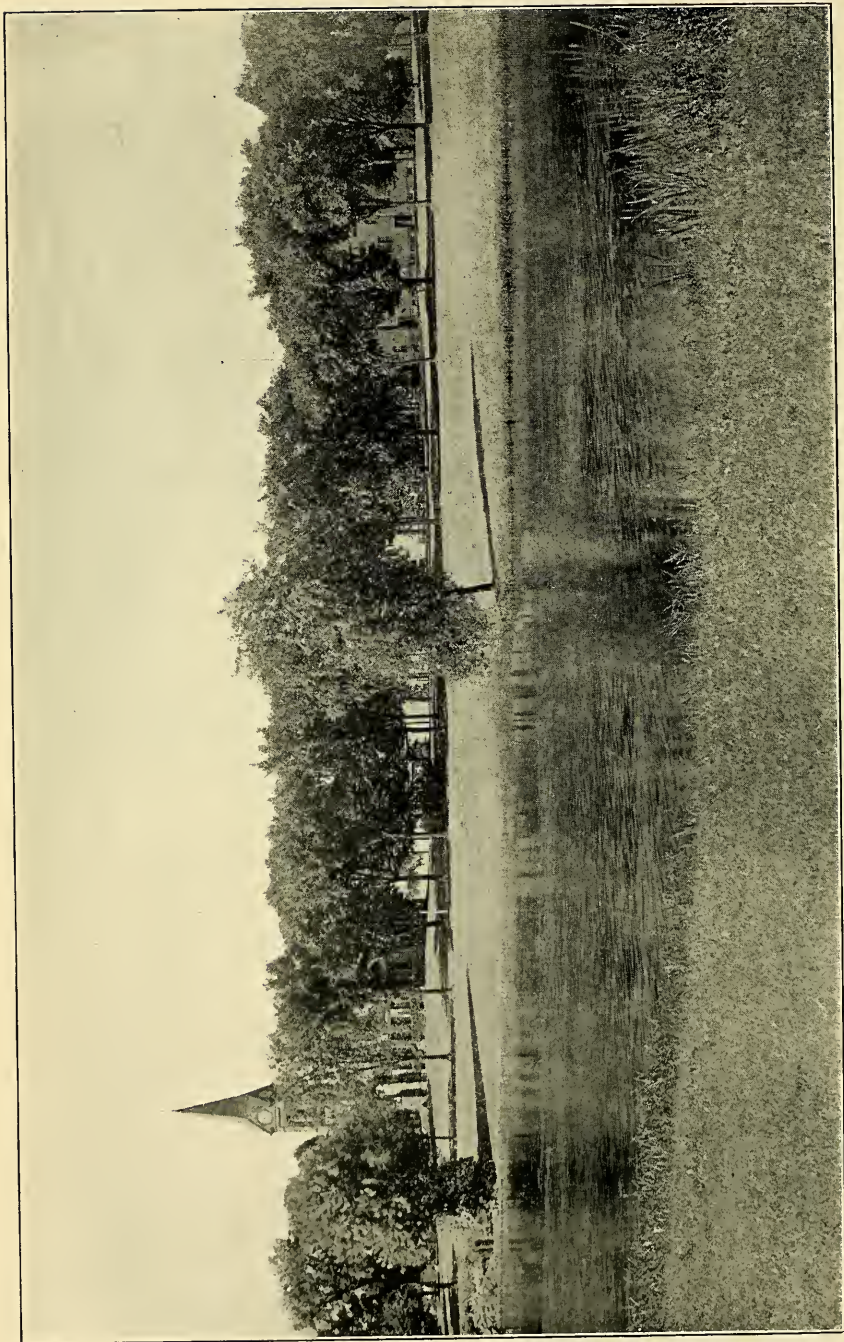
BOSTON

WRIGHT & POTTER PRINTING CO., STATE PRINTERS

32 DERNE STREET

1918

PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.



A view of the campus showing library

FACULTY, 1919

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

EDWARD M. LEWIS, A.M.
Acting President of the College

JOHN PHELAN, A.M.
Director of Short Courses

	DEPARTMENT
A. B. BEAUMONT, B.Sc. <i>Associate Professor of Agronomy</i>	Soil Fertility
ALEXANDER E. CANCE, Ph.D. <i>Professor of Agricultural Economics</i>	Agricultural Economics
H. P. COOPER, M.Sc. <i>Assistant Professor of Agronomy</i>	Field Crops
A. L. DACY, B.Sc. <i>Associate Professor of Market Gardening</i>	Market Gardening
HENRY T. FERNALD, Ph.D. <i>Professor of Entomology</i>	Entomology
JAMES A. FOORD, M.Sc.Agr. <i>Professor of Farm Management</i>	Farm Management
JOHN C. GRAHAM, B.Sc.Agr. <i>Professor of Poultry Husbandry</i>	Poultry Husbandry
CHRISTIAN I. GUNNESS, B.Sc. <i>Professor of Rural Engineering</i>	Rural Engineering
ORVILLE A. JAMISON, M.Sc. <i>Associate Professor of Dairying</i>	Dairying
JOHN C. MCNUTT, B.Sc.Agr. <i>Professor of Animal Husbandry</i>	Animal Husbandry
A. VINCENT OSMUN, M.Sc. <i>Professor of Botany</i>	Botany
LOYAL F. PAYNE, B.Sc. <i>Associate Professor of Poultry Husbandry</i>	Poultry Husbandry
BYRON E. PONTIUS, B.Sc.Agr. <i>Associate Professor of Animal Husbandry</i>	Animal Husbandry
FRED C. SEARS, M.Sc. <i>Professor of Pomology</i>	Fruit Growing

CHARLES R. GREEN, B.Agr.
Librarian of the College

FOREWORD

This bulletin describes the work of a course offered this year for the first time by the Massachusetts Agricultural College. It is intended for those who wish to know more about the business of farming and who cannot take the regular four-year college course. It makes the resources of the college available to a large number of young men and young women who are either now engaged in the business of farming or who plan to take up farming as an occupation.

Does an education pay if one intends to be a farmer? There is but one answer to this question. There is no business, profession or occupation to-day that calls for a wider range of knowledge or a higher degree of skill than farming. No man succeeds in making the farm pay as a farm who has not gained a good working knowledge of the farm business. Many have secured this knowledge through years of experience on the farm, — the longer and the costlier way; others have availed themselves of what schools and colleges had to offer and then put their education to the test of practical life. Most young men and young women must make their own place in the world. Competition is keen in all lines of work, in farming, as in other industries. Those who would compete in doing the world's work must be prepared by instruction and training to meet this competition. That is why the governments of the warring countries are sending returned soldiers to schools and colleges. The boys have to enter a world of competition and in that world an education pays. An education pays not only in dollars and cents, but it gives also a greater interest and satisfaction in the work that one is doing. Young men and young women should prepare for the future. A practical education is an investment that returns a dividend for life. It is a safe investment. The need for trained men and women in the work of

agricultural production has never been so great. Each year of the war intensifies this need. With the close of the war it has been estimated that Europe will have to depend upon America for the next ten years for a much larger part of its food supply than ever before in the world's history. To increase one's productive power on the farm through education is not only good business but also a patriotic service in these days when so much depends upon the efficiency of men and women who produce the world's food.

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Massachusetts Agricultural College announces the organization of a Two-Year Course in Practical Agriculture open to young men and young women who have attained the age of sixteen years and who possess at least a common school education. The instruction is not elementary or preparatory. It is designed to provide the largest amount of practical information and training in agriculture in the shortest possible time consistent with thorough-going work. The problems that confront the farmer in his every-day work on the farm will be the basis of class instruction and discussion. They will interest all young men and women who wish to make the farm produce more and pay better. The work of the course is so arranged for this year that it will bear directly upon the problems of food production and distribution. Men and women who through training increase their productivity on the farm render a service not only to themselves but to the nation and to the world at large. Upon intensive training through practical courses we must rely to a great extent for the next few years for the development of agricultural production.

INSTRUCTION

The instruction is given largely by the regular faculty by means of class-room teaching, laboratory exercises and practical work (assistance will be given from time to time by nonresident lecturers on special subjects). The work of the class room is supplemented by demonstration work in the laboratory, dairy room, greenhouse and stables. The library of over 50,000 volumes offers exceptional opportunities for special study in agriculture, horticulture and related

sciences. The instruction is designed to offer plain, practical, direct information to establish the underlying reasons as well as the method employed in the various operations.

WHO MAY ATTEND

There are no examinations or entrance requirements other than here stated. The course is open to students who have attained the age of sixteen years and who possess at least a common school education. The advantages of the college staff of specialists, 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.

ADVANTAGES OFFERED YOUNG WOMEN

All courses offered are open to men and women. The opportunities offered by this course will be of advantage not only to women who own or operate farms but to all women whose living comes from a farm. The problems that women have to meet as farm owners and managers, and the ways and means by which girls and women may add to the income of the home farm, will receive special consideration. Special courses in homemaking are also provided for girls and women.

A college-trained woman who has had practical experience in farming will have general supervision of the development of courses for women. The technical information in soils, poultry, etc., will be given in the regular classes. The problems of practical management from the standpoint of women in agriculture will be considered in a series of conferences in charge of the woman supervisor of agriculture. Other farm women who have had successful experience in this and other States will be present at many of these conferences to present problems of women in agriculture from the standpoint of actual experience.

SUBJECTS OFFERED THE FIRST TERM

Ten subjects are offered, from which the student may choose not less than three nor more than four, except with the consent of the Director of Short Courses.

Classes meet five times a week in each subject. Each class-room hour calls for one hour of laboratory work or study in connection with each subject, hence one subject will occupy ten hours of the students' time. It is believed that by regular daily work, by increasing the number of class-room hours and diminishing the number of study hours students will derive greater benefit from the work of the course. All elections of courses must be approved by the Director of Short Courses.

Crop Production, including Soils and Soil Fertility.

Feeding and Care of Farm Animals; Live Stock Judging.

Dairying.

Business Principles of Farming and Marketing Farm Products.

Market Gardening.

Fruit Growing.

Poultry Husbandry.

Insect Pests and Plant Diseases.

Farm Machinery, Farm Shop Practice.

Farm Management.

FUTURE PLANS FOR THE COURSE

The Two-Year Course in Practical Agriculture will, we hope, as soon as war conditions permit, be established on the year basis. The work of this first term will, however, carry full credit on the Two-Year Course.

In order to meet the needs of young men and young women who wish to take advantage of the practical course in agriculture but who must carry on the work of the farm, arrangements will be made to offer during each winter term of the Two-Year Course in Practical Agriculture a wider range in the choice of subjects.

Actual farm experience will be required of every student who completes the full Two-Year Course in Practical Agriculture.

REPORTS

At the close of the term all students will receive a formal report 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. All students who possess college entrance requirements and who wish to take the regular college work should address the registrar of the college.

FEES AND EXPENSES

No charge is made for tuition to residents of the State. For non-residents the tuition fee is \$30 a term of four months.

Small laboratory fees are required in certain courses, as stated below:—

Agronomy	\$1.75 per term of four months
Animal Husbandry	\$2.50 per term of four months
Dairying	\$4.00 per term of four months
Rural Engineering	\$2.50 per term of four months
Market Gardening	\$3.50 per term of four months

Board may be had in Amherst for about \$6.50 per week. Rooms vary from \$1.50 to \$3. The expenses of the student will vary with the needs and tastes of the individual.

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 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.

All students enrolled in the Two-Year Course will be expected to attend the regular college exercises.

SCHOLARSHIPS.

The New England Branch of the Woman's National Farm and Garden Association is offering this year five hundred dollars in scholarships available to women electing agricultural courses.

Applicants for these scholarships should communicate with the Committee on the Award of Scholarships, Woman's National Farm and Garden Association, 4 Joy Street, Boston, Mass.

ENROLLMENT

Fill out blank form of application and mail to the Director of Short Courses as soon as possible. This enables the college to arrange classes to meet the needs of the students. On arrival at Amherst come to the office, where information may be had in regard to suitable boarding and rooming places, class hours, etc. Members of the college staff will be present to advise with students in regard to their work.

DESCRIPTION OF COURSES

**Crop Production**

This course is planned primarily to meet the needs of those interested in the actual production of the field crops commonly grown in Massachusetts. It is aimed to give enough of the theories and underlying principles of agriculture to arouse the student's interest and give him an insight into the practices. Emphasis will be placed on agricultural practices. As far as seasons and weather conditions will permit, studies will be made of the practical agriculture of the college farm. Some previous farm experience is desired, but not required, of those taking this course.

The subject matter will be presented by means of lectures, demonstrations, laboratory exercises and field trips, and will include as far as practicable: —

Part I. — Kinds of soils, what they are and what they contain; tillage operations on the farm; control of soil moisture; drainage and irrigation; organic matter of the soil, its importance and maintenance; acid soils and liming; the plant food of the soil; farm manures, their composition, care and use; commercial fertilizers, their composition, properties and use; home mixing of fertilizers.

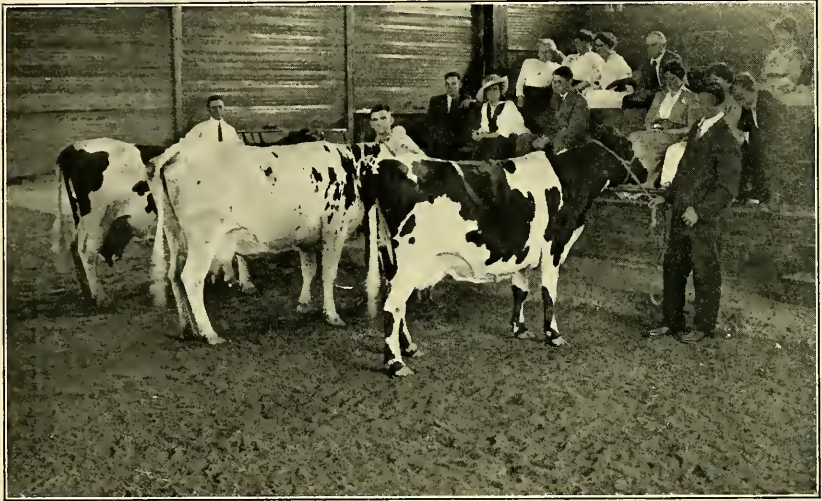
Part II. — The plant, its structure and how it feeds; the relation of the plant to the soil and other environment; selection of crops to be grown; rotation of crops; the planting, fertilizing, culture and harvesting practices of some of the most common field crops of Massachusetts. Five class hours.

The Department



Reproduced by courtesy of
The "Country Gentleman."

ANIMAL HUSBANDRY



Short course students judging stock

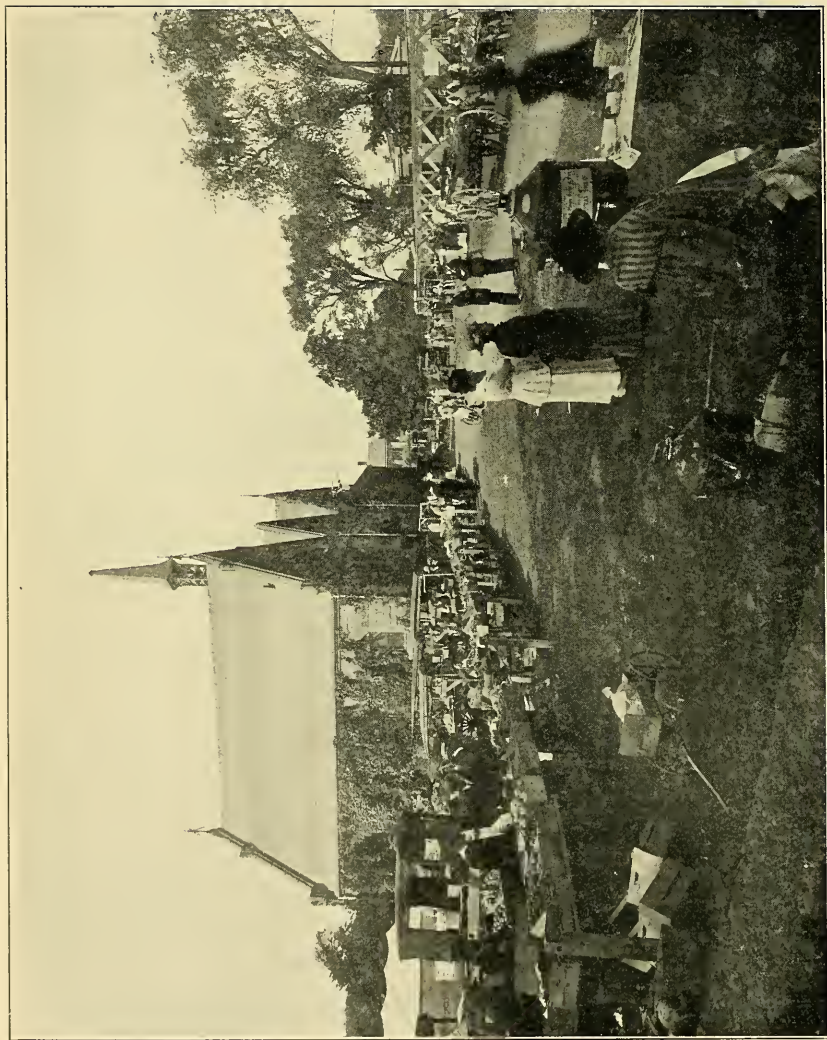
The department is equipped with an excellent laboratory, which has a seating capacity of 180 and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for class-room purposes.

1. Breeds of Live Stock and Stock Judging. — A study of the breeds of live stock. The characteristics of the various breeds of horses, cattle, sheep and swine will be studied so that the student may become familiar with the breeds. One period each week will be

devoted to stock judging. Two recitation periods and one laboratory period per week.

2. Live Stock Feeding and Management. — A course arranged to give the student a clear conception of the various feeds and the nutrition of animals. Part of the time will be devoted to formulating rations. Three periods per week.

Professor McNutt



A community market

ECONOMICS

Business Principles of Farming and Marketing Farm Products

The purpose of this course is to present the business side or economics of agriculture. It is based upon the principle that products are produced 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, how to use credit profitably, are some of the topics studied.

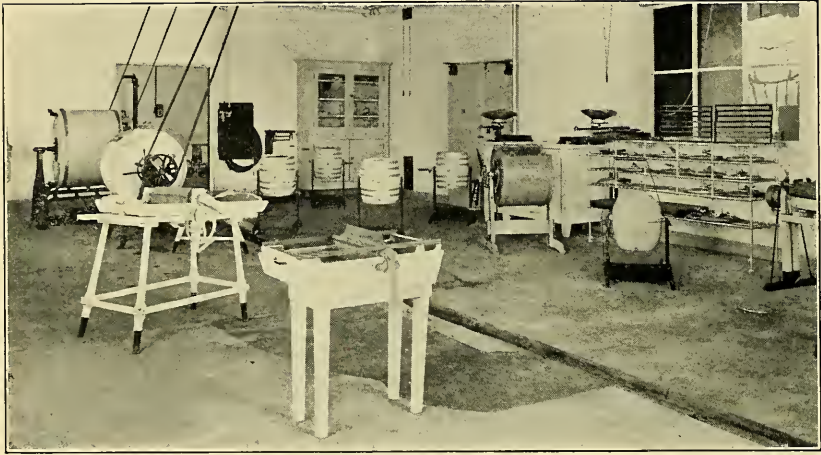
Another division of the subject is marketing farm products. This will be treated in a very practical manner. The following are some of the topics: marketing as a part of production; outlets for the sale of farm products; principles of marketing; description of wholesale methods of distribution; middlemen, 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.

Lectures, textbook, original study and report. Five class hours.

The Department

DAIRYING



A view of one of the laboratories

The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

This course is to acquaint the student with a general knowledge of the entire dairy problem and the important position it occupies in the agriculture of New England, and especially of Massachusetts.

It will take up the advantages of dairy farming as compared to other types in the improvement of the herd; the Babcock test and its use; cow test associations, their formation and the benefits to be derived from them; a comparison of selling whole milk, cream or butter; methods which should be used in handling and preparing milk or cream for market; cream separation; buttermaking; and manufacture of skim milk into profitable by-products. Three lectures, two laboratory periods.

The Department

POMOLOGY

Learning to grade and pack

Fruit Growing

This course is designed for those who wish to learn how to conduct a fruit plantation successfully.

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 choice of varieties will be discussed in order that the student may avoid setting those sorts (and there are many of them) which might do well in Ohio or Pennsylvania or Missouri but which ought not to be set in Massachusetts.

The soil preferences of varieties of fruits will be considered so that he 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 pruning of all kinds of fruits will be fully considered, and wherever possible the students will be taken into the plantations and given an opportunity to perform the actual work.

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.

Modern methods of spraying will be considered (with a very brief discussion of fruit pests), and the student will be trained in the preparation and application of the different sprays.

There will be a full discussion of strawberries and other small fruits (as well as the tree fruits), because it often happens in Massachusetts that more money is made in growing strawberries than in any other kind of fruit growing.

Lastly, picking, packing, storing and marketing will be discussed, and actual work performed in packing apples in barrels and boxes.

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 orchard practices are based.

The department is well equipped for handling such work. There are 50 acres devoted to the different fruits, with 100 varieties of apples, 20 of plums, 40 of grapes, and other fruits in proportion. There is a full equipment of machinery, including three types of power sprayers, a dusting outfit, four apple sizers, and the best types of plows, harrows and cultivators; while for the work of packing and storing, the department has one of the best storage buildings in the United States. Five class hours.

Professor Sears

MARKET GARDENING



“War gardens” have added remarkably to the food supply of the nation during the past two years. Their products will be needed for several years to come, in the period of reconstruction after the war. Aside from the value of the food they have contributed they have been well worth while for the lessons they have taught of the value of vegetables in the daily diet, of the healthful exercise and pleasure derived in the production of fresh vegetables, and of the latent possibilities in even a small plot of ground well tilled. They have taught something of the difficulties as well as the pleasures of production, and have opened the minds of many to the fact that successful vegetable gardening requires knowledge and skill on the part of the gardener. The result has been a large demand for information on the subject.

This course is designed to meet this need. Beginning with a study of vegetable seeds it takes the student through the garden season, considering planning the garden, fertilizing and preparing the soil for

planting, planting seeds and transplanting, garden tools, cultivating and thinning, the control of injurious insects and diseases, and the harvesting, storing and marketing of the products.

The instruction is made as practical as possible by means of illustrative material and laboratory exercises. A student after taking the course should be qualified to secure maximum returns from his own gardening operations, whether conducted for pleasure or profit, or to direct the work of others needing skilled advice. The course is given in three one-hour class-room and two laboratory exercises per week.

Professor Dacy

INSECT PESTS AND DISEASES OF CROPS

Insect Pests and Their Control

This course is given as an introduction to a knowledge of insects in their relation to agriculture and to health. It takes up the most serious insect pests of our crops, treating of their life histories and habits as connected with methods for their control. Some of the insects included are the San José scale, oyster-shell scale, plant lice, squash bug, codling moth, peach borer, tent caterpillar, gypsy moth, brown-tail moth, European corn borer, cutworms, fall webworm, apple maggot, onion maggot, cabbage maggot, plum curculio, asparagus beetles, apple-tree borer, wireworms, white grubs, the currant worm, etc. In addition, sufficient time will be given to insecticides and other methods for insect control to enable the student to prepare and use them intelligently. Consideration of some of the insects causing disease or otherwise injuring man or domestic animals will also be included in the course. Five hours per week for two months.

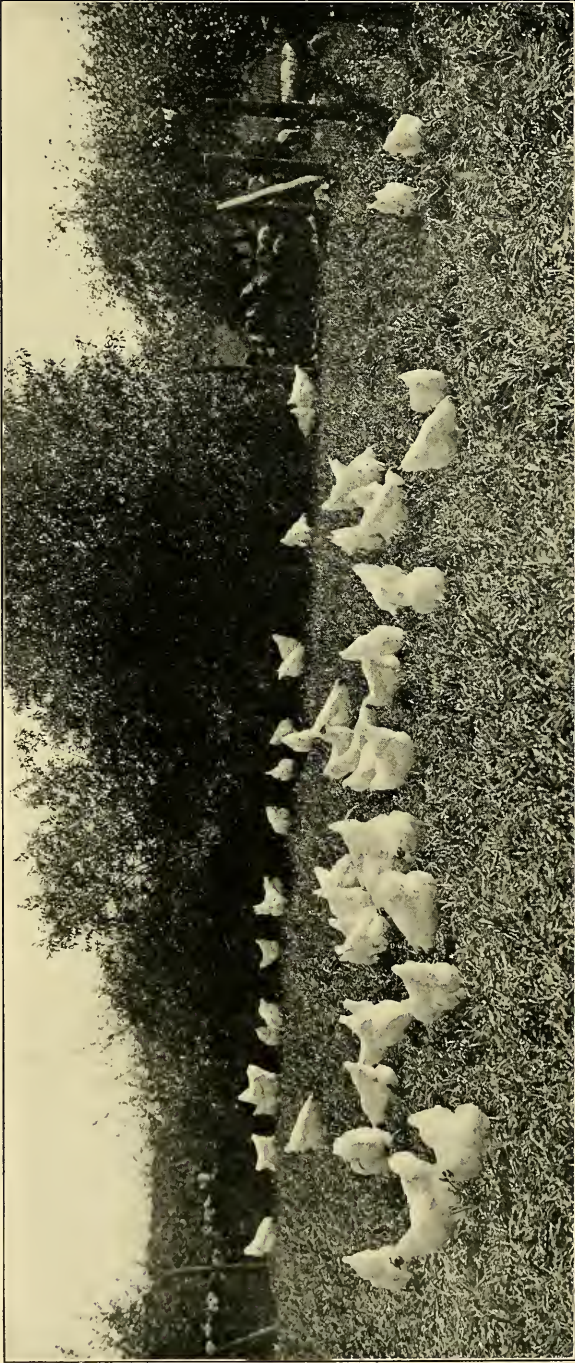
Professor Fernald

Diseases of Crops

To the grower of crops familiarity with the common diseases which afflict them is quite as important as knowing how to fertilize, plant and cultivate. Enormous losses in yield are caused by decay, spotting, rusting, smutting, etc., and unless diseases are successfully combated poor crops and low yields must result. Therefore, every crop grower should learn to recognize these enemies and also know how to prevent or control them.

This course considers principally diseases of fruits, vegetables and grains. Students are given opportunity to examine diseased plant materials and to learn about the agents which cause plant disease. Methods of disease control and the making of fungicides also are given due attention. Lectures and laboratory instruction. Five hours a week for eight weeks.

The Department



Raising poultry for profit

POULTRY HUSBANDRY

This department is well prepared to give practical instruction in poultry husbandry. Our new quarters and equipment in Stockbridge Hall furnish us with ample laboratory facilities for careful studies in avian anatomy and physiology, identification of and the value of the various grains and feedstuffs used for poultry, the different grades and varieties of eggs and poultry, both fresh and storage, and other work of a highly technical character.

Our practical laboratory (poultry plant) comprises over 1,200 adult birds, divided into about 30 pens in various types of houses, the flocks varying in size from 10 to 200; two large incubator cellars containing a great variety of lamp and electric incubators, as well as two large mammoth machines; brooding facilities for 5,000 chicks, including a large open pipe brooder house for 1,200 chicks, and different kinds of brooders, stove, kerosene and electric; laboratories for pen management, judging, culling, fattening, killing, picking, caponizing, compounding feeds, carpentry, etc.

In addition to the practical laboratory work actually done by the student he has an opportunity to keep under observation practical experiments and demonstrations that are being continually carried on for the benefit of students and practical poultrymen.

The course in poultry husbandry includes —

(a) **Lectures**, covering opportunities in poultry culture, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, poultry diseases, markets for poultry and poultry products, and the preparation of poultry and eggs for market, poultry farm management.

(b) **Laboratory Work**, covering carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, mixing and applying disinfectants and lice powder, identification and study of poultry feeds, incubation, brooding, judging and culling, comparative study of the various grades and varieties of eggs, and dressed poultry. Two lectures and three two-hour laboratory periods per week.

The Department

RURAL ENGINEERING

Farm Machinery

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. The gas engine is studied exhaustively and the application of the engine to farm work is taken up in detail. The farm tractor and the automobile are given due importance, and considerable time is devoted to the care and repair of these machines. The various types of carburetors and ignition systems are studied and practice given in the location and repair of engine troubles.

One 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, thread 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. Two lectures and three two-hour laboratory periods.

Professor Guinness

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 Professor P. B. Hasbrouck, Registrar, Amherst, Mass.

B. The 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 asparagus 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 Fred W. Morse, 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 William D. Hurd, 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.

APPLICATION FOR ENROLLMENT
 IN THE
TWO-YEAR COURSE IN PRACTICAL AGRICULTURE
 OFFERED BY THE
MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

I wish to enroll for the first term of the Two-Year Course in Practical Agriculture, beginning Dec. 2, 1918.

Name.....Date of Application.....
 Date of Birth.....Post Office.....
 Street Address.....Present Occupation.....
 Previous Education.....
 Name and Address of person to notify in case of illness or accident

Place an X before each course you wish to take. Students may elect not less than three nor more than four, except with the consent of the Director of Short Courses.

1. Soils, Field Crops and Fertilizers.
 2. Selection, Breeding and Care of Farm Animals.
 3. Business Principles of Farming and Marketing Farm Products.
 4. Poultry.
 5. Dairying.
 6. Fruit Growing.
 7. Market Gardening.
 8. Insect Pests and Plant Diseases.
 9. Farm Management.
 10. Farm Machinery, Farm Shop Practice.
- Courses for girls and women. Send for special bulletin.

HOW TO REGISTER

Fill out the application blank, checking the subjects you wish to take and mail this blank to

JOHN PHELAN,
Director of Short Courses,
Massachusetts Agricultural College,
Amherst, Mass.



THE M. A. C. BULLETIN

Amherst, Mass.

Volume X

NOVEMBER, 1918

Number 8

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October 3, 1917, authorized on July 3, 1918

THE TEN WEEKS' WINTER SCHOOL

1918-1919



BOSTON

WRIGHT & POTTER PRINTING CO., STATE PRINTERS

32 DERNE STREET

1918

THE TEN WEEKS' WINTER SCHOOL

1918-1919

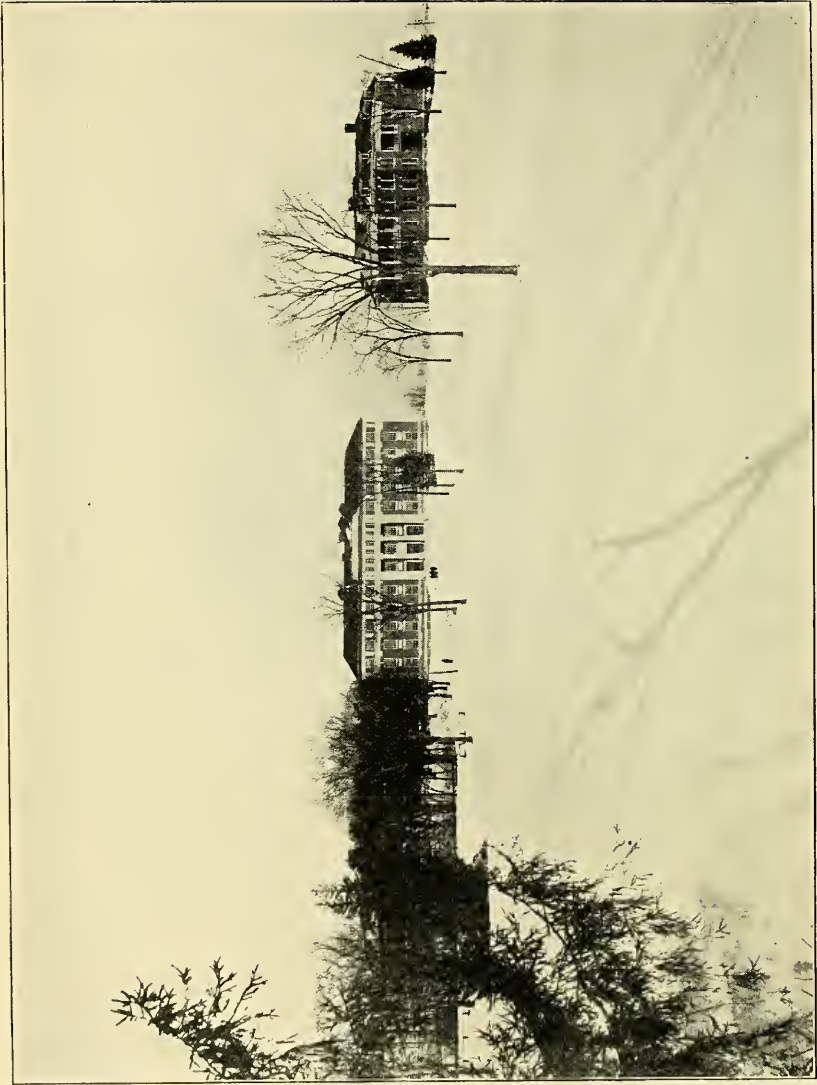
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PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.



Stockbridge and Draper Halls.

FACULTY, 1919

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

EDWARD M. LEWIS, A.M.
Acting President of the College

JOHN PHELAN, A.M.
Director of Short Courses

	DEPARTMENT
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A. B. BEAUMONT, Ph.D. <i>Associate Professor of Agronomy</i>	Soil Fertility
ALEXANDER E. CANCE, Ph.D. <i>Professor of Agricultural Economics</i>	Agricultural Economics
WALTER W. CHENOWETH, A.B., M.Sc. <i>Professor Horticultural Manufacture</i>	Horticultural Manufacture
H. P. COOPER, M.Sc. <i>Assistant Professor of Agronomy</i>	Field Crops
A. L. DACY, B.Sc. <i>Associate Professor of Market Gardening</i>	Market Gardening
HARRY D. DRAIN, B.Sc.Agr. <i>Instructor in Dairying</i>	Dairying
HENRY T. FERNALD, Ph.D. <i>Professor of Entomology</i>	Entomology
JAMES A. FOORD, M.Sc.Agr. <i>Professor of Farm Management</i>	Farm Management
JOHN C. GRAHAM, B.Sc.Agr. <i>Professor of Poultry Husbandry</i>	Poultry Husbandry
CHRISTIAN I. GUNNESS, B.Sc. <i>Professor of Rural Engineering</i>	Rural Engineering
MARGARET HAMLIN, B.A. <i>Supervisor Agricultural Courses for Women</i>	Short Courses

WILLIAM R. HART, A.M., LL.B. <i>Professor of Agricultural Education</i>	Agricultural Education
ORVILLE A. JAMISON, M.Sc. <i>Associate Professor of Dairying</i>	Dairying
CHARLES E. MARSHALL, Ph.D. <i>Director of the Graduate School and Professor of Microbiology</i>	Microbiology
JOHN C. MCNUTT, B.Sc.Agr. <i>Professor of Animal Husbandry</i>	Animal Husbandry
A. VINCENT OSMUN, M.Sc. <i>Professor of Botany</i>	Botany
JAMES B. PAIGE, B.Sc., D.V.S. <i>Professor of Veterinary Science</i>	Veterinary Science
LOYAL F. PAYNE, B.Sc. <i>Associate Professor of Poultry Husbandry</i>	Poultry Husbandry
WALTER M. PEACOCK, M.Sc.Agr. <i>Instructor in Farm Management</i>	Farm Management
BYRON E. PONTIUS, B.Sc.Agr. <i>Associate Professor of Animal Husbandry</i>	Animal Husbandry
WILLIAM S. REGAN, Ph.D. <i>Associate Professor of Entomology</i>	Entomology
FRED C. SEARS, M.Sc. <i>Professor of Pomology</i>	Fruit Growing
S. E. VANHORN <i>Instructor in Dairying</i>	Dairying
JAMES WHITING <i>Foreman, Department of Floriculture</i>	Floriculture
EDNA SKINNER, B.Sc. <i>Professor of Home Economics</i>	Home Economics

CHARLES R. GREEN, B.Agr.
Librarian of the College

THE NATURE OF SHORT COURSES.

Short courses make a universal appeal irrespective of age, sex or previous education. They are attractive and valuable to experienced farmers and farm women, to young men and women who are engaged or expect to be engaged in the business of farming, to teachers and prospective teachers of agriculture, boy club workers, college graduates, leaders and workers in the Land Army. Short courses open the door of opportunity for busy men and women who wish to increase their efficiency and earning power. The aim of short course work is not to provide preparatory or elementary instruction, but to afford the largest amount of information and training in agricultural lines in the shortest possible time.

In this State there are thousands of young men and young women who are to become future farmers, orchardists, poultry producers, dairy men and women. It is to the interest of both the individual and the State that these young men and young women shall keep pace with the rapid development of agriculture. There are also many mature men and women well past the usual school age who desire to acquaint themselves with the more recent developments in agricultural science and practice. It is to meet the needs of these men and women that short courses are offered.

The Massachusetts Agricultural College offers through its short course administration the following schools and courses for 1918-19.

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE, designed for young men and young women sixteen years of age or over who have at least a common school education. This is a new course offered by the college for the first time this year. The first term begins December 2, and closes March 22, 1919. Send for special bulletin.

THE TEN WEEKS' WINTER SCHOOL, intended for young and old who wish to avail themselves of a short period of intensive training along agricultural lines. This 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 December 30.

VOCATIONAL COURSES, planned for those who wish to specialize in some particular farming interest. In connection with the short course work the college hopes to offer in the near future several vocational courses that may be taken during one year of residence. But one such course is now offered, — the course in Poultry Husbandry. See page 25.

THE SUMMER SCHOOLS, concerning which announcement will be made later.

This bulletin describes the work of the Ten Weeks' Winter School, and the Vocational Course in Poultry Husbandry.

For further information, or to register in any of these courses, write or apply to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.



THE TEN WEEKS' WINTER SCHOOL

Dec. 30, 1918, to March 8, 1919

PURPOSE

The Ten Weeks' Winter School at the Massachusetts Agricultural College is offered to meet the needs of those, both young and old, who desire to study the principles and modern methods of agriculture. The work is planned to bring before the student the results of the latest investigations in agricultural science, and to point out their practical application. Ten weeks being a comparatively short period of time, the courses are necessarily concentrated and practical, and are therefore attractive and valuable to the farmer or the prospective farmer regardless of what his previous training may have been or how extensive his previous education. Teachers of agriculture actively engaged in the work, or men and women who have had practical farm experience and who desire to prepare themselves for teaching, will find these courses particularly helpful.

A special effort is being made this year to provide such courses as will best meet the needs of agriculture as related to conditions arising out of the war. Courses in food production and food conservation, instruction for women in agricultural occupations, courses for teachers of agriculture and courses in homemaking will be offered.

INSTRUCTION

The instruction is given largely by the regular faculty by means of lectures, recitations, laboratory exercises and practical work (assistance is given from time to time by non-resident lecturers on special subjects). It is designed to offer plain, practical, direct information, to establish the underlying reasons as well as the method employed in the various operations. The work of the classroom is supple-

mented by demonstration work in the laboratory, dairy room, greenhouse and stables. The library of over 50,000 volumes offers exceptional opportunities for special study in agriculture, horticulture and related sciences.

ELECTION OF COURSES

Students will be required to elect courses to make not more than twenty-four nor less than twelve exercises each week. The arrangement of courses is such that students must follow certain lines of work. Those electing Field Crops, Market Gardening, Floriculture or Fruit Growing should also take courses in allied subjects, as noted in the description of these courses. In general agriculture more latitude is allowed, but it is expected that students will show a definite purpose in the selection of work. All elections, as well as any deviation from the regular rule, must be approved by the Director of Short Courses.

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. The number of scholarships is unlimited, and the stipend is sufficient to pay all the expenses of the holder for the course, such expenses usually amounting to from \$100 to \$150. A number of these scholarships have been awarded for the Massachusetts Agricultural College.

Applications for these scholarships should be made to The Jewish Agricultural and Industrial Aid Society, 174 Second Avenue, New York City.

AGRICULTURAL COURSES FOR WOMEN

In recent years women have entered agriculture in larger numbers than ever before, and there has been an increasing demand upon colleges to provide instruction to meet their special needs. A college trained woman with practical farm experience will have charge of the development of agricultural courses for women. Instruction in the technical subjects will be given by the staff; problems of practical management from the standpoint of women in agriculture will be considered in a series of conferences in charge of the woman supervisor of agricultural courses. Non-resident lecturers, particularly successful farm women in this and other States, will be present at several of these conferences to present practical problems.

The subjects offered during the Ten Weeks' Winter School will be of particular value to women who expect to manage their own farms or to assist in the management, to direct Land Army Camps, or to do farm work next year. The need for increased food production will be great during the next few years while industry is being reorganized. The opportunities for women in agriculture have increased very rapidly since the war and it is to be expected that a large number of women will enter agriculture for a life work as one of the results of their previous participation.

A special effort will be made to develop courses for women that they may receive the kind of instruction which will prove valuable to them later, so that they may fit into agricultural needs.

DESCRIPTION OF COURSES



A. GENERAL AGRICULTURE

1. Soil Fertility

The nature of soils, their properties and management, including: tillage, drainage; maintenance of organic matter; limes and liming; manures, their composition, value, preservation and use; and the properties and use of commercial fertilizers. Three lectures a week.

Professor Beaumont

2. 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 1 required. Two lectures and one two-hour laboratory period a week.

Professor Cooper

3. Types and Breeds of Livestock

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 livestock 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.

Professor McNutt

4. Livestock Feeding

A study of the physiology of nutrition, the composition of feed-stuffs, and of rational economic feeding. The feeding of dairy cattle and their management for profitable milk production receive first attention. Similarly, the feeding of horses, of beef cattle, of sheep and of swine are studied. Three lectures a week.

Professor McNutt

5. Animal Breeding

A discussion of the more common problems pertaining to the breeding of livestock, their explanation and solution; in-breeding; cross-breeding; grading. 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.

Professor McNutt

6. Dairying

(a) Testing milk and milk products: composition and properties of milk, Babcock test for fat, tests for acidity; moisture and salt in butter. Two lecture hours, one two-hour laboratory period.

(b) Manufactures: study of separators, separating, ripening cream, making starters, making butter, and making cottage cheese and other soft cheese. Two lecture hours, two three-hour laboratory periods.

(c) Market milk: a study of market milk conditions, production, care and handling; various types of dairy buildings. One lecture hour, one two-hour laboratory period.

(d) Dairy arithmetic: problems of the dairy. One two-hour laboratory period.

Professor Jamison, Mr. Drain, Mr. VanHorn

NOTE. — Dairy students are required to take (a), (b), (c) and (d); (a) only, open to other students.

7. 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

8. Animal Diseases and Stable Sanitation

Lectures upon some of the common diseases of livestock, giving special attention to methods of prevention, care and sanitation; the treatment of emergencies and accidents; how to keep animals healthy. Two lectures a week.

Professor Paige

9. Poultry Husbandry

The course consists of lectures on poultry house construction, winter egg production, incubation and brooding, feeds and feeding and marketing poultry and eggs. There are also one or two demonstration periods per week, depending upon the size of the class. Demonstrations or practical work in killing, picking, caponizing, sorting and packing eggs for market, judging fowls for egg production, studying types, and studying construction of incubators and brooders. Our equipment enables us to demonstrate various methods in housing and feeding. Practical work in running incubators is given to as many as can be accommodated. Class limited to 80. Five lectures and one two-hour laboratory period a week.

Professors Graham and Payne

B. HORTICULTURE



10. 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 Course 1, and it is recommended that they take Courses 18 and 19. Three lectures and one two-hour laboratory period a week.

Professor Sears

11. Market Gardening

This course is designed to acquaint the student with the business of market gardening as conducted in New England. It will consist of lectures, textbook assignments and laboratory exercises. The course will be divided into three principal groups: (A) the characteristics of the market gardening business from the standpoints of capital required, location, markets, site, area, soils and other fundamentals; (B) the application of general agricultural principles to the market gardening business; and (C) market garden crops in detail, with systems of production, in so far as the time will allow. Class limited to 30. Students electing market gardening are required to take Course 1, and it is recommended that they take Courses 18 and 19. Three lectures and two two-hour laboratory periods a week.

Professor Dacy

12. Floriculture

This course is designed to furnish those who have not the time to devote to a longer course with the theoretical and practical considerations essential to success in floricultural work. The course covers as thoroughly as time will permit those aspects of the work of especial interest to a commercial florist. Some of the topics considered are greenhouse construction, greenhouse management, and methods used by the progressive florist. Special trips to some of the up-to-date floricultural establishments in the State are arranged. Students electing this course will also be obliged to take Courses 1, 18 and 19. Five lectures a week; field trips on Saturday.

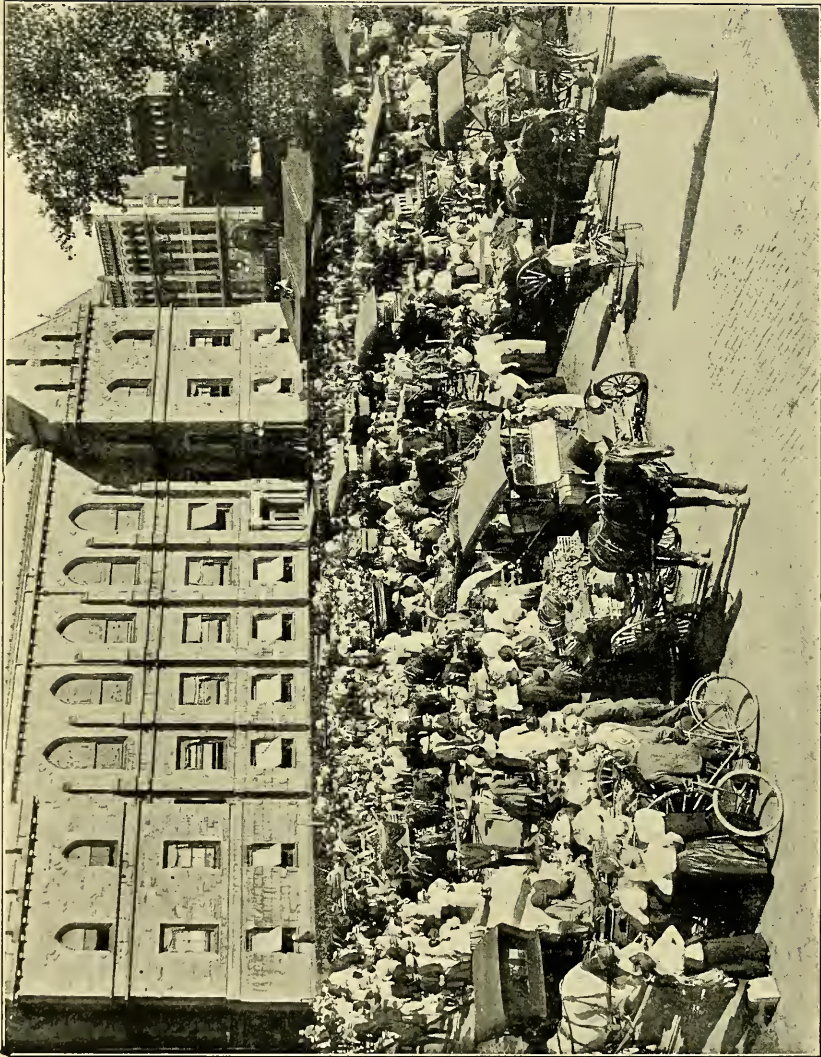
Mr. Whiting

13. Horticultural Manufacture

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 community and small commercial plants. The evaporation of fruits and vegetables. The various types of

equipment and methods of preparation. The manufacture of (a) fruit products, such as jams, jellies, butters, fruit juices, vinegar, pastes, etc.; (b) vegetable products, as pickles, piccalilli, sauerkraut, catsup, etc. A study of storage conditions as applied to fruits, vegetables and manufactured products. Two lectures and two laboratory periods a week.

Professor Chenoweth



Holyoke Market (one month after opening).

C. FARM BUSINESS

14. 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, Mr. Peacock*

15. 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. *Mr. Peacock*

16. 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-five lectures. Original study of particular product.

Department of Agricultural Economics

17. Sources and Use of Agricultural Credit

The course deals with the need, the sources, the methods of obtaining farm capital in New England. When and when not to borrow; length of loan, methods of payment, interest, amortization, loan associations, Federal land banks, mortgage credit, personal loans, collateral, and like practical topics are discussed. Safe and unsafe securities, notes, bonds, stocks and investments are discussed. Twenty lectures.

Department of Agricultural Economics

D. RELATED SUBJECTS

18. 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 lectures a week.

Professor P. J. Anderson

19. Entomology

A study of the insects causing most injury to farm, orchard, garden and greenhouse crops, and to domestic animals, with methods for their destruction or control. Closely correlated with the work in horticulture and agriculture. Three lectures a week.

Dr. Regan

20. Farm Mechanics

Study of tillage, seeding and harvesting machinery; steam and gas engines; practice given in babbitting and fitting bearings, lining shafts and pulleys, lacing belts and packing valves; use of concrete for floors, walks, foundations, tanks and posts. One lecture and two two-hour laboratory periods a week.

Professor Guinness

21. Rural Sanitary Science and Hygiene

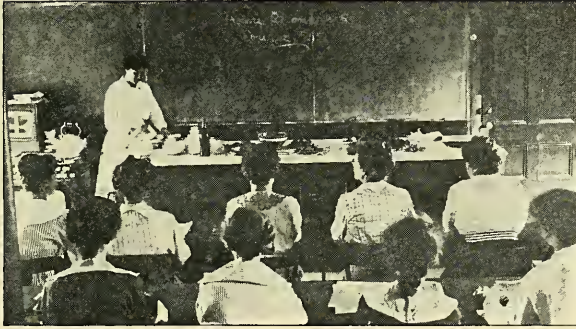
Significance of sanitary science in the relation to health; the theories of disease; air and ventilation; water and its protection; sewage, disposal and purification; foods, their care, preservation, decomposition and nutrition; vaccines and serum treatment; carriers of disease, immunity and susceptibility; infectious diseases; disinfection and care of infectious diseases. Two lectures a week.

Professor Marshall

22. Citizenship

A series of lectures dealing with present-day problems of citizenship, especially those related to the welfare of farmers and the agricultural industry, will be offered in connection with short course work. These lectures will be given by members of the college staff and non-resident lecturers. They will be open to all students.

E. HOMEMAKING



23. Foods and Conservation

This course will consist of lectures on kinds, composition, marketing, and care of foods. Special emphasis will be placed on cereals, vegetables, fruits, nuts, milk, eggs and fats. The possibility of food exchanges in the preparation of the three meals a day will be discussed. Considerable time will also be given to food conservation in such forms as canning, making of jellies and butters, drying, storing, and the elimination of wastes. Laboratory sections will give opportunity for the practical applications of methods discussed in the lectures. Three lectures and two two-hour laboratory periods a week.

Miss Skinner and Assistant

24. Home Nursing

A study of the fundamental principles of hygiene and their application in safeguarding the health of the farm family; simple diseases and their methods of prevention; the feeding and care of young children and invalids; home care of the sick; first aid to the injured.

Miss Skinner and Assistant

25. Clothing

The selection and purchase of suitable materials; a consideration of character, cost and durability from the standpoint of utility and economy; principles of design; practical work in sewing with instruction in the care and repair of clothing, remodeling of garments.

Miss Skinner and Assistant

F. VOCATIONAL AGRICULTURAL TEACHING

A joint arrangement is being made by which the Massachusetts Agricultural College will co-operate with the Massachusetts Board of Education in training teachers for vocational agriculture under the Smith-Hughes act. In addition to the pre-employment training of such teachers in undergraduate courses the college plans to co-operate in certain phases of the professional improvement work for the teachers in service. As one phase of this work employed teachers in agriculture or related subjects may occasionally be able to spend their professional improvement period at the college either during the winter short course period or during the summer school.

The department of Agricultural Education at the college under Professor Hart will co-operate with the agent for Agricultural Teacher-training of the State Board of Education, F. E. Heald, for the purpose of providing such courses in general education and special method as may supply the needs of men who may apply for such courses. While primarily intended for men now in service the courses will be open to high school teachers or other persons who have had the necessary farm experience and other qualifications, and who express their intention of entering the field of vocational education. The demand for such teachers far exceeds the supply, and every effort will be made to assist men to qualify.

During the winter short course period such persons would be able to obtain agricultural subject-matter courses. During the same period Professor Hart conducts an undergraduate course in Principles and Methods of Teaching, and the department offers a course in Special Methods in Vocational Agriculture. Arrangements will be made by which experienced teachers may enter these courses or may arrange conference work as individuals or in small groups.

The State agent for Agricultural Teacher-training will conduct during the entire term a seminar course covering the concrete applications of the fundamental principles of teaching to the situations

arising in vocational schools and departments of agriculture under the Smith-Hughes act.

An intensive course may be conducted for ten days or two weeks, beginning about December 30, if a sufficient number of men, who will be able to remain at the college only during a short period, demand such a course.

It is anticipated that similar courses may be offered for the summer term if it is apparent that enough teachers may have freedom and desire to attend such courses during the summer vacation.

If enough men should request any single subject-matter course to make it worth while, the matter will be submitted to the Director of Short Courses, who may be able to arrange special courses for the group of instructors.

A ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

J. C. GRAHAM, LOYAL F. PAYNE, LUTHER BANTA, *Instructors*

This course is designed for graduates of the agricultural vocational schools and others who wish to take a truly vocational course and can spend only one year at college. This course, beginning when college opens in the fall and extending through the college year, is limited to 12 students.

The institution of this one-year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and who feel they cannot spend either two or four years in doing it. This course is intermediate between the college course and the ten weeks' short course, and is designed to prepare the student for practical poultry keeping, either for pleasure or for profit. "Learn to do by doing" is our motto. A more or less detailed outline is given below and the general plan is as follows: the student devotes all his time to poultry work from the opening of college to January 1, at which time he drops all poultry courses except Course 1 and takes about 15 credits in Course 6. From the close of the winter short course, about March 10, until college closes, he again devotes all his time to poultry work. As will be seen, the short course brings the student in contact with other members of the faculty and acquaints him with important correlated work. As the class is limited to 12, it will be well for those who wish to take advantage of it to apply at once.

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 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. "The Standard of Perfection" will be used as a textbook. 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. 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, 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 October until December, inclusive, and from March until college closes.

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.

For further information concerning this course, write **POULTRY DEPARTMENT.**

GENERAL INFORMATION

Requirements for Admission

No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard, or greenhouse work is an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character. References are required and these are investigated before applicants are accepted.

Application for admission should be made as early as possible by filling out the blank on page 33 of this bulletin. It is sometimes necessary, when the registration becomes too large, to limit the numbers in certain courses. In limited courses, students are accepted in the order of registration as shown by date on application blank.

Those who are late in entering are admitted only on consent of the instructors in the courses desired.

Students should report to the Director on Monday, December 30, in order to begin work promptly on the morning of December 31.

Reports

At the close of the school all students will receive a formal report showing their standings in all courses in which they were registered.

Expenses and Other Information

A registration fee of \$5 is charged those who take the Ten Weeks' Courses. This fee is payable upon presentation of the application blank.

Living expenses in connection with the courses are about as follows:—

	Per Week.
Furnished rooms in private families	\$1.50-\$3.00
Board in private families	\$6.00-\$8.00

A lunch counter is operated in connection with the college dining hall, at which meals may be secured a la carte at very reasonable prices. There are also several restaurants in the village which offer very reasonable rates.

Students in each of the dairy courses must provide themselves with two white wash suits, and a white cap for use in the practical dairy work. The cost in Amherst is about \$1.35 for suit and cap.

Textbooks are required in certain courses, and their purchase is recommended in others. The cost of this item should not exceed an average of \$5.

A list of available rooms is furnished at registration time, and every effort will be made to see that all who come are comfortably located.

Rules and Regulations

Those who attend the short courses are expected to conduct themselves in a manner that will conform to the usages of good society.

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, constitute the standards 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 or dismiss students, but also to name conditions under which students may remain in the institution.

Chapel and Assembly

Previous to 1916 the limited seating capacity of the chapel precluded the attendance of Winter School students at morning chapel and Wednesday assembly. The new auditorium in Stockbridge Hall, seating one thousand people, now permits their attendance at the regular exercises. All Ten Weeks' Course students, therefore, will be required to attend Sunday chapel at 9 A.M., and mid-week assembly at 2 P.M. on Wednesday. These gatherings are all held in the auditorium in Stockbridge Hall.

Organizations

During the past several years winter course students have maintained an organization for social, recreative and study purposes. This organization has met each week during the course.

The Stockbridge Club is a student organization which holds meetings every week for the discussion of agricultural and horticultural subjects. Its meetings are often addressed by well-known specialists. Membership is open to students in the Ten Weeks' Courses.

The college Y. M. C. A. meetings, conducted by students and outside speakers, are held regularly on Thursday evenings, at 6.45 o'clock, in the chapel. There is also a students' Catholic Club, which holds periodical meetings. All winter school students are cordially invited to affiliate themselves with these organizations.

Social Events and Special Features

To the end that a spirit of friendship and acquaintance may be promoted among winter course students, a series of special meetings of interest to all will be arranged. While a large number of these meetings will be purely social, it is planned to have able speakers address the students occasionally, dealing with topics of general interest. A faculty committee has been appointed to attend to this matter. A committee will be appointed from among the winter course students to co-operate with the faculty committee in arranging these events.

The Library

The college library occupies the entire lower floor of the chapel building and contains nearly 52,000 volumes in addition to a large number of pamphlets. The equipment is such that the library ranks extremely well with the agricultural libraries of the country. Short course, as well as regular students, are able to find splendid material in every line of college work, especially in agriculture, horticulture, botany, entomology and sociology. The reading room is provided with a variety of magazines, encyclopedias and reference books, in

addition to the newspapers and agricultural weeklies. Branch libraries and reading rooms are maintained in some of the department buildings and these are open to short course students.

The library hours are from 8 A.M. to 9.30 P.M. excepting meal time every week day, and from 10 A.M. to 2 P.M. on Sundays. The librarian and his assistants are constantly on hand, ready and willing to be of assistance to short course students.

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 Professor P. B. HASBROUCK, Registrar, Amherst, Mass.

B. The 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. A branch station in cranberry culture is maintained in another section of the State.

The station considers the farmer's 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 FRED W. MORSE, 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 WILLIAM D. HURD, 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 Vocational Courses, the Summer Schools, write or apply to JOHN PHELAN, Director of Short Courses, Amherst, Mass.

THE MASSACHUSETTS AGRICULTURAL COLLEGE

TEN WEEKS' COURSES

Application Blank

I hereby make application for admission to the Ten Weeks' Courses which are to begin Dec. 30, 1918. I am enclosing the registration fee of five dollars (\$5) in cash, check or money order. (Designate which one.)

Name (Mr., Mrs., or Miss).....
Date of birth..... Date of application.....
Street address..... Post office.....
State..... Present occupation.....
Previous education.....
Reference (name and address).....
.....
Name and address of person to notify in case of illness or accident.....
.....

Check subjects you wish to take and mail blank, enclosing fee, to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

Group A. General Agriculture

Soil Fertility
Field Crops
Types and Breeds of Livestock
Livestock Feeding
Animal Breeding
Dairying
Dairy Bacteriology
Animal Diseases
Poultry Husbandry

Group B. Horticulture

Fruit Growing
Market Gardening
Floriculture
Horticultural Manufacture

Group C. Farm Business

Farm Management
Farm Accounts
The Supply and Marketing of Farm
Products in Massachusetts
Sources and Use of Agricultural Credit

Group D. Related Subjects

Botany
Entomology
Farm Mechanics
Gas Engines
Tractors
Rural Sanitary Science
Citizenship (special lectures)

Group E. Homemaking

Foods and Conservation
Home Nursing
Clothing

Group F. Vocational Agricultural Teaching

NOTE.—Registration fee must accompany this application. Make check or money order payable to the MASSACHUSETTS AGRICULTURAL COLLEGE.

Fee.....
Date received.....
Reference.....











