

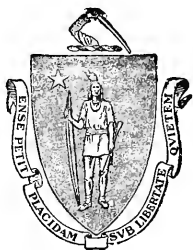
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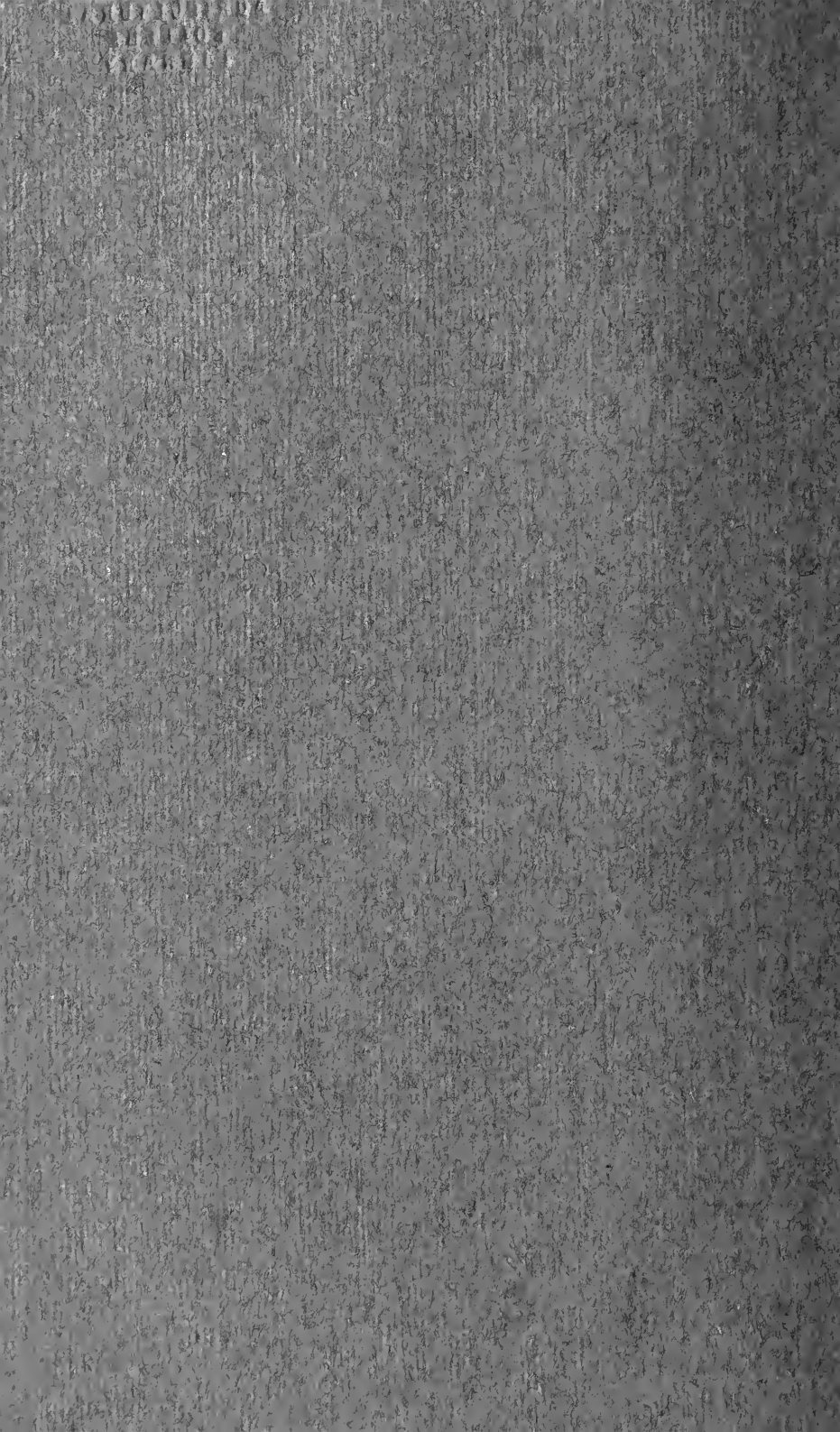
## REPORT OF THE EXTENSION SERVICE FOR TWO YEARS

1909-1911



Amherst, Massachusetts

Entered as second-class matter at the Postoffice, Amherst, Mass.



Massachusetts Agricultural College Bulletin

**REPORT OF**  
**THE EXTENSION SERVICE**  
**FOR TWO YEARS**

1909-1911



Amherst, Massachusetts

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**LETTER OF TRANSMITTAL**

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PRESIDENT KENYON L. BUTTERFIELD:

SIR:—I herewith present my report as Director of the Extension Service of the College from September, 1909, to October, 1911.

Respectfully submitted,

WILLIAM D. HURD,  
Director.

Amherst, Mass., November 1, 1911.



## The Organization of our Agricultural Colleges and the Growth of Extension Work.

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In the year 1862, just at the time of the fiercest heat and turmoil of the Civil War, there was introduced into the United States Congress by the Hon. Justin S. Morrill of Vermont, a bill apportioning 30,000 acres of land to each Senator and Representative in Congress to which the States were entitled,

“To establish at least one College where the leading object shall be, without excluding other sciences and classical studies, and including Military Training, to teach such branches of learning as are related to Agriculture and the Mechanic Arts, in such manner as the Legislatures of the States shall respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.”

(Extract from Morrill land grant act of 1862)

This bill was immediately signed by President Lincoln, and, had there been no emancipation proclamation, this one act of providing for education in agriculture and the mechanic arts, with its consequent results on the development of this nation, would have been sufficient, in itself, to make the name of Lincoln immortal.

As a result of this act of Congress, there have been established in this country some sixty Agricultural Colleges and State Universities.

When these Colleges were first started the science of agriculture was new; only a few years previous to the civil war, Liebig and other chemists had begun to study chemistry in its relation to agricultural development. Little had been done in botany, entomology, zoölogy or physics toward directing study in these sciences along economic lines, and the application of modern mechanics to agricultural implements and equipment was hardly dreamed of.

It soon became evident to the pioneers in the development of agricultural education in this country that before sound, systematic instruction could be given to students, or to farmers, it was necessary, through research work, to find out facts and establish a fund of agricultural knowledge. In order to accomplish this, the “Hatch act” of 1887 was passed by Congress, appropriating \$15,000 annually to the several states for the purpose of establishing Experiment Stations to carry on this necessary research work.

But, as time went on, these Colleges, supported in most cases entirely by State and Federal funds, began to realize that in order to provide a “liberal and practical education for the industrial classes in the several pursuits and professions of life,” they must carry their instruction one step further than the teaching of young men and women who were fortunate enough to be able to come to the Colleges, and the conducting of this research work. They realized that, to fulfill their obligations to the people of the respective states who supported the institution by taxation, they must make the teachings of the College and the results of the experimental work at the Station available

to all the people, and that this must be carried out to all parts of the state in a well planned, systematic and dignified way. So, to meet this obligation, there have been organized in some of these colleges during the past fifteen years, departments of "Extension Work."

Now, a well organized Agricultural College does three distinct, yet closely related, types of work.

1. **Academic work.** (Teaching of resident students.)
2. **Research work.** (The Experiment Station.)
3. **Extension work.** (The carrying of the teachings of the College, and the results of the work of the Station, to all parts of the state, by men trained for this particular work.)

The Massachusetts Agricultural College has included in the organization of its Extension Work the various short courses that are offered. These are described later in this report.

Making our Agricultural Colleges more useful to the people of the states has resulted, as might be expected, in creating a sympathetic and appreciative attitude on the part of the people for this extension work. Five years ago, only four Colleges had definite departments for the development of this work. (Of course, more or less lecturing and other unorganized work has been carried on by the faculties of these institutions ever since they were established, but little had been done to systematize the work.) Today, there are thirty-three institutions which are attempting to organize this work in a definite way. The organization of Extension Work, aside from its effect on the economic development of the country, has been necessary because so many demands from outside the College were being made on teachers and investigators that the teaching of regular students and the progress of the experimental work were being seriously interfered with.

## What Extension Work Is, and What Some People Think of it.

"Extension teaching in agriculture embraces those forms of instruction in subjects having to do with improved methods of agricultural production and with the general welfare of the rural population, that are offered to people not enrolled as resident pupils in educational institutions."

Definition given by Committee representing Association of  
Agricultural Colleges and Experiment Stations.

"A college, to be of any great value, must grow out of the community in which it lives, and must be in absolute touch with the community, doing all the good it can, and doing what the community needs. . . . Any institution not in close touch with the community about it is doomed to wither and die. . . . The institutions about us today which are doing the most in the way of helping their respective communities are the great state universities of the Middle West. We must learn to do those things which they are doing."

PRESIDENT LOWELL of Harvard.

"These colleges of agriculture are forcing a new definition of education. . . . All persons in the Commonwealth are properly students of a

state educational institution, but very few of them have yet registered, nor is it necessary that any great proportion of them should leave home in order to receive some benefits of the institution. It is the *obligation of such an institution to serve all the people*, and it is equally the obligation of all the people to make the institution such that it can exercise its proper functions, and all this can be brought about without sacrificing any worthy standards of education.”

DEAN BAILEY of Cornell University.

“Extension teaching is both a state and a national problem, since through its agency a solution may be found for many distressing economic situations. . . . As a means of getting in touch with the farm, the home and the school, and giving a new impulse to their activities, and of harmonizing the effort of town and city so that they may work together for their mutual uplift, no other phase of educational work yet devised promises so much.”

PRESIDENT A. M. SOULE of Georgia State College.

“The great work of extension teaching is to benefit men and women; and the benefit is not to be confined to the increase of production of crops nor the securing of larger profits from the business of farming. They are legitimate and even fundamental, but our task is a far larger and more significant one than this. It is nothing less than the carrying on of a great campaign for rural progress, which shall affect the intellectual culture, the social prerogatives and the moral welfare of all individuals who live upon the land.”

PRESIDENT BUTTERFIELD of Mass. Agricultural College.

“If the nation and the state were to wait the slow process of educating only those who apply to the agricultural colleges for class instruction or to wait for the instruction given by bulletins to affect the power of production, this country would not soon be able to solve the world’s food problems. We dare not wait. This nation must continue to be an exporting nation. The great call, therefore, must be a call for protection for the boys and girls of today and tomorrow. The need is for instruction and for inspiration for the mass of producers.”

PROFESSOR J. H. MILLER of Kansas Agricultural College.

“The farmer must be reached with information adapted to his needs if agriculture is to improve sufficiently and rapidly enough to supply the increasing population through future years. Only a short time ago there was a dearth of information of value to agricultural people; now there is more than can be effectively distributed with the present machinery. Methods of education in agriculture adapted to resident students have been developed, and a vast amount of reliable knowledge adapted to practical use by farmers has been accumulated through researches and investigations by the experiment stations and like agencies. But the educational system has failed to reach the masses, and particularly it has failed to get the known truths of agriculture into the practice of the every-day farmer. The present methods of dissemination are confessedly inadequate. Some system of extension teaching is therefore a necessity if agriculture in the United States is to develop in time to meet the needs of the multitudes who are to people this country in years to come.”

JOHN HAMILTON, in Circular No. 98, Office of Experiment Stations, U. S. Department of Agriculture.

The Association of Agricultural Colleges and Experiment Stations, three years ago, recognized the standing the work had attained, and organized a section of it coordinate, in organization and representation, with the **College** and the **Station**.

The National Grange, at its last two sessions, has passed strong resolutions asking that the several states provide liberally for the development of this work.

Men prominent in industrial development, like James J. Hill, and President Brown of the New York Central R. R. lines, are strongly urging Extension Work as the greatest means of educating the American farmer in the New Agriculture.

The Massachusetts State Grange, in session at Worcester during the past two years, have passed resolutions and strongly urged in their reports on the college and experiment station support for Extension work.

The following resolutions were passed at the 1910 session:

"Whereas, the Massachusetts Agricultural College has established extension work as a part of its general policy, and is endeavoring in this way to be added help to the farmers of Massachusetts, be it therefore

"Resolved, By the Massachusetts State Grange, in annual session assembled in Worcester, Mass., Dec. 13, 14, 15, 1910, that we cordially endorse this extension work of the Massachusetts Agricultural College, and that we urge the Legislature to make adequate appropriation for the same. And be it further

"Resolved, That we specifically endorse the idea of a campaign of education through the extension work of the Massachusetts Agricultural College for the benefit of the milk producers and milk consumers of the state."

The following extracts are taken from the report of the Committee on Agricultural College and Experiment Station adopted by the State Grange session of 1911:

Speaking of the extension work, the report says on page 92 of the Proceedings, ". . . . We do not believe you have any business representing the Patrons of Husbandry here or anywhere else, if you cannot go home and urge your representative to vote early and often for the appropriation of needed funds by the next Legislature to carry on the work. . . . Some of the best features have had to be cut out because of the financial condition.

"Your Committee on Agricultural College and Experiment Station earnestly recommend and strongly urge the committee on legislation of the State Grange, as well as the individuals of this body, to use all influence possible to see that the requests of the trustees of the Massachusetts Agricultural College for appropriations should be granted."

The above resolutions were passed without a single dissenting vote.

Massachusetts has been one of the first to recognize the need of extending the usefulness of the College to all sections of the state. The Legisla-

ture of 1909 appropriated the sum of \$7,500 for the development of Short Courses, and a Director of Short Courses was appointed to develop this work. Calls for help began to come in to the College in large numbers. These were met, so far as was possible, but the greater bulk of the work done was more truly Extension Work than that pertaining strictly to short courses. The Legislature of 1910 increased the appropriation for "Short Courses and Extension Work" to \$15,000 for the ensuing year. The Trustees of the College changed the title of the work from "Short Courses" to "Extension Work," that the name might be more in keeping with the work actually being done. The work was made coordinate in rank with the academic work, the Experiment Station and the graduate school, and a Director was placed in charge.

The Legislature of 1911 increased the appropriation for the ensuing year to \$20,000. The work is now tentatively organized according to the plan outlined later in this report.

We believe that it is just as possible to develop sane, dignified, systematic and scientific instruction for the people of the state as it is for College students, (although teaching the former is conceded to be the more difficult task.)

President Lowell says: "It is as easy as can be to entertain the public; it is an extremely difficult thing to instruct it."

Instruction and not entertainment, is what is constantly kept in mind at all times in the development of our Extension Work.

### **THE EXTENSION SERVICE STAFF**

At the present time the following list comprises the staff for carrying on the Extension Work:

WILLIAM D. HURD, Director.

EARNEST D. WAID, Assistant Director.

ALVAH J. NORMAN, Extension Instructor in Pomology.

GEORGE F. STORY, Extension Instructor in Dairying and  
Animal Husbandry.

CHARLES H. WHITE, District Field Agent, Worcester Co.

ALBERT R. JENKS, Supervisor of Correspondence Courses and  
Editor of Extension publications.

Dr. Alexander E. Cance has had supervision of the agricultural survey work of the past summer, and Professor F. B. Jenks devoted some of his time to extension work in agricultural education, but neither of these men receive salary from Extension Work funds.

The extension work carried on by the College cannot begin to be measured by what is done by the men who devote their whole time to the work. About twenty-five members of the regular faculty give time, and in some cases much time, to the extension service.

The Experiment Station is always ready to give liberally of material and time of Station men in the furtherance of the work, and most of the departments of the College cooperate heartily when demands are made upon them.

## ORGANIZATION OF THE EXTENSION SERVICE AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

### A. Short Courses given at the College.

#### (a) Winter School.

1. Ten Weeks' Winter Courses. (Twenty-one courses.)
2. Short Poultry Course.
3. Farmers' Week.
4. Bee Keepers' Course and Convention.

#### (b) Summer School.

- The Summer School. (Thirty-one courses.)  
Conference for Rural Social Workers.

### B. Special Days for Foreigners, Agricultural Organizations, Etc.

### C. Instruction given away from the College.

1. Correspondence Courses. (Fourteen courses.)
2. Lecture Courses and Demonstrations. (Thirty lecturers, One hundred and sixty subjects.)
3. Conferences for Community Development.
4. Extension Schools of Agriculture.
5. Educational Trains. (Steam and trolley.)
6. Educational Exhibits, with Lectures and Demonstrations at Fairs.
7. Demonstration Orchards.
8. Dairy Improvement Associations.
9. The M. A. C. Agricultural Improvement Association.
10. Agricultural Surveys.
11. Advisory Work with Individuals, State Institutions, etc.
12. Publications, "Facts for Farmers," etc.
13. Student Extension Work.
14. Faunce Demonstration Farm.
15. Boys' and Girls' Clubs.
16. Demonstration Plots.
17. Traveling Libraries.
18. Coöperation with Various Organizations already in Existence.
19. District Field Agents.
20. Information by Correspondence, etc.

## ENROLLMENT AND STATISTICS

1910-1911

	1910	Enrollment 1911
Ten Weeks' Winter Course .....	65	113
Special Poultry Course .....	51	74
Farmers' Week.....	559	830
Bee Keepers'.....	19	16
Summer School .....	228	153
Conference of Rural Social Workers.....	325	247
Correspondence Courses.....	206	370
	1363	1803
Totals,		

(Several organizations have held meetings two days in length at the College. No accounting is made of the attendance at these.)

## STATISTICS OF EXTENSION WORK DONE AWAY FROM THE COLLEGE

### Lectures and Demonstrations.

	1910	1911	Total.
Requested .....	123	600	723
Impossible to give.....	69	222	291
Lectures and Demonstrations given.....	54	378	432
Attendance (no actual count, but fully) 20,000.			

### Educational Trains.

Boston and Albany—			
Days on road.....	4	none.	
Stops made.....	18	none.	
Springfield Trolley—			
Days on road.....	3	none.	
Stops made.....	13	none.	
Lectures and demonstrations given on both trains .....	250	none.	
Total attendance at lectures (hundreds of others visited the train), 9,000.			

### Exhibits at Fairs, Expositions, Etc.

Exhibits at Fairs .....	6	10	16
Lectures and demonstrations given .....	32	69	101
Attendance both years, 3,000.			

(Thousands visited the exhibits, asked questions, and received instructions from the attendants.)

### Demonstration Orchards.

Requests for orchards on file.....	31	99	130
New orchards planted .....	4	4	8
Renovation plots .....	2	2	4

### M. A. C. Agricultural Improvement Association.

Membership.....	0	110	110
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### Boys' and Girls' Corn and Potato Clubs.

Number of clubs.....	125	350	
Number enrolled .....	8,300	16,900	25,200
Total number enrolled in two years, 25,200.			

### Conferences for Community Betterment.

Number held .....	2	4	6
Total number attending, 1,000.			

### Dairy Improvement Association.

Number organized.....	0	2	2
Requests for others .....	0	3	3
Number of members.....	0	52	52

**Massachusetts Poultry Association.**

(Meetings at College.)

Attendance ..... 75                      75                      150

**Bee Keepers' Convention.**

Attendance ..... 0                      75                      75

**Polish Farmers' Day.**

Attendance ..... 0                      95                      95

Total number known to have been actually reached through the Extension work during the two years,

**61,848**

Among the things not listed here, several State Institutions have been visited, scores of individuals have been personally helped in the management of their estates, several hundred persons in towns near Amherst have been helped through the Student Extension work, and hundreds of letters have been written in answer to specific questions.

As yet, no system has been devised so that an accurate record of this miscellaneous work could be kept.

**Description of the Work That Has Been Carried On.****(A) SHORT COURSES GIVEN AT THE COLLEGE.****1. Ten Weeks' Course.**

The Ten Weeks' Winter Course comprises courses in soil fertility, field crops, breeding of live stock, feeding of live stock, dairying, dairy bacteriology, veterinary science, poultry management, market gardening, landscape gardening, floriculture, forestry, botany, entomology, the development of the community, farm buildings and machinery, farm accounts, farm mechanics, rural sanitary science, and meat production and marketing.

The courses are given by twenty-eight members of the regular faculty, most of whom are heads of departments, so that those who attend these courses are given the best of instruction.

A total of 178 men and women have been enrolled in these courses during the past two years. Several of these were graduates of other colleges, and all of those who attended either already owned farms or were looking forward toward purchasing land in the near future.

Aside from the regular faculty, an exceptionally able corps of non-resident lecturers have assisted in giving the courses. Last year's list included Robert Thompson, St. Catherines, Ont.; Alex. McNeill, Ottawa, Can.; George A. Drew, Greenwich, Conn.; J. H. Hale, South Glastonbury, Conn.; A. Warren Patch, Boston, Mass.; Prof. C. D. Jarvis, Storrs, Conn.; H. L. Frost, Arlington, Mass.; Charles E. Lyman, Middlefield, Conn.; W. H. Elliott, Brighton, Mass.; Eber Holmes, Montrose, Mass.; M. A. Patten, Tewksbury, Mass.; C. W. Ward, Queens, Long Island, N. Y.; C. H. Totty, Madison, N. J.; W. N. Craig, North Easton, Mass.; F. J. Elder, Tarrytown, N. Y.; R. O. King, North Tonawanda, N. Y.; E. J. Canning, Northampton, Mass.; J. Otto Thilow, Philadelphia, Pa.; H. P. Hinckley of Armour & Co., Springfield, Mass.



These practical men have added materially to the work given by the regular faculty.

Up to the present year no tuition has been charged in this course. A registration fee of \$5.00 will be charged in the 1912 Short Course. The only other necessary expenses are for board and room.

The Ten Weeks Courses furnish the best of instruction for those who can spend but a limited time in securing practical and up-to-date information.

The next course opens January 2, 1912.

## 2. **The Short Poultry Course.**

To meet demands from the poultrymen of the state a short course, two weeks in length, has been given during the past two years. The instruction has covered the breeding, care and management of poultry, the operation of incubators and brooders, feeding of poultry, fattening, killing and dressing, scoring and judging, poultry house construction, diseases of poultry, and small fruits, vegetables, etc., as adjuncts of the poultry business. The work of the regular faculty has been supplemented by such well known poultry experts as John H. Robinson, Boston, Mass.; Prof. James E. Rice, Cornell Univ.; D. J. Lambert, Kingston, R. I.; Henry D. Smith, Rockland, Mass.; Prof. F. C. Elford, St. Anne de Bellevue, Quebec, and Prof. Stoneburn, of Storrs, Conn.

The completion of the College poultry plant and the employing of Prof. J. C. Graham as head of that Department will give much better opportunity for satisfactory short course work. There were one hundred and twenty-five in attendance at this course during the past two years.

It is now planned to give a ten weeks short course in this subject the coming winter, and in place of the two weeks Poultry Course to have a Poultry Convention, lasting one week. Expert poultrymen will be engaged to help with the instruction at that time. The dates for this convention are March 4-8, 1912.

## 3. **Farmers' Week.**

"Farmers' Week" was established two years ago for the benefit of those who could not leave their farms for more than a few days at a time, but who were desirous of obtaining more and better information on agricultural subjects. The work begins on Monday night and continues through Friday afternoon, each day and evening being filled full of lectures and demonstrations on various subjects. In the past, the work has followed three distinct lines, a full week's work being given in each.

1. *Section on General Agriculture*, including soil fertility, crops, animal breeding and feeding, dairying and poultry raising, with lectures and demonstrations in each subject.

2. *General Horticulture*, including fruit growing, vegetable gardening, floriculture, ornamental horticulture, forestry, and the diseases and insects injurious to plant growth.

3. *Women's Section*, problems of food, clothing, sanitation and home decoration, with valuable demonstrations of each subject.

Features of past Farmers' Weeks have been the "Corn Show," the "Fruit Show," and the "Dairy Show," which have created much interest. Competitive judging contests have been held. The 1911 Dairy Show had the largest number of entries of market milk of any show yet held in New England.

At least one session of Farmers' Week has been devoted to a discussion of the subject of "Community Development."

As a result of the discussion aroused at the 1911 Farmers' Week, the Massachusetts Dairymen's Association (Inc.) and the M. A. C. Agricultural Improvement Association were organized. These and other state agricultural associations are planning to hold their meetings annually in connection with Farmers' Week at Amherst. Most of the regular faculty assist in the program of Farmers' Week. Some of the leaders in Practical Agriculture and Rural Development are brought to the College each year for the benefit of those who attend.

Among those who have helped during the last two years are: Hon. J. Lewis Ellsworth and P. M. Harwood of Boston; Director L. A. Clinton, Storrs, Conn.; Miss Isabel Bevier, University of Ill.; Miss Helen Louise Johnson of "Good Housekeeping"; Doctor Austin Peters, Boston; Doctor T. N. Carver, Harvard College; Miss Anna Barrows, Teachers' College, Columbia University; Rev. N. H. Hoagland, Tyngsboro, Mass.; Doctor J. V. W. Boyd, Springfield; Charles M. Gardner, Westfield; Mrs. George S. Ladd, Sturbridge; F. W. Rane, Boston; George T. Powell, New York City; Miss Sarah Louise Arnold, Simmons College; Leon S. Merrill, Orono, Me.; Doctor David Snedden, Boston; Mrs. Ellen H. Richards, Mass. Institute Technology; George S. Ladd, Sturbridge; Prof. C. S. Wilson, Cornell University; Prof. F. W. Taylor, Durham, N. H.; Miss Bertha E. Shapleigh, Columbia University; Prof. J. M. Trueman, Storrs, Conn.; Elmer D. Howe, Marlboro; Doctor H. J. Webber, Cornell University; Mrs. Mary Schenck Woolman, Columbia University, W. E. Riley, Dalton; Mrs. Arthur J. Hopkins and Prof. F. B. Loomis of Amherst College; Miss Zaidee Brown, Mass. Library Commission; Rev. Margaret Barnard, Rowe; Miss Elizabeth Jenkins, Sandwich; Mrs. Margaret Wright, Billerica; George E. Taylor, Jr., Shelburne; Perley E. Davis, Granby; Harry S. Chapin, Sheffield, and George E. Stickney, Newburyport.

The attendance has been most gratifying, 1,384 being enrolled during the two years. Farmers' Week is one of the most valuable features of our Extension work, and plans are now being made to make the 1912 Farmers' Week, to be held March 11—15 next, one in which there will be given more practical instruction than ever before.

#### 4. **The Bee Keepers' Course.**

This course is given the last week of May and first week in June each year. It is a course in which great interest is shown. The work is given under the direction of Doctor Burton N. Gates, assisted by several other members of the faculty. The work given includes lectures on bee-keeping equipment, rearing of queens, construction of different kinds of hives, comb

and extracted honey, the handling and hiving of bees, diseases of bees, crops for honey bees, the relation of bees to the pollination of plants, the structure of the honey bee, bee keepers' supplies and practical demonstration of handling bees in the College apiary.

In 1911, a Bee Keepers' Convention was held as a closing feature of the Short Course, to which seventy-five from all parts of the state came. Aside from the regular faculty of the College, the following experts in bee keeping assisted in the course and in the program of the convention: A. A. Byard, Westchester, N. H.; Mrs. Anna Botsford Comstock, Cornell University; Doctor James P. Porter, Clark College; E. R. Root, Medina, Ohio; Arthur C. Miller, Providence, R. I.; O. F. Fuller, Blackstone, Mass., and H. F. Cary, Lyonsville, Mass. A very fine exhibit of bee keepers' supplies and apparatus was made by the College and several firms dealing in these goods. The attendance in the course for the two years has numbered 31. The course will be held in 1912, May 29—June 12.

## THE SUMMER COURSES.

### 1. The Summer School.

The Summer Schools of the last five years have been eminently successful, and have commanded much attention, not only in this country but in foreign lands as well. It was unique in that it was the first Summer School of Agriculture to be held in which courses intended to cover the whole sphere of country life were offered. Several other colleges have now copied after it and are offering similar courses. The work is laid out to be especially helpful to school teachers, principals, superintendents, school committees, farm owners, householders, suburban residents, country clergymen, grange officers, librarians, and others interested in the country life movement.

The courses offered during the last two years have been as follows: Soils and tillage, field crops, domestic animals, dairying, poultry management, fruit growing, gardening, trees and shrubs, forestry, home economics and domestic science, agricultural education, rural economics, rural sociology, the church and the rural problem, coöperation, rural literature, landscape gardening, chemistry, plant life, botany, bird life, entomology and bee keeping.

Twenty-three members of the College faculty have given the work. Besides these, the following instructors from other institutions have assisted: Prof. Robert Matheson, Cornell University (Entomology); Arthur C. Monahan, Turners Falls (Chemistry); C. J. Maynard, West Newton, Mass. (Bird Life); Miss Harriet Rinaker, University of Illinois (Home Economics); Rev. W. L. Anderson, Amherst, Mass. (Church Problems); Miss Mabel Carney, Macomb, Ill. (School Problems); Rev. E. Tallmadge Root, Providence, R. I., and Rev. Warren H. Wilson, New York City (Church Problems); Miss Annette Chase, Simmons College (Home Economics), and Prof. J. C. McNutt, New Hampshire State College (Animals).

Some of the best known educators and thinkers in this country in Rural Social Science have delivered evening lectures before the Summer School.

Prominent people from all walks of life have attended the Summer School, and have been very enthusiastic over the help and inspiration they have received. These same people have gone to other communities and to other states, and have started similar work, which is having a marked effect on the agricultural development of those regions.

Because of insufficient funds to carry on all the Extension work outlined in this report, the Summer School will be omitted in 1912.

The value of the Summer School in the estimation of those who attend perhaps can best be shown by introducing here a copy of the resolutions offered and unanimously adopted by the students themselves at the close of the 1911 Summer Course.

"We, the members of the M. A. C. Summer School of 1911, wish to put on record our hearty appreciation of the opportunities and privileges that have been so generously offered us at the State College. The wide range of subjects, the high quality of the instruction, the beauty of the location, and the friendly social atmosphere have all contributed to make the month spent in this environment a season to be remembered.

"The interest felt in a school of this kind is shown by the size and character of the enrollment this summer, which has included persons of widely differing interests and needs—a large proportion of them men—gathered from all parts of the state and even from other states. Teachers, business men, students, prospective farmers, clergymen and housekeepers have found in the various courses both the information and the inspiration needed for their work.

\* \* \* \* \*

"The dissemination of agricultural knowledge and household science and familiarizing the public with the widespread menace of our insect and fungous pests would seem enough to justify the continuance of the Summer School as a part of the Extension service of the College. And through their sojourn here outsiders have become acquainted with the farming possibilities of the state—an acquaintance that, in some cases at least, is likely to result in the buying of homes here.

"We, the school of 1911, earnestly hope that the opportunities we have enjoyed here may again be available. It is with profound regret that we learn of the doubtful prospect for a session next summer, for the discontinuance of this work would be a distinct step backward in Massachusetts education.

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"The personal influence of every one of us will certainly be exerted to make the M. A. C. Summer School a permanent thing."

ARABELLA H. TUCKER,  
A. EUGENE BARTLETT,  
MARY B. ROBINSON,  
MRS. A. E. BARTLETT,  
RALPH A. WISWALL,  
CHARLES D. MACDONALD,  
DANIEL FOLEY,  
MARY CHALMERS,  
S. ELIZABETH BELCHER,  
JOSEPH L. RICHARDS,

Committee on Resolutions.

RESOLUTIONS RECEIVED FROM THE CONFERENCE OF RURAL SOCIAL  
SOCIAL WORKERS, 1911.

"We, the members of the Conference of Rural Social Workers and of the Summer School for Clergymen of the Massachusetts Agricultural College, desire to express our deep appreciation for the suggestions, instruction, inspiration and broader vision of the needs and opportunities in our different fields of labor, which we have received at this Second Annual Conference.

"We desire to thank President Butterfield, Director Hurd, the members of the College faculty and all others who have made our stay so pleasant and profitable.

"It is somewhat humiliating to those of us who are graduates of theological seminaries to have received our highest inspiration and vision for the most efficient work in the ministry, not in our denominational schools but in an Agricultural College. We rejoice, however, that this service is being done and that the vital importance of religious and social work is recognized by those in charge of this institution.

"We recommend that as many country and city ministers, together with laymen and women, as can possibly do so, from all New England, attend the next annual Conference."

[Signed], MERRITT S. BUCKINGHAM,  
THOMAS H. DERRICK,  
L. M. POWERS,  
Committee on Resolutions.

Amherst, Mass, Aug. 4, 1911.

It is to be hoped that funds will permit the resuming of the Summer School, with additional courses and other desirable features, in 1913.

The attendance during the last two sessions of the Summer School has been 383.

## 2. **The Conference of Rural Social Workers,**

As a closing feature of the Summer Schools of the past two years, and corresponding to Farmers' Week as a closing feature of the Winter School, except that, in this case, questions of how to develop the community are given more attention than practical farm problems, a Conference for those interested in building up the life of the rural community has been held. Representatives of granges, village libraries, schools, churches, town governments, village improvement associations, boards of health and other organizations have been present each year for about four days, and discussed their problems together in a frank, informal way. The mornings have been given up to group meetings, the afternoons to general conferences, and each evening some speaker of international reputation has addressed the gathering.

Among the best known of those who have taken part in these conferences are: Prof. Charles Zubelin, Winchester, Mass.; Doctor S. A. Knapp, Washington, D. C.; Doctor Josiah Strong, New York; Albert E. Roberts,

New York; Mr. Henry Israel, New York; Miss Louise Holmquist, New York; Richard B. Watrous, Washington, D. C.; Myron T. Scudder, New Brunswick, N. J.; Warren H. Manning, Boston; Miss Helen Holmes, Kingston, Mass.; Miss Caroline Hunt, Washington, D. C.; Howard Bradstreet, New York; Mrs. Marie Garland, Buzzards Bay, and Dr. Liberty Hyde Bailey, Cornell University. Besides these named, most of the state organizations and commissions interested in agricultural development were represented on the program.

As a feature of the 1911 Conference, a Rural Social Service Exhibit was held in the Drill Hall. The following organizations contributed to the great success of the enterprise by showing the work they were doing in a graphic way: The County work of the Y. M. C. A., the Country Church, the Federation of Churches, the Agricultural Press, the State Library Commission, the Faunce Demonstration Farm, the Old Colony Union, the State Board of Agriculture, the Deerfield Industries, Smith's Agricultural School, Carnegie House of Northampton and the various departments of the College and Experiment Station. The whole formed a most valuable and interesting feature of the Conference.

The State Board of Education, the State Board of Health, the State Library Commission, the Federation of Churches, the Massachusetts Civil League, the New England Home Economic Association and the County Work of the Y. M. C. A. have already decided to cooperate with the College for the holding of a third conference during the summer of 1912, each furnishing a part of the program. Other organizations will, no doubt, decide later to provide programs for their sections. The dates of the 1912 meeting are set for June 28—July 3.

People who are interested in community betterment come from all parts of the state to attend this conference. They are given a chance to tell of their work. They secure new ideas from others. The progress of the movement toward a better country life is brought to their attention. They return to their communities with new courage and enthusiasm for the direction of more intelligent effort. The principal theme of these conferences has been "Coöperation and Federation of forces for the betterment of the whole community—and how this may be accomplished." The number enrolled in the conferences of the last two years was 582.

## **(B) Special Days for Agricultural Organizations, Foreigners, Etc.**

### **1. Agricultural Organizations.**

It has been especially pleasing to the College to have organizations, such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners, Breeders' Associations, Milk Inspectors, and others of a similar nature, meet frequently at the College. Usually a program of one or two days is provided, largely by the College faculty. These meetings serve the two-fold purpose of giving the members of these organizations a chance to inspect the equipment and see the work

that is being carried on by the College, and it also gives the College men a chance to find out the needs of the men engaged in the various lines of agriculture. It is to be hoped that organizations like those named above, and others, will continue to meet at the College even more frequently than in the past.

## 2. **Polish Farmers' Day.**

Some of the best farms in towns adjacent to Amherst are being purchased by Polish farmers, and this section of the Connecticut Valley is fast passing from the ownership of native New England stock into the hands of emigrants from Poland. The Polish people are sturdy and industrious. They are here to stay, and the sooner the College does its part in making not only good farmers but good American citizens out of these people, the better it will be for all concerned. In order to show these people that the College was ready to aid them, a "Polish Farmers' Day" was arranged last March and an invitation was extended to the Polish farmers to come to the College. It was very gratifying that ninety-five intelligent men eager to learn something of the science of agriculture came, and there was never gathered within the College buildings a more interested or appreciative audience. Talks on selecting onion seed, fertilizing onions, what feeds to buy for dairy cattle, and the ways by which the College could aid the Polish people were given by members of the faculty. A stirring address on "The needs of the Poles becoming good American citizens," was given by Mr. John Romaszkiwisc, President of the National Polish Alliance of America. Prof. R. F. Nelligan of Amherst College spoke on "How to get strong and how to keep strong." Mr. Frank Gribko, a Polish farmer of Sunderland, discussed the growing of onions, and Dr. G. W. Tupper of Boston, told them of "What the Polish people had done for America."

Mr. K. J. Wolski of Holyoke acted as interpreter in a most able manner.

Before the close of the meeting, the Polish farmers asked if the College would assist them in organizing a coöperative onion growers' association. This will be done during the coming winter. They also asked that another day be given for their benefit early in 1912.

Our Polish Farmers' Day has commanded much notice by other colleges and organizations interested in work for foreigners, and we are told that this effort was widely heralded in the press of Poland.

Recently the Jewish Alliance requested that the College do similar work for Jewish farmers.

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NOTE.—Bulletins and circulars describing each of the Short Courses are issued from time to time. These give in detail the courses, the instructors, the cost and other information. They are furnished free on request to the Director.

## (C) Instruction Given Away from the College.

### 1. The Correspondence Courses.

At the time the Extension Work was started, calls came from all over the state from persons who could not come to the College even for the Short Courses, for instruction by correspondence. The following courses are now being given: 1. Soils and Soil Improvement. 2. Manures and Fertilizers. 3. Field Crops. 4. Farm Dairying. 5. Fruit Growing. 6. Market Gardening. 7. Animal Feeding. 8. Floriculture (divided into four parts). 9. Farm Accounts. 10. Agriculture for Secondary Schools. 11. Agricultural Education. 12. Bee Keeping. 13. Forestry. 14. Shade Tree Management. A course on injurious insects is being prepared, and so many calls are coming in for a correspondence course in poultry management, that this should be offered next year.

The lessons are prepared by our own faculty, and are therefore thoroughly adapted to Massachusetts conditions. These are neostyled and sent out in a neat cover, one lesson at a time. Each lesson is accompanied by a list of questions. When these are answered, the next lesson is sent. The lessons are supplemented by books. A uniform charge of \$1 is made for each course, and when text-books are required these are furnished at list price. The numbers who have desired to enroll in these courses have been so great that it has been necessary to stop taking in more students each year.

The Correspondence Courses reach people who cannot take advantage of the help offered by the College in any other way. There are great possibilities in these, and they should be developed further, and should be given more and better attention by the College than has been possible in the past.

The total registration for the past two years was 476.

### 2. The Lecture Courses and Demonstrations.

The renewed interest in agriculture manifested on all sides by city dweller and countryman alike has resulted in a large number of calls on the faculty for lectures and demonstrations. The calls come from granges, farmers' clubs, schools, boards of trade, men's clubs in churches, woman's clubs, Y. M. C. A.'s, village improvement associations, lodges and other organizations. Our lecture course circular contains the names of more than thirty members of our faculty who stand ready to give lectures on more than 160 subjects. So far as is possible, without interfering too much with the regular College or Station work, the lectures are given free, provided the meetings are open to the public and the traveling expenses of the lecturers are paid by the organization making the request. About 700 requests for lectures have been received during the past two years, and only about one-half of these requests could be met. When possible, and if desired, a practical demonstration on the subject under discussion is given. The following demonstrations have been called for most commonly in the past: Clean milk production, Babcock testing, scoring live stock, scoring and judging poultry, spraying fruit trees, packing apples, pruning and grafting, corn judging, and demonstrations of handling bees.



To help meet the demands made on the College for lecturers, our "Lecture without a Lecturer" scheme has been devised. A stereopticon, slides, and written lecture are sent out to responsible parties, when it is impossible for a member of the Faculty to go. The subjects and slides, which will be ready the coming winter, are: Clean milk production, Apple growing, Types and breeds of animals, history, uses and culture of corn, Potato growing, Home and school ground decoration, and The organization and work of the Massachusetts Agricultural College.

### 3. **Conferences for Community Development.**

Largely as an outgrowth of the inspiration received from the meetings at the College during Farmers' Week, and more especially through the Conferences for Rural Leaders, several communities have asked the College to assist in holding meetings in which problems of town improvement have been considered. These conferences have been held in West Newbury (two years), Sandwich, Walpole, Rowe and Kingston. In West Newbury and Sandwich, leagues for town improvement have been organized. Such organizations already existed in Walpole and Kingston.

The programs at these meetings have included agricultural lectures of interest to each community, such as corn or potato culture, fruit growing, poultry management, or dairying. Lectures on village improvement, county work of the Y. M. C. A., boys' clubs, playgrounds and recreation, etc. A free discussion has followed, and usually a program of work is laid out for the town. The meetings are well attended, usually from 200 to 300 being present. Surrounding towns send delegates, who in turn carry the ideas gained back to their own towns, thereby making the results of the Conference far reaching. The Conferences in Walpole and Kingston have aroused enough interest so that the citizens have petitioned the College for our regular Extension Schools in 1912.

### 4. **Extension Schools of Agriculture.**

For the first time in New England, this College is offering to the people of the state, Extension Schools, similar to those which have been so popular among the people of Ohio, Indiana, Wisconsin, Iowa and some other western states. The plan of these schools is as follows:

A corps of Extension instructors go to a town in which the citizens have guaranteed a sufficient attendance and a suitable hall properly heated and lighted, free of charge, for five days' definite instruction in courses selected by the community.

The College is offering the following courses this year: 1. Soils and crops. 2. Dairying. (These two courses are required.) As optional courses a selection may be made between fruit growing, vegetable gardening, poultry management and a home makers' course for women. Six hours of instruction are given each day, and registration and attendance is required. The instructors provide themselves with demonstrative apparatus, securing animals, poultry, etc., from the immediate neighborhood when necessary.

The Extension School differs from the single lecture, the two day conference or the Farmers' Institute, principally in that the instructors give from five to ten lectures on one general line of work, so that enough of any subject is given to be worth while and the work can be properly systematized. These Extension Schools, when their real worth becomes known, are sure to be sought after by live agricultural communities in every county.

### 5. **Educational Trains—Steam and Trolley.**

In the spring of 1910 the College, in cooperation with the State Board of Agriculture, the State Dairy Bureau and the State forester, equipped and operated two "Better Farming Trains." The first was run over the lines of the Boston & Albany R. R., and covered four days in time. All the equipment (five cars) and dining car service was furnished free of charge by the railroad company. Stops of one to two hours in length were made. From four to fourteen lectures and demonstrations were given at each place. The following places were visited: Westfield, Pittsfield, Cheshire, North Adams, Chester, Springfield, Enfield, New Salem, Athol, Templeton, Barre, Ware, Palmer, East Brookfield, Worcester, Westboro, South Framingham and Milford. The five cars contained exhibits and demonstrating apparatus used in the lecture work, illustrating the results of the Station's work and methods of teaching the subjects in the class room, in crop production, cattle feeding, dairying, fruit growing and poultry management. The State Forester equipped one car with forestry materials, fire fighting apparatus, etc. A corps of about a dozen lecturers from the College and the other organizations already mentioned, accompanied the train.

Two weeks later, what is believed to be the first "Trolley Farming Special" was run over the lines of the Springfield and Worcester Electric Ry. This trip lasted three days. The equipment in this case, too, was furnished free of charge by the railway company. The exhibits and the personnel of the lecturers were similar to those of the Boston & Albany train. The "trolley special" had the advantage over the "steam special" in that it reached towns that had never before been visited by a similar undertaking. Lectures and demonstrations were given at the following places: Amherst, South Hadley, Russell, Huntington, Springfield, North Wilbraham, Brimfield, Sturbridge, Charlton Center, Oxford, Worcester, Holden and Sterling. This "better farming train" work is valuable work. It reaches large numbers of people at small cost. The railroads are glad to contribute toward developing the region through which their lines run. The College proposes in the future to have the railroads place cars at its disposal, to be used for several weeks, attaching them to regular trains and leaving them at a station for half a day at a time. More than 250 lectures and demonstrations were given on these two trips. They were listened to by more than 8000 people, and hundreds of others visited the train.

At the suggestion of the manager of the Springfield and Worcester Electric Ry. Co., a "Corn Special" is to be run over the trolley lines of Central Massachusetts in the near future. The lectures and demonstrations will be furnished by the College. The prize exhibits will be gathered from growers

all over the state, and other interesting exhibits pertaining to corn growing and dairying, as a related industry, will be placed in the cars. One car is to be given over solely to boys' and girls' club work. This "corn special" will no doubt be fully as successful as the other trains have been in carrying the gospel of the new agriculture to all towns that can be reached.

## 6. Educational Exhibits, Lectures and Demonstrations at Fairs and Expositions.

The managers of many of the Agricultural Fairs in the state are desirous of making these institutions of more educational value to those who attend, and have asked the College to coöperate with them in bringing this about.

During the past two years, educational exhibits have been made at Barnstable (two years), Worcester, Clinton, Greenfield (two years), Amherst (two years), Northampton (two years), Topsfield, Framingham and Amesbury; also at the New England Corn Exposition held in Worcester in 1910, at the National Corn Exposition held in Columbus, Ohio, at the New England Industrial Exposition lasting a full month in Boston, and at the Massachusetts Corn Show held in Springfield.

For this work a large tent is furnished by the Fair Association. In this the exhibits are arranged around the outside with a platform and seats in the center.

The exhibits are supplemented by five or six short, practical talks and demonstrations each day. Such subjects as these are used: Stock judging, apple packing, fertilizers, corn judging, Babcock testing, spraying, pruning, stock feeds, etc. Good sized audiences listen with fine attention to these lectures and demonstrations.

Besides this work, in connection with the exhibits, many fairs are now employing college men to act as expert judges. This places this work on a different plane than it has been in the past.

The educational work at fairs is worth continuing and developing further. George E. Taylor, president of the Franklin County Agricultural Society, says, "The work done by the College is the most valuable feature which the fair has ever introduced." This work has been carried on at sixteen fairs. Over one hundred lectures and demonstrations have been given to more than 3,000 people, and hundreds have visited the exhibits and secured information from the attendants.

## 7. Demonstration Orchards.

There never was a time when there was as much interest in orcharding in New England as at present. It has been proven beyond any question that fruit of the highest grade can be grown here if the right methods are practiced. In order to demonstrate what proper treatment will do, and also to have these examples where a large number of people will profit by seeing them, demonstration orchards are being placed in good fruit growing regions all over the state. The plan followed is that the College furnishes enough trees for about five acres, a spraying outfit, and supervises the planting of

and caring for the orchard. The owner of the land signs a contract to carry out the directions of the College for fifteen years, during which time the owner receives any income from the orchard. For renovation orchards the period is five years. New orchards have been placed on the farms of Geo. C. Thurlow, West Newbury; E. B. Clapp, Westhampton; Arthur Fish, Colrain; Frank T. Haynes, Sturbridge; C. A. Wilson, Medway; L. B. Dickinson, Granville; C. W. Maynard, Enfield, and C. M. Ottman, North Adams. Renovation orchards are on the farms of J. C. Paige, Hardwick; George B. Flood, North Adams, and S. Lothrop Davenport, North Grafton.

The educational work planned is to hold pruning, spraying and fruit packing demonstrations at these orchards each year. At these meetings orchard management is discussed. Those interested in orcharding are invited to attend these meetings. Several in each community where our orchards are located have set out new plantations and are handling these in accordance with the directions laid down by the College. It is estimated that 25,000 trees will be set out in the neighborhoods where our demonstration orchards are located in 1912.

Careful data are being kept as to the cost of growing these orchards. One orchard has already given a net return of \$24 an acre for each of the two years since planting, from hoed crops between the rows. The renovation work has also given the best of results.

Eight new orchards have been planted and three old orchards have been renovated. We have 130 applications for orchards on hand from men who are extremely desirous of having more of this valuable work carried on.

Other Extension work in Pomology consists in giving lectures and demonstrations on fruit topics, visiting farms, advising as to selection of land, planting and caring for orchards, etc. About thirty-five regular College students have gone out during the spring vacations to supervise the pruning and spraying of orchards belonging to citizens of the state.

The Extension instructor in Pomology gives about one-third of his time to teaching regular College classes in the department of Pomology.

### **8. Dairy Improvement Associations.**

The number of dairy animals in Massachusetts is decreasing each year. The chief trouble seems to be that the dairy business is unprofitable under the present system of management. Other states have found that the best means of educating dairymen and to stimulate interest in this industry, was to organize Dairy Improvement or Cow Test Associations, the records of which show the unprofitable animals, cost of production and money brought in from the sale of the product. Two Dairy Improvement Associations have already been organized here, one in the Connecticut Valley and one in Norfolk County. This department furnishes record blanks, and the Extension instructor in Dairying assists in the organization of these associations, supervises the work of the official tester and acts in an advisory capacity to the members.

Other Extension work in Dairying consists in giving lectures and demonstrations on breeding, feeding, stock judging, Babcock testing, clean milk

production, horse and swine breeding, conducting judging contests, planning barns, giving advice as to dairy farm management, visiting farms and assisting individual dairymen and stockmen whenever this is desired. A directory of all breeders in the state is being prepared.

Calls are on file asking that other Dairy Improvement Associations shall be organized. This will be done as soon as competent men can be found to take up the work of doing the official testing.

The Extension instructor in Dairying assists in teaching the regular classes in Dairying in the College.

### 9. **The M. A. C. Agricultural Improvement Association.**

This is an organization of ex-students of the College, who are farming in the state, banded together according to the wording of the constitution adopted:

"To promote the agricultural development of the state by carrying on experiments and demonstrations that shall benefit all parties interested in progressive farming, by forming a more perfect union between the Massachusetts Agricultural College and its former, present and future students to enable them to act in unison for the betterment of rural pursuits; by using and encouraging the use of better seeds and animals and by the organization of coöperative societies for plant and animal development; by the dissemination of literature bearing on recent agricultural investigations and development; and by holding an annual meeting to report on all progress that has been made and on future work beneficial to the members of the Association."

The membership the first year numbers 110. Improvement work on corn, potatoes, pastures, and in the use of fertilizers is being carried on this year. The annual meeting is to be held during the next Farmers' Week at the College.

It is expected that this Association will do as much for Massachusetts agriculture as similar organizations have done in Ontario, Wisconsin, Missouri and other states.

### 10. **Agricultural Surveys.**

It has been pretty generally agreed that much more effective educational work could be carried on if definite information was at hand in regard to actual conditions in rural communities. The College has had in mind for some time the making of a broad, comprehensive survey of certain towns, this survey to later extend over the entire state. The complete survey should include a soil survey, a farm management inventory, the extent of different crops, dairies, poultry plants, orchards, etc., the income from each and a careful inquiry into the educational system, and the social, moral, religious and governmental conditions of these communities.

The United States Department of Agriculture has offered to co-operate with us in this work by making the fundamental soil survey and assigning men for the farm management inventory. Several other organizations are

looking to the College for help in making surveys along the lines in which they are particularly interested.

During the past summer, under the direction of Doctor Alexander E. Cance and two College students, quite a comprehensive survey was made of the town of Belchertown. Data has been gathered from more than 200 farms. This is now being put into shape for future use. The experience gained from this survey will aid materially in the development of future work.

Considering the liberal offer made by the United States Department to help in the work, and the great need of reliable information along the lines mentioned, it would seem that a complete and extensive survey of rural Massachusetts should be made as quickly as possible.

#### **11. Advisory Work with State Institutions, Individuals, etc.**

We have felt for some time that some coöperation should exist between the College and the other state institutions in the handling of their agricultural projects. Governor Foss, last spring, in one of his messages, strongly recommended such coöperation. To determine whether this coöperation would be welcomed by the superintendents, and was desirable and feasible, the Director of Extension Work sent a letter to each of the twenty-eight state institutions, outlining a plan and asking the superintendents for a frank statement of their feelings in this matter. More than twenty have now replied, and in all cases these officials not only feel that coöperation is desirable and feasible but will welcome any help the College can give, and are glad to have their farms used for demonstrations or in any other way that will benefit the region in which their institutions are located. The Legislative budget of the Extension department for the coming year contains an item asking for sufficient money to work out this relationship as it should be done. It is certainly highly desirable.

More calls than ever are coming from individuals asking that men from the College come to their farms to advise them how to manage them. It would be highly desirable if the College could help all those who ask for this advice, but the number of calls coming in (several each week) makes this utterly impossible.

The policy of the College in doing this kind of work is a matter which should be decided in the near future.

#### **12. Publications of the Extension Department.**

This department publishes each year bulletins and circulars describing the Winter Courses, Farmers' Week, Summer School, Bee Keepers' Course, Conference for Rural Leaders, Correspondence Courses, Lecture Courses and other activities.

There seemed to be a need of the College having on hand for distribution a series of short, terse, practical leaflets, covering subjects which are asked about most frequently by farmers. To meet this need, "Facts for Farmers" is now published monthly. The subjects treated in these leaflets up to the present time are as follows:

September, 1910, Vol. 1, No. 1. Directions for Selecting Corn for Exhibition. Wm. D. Hurd.

October, 1910, Vol. 1, No. 2. Fall Spraying for Massachusetts Orchards. A. J. Norman.

November, 1910., Vol. 1, No. 3. The Possibility of Keeping Bees. B. N. Gates.

December, 1910, Vol. 1, No. 4. Some Good Books for Farmers and Others Interested in the Affairs of the Country. C. R. Green.

January, 1911, Vol. 1, No. 5. Pruning of Shade Trees. G. E. Stone.

February, 1911, Vol. 1, No. 6. Top Grafting Fruit Trees. A. J. Norman.

March, 1911, Vol. 1, No. 7. Feeding for Milk Production. P. H. Smith.

April, 1911, Vol. 1, No. 8. Home Mixed vs. Factory Mixed Fertilizers. H. D. Haskins.

May, 1911, Vol. 1, No. 9. Summer Spraying. A. J. Norman.

June, 1911, Vol. 1, No. 10. The Feeding and Care of Chicks Hatched Artificially. J. C. Graham.

July, 1911, Vol. 1, No. 11. Home Vegetable Gardening. C. S. Heller.

August, 1911, Vol. 1, No. 12. Fruit for Exhibition. A. J. Norman.

September, 1911, Vol. 2, No. 1. Pig Feeding. G. F. Story.

October, 1911, Vol. 2, No. 2. Clean milk. W. P. B. Lockwood.

A list of desirable books on Agriculture and Rural Social Science is usually kept on hand for distribution.

There is need of popular bulletins on Corn, Potatoes, Clean Milk, Fruit Growing, Poultry and other subjects. These should contain information gleaned from the Station bulletins, but should be well illustrated and present the facts which farmers wish to know in a non-technical way. The department hopes to be able to begin the publication of such bulletins within the next year.

All the publications of the Extension department are free to those who wish them. A permanent mailing list is being prepared. Those whose names are placed on this list will receive all the publications as fast as they are issued.

### 13. Student Extension Work.

During the past two years, under the direction of Mr. Charles H. White, about thirty of the regular students of the College have been engaged in Extension work in the small towns within a radius of twenty-five miles of Amherst. Some of the towns reached have been Cushman, Sunderland, Leverett, Shutesbury, Pelham, Belchertown, South Amherst, Hadley, Dwight, South Hadley, Granby, Conway, Ashfield, Hatfield, Shelburne Falls, Three Rivers, Cummington and Northampton.

The work has consisted in teaching English to foreigners, coaching athletic teams and supervising contests, organizing debating societies, giving talks on clean living and "true sportsmanship" to boys, conducting religious services, giving musical entertainments, giving talks on agriculture, acting as judges at grange, fairs, etc. The work, no doubt, is of much benefit to these communities, but more than that it instills into the minds of our

College students a spirit of service for others which they would not otherwise get and better qualifies them to take up the leadership which their College education should fit them for in their home communities.

#### 14. **The Faunce Demonstration Farm.**

Four or five years ago Doctor Faunce, the village physician of Sandwich, died, and among his bequests was one granting some land and a certain sum of money, the income of which was to be used to benefit the town industrially and especially in an agricultural way. Four residents of Sandwich were appointed trustees of these funds, and, not knowing just what was the best thing to do they appealed to the College for help. The President turned the matter over to the Director of the Extension Service, and after consulting with the trustees and other members of our faculty, a plan for using the land for a demonstration farm was presented to the trustees and accepted by them. The farm has since been under the direction of the Extension department.

Mr. Albert W. Doolittle was secured as superintendent. Three lines of work, adapted to that region, were started, namely: Small fruits, vegetables and poultry management. About eight acres of land are now utilized for these three purposes. Every effort has been made to keep all demonstrations within the possibility of every resident of the town. Fruits and vegetables have been raised at a profit. One hundred and thirty-five pullets have yielded more than \$400 income above the cost of feed within the year. The land, crops and poultry plant have been used as a laboratory for teaching these subjects to children in the schools. The larger boys have helped to construct the poultry houses and other equipment used on the place. Mr. Doolittle has been of much service to farmers of that region by going out to farms and also advising those who came to him. Steps are now being taken to establish a department of agriculture in the high school. Cape Cod is being shown, in a way that does not bear contradiction, that there are still possibilities there for young men in at least the lines that are being developed at Faunce farm. The whole community has taken on new life. A two day meeting was held in Sandwich last spring, using this farm as a center.

#### 15. **Boys' and Girls' Clubs.**

These have been organized and conducted under the direction of Professors W. R. Hart and F. B. Jenks of the Department of Agricultural Education.

There are now about 350 Corn and Potato Clubs in the State, having a total membership of 16,900 (10,000 in the potato clubs, and 6,900 in the corn clubs).

Seed corn and seed potatoes for planting are furnished by the College. Competitive exhibits are held each autumn, the plan being to bring the best exhibits from the different clubs to one of the larger agricultural shows in the State each year.



About seventy-five meetings of teachers, superintendents, and patrons of the schools have been attended and addressed. 200 conferences have been held with school officials and teachers concerning definite problems. Twelve circulars of instruction have been published. Great interest has been shown in the work and it is confidently expected that the membership in the corn and potato clubs will reach 25,000 in 1912.

#### 16. **Demonstration Plots.**

So far, aside from the work done through the M. A. C. Agricultural Improvement Association, little has been done toward placing demonstration field crop plots in different sections of the State. However, co-operating with the U. S. Department of Agriculture (R. A. Oakley) four pasture demonstrations have been placed in the vicinity of Amherst. The results of fertilizing and seeding without plowing are being tried and after some information is secured, the work will be extended.

A co-operative test of the ear row method of planting corn has also been carried out with the students of Smith's Agricultural School in Northampton.

It would be highly desirable to have plots showing the results of the use of fertilizers on grass land, rotation of crops, good seed selection, and so forth, scattered all over the State, and as soon as proper supervision can be given, this work will be extended.

#### 17. **Traveling Libraries.**

As soon as the Correspondence Courses began to develop and the reading of certain standard agricultural books was recommended to the students, it was discovered that very few of the rural libraries had any books whatever, dealing with agricultural subjects.

Some of the leading book publishers have generously loaned us about 160 of the newest and best agricultural books. From these, four traveling libraries have been made up, and these are loaned to small towns, without cost. The books remain in a library for from four to six weeks, giving the librarian a chance to look them over and decide which to place on the shelves. The books may also be taken out by patrons of the library for a limited time.

The libraries are in great demand and a dozen of them could be kept in constant circulation if we had them on hand. Considering that a good many libraries in Massachusetts do not have more than \$25 to \$50 to expend annually for books, the sending out of these traveling libraries is another way in which the College can be extremely helpful to the smaller rural communities.

#### 18. **Co-operation with Existing Organizations.**

It has been the aim from the beginning, of those who have the Extension Work in charge, to co-operate with agencies already existing, rather than to create new machinery for the development of extension teaching in agriculture. Rejuvenation of dormant organizations and federation of living organizations have always been urged.

**The State Board of Agriculture.** The College has always entered heartily into any projects put forward by the State Board of Agriculture, and when

invited to do so, our faculty help in the Farmers' Institute Work under the direction of the Board. On the other hand, so far as is known to the Director of Extension Work, all requests of the Board from the College have met with equally hearty approval.

**The Grange.** The College is frequently called upon by the officers of the State Grange and subordinate granges for assistance in various ways, and we always try to meet these demands and to help in the furtherance of the work of the order in every way possible.

**The County Work of the Y. M. C. A.** A new force for rural betterment has recently entered the field. The Y. M. C. A. which has carried on such virile work for young men in the cities has now extended its organization into rural districts. Four counties are now organized in Massachusetts. The county secretaries realize that a community which is economically prosperous is much more apt to have better moral conditions than one which is not prosperous. These secretaries are not experts in agriculture and they are depending on the College to furnish the technical information which will help build up the agriculture of the counties in which they are stationed. Programs for agricultural days under the auspices of the County Work of the Y. M. C. A. have already been given in a half dozen towns of western Massachusetts, and requests have been received for several other such programs during the coming winter.

**Tent Evangelistic Work.** The federation of churches has maintained for several years in the hill towns of western Massachusetts, a gospel tent. The tent, with a corps of religious workers remains in a community for ten days or two weeks. Those who have had these meetings in charge have endeavored to reach the people by holding at least one agricultural day in each place. Members of our faculty have given the program at eight such days and in as many different places during the past two years.

**City Y. M. C. A.** The Secretaries of city Y. M. C. A.'s always alert to the needs of their communities, have conceived the idea of having courses in agriculture along lines of interest to suburban residents. These courses are given along with courses in engineering, mechanics, bookkeeping, and so forth, which have been maintained by these organizations for some years. Eight evening lectures on fruit growing and eight on poultry raising were given by our faculty under the auspices of the Springfield Y. M. C. A. last winter. The work proved so popular that a more extended course was asked for during the coming winter. A similar request came from Worcester and it has now been arranged that members of our faculty will give twenty-three lectures in Worcester and twenty-six lectures in Springfield during the coming winter. The subjects covered are soil fertility, fruit growing, gardening, floriculture, poultry management, dairying, forestry, and several single lectures of general interest.

Other cities are now asking: "Why cannot this be done for us, too?"

This account of co-operation with other agencies might be extended almost indefinitely. More or less work has been done with Boards of Trade, men's clubs, women's clubs, Village Improvement Associations, and other organi-

zations. The range of possible work with these organizations is limited only by the number of men available for it.

#### 19. **District Field Agents.**

Those in charge of the Extension Work have had the feeling that if the services of Extension instructors were valuable when these men traveled all over the State, their work could be made of much greater value if their efforts were confined to a smaller area, where they could become more familiar with existing conditions. The plan of placing graduates of the Agricultural College out into good agricultural towns has been carried on with the greatest of success in Ontario. In order to try the plan out in Massachusetts, Mr. Charles H. White, for the last two years Field Agent in our Extension Department, has been appointed District Field Agent, with headquarters at North Uxbridge. Mr. White will live on and operate his farm, and will confine his efforts chiefly to the southern part of Worcester County. Mr. White will visit farms, finding out what the needs of the region are. He will bring to the farmers of that section the best advice which can be furnished by the heads of the various departments at the College. He will co-operate with agricultural organizations, granges, and other clubs in arranging programs. He is available for consultation by farmers on questions of farm management at all times.

The work has already started in a most encouraging way, and bids fair to open up a new field of usefulness for the College.

#### 20. **Information by Letter.**

It would be utterly impossible to give any accurate estimate of the helps given to people, not only of this State, but of all parts of the world, by letters from the various departments of the College. The inquiries cover nearly every imaginable subject, and the letters sent out yearly number up into the thousands. The College always endeavors to give all the information possible in a prompt, courteous way.

### **What the Extension Service Has Accomplished.**

1. It has systematized the scattered work heretofore done by the several members of the faculty.

2. Through the various Short Courses, the best of instruction has been given to several hundred people who could come to the College for a short time only.

3. Through the lectures, demonstrations, demonstration orchards, Dairy Improvement Associations, traveling libraries, and personal visits to farms, trains, fair exhibits, extension schools and other activities, reliable information has been carried to thousands who could not come to the College for it.

4. Through the Correspondence Courses, men and women have been able to pursue systematic study and still attend to their business or professional duties.

5. By means of the Summer School and Conference for Rural Social Workers, teachers, clergymen and others concerned in building up the educational and social life of rural regions have obtained a new conception of the function of the various organizations in the community, and the part they may play in community betterment. Many communities have taken on new life, due chiefly to the inspiration received by some person at the Summer Conference. This influence has by no means been confined to Massachusetts, but has reached to all sections of this country.

6. Agriculture, in the broader sense, in this State, has received much stimulation at the hands of the faculty, through the several extension activities.

7. Through the Extension work, the equipment of the College, and the knowledge possessed by the experts on the faculty are made more useful to the citizens of the State who support the College.

8. The Extension work has been carried on through agencies already existing, thus helping to make these organizations more useful and effective. During the two years we have co-operated with the State Board of Agriculture, the State Department of Education, the Dairy Bureau, the State Forester, Boards of Health, county work of the Y. M. C. A., State Grange Boston Chamber of Commerce, and other Boards of Trade, Village Improvement Societies, city Y. M. C. A. fairs, Men's and Women's Clubs, and many other organizations interested in rural problems.

9. Through the Extension work, the College becomes more nearly a "Public Service Institution."

## Future Needs of the Extension Service.

Nothing will add more to the prosperity of the Commonwealth, or will do more to develop the resources of the State than well organized and efficiently conducted Extension work in Agriculture. At the present time, the College is able to respond to only about one-third of the calls made upon it for help. The future development of the work is greatly retarded, due to the lack of sufficient men to carry on the work, and depends entirely on the financial support given by the State for this valuable work. Citizens of the Commonwealth are demanding that these helps should be given them. Since this money is all used directly to build up the agriculture of the Commonwealth, funds to meet these demands should be appropriated.

The Trustees of the College will ask the Legislature of 1912 for an appropriation of \$50,000 with which to develop this work. The following seem to be the most important lines of work at the present time:

1. **Administration of the Work.**—Salaries, office equipment, traveling expenses, clerical help, and so forth.

2. **The Development of the Correspondence Courses.**—Salary of supervisor, office equipment, clerical help, and so forth, so that at least 1,000 may register in these courses.

3. **Itinerant Instruction.**—The Extension Schools, Fair exhibits, Educational trains, lectures, demonstrations, etc., require money for apparatus

and to defray the expenses of carrying on these, which are perhaps among the most important of our projects.

4. **Agricultural Surveys.**—In co-operation with the United States Department of Agriculture, to begin a thorough survey of the entire State.

5. **Demonstration Orchards.**—To continue to plant these orchards and to provide help to supervise the growing of them.

6. **"Traveling Instructor."**—To pay salary and expenses of a man provided with an automobile or covered "van," equipped with all kinds of demonstrating apparatus, to travel from town to town giving demonstrations to small groups of farmers.

7. **Demonstration Plots.**—To provide funds so that demonstration plots showing results of the use of fertilizers, seed selection, rotation of crops, and so forth, can be placed all over the State and properly supervised by a representative from the College.

8. **Supervisor of Co-operative Work with Other State Institutions.**—Funds to pay salary and traveling expenses of a man with the best of practical training to take up this co-operative work that has been asked for by the other State institutions.

9. **Support for the M. A. C. Agricultural Improvement Association.**—Funds to provide selected seeds, printed instructions, and other material to be used as a basis for improving the agricultural industry of the State.

10. **Extension Instructor in Rural Engineering.**—To provide salary and traveling expenses of a man, trained in the problems of farm buildings, power on the farm, heat, lights, and rural sanitation.

11. **Extension Instructor in Town Improvement and Civic Betterment.**—Funds to pay the salary of a man to work with village improvement officers, town officers, and others, on such subjects as beautifying the town, public roads, drives, parks, school grounds, cemeteries, streets, trees, and so forth, and to organize and federate all the forces of the community to work for one common end.

12. **Extension Instructor in Agricultural Education.**—To pay the salary and traveling expenses of a man to help school boards in the organization of agricultural work in High Schools and to take up and develop further the Boys' and Girls' Club work which has already started so finely.

13. **Extension Instructor in Home Economics.**—To provide salary and expenses of a woman trained in this subject, especially from the rural standpoint, to give instruction in the Short Courses, to teach in the Extension Schools, to give lectures and demonstrations on foods and their value, cooking, canning, preserving, sanitation, labor-saving conveniences, household equipment, and to help in the introduction of these subjects into the smaller towns.

14. **District Field Agents.**—To pay salary of men to be located in good agricultural centers, to act as district field agents, devoting their entire time to the building up of the agriculture of the section in which they work.

15. **Extension Instructor in Poultry Management.**—To provide salary and expenses for a trained poultry man to give his time to helping the poultry interests of the State. At present, we cannot accept one-tenth of the calls made upon us.

The reading of this account of the Extension Work carried on by the Massachusetts Agricultural College during the last two years ought to convince everyone that **real extension work** is in no way an "advertising scheme." As time goes on, it is our desire to develop as systematic and efficient a system for educating the people of the State as has been worked out for college class rooms.

The time has been reached when we must look forward to the education of the people, if future economic conditions are to be met. This country is now no more than self-supporting in the production of food materials. At the present rate of increase in population, we are told that we must look forward to feeding, clothing, and giving employment to more than 200,000,000 of people in 1950. There is no more land available today than when this country was first discovered. Along with this development of the practical side of agriculture, there must come, hand in hand, a change in the educational, the social and the economic sides of country life. This means greatly increased production and improved rural conditions, and these must be brought about largely through the education of the masses.

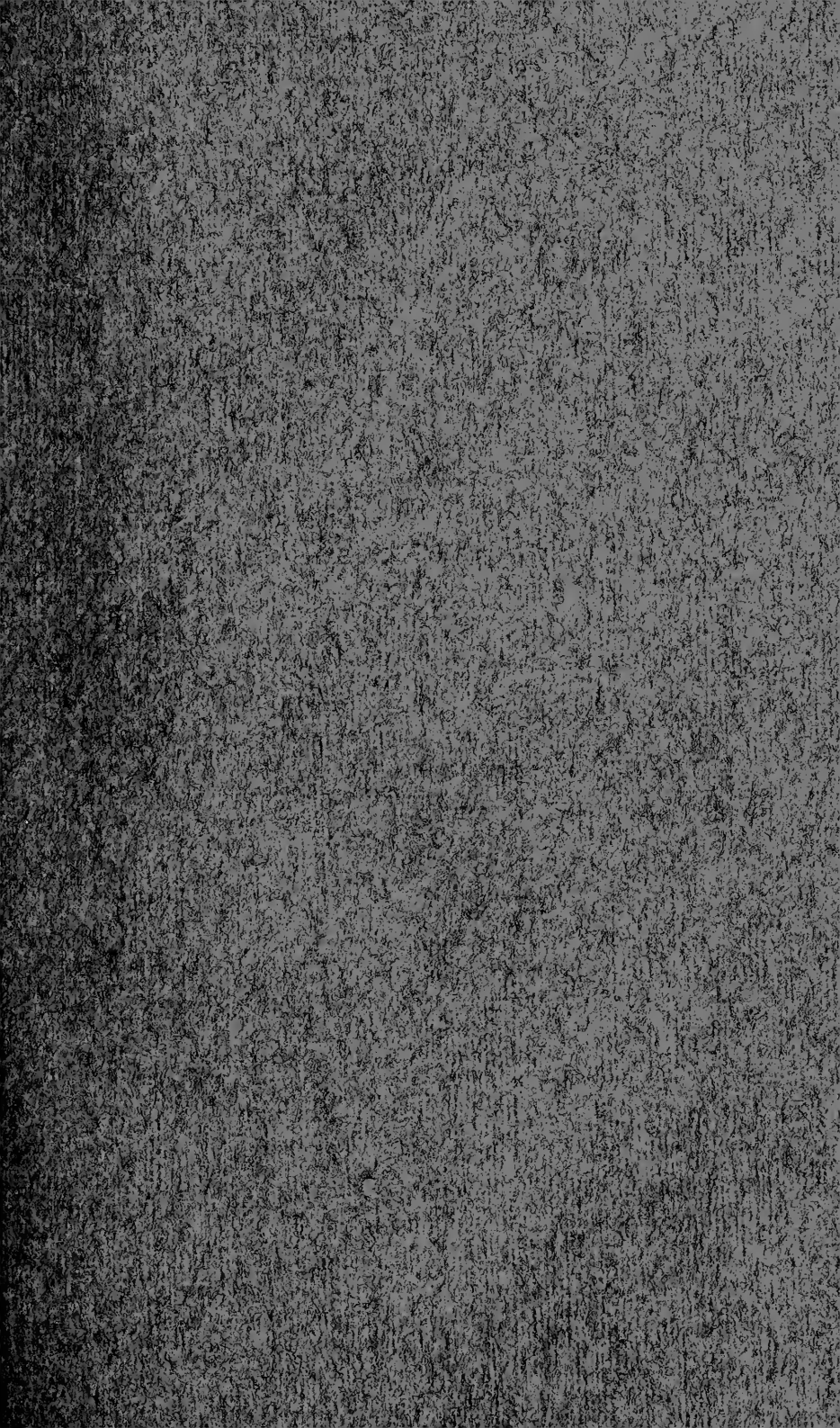
The worth, the usefulness and the efficiency of an institution, supported by the State, is measured by the service it renders to the people, and the place it takes in the social, educational and industrial development of the State which fosters and supports it. The Massachusetts Agricultural College is such a "Public Service Institution."

It strives to give men and women who come to it an education which shall fit them for the lines of work they have chosen to pursue.

It carries on experiments and research work to determine facts which can later be used in the education of students and in the upbuilding of agriculture throughout the State.

But more than this, the College is prepared, through its Extension Service, to throw open its doors to the people of the Commonwealth and carry the teachings of the College and the results of the research work of the Station, by means of trained experts, to every town, community or hamlet that asks for these helps.

By performing these three lines of work, the College more nearly meets the ideals of its founders, Morrill and Lincoln, in that it "promotes a liberal and practical education of the industrial classes in the several pursuits and professions of life."







# Massachusetts Agricultural College Bulletin

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AMHERST, MASSACHUSETTS

February, 1912

## FOURTH ANNUAL FARMERS' WEEK PROGRAM



AMHERST, MASS.

MARCH 11th TO 15th, 1912

Entered as second-class matter at the Postoffice, Amherst, Mass.

## FOURTH ANNUAL FARMERS' WEEK.

Farmers' Week has come to be *the big feature* of the year at the College. More than 800 attended last year. The program this year surpasses anything yet attempted in this line.

The purposes of Farmers' Week are to give instruction and information to those who cannot come to the College for a longer period. You will be benefited—

1. By attending the practical lectures and demonstrations.
2. By the personal conferences that you can have with the experts in the College and Experiment Station.
3. By having a chance to talk things over with others who have problems similar to your own.

### GENERAL INFORMATION.

Register when you arrive at the office of the Director of the Extension Service, or in the section meetings, and receive a badge. This is the only obligation the College imposes upon you.

**Ladies' Rest Rooms.** The Entomology building has been set aside for the use of the ladies this week. Light luncheon for ladies served here from 12.30 to 1.30 daily.

Telegrams and letters should be sent in care of the Director.

Meals can be had at Draper Hall on the campus. Breakfasts and suppers 25c; dinners, 35c. Lunches consisting of sandwiches, coffee, etc., will be served from 12.30 to 1.30 daily in the Drill Hall.

Rooms, so far as they are available, can be had in private houses in Amherst at a rate of \$1.00 a day for two persons. Rooms will be assigned in the order in which applications are received.

Rates at the Amherst House: Lodging, one in a room, \$1.00. Two in a room, 75c each. Rates by the day, \$2.00 and \$2.50.

Rates at the Prospect House: \$2.50 per day; rooms \$1.00, meals 50c each.

Hotel rates in Northampton: Draper Hotel, European plan, \$1.00 single, \$1.50 double. Bay State Hotel, rooms \$1.00, meals 50c.

*Everyone is urged to make arrangements for rooms in advance.*

*Come prepared to stay through the whole week.*

### EXHIBITS.

Corn Show in the Drill Hall, Wednesday and Thursday.

Dairy Show in the Drill Hall, Wednesday and Thursday.

Fruit Show in Wilder Hall, Wednesday and Thursday.

Floricultural Show in French Hall, Thursday.

Exhibit of Household Conveniences in Entomology Building, three days.

Do not fail to visit these exhibits. You will find things of interest to you.

## MONDAY, MARCH 11

### Forenoon.

Registration and assignment of rooms at the office of the Director of The Extension Service, South College.

### SECTION ON FARM CROPS AND FARM MANAGEMENT.

#### 1.30 P. M. (*Chapel*).

The Restoration of Fertility. Professor E. D. Waid

#### 2.30 P. M.

Economical Use of Commercial Fertilizers. Professor H. D. Haskins

#### 3.30 P. M.

Growing Clovers and Alfalfa. Professor S. B. Haskell

### SECTION ON DAIRYING AND ANIMAL HUSBANDRY,

#### 1.30 P. M. (*Animal Husbandry Building*).

Feeding and Management of Swine. Professor J. A. McLean

#### 1.30 P. M. (*Third Floor, Chemical Building*).

Poultry Houses. Professor J. C. Graham

#### 2.30-4.30 P. M. (*Grinnell Arena, Animal Husbandry Building*).

Demonstration of Judging Swine. Mr. E. L. Quaife

### SECTION ON HORTICULTURE.

#### 2.00 P. M. (*French Hall*).

The Cold Storage of Fruits. Professor F. C. Sears  
Inspection of new storage house and orchards.

### Monday Evening.

#### 7.30 P. M. (*Chapel*).

Concert. M. A. C. Band

#### 8.00 P. M. (*Chapel*).

Address, "How to make the Country Life Movement Effective."  
Dr. Thomas F. Hunt, Dean and Director Pennsylvania State College

## TUESDAY, MARCH 12

### SECTION ON FARM CROPS AND FARM MANAGEMENT.

#### 8.30 A. M. (*Chapel*).

Hay Production. Director William P. Brooks

#### 9.45 A. M. (*Chapel*).

Farm Accounting. Professor J. A. Foord

**11.00 A. M. (Chemistry Building).**

Lecture demonstration, "Industrial Alcohol from Farm Crops."

Professor Joseph Chamberlain

**1.30 P. M. (Agricultural Room, South College).**

"Concrete, its Uses on the Farm." (Illustrated.)

Mr. Lewis R. Ferguson, C. E., Portland Cement Mfg. Co., Phila., Pa.

**2.30 P. M. (Farm Implement Building, rear of barns).**

Demonstration—Mixing concrete, making posts, etc.

**SECTION ON DAIRYING AND ANIMAL HUSBANDRY.****8.30 A. M. (Grinnell Arena, Animal Husbandry Building).**

Feeding and Management of Horses.

Professor J. A. McLean

**9.45 A. M. (Grinnell Arena, Animal Husbandry Building).**

Feeds for the Dairy Cow.

Dr. J. B. Lindsey

**11.00 A. M.**

Round Table Discussion—The Benefits to be derived from Dairy Improvement Associations.

Led by George F. Story

**11.00 A. M. (Third Floor, Chemistry Building).**

Incubation and Brooding.

Professor J. C. Graham.

**1.30 P. M. (Grinnell Arena, Animal Husbandry Building).**

Breeding and Improvement of Horses.

Dr. C. W. Gay, Veterinary College, University of Pennsylvania

**2.30-4.30 P. M. (Grinnell Arena).**

Demonstration of Judging Horses.

Dr. Gay

**SECTION ON HORTICULTURE.****8.30 A. M. (Third Floor, French Hall).**

Orchard Planting.

A. J. Norman

**9.45 A. M. (Third Floor, French Hall).**

Fruit Growers' Vegetable Garden.

Professor F. L. Yeaw

**9.45 A. M. (Wilder Hall).**

Round Table Discussion—Demonstration Orchards.

A. J. Norman, Leader

**11.00 A. M. (Wilder Hall).**

Small Fruits.

Mr. Wilfred Wheeler, Concord

**11.00 A. M. (Third Floor, French Hall.)**

The Farm Woodlot.

Professor F. F. Moon

**2.00 P. M. (French Hall.)**

Round Table Discussion—Spraying.

Mr. H. L. Frost, Arlington

**4.00 P. M. (Wilder Hall).**

Apple Judging Contest.

Professor F. C. Sears

First, second and third prizes awarded.

**4.00 P. M. (Entomology Building).**

Orchard Insects.

Dr. H. T. Fernald

### WOMEN'S SECTION.

#### General Topic—Food Problems in the Home.

##### 9.30 A. M. (*Entomology Building*).

The Value of, and Care of Milk in the Home. Miss Diana Constable

##### 10.30 A. M.

Various Ways of Cooking Vegetables.

Miss Bertha Shapleigh, Teachers' College, Columbia University

##### 2.00 P. M.

Lecture and Demonstration—Preparation of Luncheons and Suppers.

Miss Shapleigh

#### *Tuesday Evening.*

##### 7.30 P. M. (*Chapel*).

Concert.

M. A. C. Orchestra

##### 8.00 P. M. (*Chapel*).

Address, "What Canada does for her Farmers."

Dr. G. C. Creelman, President Ontario Agricultural College, Guelph, Ont.

### WEDNESDAY, MARCH 13

Program under the auspices of the Massachusetts Dairymen's Association and other allied organizations.

Sections on **Farm Crops and Farm Management** and on **Dairying and Animal Husbandry** join with the Massachusetts Dairymen's Association and other organizations in the meetings of the day.

##### 8.30 A. M. (*Chapel*).

Breeding and Improvement of Dairy Cattle. Professor J. A. McLean

##### 9.30 A. M. (*Chapel*).

Dairy Farm Management. Mr. H. O. Daniels, Middletown, Conn.

##### 10.30 A. M. (*Chapel*).

A plan of securing coöperation of Farmers in the Production of Clean Milk. Dr. Charles E. North, New York City

##### 11.30 A. M. (*Chapel*).

Business meeting, Massachusetts Dairymen's Association.

##### 1.30 P. M. (*Grinnell Arena, Animal Husbandry Building*).

Demonstration of Judging Dairy Cattle. Professor J. A. McLean

##### 3.00 P. M. (*Grinnell Arena*).

Dedication of the Grinnell Arena (Animal Husbandry Building).

Address of welcome.

President Kenyon L. Butterfield

The Grinnell Arena and }

William H. Bowker,

James J. Grinnell. }

Chairman of Building Com. of Board of Trustees.

The Live Stock Industry in New England.

Dr. Gay

The Live Stock at Massachusetts Agricultural College.

(with exhibit of stock)

Professor J. A. McLean

**4.30-6.00 P. M. (Social Union).**

Informal reception given by the ladies of the faculty to all Farmers' Week visitors.

**SECTION ON HORTICULTURE.****8.30 A. M. (Third Floor, French Hall).**

Varieties of Apples for New England.

J. K. Shaw

**9.45 A. M. (Third Floor, French Hall).**

Fruit Packing from a Commission Man's Standpoint.

By a representative of the H. P. Stone Co., Springfield

**9.45 A. M. (Wilder Hall).**

Round Table Discussion—Fruit Harvesting.

Mr. F. A. Smith, Leader, Turner Hill Farms, Ipswich

**11.00 A. M. (Third Floor, French Hall).**

Orchard Culture.

Professor Sears

**11.00 A. M. (Wilder Hall).**

Dwarf Fruit.

Professor Waugh

**2.00-4.00 P. M. (Third Floor, French Hall).**

Round Table Discussion—Pruning.

Professor Sears

**2.00 P. M. (Third Floor, French Hall).**

Lecture and Demonstration on Pruning.

A. J. Norman

**4.30-6.00. (Social Union).**

Informal reception given by the ladies of the faculty to all Farmers' Week visitors.

**WOMEN'S SECTION.****General Topic—Household Efficiency.****9.30 A. M. (Entomology Building).**

Suggestions as to Marketing.

Miss Shapleigh

**10.15 A. M. (Entomology Building).**

Some things women ought to know about Business and Banking.

**11.00 A. M. (Entomology Building).**

Round Table Discussion—Household Organization and Management.

Leaders: Miss S. Maria Elliott, Simmons College

Mrs. Elizabeth Eddy Norris, Brookfield.

Mrs. A. L. Hardy, Amherst.

**2.00 P. M. (Entomology Building).**

Lecture Demonstration—The Equipment of the Home for Household Economy. Given by Mr. and Mrs. Alfred T. Childs, of the House-keeping Experiment Station, Darien, Conn.

**4.30-6.00 P. M. (Social Union).**

Informal reception given by the ladies of the faculty to all Farmers' Week visitors.

*Wednesday Evening.***8.00 P. M. (Chapel).**

Complimentary concert given by the M. A. C. Musical Clubs to Farmers-Week visitors.

**THURSDAY, MARCH 14****SECTION ON FARM CROPS AND FARM MANAGEMENT**

Program under the auspices of the *M. A. C. Agricultural Improvement Association.*

**8.30 A. M. (Chapel).**

Annual Address of the President.

Harry Carter, Millbury

Report of First Year's Progress.

Charles H. White, Secretary

**Brief Reports by Members of the Association—**

Top-Dressing with Commercial Fertilizers.

S. Waldo Bailey, West Newbury

Selecting Seed Potatoes.

William H. Porter, Agawam

Lessons from the Ear-to-Row Corn Experiment.

L. T. Hopkins, Conway

Dairy Improvement Work.

J. G. Cook, Amherst

A Successful Demonstration Orchard.

Frank Haynes, Sturbridge

**10.30 A. M. (Chapel).**

Address—"What the Wisconsin Experimenters' League has done for the Agriculture of Wisconsin."

Prof. R. A. Moore, Sec'y of League, University of Wisconsin, Madison

**11.45 A. M. (Chapel).**

Business meeting of the M. A. C. Agricultural Improvement Association

**1.30 P. M. (Chapel).**

Corn Culture and Improvement.

Professor G. E. Adams, Rhode Island State College

**2.30 P. M. (Drill Hall).**

Demonstration—Corn Selection and Judging. Professor E. D. Waid

**3.00 (Drill Hall).**

Corn Judging Contest for both adults and boys.

First, second and third prizes for each class.

**4.30 P. M. (Chapel).**

Sending the College to the State.

William D. Hurd, Director of The Extension Service

**SECTION ON DAIRYING AND ANIMAL HUSBANDRY.**

Section joins in the morning in the program under the auspices of the M. A. C. Agricultural Improvement Association, in Chapel.

**1.30 P. M. (Grinnell Arena).**

Feeding and Management of Sheep.

Mr. E. L. Quaife

**1.30 P. M. (Third Floor, Chemistry Building).**

Breeding and Selection of Poultry.

Professor J. C. Graham

**2.30 P. M. (Poultry Building).**

Demonstration—Judging Types and Breeds. Professor Graham

**2.30–4.00 P. M. (Grinnell Arena).**

Demonstration—Judging Sheep. Professor J. A. McLean

**4.00 P. M. (Agricultural Recitation Room, South College.)**

Meeting of all those interested in developing the sheep industry in the State. Subject for discussion:

“ Shall we Organize a Massachusetts Sheep Breeders’ Association? ”

Professor J. A. McLean, Leader

**4.30 P. M. (Chapel).**

Sending the College to the State.

William D. Hurd, Director of the Extension Service

**SECTION ON HORTICULTURE.****Market Gardening and Floriculture Day.****8.30 A. M. (French Hall).**

Market Gardening at the College.

Professor F. L. Yeaw

**9.45 A. M. (French Hall).**

The Growing of Market Garden Crops.

Mr. H. M. Howard, West Newton

**11.00 A. M. (French Hall).**

The Marketing of Vegetables. ....

**1.30 P. M. (French Hall).**

Fertilizers for glass house agriculture.

H. D. Haskins, Mass. Experiment Station

**3.00 P. M. (French Hall).**

Plant Disease Problems of the Florist.

Dr. H. H. Whetzel, Cornell University, Ithaca, N. Y.

**4.30 P. M. (Chapel).**

Sending the College to the State.

William D. Hurd, Director of The Extension Service

**7.00 P. M. (Entomology Building).**

Some recent investigations in greenhouse fumigation.

Dr. H. T. Fernald

In addition to the addresses on floriculture, there will be an exhibit of roses, carnations and various other species, to include many of the newer varieties, which will be sent by different growers.

**WOMEN'S SECTION.****General Topic—The Home Beautiful.****9.30 A. M. (Entomology Building).**

The Architectural Features of the Home.

Mr. Ralph Whitcomb, Amherst

**10.30 A. M. (Entomology Building).**

Outdoor Art.

Professor Frank A. Waugh



**11.30 A. M. (Entomology Building).**

The Education of Girls for Homemaking.

Mrs. Margaret Stannard, Head of the Garland School of Homemaking, Boston. Discussion led by Mrs. Henry Whitcomb, Amherst.

**2.00 P. M. (Entomology Building).**

Lecture—Demonstration,

How Leisure Hours may be devoted to Beautifying the Home.

Miss Flora McDonald, Interior Decorator, Boston

**4.30 P. M. (Chapel).**

Sending the College to the State.

William D. Hurd, Director of The Extension Service

**Thursday Evening.****8.00 P. M. (Chapel).**

Addresses: (a) Hon. J. Lewis Ellsworth, Secretary of the State Board of Agriculture, Boston.

(b) "Rural Massachusetts, 1920."

President Kenyon L. Butterfield

**FRIDAY, MARCH 15****SECTION ON FARM CROPS AND FARM MANAGEMENT.****8.30 A. M. (Chapel).**

Farm Management.

Professor J. A. Foord

**9.45 A. M. (Chapel).**

Potato Growing.

Professor Hurd

**11.00 A. M. (Chapel).**

Principles of Building Construction and Ventilation.

Mr. Ralph Whitcomb, Amherst

**SECTION ON DAIRYING AND ANIMAL HUSBANDRY.****8.30 A. M. (Grinnell Arena, Animal Husbandry Building).**

Demonstration of the Babcock Test.

Mr. George F. Story

**9.45 A. M.**

Factors entering into the Handling of Clean Milk.

Professor Lockwood

**11.00 A. M. (Grinnell Arena, Animal Husbandry Building).**

Breeding and Improvement of Sheep.

Professor J. A. McLean

**11.00 A. M. (Third Floor, Chemistry Building).**

Feeding for Egg Production.

Professor J. C. Graham

**SECTION ON HORTICULTURE.****Forenoon.**

Observation Trip—Professor E. A. White, Conductor.

Rose ranges of the Montgomery Co., East Hadley.

Commercial range of H. W. Field, Northampton.

**M. A. C. CORN SHOW.***Drill Hall, March 13 and 14.*

Professor E. D. WAID, Superintendent.

Professor G. E. ADAMS, Rhode Island State College, Judge.

**CLASS A. TEN EAR SAMPLES.**

- |        |               |                                   |
|--------|---------------|-----------------------------------|
| Lot 1. | Best ten ears | Yellow Dent.                      |
| " 2.   | " " "         | White Dent.                       |
| " 3.   | " " "         | Yellow Flint.                     |
| " 4.   | " " "         | White Flint.                      |
| " 5.   | " " "         | Flint other than White or Yellow. |
| " 6.   | " " "         | Pop Corn.                         |
| " 7.   | " " "         | Sweet Corn.                       |

**CLASS B. SINGLE EARS.**

- |        |                 |                                   |
|--------|-----------------|-----------------------------------|
| Lot 1. | Best single ear | Yellow Dent.                      |
| " 2.   | " " "           | White Dent.                       |
| " 3.   | " " "           | Yellow Flint.                     |
| " 4.   | " " "           | White Flint.                      |
| " 5.   | " " "           | Flint other than White or Yellow. |
| " 6.   | " " "           | Pop Corn.                         |
| " 7.   | " " "           | Sweet Corn.                       |

**CLASS C. SWEEPSTAKES.**

Best ear corn, any type.

Best ten ears Dent Corn.

Best ear Dent Corn.

Best ten ears Flint Corn.

Best ear Flint Corn.

Ribbons will be awarded.

**CORN JUDGING CONTEST.***Thursday, March 14.*

1. Open to farmers who have grown at least one acre of corn in 1911.
  - 1st prize. Book of Corn. Myrick.
  - 2d prize. Corn Culture. Plumb.
  - 3d prize. Manual of Corn Judging. Shamel.
2. Open to boys and girls under 18 years of age.
  - 1st, 2d and 3d prize winners same as those above.

**DAIRY SHOW.***Drill Hall, March 13 and 14.*

Professor W. P. B. LOCKWOOD, in charge.

Professor J. M. Trueman, Connecticut Agric. College, Judge of Milk.  
Judge of Butter.

*The Second Annual Milk, Cream and Butter Show*

held under the auspices of the Massachusetts Dairyman's Association, the Massachusetts Creamery Association and the Agricultural College, March 13 and 14.

First, second and third ribbons, with sweepstakes ribbons for highest scores of each group.

**Market Milk.**

- Class 1. Certified Milk.
- Class 2. Inspected Milk.
- Class 3. General Market Milk.

**Cream.**

- Class 1. Certified Cream.
- Class 2. Inspected Cream.
- Class 3. General Market Cream.
- Class 4. Creamery Patrons Separator Cream.
- Class 5. Creamery Patrons Cooley Cream.

**Butter.**

- Class 1. Whole milk, Factory Separated Cream. 5 lb. boxes or prints.
- Class 2. Gathered Cream, Creamery. 5 lb. boxes or prints.
- Class 5. Dairy Butter. 3 lb. boxes, rolls or prints.

All milks and creams scoring 90 or over will receive a framed certificate stating the fact. This will be a permanent feature at these annual shows, and should be a very desirable one from the exhibitors' standpoint.

Milks and creams will be judged with the use of the United States Dairy Division Score Card.

All entries must be produced in Massachusetts.

Several special prizes will be offered. Write after February 15th and find out about them.

Extensive exhibits of dairy apparatus, machinery and equipment will be made by manufacturers of these goods.

**FRUIT SHOW.**

*Wilder Hall. March 13-14.*

Under direction of Professor F. C. SEARS.

During Farmers' Week an extensive exhibit of fruit, both that grown in Massachusetts and in other parts of the country, will be shown. This exhibit will also be supplemented by pruning, spraying, packing and other equipment used in up-to-date orcharding.

**THE FLORICULTURAL SHOW.****Thursday, March 14.**

A fine exhibit of roses, carnations and various other species, to include many of the newer varieties from the College and from different growers all over the State, will be made.

**EXTRA LIVE STOCK.**

It is expected that prominent breeders of horses and sheep will send in some of their best stock, to be used in the demonstrations of judging and scoring of these animals.

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**DIRECTIONS FOR REACHING AMHERST.**

Amherst can be reached from Boston over the Southern Division of the Boston and Maine Railroad. The Central Vermont also runs through Amherst, connecting with the Boston and Albany at Palmer.

Trains run almost every hour each way between Springfield, Holyoke and Northampton.

Electric cars connect Springfield, Holyoke, Northampton, South Hadley, and Sunderland, with Amherst. Time from Northampton to Amherst, thirty minutes. Holyoke to Amherst, one hour.

It is hoped the railroads will offer reduced rates.

To reserve rooms, or for other information, write to

WILLIAM D. HURD,

Director of The Extension Service,  
Amherst, Mass.

# THE M. A. C. BULLETIN

AMHERST, MASS. *March*

Vol. IV. No. 1

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FORTY-NINTH ANNUAL REPORT  
OF THE  
MASSACHUSETTS  
AGRICULTURAL COLLEGE.

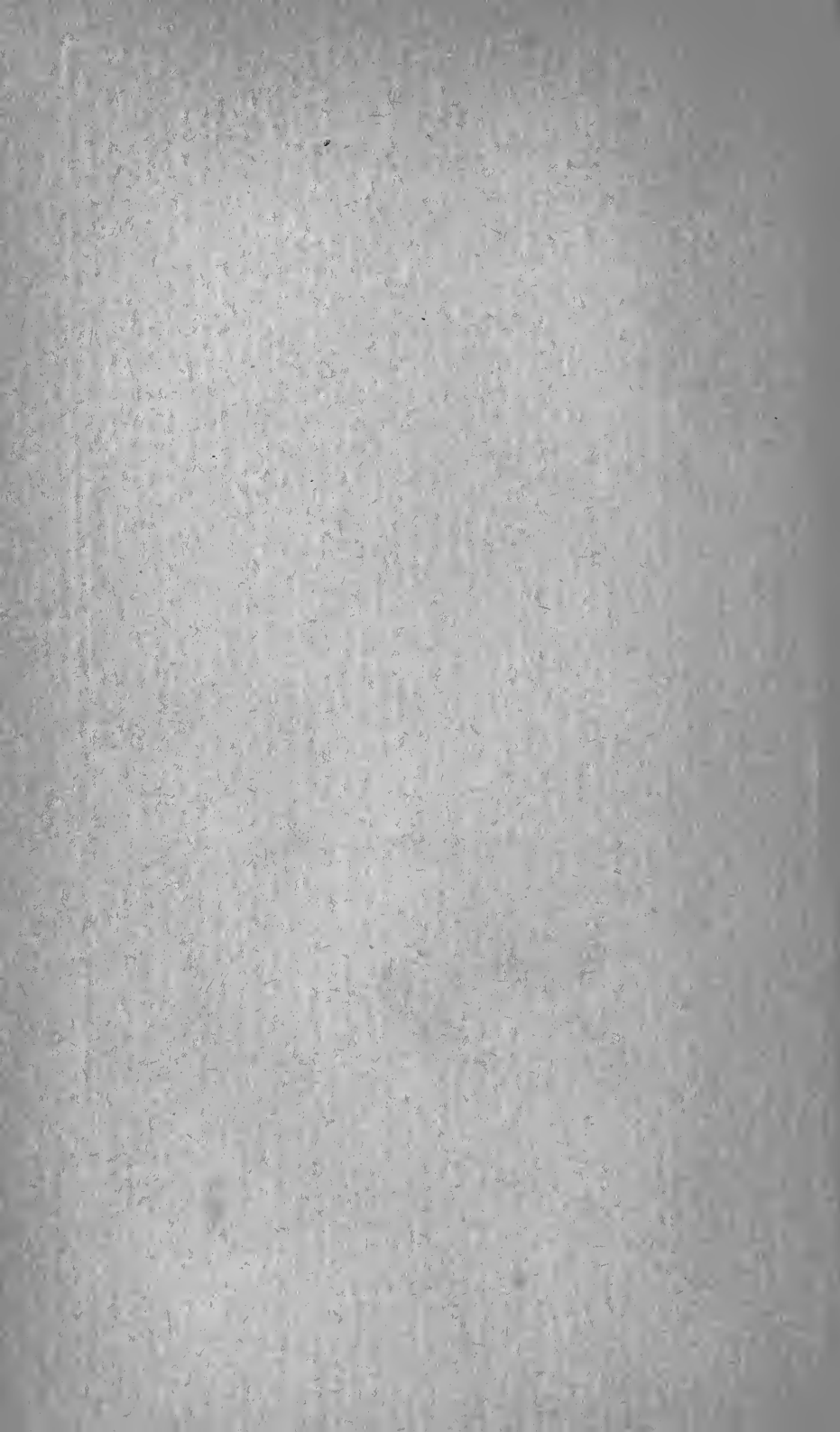
PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS

FOR FISCAL YEAR ENDED NOV. 30, 1911.



BOSTON:  
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,  
18 POST OFFICE SQUARE.  
1912.



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APPROVED BY  
THE STATE BOARD OF PUBLICATION.



## The Commonwealth of Massachusetts.

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MASSACHUSETTS AGRICULTURAL COLLEGE,  
AMHERST, Dec. 1, 1911.

To His Excellency EUGENE N. FOSS.

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 forty-ninth annual report of the trustees, for the fiscal year ended Nov. 30, 1911, this being the report to the corporation of the president and other officers of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,  
*President.*



## REPORT OF THE PRESIDENT OF THE COLLEGE.

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*Gentlemen of the Corporation.*

I herewith submit my annual report as president of the Massachusetts Agricultural College.

Acting in accordance with a plan approved by the administrative officers of the college and by the trustees, the scope of the report has been considerably broadened. Each administrative officer has been asked to present a résumé of the year's work coming under his jurisdiction, a statement of immediate needs, and the suggestion of some fundamental problems. This material has been freely utilized, without particular credit, in the preparation of this report.

The report divides into three fairly distinct portions: —

1. A discussion of some fundamental problem of the college.
2. A review of the year.
3. A statement of immediate needs.

The report is followed by the usual data concerning students, gifts, etc., and by the annual report of the treasurer of the institution.

It is a part of the plan hereafter to discuss at some length in each annual report one or more of the fundamental problems which the college has to face. This year it seemed best to consider the general function, or mission, of the college.

### THE FUNCTION OF THE MASSACHUSETTS AGRICULTURAL COLLEGE.

After nearly forty-five years of active service by the college it may seem invidious, at first thought, to incorporate in a report of the president of the institution a discussion of its main purpose. So long a period of work must surely have revealed both the task of the college and the attitude of our people toward its service. But as "new occasions teach new duties" to individuals, so new

conditions create new demands upon institutions, often call for new methods, and may even develop entirely new functions. There is no merit in change for its own sake; but change is pretty sure to be a concomitant of growth. Hence, from time to time the function of an educational institution needs restating if not re-shaping. The excuse for introducing this subject in this report lies, therefore, in the belief that the time has come to plan large policies for the future in the light of a clear-cut modern statement of the fundamental purpose and task of the college.

An institution of education supported by the government gains its main purpose from four sources: first, from legislation; second, from the historic policy of the college itself; third, from the realization of some fundamental need of society, that may be met by the college; fourth, from the changing aspects of this fundamental need, as expressed in new demands for service, which in turn call for new methods and even new types of work.

The legislation which calls a college into existence is considered by some a sufficient statement of its purpose. The State laws incorporating the college utilized the Morrill act of 1862 for the purpose of stating the main work of the college. The Morrill act is, then, virtually the legal charter of the college. So we are repeatedly asked to read the Morrill act of 1862 for the statement of the work of this institution. From the legal point of view, the Morrill act is, and forever must be, the starting point from which the work of the college proceeds and spreads. Nevertheless, it cannot be considered a sufficient statement of the service demanded of this college by the present age. This is not to deny the value of the Morrill act; it is not to impugn its worth; it is not to repudiate its statements; it is simply to assert that with the lapse of time, the rise of new ideas, the need of adaptation to modern conditions, the Morrill act does not in itself, alone, give us the cue to the complete function of the college. Indeed, I question whether it was ever meant to do so.

It is sometimes stated that the Morrill act, in its definition of the work of the land-grant colleges, is clear and specific. I cannot agree with that statement. The law has actually been interpreted in such a way that the institutions based on the law have developed widely varied policies. They are all one in the emphasis on including preparation for the industrial vocations, but they are

widely divided as to the scope of other work performed. It will not do to impugn the motives or the intelligence of those who have managed these institutions in such diverse ways. We have here simply an illustration of the possibilities of differing interpretations of the Morrill act. I think one of the finest compliments that can be paid to the act is to say that it was so broadly drawn that the States could adapt the work of their colleges to varied needs and ideals. But this fact again enforces the former statement that the unsupported language of the Morrill act itself is not to-day a sufficient guide for the total work of our own agricultural college.

Furthermore, we must remember that legislation itself is only an expression, and almost without exception an incomplete expression, of some need of society. Hence, a law like the Morrill act must be interpreted in terms of both the fundamental and the changing needs of those political units that furnish the funds for the support of the college thus called into existence. In other words, the needs of Massachusetts for to-day and to-morrow must help interpret the laws of yesterday, with respect to the work of this college.

It is almost impossible to conceive that a college can labor for forty-five years, with reasonable success, and yet be on the wrong track. Time itself, as well as experience, justifies policies. Hence precedents count for something, and we have no right to break with the past abruptly. Historic policies should never become swathes that bind us irrevocably to the past; they are rather foundations for our building which we may not safely disregard.

But, after all, the real test of the work of our college is neither a law nor an historic policy, but this: Is the college meeting the *need* of the people of the State? In other words, what is the social purpose of the college, its real excuse for existence? Why is the State still willing to pay the cost of its support? Why may we confidently argue for the continued investment, in equipment and maintenance, of such large amounts of the public funds?

And, finally, we must seek constantly to meet new issues as they arise and thus keep the college abreast the times.

The limits of this report forbid an exhaustive development of the four propositions just laid down as to the source of an authoritative policy. We may, however, give attention to a few

preliminary considerations growing directly out of these propositions: —

1. The Massachusetts Agricultural College is a *college*. It is not a school. Governor Andrew, in his message to the Legislature of 1865, said, "I should deeply regret to see an institution which bears the name of Massachusetts, and will be held to be representative of the Commonwealth, especially of the highest aspirations of her yeomanry, allowed, for want of generous support, to degenerate into a mere industrial school." In spite of this statesmanlike utterance of nearly a half-century ago, we occasionally hear suggestions that the college is getting too far away from its constituency, and that in order to meet this constituency its standards of admission should be kept low. One cannot help sympathizing with the democratic notion that lies back of these sincere suggestions, but they are based upon the fallacy that a high grade of work will separate the college from its real task. As Governor Andrew so well said, this college represents the highest aspirations of the rural people of Massachusetts, and we can never admit that the highest aspirations of the rural people may be expressed in inferior scholarship. Without question, there is need of institutions of lower grade for the teaching of agriculture, but these should be provided, as Massachusetts has now so wisely ordered, through agricultural high schools and agricultural departments of public schools. But the agricultural college is the educational leader for the building of a highly developed rural civilization within the State.

Now the college is our most characteristic expression of such leadership. Emphasis upon the fact that this institution is a college calls, therefore, for college standards of admission and graduation, — college standards with respect to quality, though not necessarily with respect to subject matter. Within recent years the college has placed itself squarely in line with this policy, and now requires practically the same standards of admission as regards quality of work as are demanded by the typical New England college. We believe, also, as regards requirements for graduation, that, on the whole, the four years of work at the Massachusetts Agricultural College represent as good quality as will be found in the average college. Maintenance of college standards, therefore, of the college atmosphere, and of the college point of view must be our policy.

2. On the other hand, the Massachusetts Agricultural College is not, at present, a State university and, in my judgment, it ought not to be made a State university. It may seem idle to discuss this question. Nevertheless, nearly half of the institutions established under the Morrill act of 1862 are State universities. In Massachusetts we hear more or less said about the need of a State-supported university, and occasionally the suggestion is advanced that our college is the natural nucleus for such an institution. I do not purpose to discuss the question as to the need of a State university in Massachusetts, but I feel very strongly that it would be a great mistake to attempt to make a State university out of the Massachusetts Agricultural College. Its location is not favorable for such an institution. Its history and traditions are not in harmony with this form of development.

3. The Massachusetts Agricultural College is an *agricultural* college. This statement raises a question subsidiary but related to the idea of a State university. Practically all of the land-grant colleges which are not State universities have developed departments of mechanic arts, and many of them other branches of study. Our own college, all through its history, has given more or less attention to civil engineering. The general policy of the college at this point was, however, settled before the college opened for students, through a legislative arrangement by which the Massachusetts Institute of Technology secured a portion of the federal grant on the theory that the mechanic arts work should be given at the institute and agriculture at Amherst. The result of this legislation is that probably the Massachusetts Agricultural College is the only one of the land-grant colleges which may be called strictly an agricultural college. From time to time in its history suggestions have been made relative to broadening its scope beyond agriculture, emphasizing general science, etc. But I feel very keenly that we ought to emphasize now and forevermore the proposition that our college is an agricultural college and nothing but an agricultural college. I am aware that there are difficulties in carrying out this policy. The first thought that comes to mind when one speaks of an agricultural college is that its chief function is especially to train farmers. But we are located in an urban State. Many vocations which the college naturally fits for, like landscape gardening for instance, are followed in the city and not in the country, though even in landscape gardening

the work is so intimately bound up with the subject matter of agriculture that we are compelled to broaden our definition of agricultural education to include training of this sort. That statement leads us really to the heart of this whole matter: Gradually there is forming a new definition of agricultural education. The agricultural college should fit men for farming, but it is a question whether that is its chief mission. There is such an insistent call for trained men in various other forms of leadership in agriculture and country life that we cannot expect that all, or perhaps even a majority, of our graduates shall go directly to the farm. Apparently an increasing proportion of our graduates are going directly to the farm simply because they are beginning to find that they can be just as successful there as anywhere else, and because they like the independence of the farmer's life.

To put the matter in a nutshell, agriculture is broadening so rapidly, the need for trained men is developing so many new vocations, that if our college, in its research, in its teaching, in its extension work is to cover *adequately* the whole field of modern agriculture, it has a work to do which will tax to the utmost the skill of its faculty and the willingness of the Legislature to make appropriations. From the standpoint of public finance and policy, then, as well as from the standpoint of interior purpose and fundamental function, we must insist that the *Massachusetts Agricultural College* shall always be the *Massachusetts Agricultural College*.

4. Our people must also understand, and this is particularly true of the Legislature, that the *Massachusetts Agricultural College* is "a college of the Commonwealth." Its property is owned by the Commonwealth; its support has always come solely from the Commonwealth or the nation; its trustees are appointed by the Governor of the Commonwealth; it is answerable for its finances and its policies directly to the representatives of the Commonwealth; indeed, for all practical purposes its trustees are the agents of the Commonwealth. It is not a private institution. It has a public function. It grows only as public support for it grows. It is absolutely dependent upon the pleasure of the Commonwealth, or, if you please, upon the Legislature. We stand or we fall in accordance with the will of the people of the State.

I am sometimes asked why private individuals do not make endowments or gifts for the college. I suppose it is because of the



fact just mentioned, that we are a college of the Commonwealth. I hope the time may come, however, when people of means will appreciate the tremendously significant problem which the college is set to solve, and the great difficulty of even a wealthy State like Massachusetts providing all the needs that arise in the development of an institution of growing numbers and importance. We have not only the problem of maintenance, but the problem of adequate buildings. At present we are dependent entirely upon the village of Amherst for the housing of the students. It is a serious question how far we may call upon the State to provide dormitories, not because it is not a legitimate call, but because we need other things. I wish it might be possible for dormitories to be built as the result of private gifts. There are many other uses to which private gifts could be put, and I hope that people who are interested in the development of the agricultural industry and rural life in Massachusetts can come to see that State support for the college may well be supplemented by private gifts for many good causes that are likely to be overlooked by the Legislature.

#### STATEMENT OF PURPOSE OF THE COLLEGE.

In the light of these observations, can we state in one sentence the real purpose and function of the college? May we not put it this way? *The Massachusetts Agricultural College is designed primarily to benefit the agriculture and rural life of Massachusetts, and incidentally that of the nation.* It is often said that Massachusetts is not an agricultural State, and it is perfectly true. But agriculture is, nevertheless, an important and significant industry, and the cities are coming to realize that its development means something for them as well as for the farmers. The farmers themselves are beginning to see that the more intensive forms of agriculture are the ones that pay the best, and it does not take much of a prophet to suggest that the characteristic feature of Massachusetts agriculture of the future is that it is to be an intensive agriculture. Now an intensive agriculture always means education. While the industry in Massachusetts may be relatively small, it is also relatively important, and calls for the very best type of agricultural education that American genius can evolve. Moreover, an effort to help Massachusetts agriculture must be designed to result not only in better farming, but in a more efficient dis-

tribution of soil products to consumers, as well as in better conditions of living, and in better rural communities. Now whatever an educational institution of college grade can do for such objects as these comprises the task of our college. Probably in practice it is a varying task, — one thing to-day, another thing to-morrow. But the one main purpose is expressed in the thought that the college is the organ, or servant, of the Commonwealth on behalf of Massachusetts agriculture and country life. "I serve" should be its motto; and this thought of service to the rural interests of Massachusetts and the nation should govern the policies of the college and pervade its atmosphere.

#### HOW THE MISSION OF THE COLLEGE MAY BE ACHIEVED.

It will be necessary to leave for discussion in subsequent reports the details of methods by which this general function of the college may be realized. Space must be given here, however, to an outline of these methods, for they illustrate and enforce the main thesis or contention of this study.

There are three main types of service which the college may render: —

1. Investigation.
2. Instruction.
3. Extension service.

Investigation may be called the search for truth about agriculture and rural affairs; instruction, the incarnation of this truth in trained leadership; extension service, the dissemination or democratization of this truth, — its distribution among all the people interested.

Thus the college has a threefold task; not three tasks, but one task, to be fulfilled in these three fairly distinct methods or types of work. Let us discuss each one of these with as much brevity as possible.

Of course the characteristic work of this college, as of any college, is to teach the students who resort to it. But it is peculiarly true of an agricultural college that it cannot teach until it has something to teach. Hence, logically, the first business of the college is to investigate. It seems best, therefore, to place research first in the order of present discussion.

*Investigation.*

There are laws governing the operations of soil and the growth of plants and animals. Experience and observation enable men to follow these laws to a degree, — but only to a degree. Few farmers have time for prolonged or systematic study or the training or facilities for it. Men must be set apart for this work, — men specially trained, with time and apparatus. Thus the agricultural experiment station came into being. This work of investigation divides itself into several types as follows: —

1. *Research.* — This is a study of the fundamental laws that underlie the operations of the soil and the growth of plants and animals. The aim of research in agriculture is to gain exact knowledge of general principles that may be applied to the business of growing food and other supplies coming from the soil.

2. *Experimentation.* — Once the general principles or laws are discovered, the method of their application to actual operations must be worked out. Expert farmers will accomplish a good deal of this experimentation, but not all of it. Hence, the college, through its experiment station, must continuously carry on these experiments.

3. *An Agricultural Survey.* — We now recognize the need of knowing not only the general laws of nature and their applications to methods of culture, but that each farmer needs to know how to make the application under his peculiar conditions of soil, climate, topography, market and transportation facilities, etc. It may be argued that it is not the business of the State to tell each farmer how to run his farm. That is true. But so long as there are unsolved problems lying before our farmers, which can be solved only in the light of the knowledge which the average farmer cannot gain for himself, then the college must help. We must remember that we are rapidly coming to a time when each acre of Massachusetts soil must be put to its best possible use, and the only satisfactory way of determining this best possible use is by experience based on scientific study of the conditions of that acre. Now, for want of a better term, we call the search for truth about these exterior and local conditions that surround the farmer at his work an “agricultural survey.”

4. *The Economic Phase.* — Another need enters at this point

that calls for an enlargement of the scope of agricultural investigation. Production of crops and animals is only a hemisphere of the agricultural industry. These products are to be sold at a profit, if possible. At any rate, they are to be transported with economy and distributed where they are wanted, and the consumer must have them fresh and wholesome and at a price not prohibitive. Many factors enter into this problem of distributing the products once grown: the nearness to market, transportation, the character of the market, competition for the market, the function and rewards of the middlemen, the development of agricultural credit, business co-operation among farmers, etc. These economic considerations, just because they are vital to the success of agriculture, are a subject for thorough investigation by the agricultural college.

5. *The Social Phase.* — But, after all, there is an even larger issue. Our greatest concern is with the quality of people developed by the rural mode of living. Hence, the conditions of rural life — moral, religious, recreational, sociable — are of significance. So with the institutions of the rural community, — schools, churches, organizations, means of communication, — how do they do their work, how can they be improved? Just because these things, too, are vital to the welfare of the Commonwealth, they must be studied.

#### *Instruction.*

We may now consider the methods by which the instruction of the college shall minister to its chief purpose. There are three main outcomes to be cherished in the course of study, and I state them in inverse order with respect to human destinies, but in direct order with respect to immediate purposes and policies. They are, first, preparation for the agricultural vocations; second, preparation for citizenship, particularly rural citizenship; third, the all-round development of the man.

*Preparation for the Agricultural Vocations.* — This is the immediate business of the college on the teaching side. The courses of study, the methods of teaching, the atmosphere of the institution, should all make for this end. The term “agricultural vocations” is, perhaps, somewhat misleading, but must answer until we find a better one. It is not the same as farming. The term does not imply that all of these vocations are pursued in the open country, but it includes those vocations the adequate preparation for which

must embrace a thorough study of the soil, or of plants, or of animals, for the purpose of using that knowledge for economic ends; and also the vocations of a professional character which have to do directly with the life of the rural people. The men called for in these agricultural vocations may be grouped roughly as follows: —

(a) Independent farmers.

(b) Farming experts or managers.

(c) Specialists in agricultural practice or science, such as teachers and investigators and extension workers, employed in agricultural colleges, experiment stations, the United States Department of Agriculture, etc.

(d) Professional experts, such as landscape gardeners, foresters, and arboriculturists, who deal so intimately with agricultural materials that, although their vocations are not essentially rural vocations, the best training is found in connection with the agricultural teaching.

(e) Business experts in lines related to agriculture, such as the fertilizer business.

(f) Rural social engineering, that is, professions in which social service to the rural people is the keynote, such as teachers in agricultural high schools, country clergymen, rural Y. M. C. A. secretaries, etc.

It must be understood that this is only a rough grouping and, indeed, a tentative list. New vocations are developing constantly. Institutions other than agricultural colleges are taking on some of these lines of work. But in general this division indicates our goal; namely, that of the definite preparation of men for these fields of work.

*Training for Citizenship.* — The most efficient service to society which can be rendered by most men is the honorable pursuit of a useful vocation, and it becomes the fundamental task of the agricultural college to inspire its graduates with the thought that they are to follow their chosen vocation, not primarily as a means of making money, but primarily as a means of service to society. This may sound theoretical and academic, but it is sound sociology, sound pedagogy, sound ethics, sound religion.

Nevertheless, each individual has obligations to the community that lie outside his vocation. No matter how isolated his life may be, nor how busily he may be engaged in the exacting duties of

his vocation, he is obliged by many considerations, not the least of which is his education at State expense, to give an intelligent and honest account of himself as a member of society, as a political citizen. It hardly needs arguing that the man who in college gives some attention to the problems of citizenship is thereby the better fitted to fulfil his obligations as a citizen. This is particularly true of those problems that have to do with local community life, — things that many college men regard as beneath them and of small consequence, and yet which are absolutely vital to the permanence of society. It is especially incumbent upon the man who follows his vocation in a rural environment that he shall understand the peculiar needs of the rural community as well as those larger general needs which incorporate themselves in State and national policies. The agricultural college, therefore, must try to make sure that every graduate has secured some grip both upon the problems of the rural community and upon the general problems of the day, — problems social, economic, governmental, ethical.

*The Man himself.* — Without question, the man must be greater than his work and perhaps even greater than his citizenship. But I think we have not yet sufficiently realized the possibilities of vocation in the making of a man, and hence we have not realized the culture-value of the training for vocation. As a matter of fact, those qualities of mind and character that we like to think of as belonging to the superior man, such as sound physical health, intellectual vigor, ripe culture, high ideals and noble thinking are cultivated, in no small degree, by the right sort of pursuit of the day's work and by the right sort of service to one's family, neighborhood, town, State and nation. I believe, therefore, that whenever we have organized our agricultural vocational courses in the proper way, whenever the materials of study in those courses have been adequately elaborated, and assuming that all the subjects are properly taught, we will find that the man thus trained, granted that he has within him the seeds of culture, will become a cultivated, well-rounded man.

More than knowledge of problems, greater than an interest in politics, is the *spirit* of community service, the willingness to sacrifice something of one's financial gains, of one's time and energy and leisure and comfort for the sake of leading one's community on to higher levels; for the sake of solving its problems.

An agricultural college cannot give its chief attention to the training of men for the utilization of their leisure. Leisure is important, even vital, to the ripening of a man's powers, but leisure is not the characteristic attitude of a leader, and that is what colleges are for primarily, — to train leaders. An agricultural college must train for efficient work and public service and not for leisure. Yet there is no reason why the men who follow the agricultural vocations may not have leisure. They must have it. Leisure feeds the highest impulses of the soul. Leisure is essential to the enlargement of the spirit. An agricultural college should have teachers and offer courses, and require men to take those courses, that will tend to give the individual student, no matter what his vocation, some grasp of the eternal verities, some hold on the essential things of life, some knowledge of the sources of personal power, great inspiration, a grip on the problems of human duty and human destiny. This may be secured through literature, or through philosophy, or through history; but we cannot afford to give the baccalaureate degree to any man who has not at least opened the door and peered into that high-vaulted chamber which contains the choicest treasures of human thought and aspiration.

#### *The Extension Service.*

We come now to the third phase of the task of the college, — the dissemination of truth to all the people of the State. This task, perhaps, raises issues. There are those who deny that it is a primary function of an agricultural college. Some are willing to admit that the experiment station should send out bulletins describing its work and results, and that occasionally a professor should give a public lecture, but deny the task which is represented by the apt phrase of one of our own trustees, "the State is our class room." With respect to agriculture and rural matters the State of Massachusetts *is* our class room. I hold that the function of extension service on the part of the agricultural college is coordinate with its function of investigation and of teaching resident students, and the reason lies less in any logical formula than it does in a practical need and a practical means of meeting that need. What I mean is this: the ultimate purpose of the agricultural college is the benefit of the agriculture of the State. One means of benefit is investigation; another is by training leaders; but another, and, in some respects, the most important, is by reaching

with information and inspiration every worker in the land. It is the logical outcome of the social, or State, function of the institution.

There are those who will say, "Very well, we admit the significance of the task but let the work be done by some other agency than the agricultural college." I reply, why *should* it be done by some other agency than the agricultural college? It is the one institution that investigates and discovers principles and facts about agriculture. It is the one institution that is training leaders and experts. It is the one institution to which the people of the State look for educational leadership in agriculture.

But there is a positive and very practical reason why the agricultural college should develop extension teaching. If that teaching is developed by any other agency in the State, it necessarily means duplication of agencies, because the kinds of teaching needed by the great masses of the people of the State are the kinds of teaching that are given in the college, and it would be unbusinesslike, uneconomic, and would lead to friction if a second institution should be developed with a large corps of workers specifically for the purpose of popular education in agriculture, but apart from the research, the teaching, the atmosphere and the inspiration of the agricultural college.

There are other minor reasons why the extension service should become organic in the agricultural college. It reacts on the research and teaching, bringing them into more intimate touch with the realities and the fundamental needs of agriculture and country life. It gives the institution that State-wide and social leadership which makes it the center of light and leading in agricultural affairs. The people themselves expect that the college shall distribute what it knows for the benefit of the people who cannot come to the college. The college has always done this sort of work to a degree, and its validity has never been questioned. Indeed, if the college were to deny its duty to perform this service, I venture the prediction that it would not be long before the people of the Commonwealth would refuse to support it. It is because they cherish the belief that the college exists to serve them directly and immediately, as well as through the training of a comparatively few individual leaders, that they are willing to pour out money in its behalf.



Obviously this extension service should be so organized that it shall not interfere with the work of research or of teaching. Temporarily, because of lack of men, it may have this bad effect, but this is only a passing phase and can be remedied as soon as we have adequate appropriations and can develop what shall practically be an extension service faculty.

#### THE RELATIONSHIPS OF THE COLLEGE.

This discussion of the fundamental task of the Massachusetts Agricultural College leads to some observations concerning its relationship to other institutions of the Commonwealth which have tasks of a somewhat similar character.

##### *The Public School System.*

If this were a State university of long standing it would without doubt be considered the crown of the public-school system. It is not a university, but a college for a specific purpose. Nevertheless, in so far as that purpose is germane to the general educational interests of the Commonwealth, to that extent the college finds its place in the system. For practical purposes this may not mean a great deal. The fact, however, ought to be generally recognized, particularly by the school authorities of the Commonwealth. On the part of the college this fact requires that our entrance requirements shall be of such a character that they fit as closely as possible the actual high school conditions that prevail in the major portion of the high schools. It may be remarked in this connection that there is no sound reason why, as is sometimes suggested, this college should fit itself to the smaller or to the less efficient high schools. Its obligation, rather, is to the great body of high school pupils. We have tried to carry out this principle, and the present entrance requirements were not adopted until they had been submitted to all the high school principals of the State, and a number of suggestions made by these principals were incorporated.

##### *Relation to the Teaching of Agriculture in the Public High Schools.*

The Commonwealth has embarked upon a plan of developing, in systematic fashion, the teaching of agriculture in agricultural departments of public high schools, or in separate agricultural high

schools or in both. It is evident that the task of administering the new plan lies wholly with the State Board of Education. On the other hand, the work of preparing teachers of agriculture must lie chiefly with the agricultural college, with, possibly, some co-operation from the normal schools of the State. This division of responsibility seems to be so clear that there is little need for enlarging on the principles thus laid down. There are, however, two phases of the situation that call for remark. There is a great deal that can be done in the way of agricultural education with young people still of school age and with the teachers, particularly the grade teachers, who are endeavoring to develop school garden work or some other form of elementary agricultural teaching. This is one feature of agricultural college extension teaching. In some States this work has been done by the State department of education, but it seems to me so clearly an extension-teaching function that I believe it ought to be developed by the State college of agriculture. For illustration, under the direction of Professor Hart some 19,000 boys and girls, during the season of 1911, grew corn and potatoes under the direction of the college. We do not claim that this work is as yet thoroughly organized; indeed, only a beginning has been made, but it ought to be encouraged and developed by the college, of course with the approval of the State educational authorities.

The other matter has to do with the general scheme for agricultural education in the public schools. The State Board of Education must take the responsibility for this plan because it is to administer it, but the ultimate plan itself ought to be the product of a very closely knit co-operative study, especially as it is pioneer work and there are so few American precedents to guide us.

#### *Relationship to the Normal Schools.*

The extent to which the agricultural college and the normal schools may co-operate seems to be uncertain. The normal school stands essentially for training in principles of education and methods of teaching. The agricultural college stands primarily for the organization of the materials of agricultural education. Teachers of agriculture in high schools and special schools are clearly to be sought in the agricultural college. There would seem to be a call, also, for men trained in normal schools, who take a

year or two at the agricultural college for positions in agricultural teaching of high school grade. It is doubtful whether many grade teachers who are endeavoring to give some agricultural work will take regular courses at the agricultural college. The attendance at our summer school of agriculture, however, seems to show that these teachers desire to supplement their normal school training with the more technical studies that are offered by the agricultural college.

*Relationship to the State Board of Agriculture.*

During the past five years there has existed some slight misunderstanding as to certain relationships between the Board of Agriculture and the college. I think that this relationship is working itself out, and that a clearer understanding is already evident. I should like, in some future report or in some other public way, to discuss this matter more at length, but at this time merely suggest a valid general principle, which, if applied, would solve all our difficulties with respect to possible duplication of work. To put the matter in a word, I believe that the chief function of the agricultural college is educational and that the chief function of the Board of Agriculture is administrative. It is true that in the earlier days the Board of Agriculture had educational functions, but that was before the day of the agricultural college, or at least before facilities for widespread popular education by the college were developed. New conditions bring new work. Can we not, therefore, make this general principle our starting point for the enlargement, without any conflict or overlapping, of the work of both the Board of Agriculture and the college; namely, that administrative work, police work and control work belong primarily to the Board of Agriculture, and educational work belongs primarily to the agricultural college?

It may be thought that all this means the limitation of the work of the Board of Agriculture. I do not think so. All indications point to the fact that the government is going to play an increasingly larger share in our agricultural progress. The State government, therefore, through a board or department of agriculture, is sure to develop increasingly important and diverse functions. The administration of laws for the protection of the farmer, the offering of prizes and other means of stimulating agriculture and leadership, assistance by the State in solving such

problems as the farm labor question, in developing schemes for business co-operation, and in other enterprises in which the government of the State is willing to play a part, belong not to the educational but to the administrative agency. On the other hand, wherever teaching is to be done, information to be given or educational forces to be invoked on behalf of the farmers, it would seem clear that the agricultural college is the natural center for such dissemination.

Of course, there are chances for some overlapping, even under the application of this principle. For example, the dairy bureau in enforcing laws finds that one of the most powerful aids to enforcement is simply teaching the people what is the right way to do. Therefore, as an incident of law enforcement, some educational propaganda is legitimate and even necessary. On the other hand, the extension men of the college frequently find opportunity for the definite work of organizing new enterprises in country communities as the natural outgrowth of the extension teaching. But if the general principle is adhered to, I see no real difficulty with respect to these apparent exceptions.

There are at least two pieces of work, which have been in operation for a long time, that clearly contravene this principle as at present administered. The Massachusetts experiment station is charged with the duty of enforcing the laws concerning fertilizers and feedstuffs. On the other hand, the State Board of Agriculture is charged with the management of farmers' institutes. In the one case, the college, through its experiment station, takes on police duties; on the other hand, the Board of Agriculture carries on a definite educational work. It seems to me, however, that there is no need for any misunderstanding here. Both of these means of work have been established so long and have become so thoroughly rooted in the respective fields in which they were planted that good judgment would dictate they should not be disturbed, at least for the present.

This frank discussion has been introduced not so much because there is danger of serious misunderstanding, but because the agricultural movement is going ahead so fast that the more closely we can tie the work together, and the more clearly defined the task of each agency, the better results we will get for Massachusetts agriculture. The principle of division of labor seems so simple

and so clear that I venture to suggest it at this time in the hope that it may work out into a generally accepted plan of co-operative endeavor.

In so far as the State, through any other agency such, for instance, as the State Board of Health, enters the field of agriculture or country life, the same principle would hold; namely, that the State Board should assume the administrative function and the college should exercise the educational function. I speak of this particularly because I believe that the time will come when the whole question of rural sanitation ought to be made a very important feature of our agricultural propaganda, and I should like to see the agricultural college play a definite part in this very important matter.

#### *The Relationship of the College to Voluntary Associations.*

The relationship of the college to voluntary associations designed to benefit agriculture and country life is, perhaps, of less interest as a matter of discussion, although it is of a great deal of importance practically. Take, for instance, the grange. The grange is very thoroughly a friend of the college, and we have made every effort to reciprocate by assisting the grange in its educational work whenever possible. The fundamental reason, however, for assisting the grange, or the village improvement society or any other local body is, that it is always sound policy for the college in its educational work to develop as little machinery as possible, and to seek to reach the people who need its help, whenever it can be done, through agencies already in operation. It is quite possible, for example, to work out a plan by which the grange and the college could co-operate in a very effective system of agricultural teaching, which would materially increase the efficiency of the college in reaching the people at their homes, and which would also manifold the educational work of the grange, this work being, of course, the dominant purpose of the grange.

In this connection I wish to call your attention to two remarkable actions recently taken by the Massachusetts State Grange. The grange has offered two scholarships in our winter school to successful contestants in the writing of essays on some agricultural topic. They are also taking steps to organize a large loan fund, from which loans may be made to young men and women belonging

to the grange who have to pay their own way through college. While the benefits of this fund are not to be confined to students of the agricultural college, undoubtedly quite a proportion of these students will come to this college.

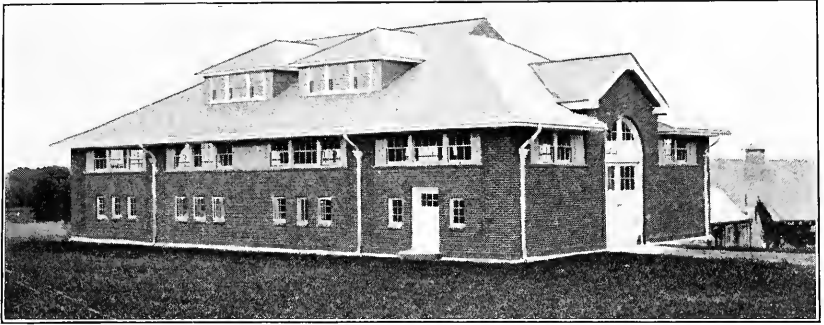
## A REVIEW OF THE YEAR.

### ATTENDANCE.

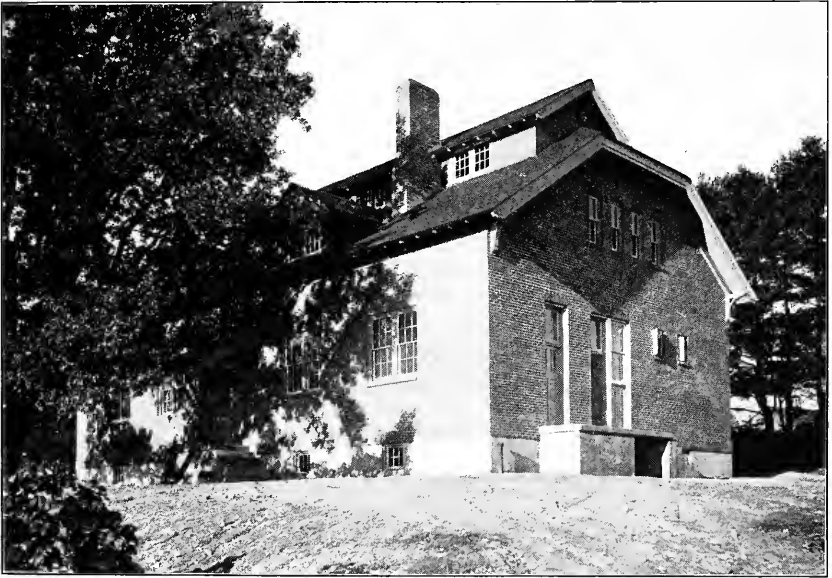
The attendance of students enrolled in the four-years course at this date is 477, an increase of 75 over the enrolment of a year ago. In addition to this enrolment of four-year men, there are 15 members of the graduate school and 29 students doing work of college grade, who are registered as unclassified students. Therefore, the total number of students doing work of college grade is 521 for the present year, a gain of 87 for the year. The entering class this fall numbered 168, an increase of 10 over the number entering last year. (See Table I.)

Nearly 87 per cent. of those entering this year come from Massachusetts; 5 other States send students and also 2 foreign nations. Every county in Massachusetts, with the exception of Nantucket, is represented in the present freshman class, Middlesex County sending the largest number, which is 36 or nearly 25 per cent. of the total number entering. (See Table V.)

Over one-fifth of the class are undecided as to their intended vocation; approximately one-third of the entire class express their intention of following some line of professional agriculture or horticulture as their life work; and about two-fifths more signify their intention of entering some vocation in practical agriculture or horticulture. Nearly 94 per cent. of those having made a decision, therefore, intend to follow an agricultural vocation. Less than one-fourth of the fathers of the members of the freshman class are engaged in agriculture or horticulture, and a little over one-fourth are business men. Approximately one-fourth of the class come from farms, and nearly two-fifths have had no farm experience whatever. The average age of the entering class is 19.17 years. (See Table V.)



**Stock Judging Pavilion, Grinnell Arena, erected in 1910-11.**

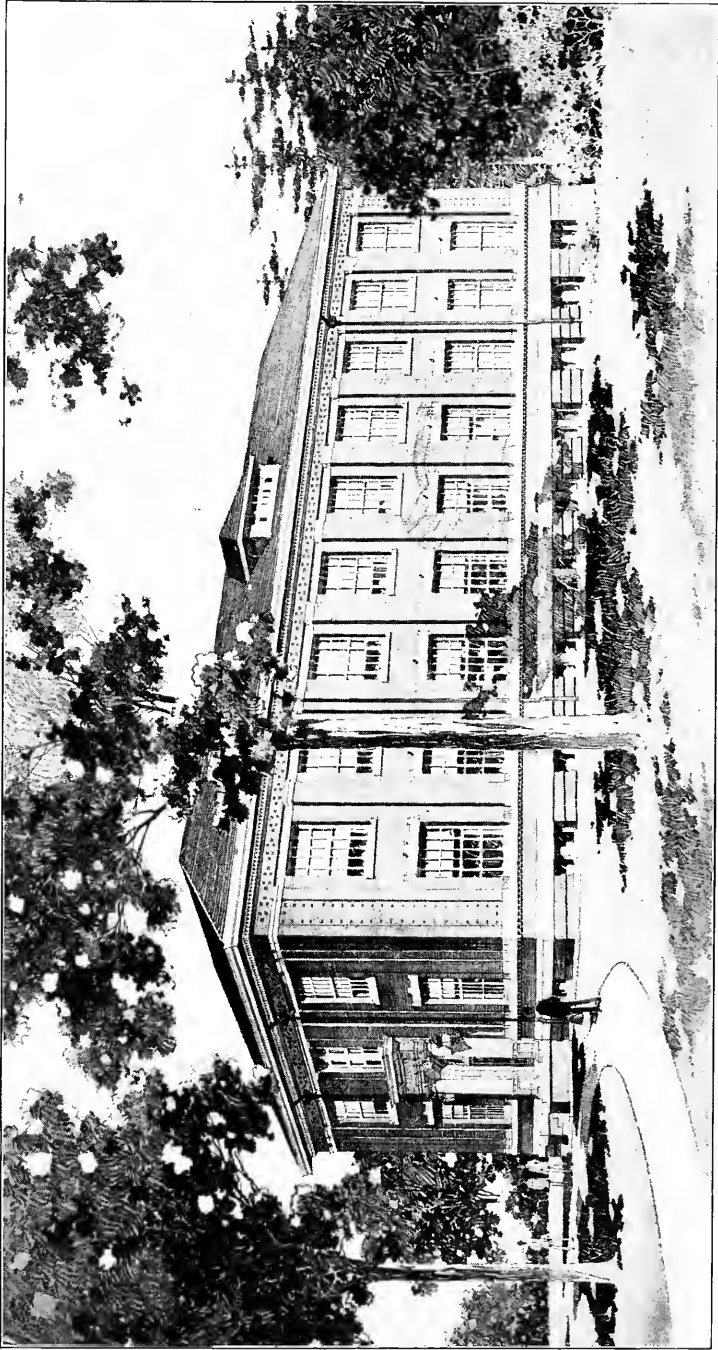


**Fruit Storage Building and Laboratory, erected in 1910-11.**









THE FLINT LABORATORY, M. A. C. — Dairy Building.

## APPROPRIATIONS.

The trustees presented to the Legislature in 1911 requests for special appropriations amounting to \$192,500; of this amount, \$122,500 was granted. An increase of \$90,000 in current annual appropriations was asked, and had this been granted the total income from the State for this purpose would have been \$232,000; the increase granted, however, was \$34,500, making the total for the present year \$176,500. (See Table II.)

The most important item granted in the special appropriations was that of \$75,000 for a dairy instruction building and laboratory. Following is a brief description of the building:—

*The New Dairy Building.*

The dairy building now under construction is to be known as the "Flint Laboratory," named in honor of the Hon. Charles L. Flint, fourth president of the Massachusetts Agricultural College. This building is the first of the proposed "agricultural group." The plan for this group makes a large agricultural building the central figure of the group, flanked by the dairy building on the west and a proposed farm mechanics' building on the east.

The dairy building will be 120 feet long, 62 feet wide, with a basement and two stories. The construction is "fireproof," being of reinforced concrete and brick with a slate and gravel roof. The partitions will be made of 4-inch terra-cotta blocks, with a hard cement plaster on each side. The finish will be smooth and sanitary. An 8-foot corridor will run the full length of the building on each floor. Large glass windows will be placed in the corridor walls so that the work being done in the different rooms can be seen to advantage from the corridor, without the visitors interfering in any way with the students.

The basement will contain a laundry, a locker room that will accommodate lockers for 150 men, a shower bath, a cheese manufacturing and a cheese curing room, storage rooms, and a dairy mechanics room, as well as a room with an artificial refrigerating plant. The refrigerating plant is designed to furnish refrigeration for the cold box or refrigerator, as well as to make artificial ice if desired.

The first floor will have two offices in the front, with the milk-handling laboratories back of them. A space 104 feet long by 24 feet wide on the north side of this floor will be given exclusively to the separating of milk, ripening of cream and making of dairy butter. On the south side will be found a complete market milk equipment, including a 16 by 16 foot refrigerator and a 27 by 24 foot ice cream manufacturing room. The refrigerator will be equipped in such a way that either artificial refrigeration or natural ice can be used.

The second floor will have an office and a department reading room. On this floor there will also be a dairy bacteriological laboratory that will accommodate 20 men at one time; a Babcock laboratory, 62 by 24 feet, that will accommodate 30 men; and a special feature in a dairy equipment museum, 57 by 24 feet, for which it is hoped a permanent exhibit of dairy apparatus may be obtained, as well as loans of "up-to-date" dairy appliances for exhibition during the time that the short-course students and farmers' week visitors are here. If this can be done the four-years men will have advantages along this line far above those ordinarily afforded.

This building is designed for instruction to meet Massachusetts dairy conditions,—market milk and farm dairy work. The laboratories will accommodate 100 men at one time if desired. This equipment, together with our certified milk equipment, which we will use even more in the future as a laboratory, will give the college, perhaps, the best college market milk equipment in the country.

#### COMMENCEMENT.

The last annual commencement occurred June 21. At that time the college conferred the degree of B.Sc. on 43 men, the degree of M.Sc. on 2, and the degree of Ph.D. on 2. Eugene Davenport, dean of the College of Agriculture of the University of Illinois, gave the commencement address, taking for his subject, "The Agricultural College as a Public Service Institution." The attendance at the alumni dinner was 206, this being the largest number present on such an occasion in the history of the institution.

### SUMMER SCHOOL.

The registration in the summer school of 1911 was 153, a number considerably smaller than the registration of the preceding year. The comparatively small attendance was undoubtedly due to the fact that last summer the registration fee was raised from \$1 to \$5. Those attending the summer school, however, seemed to have come with serious and definite purposes, and, on the whole, the school was perhaps more satisfactory than those held in former years. Owing to lack of funds for enterprises of this sort, it has been decided to omit the summer school for 1912.

In connection with the last summer school there was held another conference of rural social workers. There were present at this conference about 250, representing the grange, the Y. M. C. A., the rural school, etc. In this connection there was also held an exhibit of rural social work, which was probably the first time that the exhibit idea had been applied to the sociological side of rural affairs on so large a scale. The usual course for rural clergymen was also included in the summer school.

### THE WINTER SCHOOL.

The attendance at the winter school of 1911 was 113. Previous to that the largest attendance had been 66. The poultry course, which was given during the last two weeks of the winter school, had a registration of 74. The winter school itself was concluded by a "farmers' week," which furnished a most admirable program and brought to the college 830 people, who came for a part or all of this four days' special instruction.

### TUITION FEE.

The trustees have voted to require a tuition fee of nonresidents of the State registering for work of college grade. Beginning next September, therefore, such students will be charged a fee of \$40 a year.

### THE YEAR IN THE DEPARTMENTS OF INSTRUCTION.

*In General.* — During the year no radical changes have taken place in the method or scope of instruction. Perhaps the most significant improvement has come through the addition of a num-

ber of instructors in the required subjects of the freshman and sophomore years, made possible by the increased appropriations of one year ago. This has allowed the scheduling of relatively small sections. It is needless to say that, other things being equal, the teaching efficiency must be increased by this arrangement. A table is presented showing the numbers in the various sections of the required work of the freshman and sophomore years one year ago and the present semester.

	1910.	1911.
Sophomore class:—		
Enrolment, . . . . .	110.0	127
Number of sections, . . . . .	4.0	6
Average number in section, . . . . .	27.5	21
Freshman class:—		
Enrolment, . . . . .	158.0	168
Number of sections, . . . . .	5.0	8
Average number in section, . . . . .	31.6	21

*In the Division of Agriculture.*—The work in the division of agriculture has been strengthened materially during the year by the addition of the new men mentioned in another place in this report, and by the development of a number of new courses.

The new poultry department has been put on a sound footing; buildings have been erected and stock and equipment have been purchased. The demand for instruction in poultry husbandry, both by regular students of the institution and throughout the State, is very gratifying.

The work in animal husbandry has been considerably enlarged, and a new instructor taken on.

In the department of dairying much time has been devoted to the completion and perfection of plans for the new dairy instruction building.

The college farm has again shown an increase in sales without a corresponding increase in expenditure. It is the ambition of the division to make the farm entirely self-sustaining.

*In the Division of Horticulture.*—No important changes in the courses of study or teaching policy have been made during the year. Some changes in personnel are recorded in the statement regarding new appointments. Important plans are under way for additional experimental work, and interesting developments have been found in the plant breeding work. The greatest improvement

in the physical equipment of the division has been the erection of the new cold-storage plant for use in the departments of pomology and market gardening.

*In the Division of Science.* — The various departments in the new division of science have been carried on without notable change, except with respect to the formal organization into a division.

The department of chemistry has been reorganized, and the research and teaching sides of chemistry are now under one head. The announced object of the department is (1) to give all students in the college a reasonable understanding of the general principles of chemistry in its application to agriculture; (2) to co-operate with other departments of the college so that students may have an understanding of chemistry in its particular relation to the other arts and sciences, such as agriculture, horticulture, botany, biology, entomology, etc.; and (3) to train students for positions as chemists in experiment stations, the United States Department of Agriculture, fertilizer and feed factories, in dairy work, sugar work and the like.

The department of entomology has completed one year of work in the new building, and finds the building excellently adapted to departmental needs. A new course in forest insects has proved popular, and additions to the teaching force have made possible a greater attention to graduate teaching.

The teaching force in the department of mathematics is now adequate to permit comparatively small sections and, in the judgment of the department, the efficiency of the freshman work has been thereby materially increased. The class in senior engineering is the largest ever taking that elective course since it was introduced.

The subject of physics has been given full departmental standing during the year, and justifies its place not only because of the importance of physics as a science in itself, but also because special emphasis is laid on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, and zoölogy, thus furnishing an extra tool by which the student's work in all these subjects may be made more effective.

The department of veterinary science has been enabled to develop the accessory work in bacteriology to a considerable de-

gree on account of the addition of Dr. Gage to the teaching force.

*In the Divisions of the Humanities and Rural Social Science.* — The work in economics and sociology has been given prominence by the organization of a department, as is the case with rural sociology. Other than the addition of numerous courses in these two departments no radical changes have been made during the year.

#### THE GRADUATE SCHOOL.

During the parts of the two college years covered by this report, 24 persons registered as graduate students. Of these, 19 were candidates for advanced degrees, the others taking such subjects as they desired, whether graduate or undergraduate in grade. Two were given the Ph.D. degree, and 2 the M.Sc. degree, at the last commencement. Seven persons presented themselves for the first time for graduate work this fall, making, with former students still at work, a total of 18 graduate students this fall. Of these, 3 are not candidates for advanced degrees.

No new policies have been initiated, the temporary organization of the school being such as to render these inadvisable. Despite this, one change should be made. The school was originally organized when no divisions of the college were in existence, and some of the present divisions were only departments. New departments in those divisions have not been recognized by the trustees in connection with graduate work, and the professors in charge of those departments feel that, in consequence, they are not on the same plane with other departments, and are not inclined to take graduate students so long as this inequality obtains. This seriously hampers the success of the graduate school, and I, therefore, recommend for the consideration of the trustees the following action taken by the faculty committee on graduate school: —

Any department of the college, properly equipped and prepared to do so, may present to the committee on graduate school a full statement of the lines of work it is prepared to offer for graduate work, and on approval by the committee and endorsement by the trustees, such departments may be added to the list of those giving graduate courses, the rating of these courses as majors or minors for the degrees of M.Sc. or Ph.D. to be determined by the committee on graduate school.



The school is suffering at the present time from a lack of policies and advertising. A close, thorough organization of the work should be brought about; the scope of majors and minors determined more minutely; the latitude of choice of minors fixed; and the whole school pushed ahead more vigorously. I strongly recommend that steps be taken to give the school ample authority to develop in these and other directions.

#### THE EXPERIMENT STATION.

A number of minor changes in the station staff have taken place during the year, which are recorded in another part of this report. There has been one important building change; namely, the repairs and improvements at the station laboratory. The entire building has been renovated, the plumbing much improved, and heat from the central plant introduced; two new laboratory rooms have been provided for research work, and a large room set aside for library and reading purposes. These improvements furnish temporary relief from the overcrowded and inconvenient conditions hitherto prevailing. A substantial building has been erected on the college cranberry bog near Wareham, with sufficient capacity to handle the entire crop, and to furnish laboratory and living rooms, at a cost of about \$2,100.

The following publications have been made during the year: —

Twenty-third annual report, 451 pages.

Bulletins: Inspection of commercial fertilizers, 76 pages. Inspection of commercial feedstuffs, 56 pages (No. 136). Inspection of commercial feedstuffs, 32 pages (No. 139). Rational use of lime, 20 pages. Tomato diseases, 32 pages. Meteorological bulletins, twelve, 4 pages each.

Circulars: Rules relative to testing dairy cows, 6 pages. The chemical analysis of soils, 4 pages. Balanced rations for dairy stock, 7 pages. Lime and sulphur solutions, 4 pages.

Additional publications: six papers printed in Part I. of the annual report, and one from Part II., have been published as separates.

The mailing list has been thoroughly revised in co-operation with every postmaster in the State. Many names dropped on account of death, removal, etc. Total number dropped, 1,110. New names added, 1,291. Lists at present: —

Residents of Massachusetts, . . . . .	12,903
Residents of other States, . . . . .	2,567
Residents of foreign countries, . . . . .	242
Newspapers, . . . . .	519
Libraries, . . . . .	317
Exchanges, . . . . .	142
Cranberry growers, . . . . .	1,400
Beekeepers, . . . . .	2,880
Meteorological, . . . . .	583
	<hr/>
Total, . . . . .	21,553

A digest of the main lines of work for the year will be of general interest: —

No very fundamental changes have been made in lines of work in progress, but in many instances inquiries have been considerably broadened in scope. This is especially true of the cranberry investigations, in connection with which arrangements have been completed for meteorological observations in connection with the United States Weather Bureau. Color vision of the honey bee is a new subject taken up during the year.

*Control Work.* — The passage of a new fertilizer law has been secured. This becomes operative December 1. Fertilizer samples collected during the year, 1,061.

*Feed Law.* — A new feed law has been prepared which will be introduced in the Legislature this winter. Samples collected and examined during the year, 731.

*Dairy Law.* — A new dairy law prepared last year failed of enactment. It will be reintroduced.

The work of testing pure-bred cows continues to increase. It employs the entire time of two men, while from three to five men are needed during about five months every year.

*Seed Work.* — Purity tests, 62; germination tests, 355; samples separated, 138.

#### *Results of the Lines of Work in the Experiment Station.*

Although the report of the director of the station, printed as a separate document, should be referred to for all matters concerning details of the station work, it may not be out of place to recite some results which, in the opinion of the director, have

been attained by the year's work and are of general public interest.

*Alfalfa.* — Both home and co-operative experiments in general, satisfactory. In interpreting significance of results it seems important to remember that the much better success than was obtained in earlier years may, perhaps, be connected with the comparatively small rainfall. Still, the outlook is regarded as hopeful.

*Asparagus.* — The substation work at Concord has made excellent progress in the direction of producing a rust-resistant variety.

In the fertilizer work it has been made very apparent that the tendency to rust has been reduced by such use of fertilizers (especially nitrate of soda) as is calculated to promote uniform steady growth.

*Cranberry.* — Crop of the year excellent and will sell for a total sum of about \$4,800. This will leave in the neighborhood of \$3,500 net proceeds above the cost of harvesting, packing, etc., which becomes available to help meet costs of experimental work.

Numerous important lines of experiment have been introduced. Among the more important are overhead sprinkling system in its relation to frosts, crop production, etc., fertilizer experiments; general investigation as to insects and relation of the honey bee to pollination.

Among the significant results of the year has been the demonstration of the great importance of the honey bee in insuring pollination.

*General Results in the Department of Agriculture deserving Special Mention.* — Demonstration that sulfate of potash is far superior to muriate as a source of potash for the raspberry and for alfalfa.

Demonstration that for the onion crop no combination of fertilizer employed in addition to stable manure at the rate of 30 tons per acre is beneficial.

Demonstration that for alfalfa and oats as a nurse crop the various forms of fine-ground bone and basic slag meal are superior to fine-ground rock phosphates as sources of phosphoric acid.

Remarkable improvement in the character of pasture sod, and great increase in production of feed as result of top-dressing with moderate amounts of slag meal and double sulfate of potash magnesia.

*Results in the Chemical Department.* — Experimental and research work considerably hindered by repairs in progress, and none of the subjects which engaged special attention has been brought to a conclusion.

*Results in the Horticultural Department.* — Careful study as to the climatic adaptations of apple varieties has been completed. This work shows the great importance of exact climatic adaptation and the meteorological principles upon which this depends. It will have an important practical application in fruit growing.

*Results in the Veterinary Department.* — Experiments in feeding milk from tuberculous cows to calves and young stock have been completed. None of the animals contracted tuberculosis.

#### THE EXTENSION SERVICE.

The extension service has had two full years of operation. It is needless to say that I regard this phase of our college activities as of the utmost consequence, directly to the Commonwealth and indirectly and incidentally to the college itself. I hope in a future report to discuss at some length the problem of an adequate extension service on behalf of Massachusetts agriculture and rural life. I now recommend that you authorize the publication of a fairly full report of the work of the past two years as a separate document. In the hope that this may be done, I will here simply call attention to a table of statistics of the extension activities printed as Table III. in another part of this report, and to a brief statement of results that I believe it is fair to credit to the work thus far accomplished.

#### *What the Extension Service has accomplished.*

1. It has systematized the scattered work heretofore done by the several members of the faculty.
2. Through the various short courses thorough instruction has been given to several hundred people who could come to the college for but a short time.
3. Through the lectures, demonstrations, demonstration or-

chards, dairy improvement associations, traveling libraries, and personal visits to farms, trains, fair exhibits, extension schools and other similar activities, reliable information has been carried to thousands who could not come to the college for it.

4. Through the correspondence courses men and women have been able to pursue systematic study and still attend to business or professional duties.

5. By means of the summer school and the conference for rural social workers, teachers, clergymen and others concerned in building up the educational and social life of rural regions have obtained a new conception of the function of the various organizations in the community, and the part they may play in community betterment. Many communities have taken on new life due chiefly to the inspiration received by some person at the summer conference. This influence has by no means been confined to Amherst or to Massachusetts.

6. Agriculture, in the broader sense, in this State, has received much stimulation at the hands of the faculty, through the several extension activities.

7. Through the extension service the equipment of the college and the knowledge possessed by the experts on the faculty are made more useful to the citizens of the State who support the college.

8. Through the extension service the college becomes more nearly a "public service institution." It gives men and women who come to it a useful and practical education, which will fit them for the several pursuits and professions of life. It carries on experiments and research work to determine facts which later can be used for the education of students and in the upbuilding of the agriculture of the State. But more than this, the college is prepared, through its extension service, to carry the teachings of the college and the results of the work of the experiment station, by means of men especially trained for the task, to every community that asks for these helps.

#### NEW APPOINTMENTS.

The following appointments took effect during the winter of 1911:—

John Allan McLean was elected associate professor of animal

husbandry to fill the position made vacant by the resignation of Mr. Ray L. Gribben, as instructor in the same subject. Professor McLean is a graduate of McMaster University, Toronto, Can., in 1902, and from the Iowa State College in 1905. The five years subsequent to his graduation from Iowa State College he devoted to teaching, occupying positions at the agricultural colleges of Colorado, Iowa and Mississippi.

John C. Graham was elected associate professor of poultry husbandry. For fourteen years Professor Graham was principal of the high school in Oshkosh, Wis.; in the winter of 1911 he received the degree of B.S.Agr. from the University of Wisconsin.

Guy C. Crampton was appointed associate professor of entomology. Dr. Crampton is a graduate of Princeton University in 1904, received the degree of A.M. at Cornell University, and the degree of Ph.D. after two years' study in Germany. He has taught several years with marked success.

The following appointments took effect September 1:—

Robert J. Sprague was appointed head of the division of the humanities and professor of economics and sociology. Dr. Sprague graduated from Boston University in 1897. He subsequently pursued graduate work at that institution, receiving the degree of A.M. in 1899 and Ph.D. in 1901; he also received the degree of A.M. from Harvard University in 1900. He has had a wide experience in teaching, and has studied, worked or traveled in Germany, Italy, Canada and the British Islands. For five years prior to his appointment here he was professor of economics and sociology at the University of Maine.

Edward M. Lewis was appointed assistant professor of English and assistant dean. Professor Lewis graduated from Williams College in 1896. Subsequently he studied at Harvard University. He received the degree of A.M. from his alma mater in 1899. Two years later he received a diploma from the Boston School of Expression. He taught elocution at Columbia University for two years, and for the past eight years has taught public speaking and oratory at Williams College. For some years, also, he has taught public speaking at Yale Divinity School.

Curry S. Hicks was appointed assistant professor of physical

education and hygiene to fill the vacancy caused by the resignation of Dr. Percy L. Reynolds. Professor Hicks graduated from the Michigan State Normal College in 1908. Later he studied physical education at Amherst College, and last year was employed at the Michigan State Normal College as director of athletics and physical examiner.

Charles A. Peters, a graduate of Massachusetts Agricultural College in the class of 1897, was elected assistant professor of inorganic and soil chemistry. Dr. Peters has studied chemistry in Germany, also at Yale University, having earned the degree of Ph.D. in that subject; he has had a wide and successful experience in teaching, having been employed for several years at the University of Idaho.

Frederick L. Yeaw, a graduate of Massachusetts Agricultural College, in the class of 1905, was elected assistant professor of market gardening to take the place of Mr. Charles S. Heller who resigned in the summer. Professor Yeaw has been for five years employed as plant pathologist for the experiment station of the University of California, having had charge of the sub-station located at Davis.

George E. Gage was appointed assistant professor of animal pathology. Unique and full training in bacteriology and physiology fits Dr. Gage for this work. He had been engaged for some time by the experiment station of Maryland.

Dean George F. Mills returned to his college duties in September, after a leave of absence of one year.

Professor S. Francis Howard is on a leave of absence this year, and is spending the time in graduate study in chemistry at Johns Hopkins University.

In August Professor Frederick B. McKay resigned as assistant professor of English and public speaking. This position is being filled by Mr. Howard deF. Widger, a graduate of Yale University in 1910. Mr. Widger spent last year at Columbia University Law School.

An assistant director of extension work was appointed in June, Earnest D. Waid being elected to that position. Mr. Waid graduated from the Ohio State College in 1906, and since that time has been engaged in extension work in Maine and Ohio.

Albert R. Jenks, a graduate of Massachusetts Agricultural College in 1911, has been elected supervisor of correspondence courses in the extension service.

In the early spring Charles J. Robinson, extension instructor in dairying and animal husbandry, resigned. His position has been filled by the appointment of George F. E. Story, a graduate of Ohio State University in 1910.

Charles H. White, formerly connected with the extension service as field agent, was made district field agent for Worcester County, with headquarters at North Uxbridge.

#### NEW INSTRUCTORS AND ASSISTANTS.

The following instructors also became connected with the teaching force September 1:—

POSITION.	Name.	Institution from which graduated, and Degrees.	Year.
Instructor in physics, . . .	Charles A. Butman, . . .	Massachusetts Institute of Technology; three years' graduate work at Clark and Yale Universities.	1908
Instructor in English, . . .	Willard A. Wattles, . . .	University of Kansas, M.A.,	1911
Instructor in French, . . .	William L. Harmount, . . .	Yale University, . . .	1903
Instructor in German, . . .	Arthur N. Julian, . . .	Northwestern University, . . .	1907
Instructor in animal husbandry.	Elvin L. Quaife, . . .	Iowa State College, B.Sc.	1911
Instructor in mathematics,	William L. Machmer, . . .	Agr. Franklin and Marshall, M.A.,	1911
Instructor in landscape gardening.	Arthur K. Harrison, . . .	Associated with Mr. Manning.	
Assistant in mathematics and in military science.	Samuel R. Parsons, . . .	Massachusetts Agricultural College, B.Sc.	1911
Assistant in botany, . . .	Frederick A. McLaughlin,	Massachusetts Agricultural College, B.Sc.	1911
Assistant in agronomy and secretary to director of experiment station.	Herbert J. Baker, . . .	Massachusetts Agricultural College, B.Sc.	1911
Assistant in chemistry, . . .	Harold S. Adams, . . .	Williams College, A.B., . . .	1911

Rudolf W. Ruprecht, a graduate of the Rhode Island State College in 1911, is filling the additional position of assistant chemist in the experiment station, made necessary by the increased amount of work to be done in connection with the collection and analysis of fertilizers.

Sumner C. Brooks resigned as assistant in botany in the experiment station, and this position is being filled by Edward



A. Larrabee, who graduated from Massachusetts Agricultural College in 1911.

Just prior to Nov. 30, 1911, Joseph F. Merrill and Clement L. Perkins, assistants in the department of plant and animal chemistry of the experiment station, resigned to accept more lucrative positions elsewhere. Their successors have not yet been appointed.

*Changes in Title of Officers of the Institution.*

NAME.	Former Title.	Present Title.
Edgar L. Ashley, . . .	Instructor in German, . . .	Assistant professor of German.
Joseph S. Chamberlain, .	Associate professor of chemistry,	Associate professor of organic and agricultural chemistry.
Elmer K. Eyerly, . . .	Assistant professor of political science and lecturer in rural sociology.	Associate professor of rural sociology.
Philip B. Hasbrouck, . .	Registrar of the college, associate professor of mathematics, and adjunct professor of physics.	Professor of physics and registrar of the college.
Joseph B. Lindsey, . . .	- - -	Goessmann professor of agricultural chemistry.
Anderson A. Mackimmie,	Instructor in French, . . .	Assistant professor of French.
George F. Mills, . . .	Dean of the college, head of the division of the humanities, and professor of languages and literature.	Dean of the college, professor of languages and literature.
Charles Wellington, . .	Professor of general and agricultural chemistry.	Professor of chemistry.

NEW ADMINISTRATIVE ORGANIZATION.

By vote of the trustees at the June meeting the various departments of the college already organized, together with several others organized by the same action, were grouped into divisions. Each division has a head who acts as general administrative officer with more or less control over general policies, the extent of this control depending very largely upon the extent of the business transactions of the division. The head of the division of science is denominated the chairman of the division, and is appointed for two years on nomination by the heads of the departments in the division. The general departments of library, military science, and physical education are responsible directly to the president of the college, who for the present also retains the headship of the division of rural social science.

The original argument for developing this form of adminis-

trative organization lay in the fact that it was necessary to differentiate the departments of agriculture and horticulture into numerous departments. The question immediately arose, shall these departments be absolutely unrelated, or shall they be closely correlated? Obviously, groups of departments which in one case — horticulture — represent annual sales of \$7,000, and in another case — agriculture — annual sales approaching \$25,000, can best be handled by one administrative officer. The division idea, therefore, suggested itself as the solution of this problem. There are other forms of correlation, however, that are important, especially with respect to instruction. As the college grows it is evident that it will become more and more difficult for many problems to be discussed in general faculty meetings, particularly where those problems are of a character to interest special groups of men. The logical thing, therefore, seemed to be to organize the entire institution on the division basis. So far as possible, administrative details will be handled by the respective heads of divisions, in order that the instructors may give the larger share of their time and energy to the teaching work.

An important use of this new form of administrative organization has developed through the occasional convening of the various administrative officers, in an informal and unofficial way, as a sort of "cabinet" to the president for the discussion of general administrative questions.

It is intended that each department shall retain departmental integrity, and if the division system after a term of years is found not to meet the needs of the situation it can easily be abandoned.

#### *Organization of Types of Work.*

In the discussion of the mission of the college, I referred to the threefold division of our work as to types, — research, instruction and extension service. In this institution the instruction may be divided into two main groups, — the undergraduate instruction and the graduate school. These four types of work also find their appropriate administrative organization under the administrative leadership of "directors," as follows: —

The dean of the college is the director of the undergraduate work or instruction so far as it applies to the relation of students

to the work of the institution. At present the general questions of courses of study and methods of instruction are handled through a faculty committee.

The director of the experiment station is the director of all the research work of the institution, although for present purposes the agricultural survey is placed under the general charge of the extension service.

The director of the graduate school has general charge of the graduate teaching.

The director of the extension service is charged with the duty of developing the exterior activities of the institution.

The development of this general plan, and particularly the enlargement of the extension service, brings up a very important detail in the problem of administrative organization. Shall the extension service be organized as a separate faculty, or shall it be closely knit with the departmental organization of the institution? The plan which I strongly advocate is that of making each college-teaching department an administrative unit for all types of work. Theoretically, then, each department of the institution will have, or at least may have, four outlets for its energies: first, teaching of undergraduate students; second, teaching of graduate students; third, research and survey work; fourth, exterior teaching, or extension service. If the department is officered by only one or two men, manifestly either some types of work will be neglected or each man will be required to perform two or more types. As soon as a department, however, attains sufficient size to require the services of a large number of men, it is highly important that each man be employed for the specific purpose of giving the larger share of his time to some one type of work. What might be called a model department would have at least one man giving the bulk of his time to research, another to instruction of undergraduate students, another to the extension service. Of course, the number of men will depend upon the kind of work in the department, the resources of the college, and the demands of students and farmers generally for this special sort of work. I regard it as desirable that each man in the department should give a little time to some other work than that which represents his chief interest; for instance, that the

research man in every department should give at least one teaching course, preferably to advanced undergraduates or graduate students. If he can lecture occasionally to bodies of farmers, so much the better; but his time and energy should not be too much divided among many interests. So I think that every instructor ought to be given time and opportunity for at least minor pieces of research, and if his subject reaches the popular need, should be called upon occasionally for extension service. It is, perhaps, rather difficult for the extension man to find opportunities for research or for regular instruction in the college, although he may assist in the short-course work. Under this scheme the head of a given department may unify all the types of work that belong to the subject matter of his department. There is the objection, of course, that this is a rather complex organization, but it seems to be the only logical outcome of the desire to organize an institution like ours on a businesslike administrative basis.

*The Administrative Officers.*

The following is the schedule of the present administrative organization of the institution: —

- The president.
- The dean of the college.
- The director of the experiment station.
- The director of the graduate school.
- The director of the extension service.
- The registrar.
- The treasurer.
- The head of the division of agriculture.
- The head of the division of horticulture.
- The chairman of the division of science.
- The head of the division of the humanities.
- The head of the division of rural social science.
- The assistant dean.

The following is the schedule of —

*Organization for Teaching Purposes.*

CLASSIFICATION.	Incumbent.	Academic Rank.
I. Division of Agriculture,	James A. Foord,	Head of division.
1. Agronomy,	Sidney B. Haskell,	Assistant professor.
	William P. Brooks,	Lecturer.
	Herbert J. Baker,	Assistant.
2. Animal husbandry,	John A. McLean,	Associate professor.
	Elvin L. Quaife,	Instructor.
3. Dairying,	W. P. B. Lockwood,	Associate professor.
	G. F. E. Story,	Extension instructor.
4. Farm administration,	James A. Foord,	Professor.
5. Poultry husbandry,	John C. Graham,	Associate professor.
II. Division of Horticulture,	Frank A. Waugh,	Head of division.
1. Floriculture,	Edward A. White,	Professor.
2. Forestry,	Frank F. Moon,	Associate professor.
	Frank W. Rane,	Lecturer.
	Frank A. Waugh,	Professor.
3. Landscape gardening,	Arthur K. Harrison,	Instructor.
4. Market gardening,	Frederick L. Yeaw,	Assistant professor.
5. Pomology,	Fred C. Sears,	Professor.
	Alvah J. Norman,	Extension instructor.
III. Division of Science,	James B. Paige,	Chairman of division.
1. Botany,	George E. Stone,	Professor.
	A. Vincent Osmun,	Assistant professor.
	F. A. McLaughlin,	Assistant.
	M. T. Smulyan,	Graduate assistant.
	R. G. Smith,	Graduate assistant.
2. Chemistry,	Joseph B. Lindsey,	Professor.
	Charles Wellington,	Professor.
	J. S. Chamberlain,	Associate professor.
	S. F. Howard,	Assistant professor.
	Charles A. Peters,	Assistant professor.
	William A. Turner,	Assistant.
	Harold S. Adams,	Assistant.
3. Entomology,	Henry T. Fernald,	Professor.
	Guy C. Crampton,	Associate professor.
	Burton N. Gates,	Assistant professor. <sup>1</sup>
	William S. Regan,	Graduate assistant.
4. Mathematics,	John E. Ostrander,	Professor.
	C. Robert Duncan,	Instructor.
	William L. Machmer,	Instructor.
	Samuel R. Parsons,	Assistant.
5. Physics,	Philip B. Hasbrouck,	Professor.
	Chester A. Butznan,	Instructor.
6. Veterinary science,	James B. Paige,	Professor.
	George E. Gage,	Assistant professor.
7. Zoölogy and geology,	Clarence E. Gordon,	Assistant professor.
	Leonard S. McLaine,	Graduate assistant.
IV. Division of the Humanities,	Robert J. Sprague,	Head of division.
1. Economics and sociology,	Robert J. Sprague,	Professor.
2. History and government,	Elmer K. Eyerly,	In charge.
	George N. Holcomb,	Lecturer.
3. Languages and literature,	George F. Mills,	Professor.
English,	Robert W. Neal,	Associate professor.
	Edward M. Lewis,	Assistant professor.
	Willard A. Wattles,	Instructor.
	Helena Goessmann,	Assistant.
Public speaking,	H. deF. Widger,	Instructor.
German,	Edgar L. Ashley,	Assistant professor.
	Arthur N. Julian,	Instructor.
French,	A. A. Mackimmie,	Assistant professor.
	William L. Harmount,	Instructor.
V. Division of Rural Social Science,	Kenyon L. Butterfield,	Head of division.
1. Agricultural economics,	Alexander E. Cance,	Assistant professor.
2. Agricultural education,	William R. Hart,	Professor.
	Floyd B. Jenks,	Assistant professor.
3. Rural sociology,	Elmer K. Eyerly,	Associate professor.
VI. General Departments:—		
1. Military science,	George C. Martin,	Professor and captain.
	Samuel R. Parsons,	Assistant.
2. Physical education,	Curry S. Hicks,	Assistant professor.
3. Library,	Charles R. Green,	Librarian.

<sup>1</sup> Beekeeping.

## VISITS BY IMPORTANT BODIES.

To an increasing degree the college is becoming the objective for visits by important organizations or groups. The following is a list, doubtless incomplete, of such visits during the past year:—

	Date.
Connecticut Valley Breeders' Association, . . . . .	Jan. 24.
Massachusetts Dairymen's Association, . . . . .	Mar. 15.
Home and School Garden Club, . . . . .	Aug. 4.
Potato Culture Club, . . . . .	Oct. 7.
Massachusetts Fruit Growers' Association, . . . . .	Oct. 9.
Massachusetts Press Association, . . . . .	Oct. 9.
Executive Committee of State Y. M. C. A., . . . . .	Oct. 11.
Massachusetts State Poultry Association, . . . . .	Oct. 11, 12.
Hampshire, Hampden, and Franklin Bee Keepers' Association, . . . . .	Oct. 14.
Committee representing the Boston Gardeners' and Florists' Association, . . . . .	Oct. 31.
Committee representing the Massachusetts Horticultural Society, . . . . .	Oct. 31.
Officers of State Board of Education, . . . . .	Nov. 21.

## CONSTRUCTION AND REPAIRS.

That part of the treasurer's work which consists in the oversight of college service, such as heating, lighting, etc., and the construction and repairs of buildings, has grown enormously during the past few years, and the demands on "general maintenance" have raised some rather important problems in administration. It has been very difficult to secure adequate help, and almost impossible to carry out promptly all of the projects assigned.

Two important buildings have been completed during the year: namely, the animal husbandry building and the cold storage building. The new dairy building has been begun, the building contract being given to H. Wales Lines Company of Meriden, Conn.; the heating and ventilating to Nichols & Drown Company of Lynn, Mass.; and the plumbing to William H. Mitchell & Sons of Boston. It is expected that the building will be completed by early summer.

The largest improvement project was in connection with the west experiment station building. Other improvements and

many repairs, however, have been made or are still in process. For example, in the chemical laboratory the room formerly used for mathematics has been refitted for work in chemistry. In the social union room at North College a new fireplace has been built, the east and north entrances of the room closed, and an arch put in between the lounging room and the trophy room. A marked improvement has thus been accomplished. In the department of poultry husbandry there were erected and partially equipped a feed house, a brooder house, and a laying house. The task of repainting all of the college buildings has been begun, and this much-delayed improvement we hope may be completed before commencement.

New granolithic walks have been put in as follows: from the main walk east of the chapel to the ravine, and from South College past North College, across the ravine, to the dining hall. Walks have also been made connecting the president's house with the campus. A "stepping-stone" walk has been put in front of the new entomological building; these stepping stones are 20 inches square, laid 6 inches apart. Work has just started on the new apiary, located on the site of the "old creamery" building.

The new waiting station has been placed on the botanic walk, adjacent to the trolley line of the Amherst & Sunderland Railroad Company. This is "a long-felt want," and will be appreciated by the great number of people using it. The design was made by students in the department of landscape gardening.

Percy C. Schroyer, a graduate of the Michigan Agricultural College, in the class of 1908, has been engaged as assistant engineer.

#### IMMEDIATE NEEDS OF THE COLLEGE.

The most effective way of stating the present needs of the college is to outline the reasons which underlie the action of the trustees in formulating the legislative budget for the ensuing year. However, numerous suggestions have come to me from the officers of the college, and while not all of the needs thus expressed have found a place in the legislative budget, it will be of interest to quote some of them here, as showing how difficult it is for the college to keep pace with the requirements

made by its rapid expansion. The following are among "the immediate pressing needs," suggested by various administrative officers of the institution:—

"Greatly increased library facilities."

"Additional recitation and lecture rooms, particularly for the departments in the division of the humanities."

"Additional instructors, so that certain sections in required work may be made smaller."

"Increased scholarship requirements."

"The limiting of the number of subjects that may be taken by the student, and avoiding such multiplicity of subjects that a student may get a hazy idea of many subjects instead of a clear, well-defined idea of a few things."

"A new chemical laboratory."

"Provision for new lines of investigation in the experiment station, the most important of which are in the following subjects: poultry farming, horticulture, animal diseases, market gardening."

"Additional land for use in experimental work, especially in the agricultural department, the department of pomology and the department of entomology; the latter department needs a small area to be under its exclusive control."

"Various minor improvements at the experiment station which have been submitted in the form of projects."

"The employment of an additional assistant in animal nutrition to work in connection with Dr. Lindsey."

"Employment of an assistant for seed work with a view to studying the seed situation in its possible bearing upon the necessity of a seed law."

#### THE LEGISLATIVE BUDGET OF 1912.

The budget to be presented to the Legislature of 1912, as approved by the board of trustees at its meeting in Boston, November 3, may be summarized as follows:—



*Requested Increases in Current Funds, Available for Fiscal Year,  
Dec. 1, 1912, to Nov. 30, 1913.*

ITEMS.	Present Appropriations.	Increase asked.	Total asked.
Administration, . . . . .	\$25,000	\$5,000	\$30,000
Maintenance and equipment, . . . . .	58,000	37,000	95,000
Investigations, . . . . .	10,500	14,000	24,500
Instruction, . . . . .	60,000	23,000	83,000
Short courses and extension teaching, . . . . .	20,000	30,000	50,000
Inspection service, . . . . .	3,000	-	3,000
	\$176,500	\$109,000	\$285,500

*Requests for Appropriations for Special Purposes, 1912.*

Agricultural building and equipment, . . . . .	\$200,000
Student dormitory, . . . . .	25,000
Addition to French Hall, . . . . .	25,000
Addition to Draper Hall, . . . . .	25,000
Dwelling house for registrar, . . . . .	8,000
Tenement house for farm help, . . . . .	6,000
Sewers, . . . . .	10,000
New equipment, . . . . .	31,525
Repairs and minor improvements, . . . . .	20,760
General improvements, . . . . .	35,135
	\$386,420

*Statement of Reasons for Requested Increases in Current Funds.*

*Administration.* — Under the new legislative classification the appropriation for general administrative purposes is \$25,000 a year. This includes the salaries of the general administrative officers of the college, the maintenance expense of their respective offices, and general charges that belong to the institution as a whole, such as, for illustration, publicity, commencement, etc. The current apportionment for the next fiscal year will show that the amount of \$25,000 is not enough to carry the present charges. The charges will increase steadily year by year, and our request for an increase of this item to \$30,000 a year is clearly justified by the situation.

*Maintenance and Equipment.* — The present appropriation under this item is \$58,000 a year. The trustees have voted to ask the Legislature for an increase of \$37,000, or a total of \$95,-

000. Attention should be called to the fact that \$30,000 of this increase is intended to cover permanent current appropriations of \$15,000 each for repairs (and minor improvements), and for teaching equipment. It seems obvious enough that we should have at our disposal a reasonable sum each year for this purpose. The needs are sure to recur. They are not *special* needs. They are *current* needs. The Legislature cannot possibly judge wisely respecting the details of these expenditures. For two years prior to this we have asked the Legislature for these additions to our current income; so far without success. However, it is only businesslike that these additions should be made.

*Instruction.* — During the past few years the instruction force of the college has expanded quite rapidly, due to two main causes, the first of which is the increase in students. The attendance of students of college grade has increased more than 135 per cent. in the last five years. Necessarily this has called for more teachers, the addition of needed courses of study, and has also enlarged the work of existing departments. Furthermore, in order to keep pace with the rapidly developing field of agricultural instruction, a number of entirely new departments have been added. It will not be necessary in the future to add instructors at as rapid a rate as we have done during the past four years, but because of all the reasons just given for the recent expansion, there are still some important places to be filled. The estimates of the various departments call for additional instructors whose probable salaries would aggregate about \$30,000 a year. The trustees have voted for an increase of \$23,000. This is none too much. Instruction is the heart of the college. If we are inadequately equipped at this point we cannot possibly do the best work.

*Investigation.* — The income of the institution from the national treasury for experiment station work is fixed by law and can be changed only by congressional action. Under these conditions, as new needs arise they must be met, if at all, by appropriations from the State treasury. The trustees, therefore, acting on requests of various departments of the experiment station, are asking that the present State appropriation of \$10,500 a year for investigation be increased to \$24,500 a year. These investigations include an agricultural survey, experiments in floriculture,

market gardening, veterinary science, and particularly important experiments in the department of poultry husbandry. These projects for new types of investigation are heartily supported by committees representing various producers' organizations of the Commonwealth.

*Short Courses and Extension Teaching.* — The present appropriation of \$20,000 a year for extension service is entirely inadequate to meet the demands. The trustees have voted to ask the Legislature for \$50,000 a year to carry on this important work. While it is not possible at this time to indicate the precise outlines of the plan for the best use of this added appropriation, I take pleasure in including at this point a statement from the director of extension service, giving his judgment as to the most important lines of work which should be developed in the near future: —

*Administration of the Work.* — Salaries, additional office equipment, traveling expenses, clerical help.

*The Development of the Correspondence Courses.* — Salary of supervisor, office equipment, clerical help, so that at least 1,000 may register in these courses.

*Itinerant Instruction.* — The extension schools, fair exhibits, educational trains, lectures, demonstrations, etc., require money for apparatus, and to defray the expenses of carrying on these, which are, perhaps, among the most important of our projects.

*Demonstration Orchards.* — To continue to plant these orchards and to provide help to supervise the growing of them.

*Traveling Instructor.* — To pay salary and expenses of a man provided with an automobile or covered "van," equipped with all kinds of demonstrating apparatus, to travel from town to town, giving demonstrations to small groups of farmers.

*Demonstration Plots.* — To provide funds so that demonstration plots showing results of the use of fertilizers, seed selection, rotation of crops, etc., can be placed all over the State and properly supervised by a representative from the college.

*Supervisor of Co-operative Work with Other State Institutions.* — Funds to pay salary and traveling expenses of a man, with the best of practical training, to take up this co-operative work that has been asked for by the other State institutions.

*Support for the Massachusetts Agricultural College Agricultural Improvement Association.* — Funds to provide selected seeds,

printed instructions, and other material to be used as a basis for improving the agricultural industry of the State.

*Extension Instructor in Rural Engineering and Sanitation.* — To provide salary and traveling expenses of a man, trained in the problems of farm buildings, power on the farm, heat, lights and rural sanitation.

*Extension Instructor in Town Improvement and Civic Betterment.* — Funds to pay the salary of a man to work with village improvement officers, town officers and others on such subjects as beautifying the town, public roads, drives, parks, school grounds, cemeteries, streets, trees, etc., and to organize and federate all the forces of the community to work for one common end.

*Extension Instructor in Agricultural Education.* — To pay the salary and traveling expenses of a man to help school boards in the organization of agricultural work in high schools, and to take up and develop further the boys' and girls' club work which has already started so finely.

*Extension Instructor in Home Economics.* — To provide salary and expenses of a woman trained in this subject, especially from the rural standpoint, to give instruction in the short courses, to teach in the extension schools, to give lectures and demonstrations on foods and their value, cooking, canning, preserving, sanitation, labor-saving conveniences, household equipment, and to help in the introduction of these subjects into the smaller towns.

*District Field Agents.* — To pay salaries of several men to be located in good agricultural centers, to act as district field agents, devoting their entire time to the building up of the agriculture of the section in which they work.

*Extension Instructor in Poultry Management.* — To provide salary and expenses for a trained poultry man to give his time to helping the poultry interests of the State. At present, we cannot accept one-tenth of the calls made upon us.

*Extension Instructor in Dairying.* — Funds to pay salary and traveling expenses of a man to help teach this subject in the extension schools, and to give lectures and demonstrations and advice relating to dairying, both to producer and consumer.

*Extension Instructor in Farm Management.* — To pay salary

and expenses of a man who shall help the farmers all over the State, in soil improvement, use of fertilizers, growing of field crops and in the general equipment and management of the farm.

*Extension Instructor in Animal Husbandry.* — Funds to pay salary and expenses of a man to organize breeders' and dairy improvement associations, advise as to feeding, and to give lectures and demonstrations on the care, management, selection, etc., of live stock.

*Short Courses.* — To provide funds for the further development of the several winter courses, and the continuation of the summer school and the conference for rural leaders.

#### APPROPRIATIONS FOR SPECIAL PURPOSES.

1. *For erecting and equipping an Agricultural Teaching and Laboratory Building, \$200,000.* — Although the college has been open to students nearly forty-five years, it has never had a building devoted specifically to agricultural teaching.

Practically every agricultural college in the country finds it necessary and desirable to make such a building one of the most important on the campus.

The rapid increase in our agricultural students has crowded the agricultural departments out of their old quarters. It is almost impossible to do efficient teaching under present conditions.

The winter short-course students are also inadequately provided for.

The proposed building will have three stories and a basement, and contain offices, class rooms, laboratories for the departments of farm administration, agronomy, animal husbandry, poultry husbandry and agricultural engineering. It is proposed to erect a fireproof building and to equip it in harmony with the recent developments in these lines of work.

2. *For erecting a Student Dormitory, \$25,000.* — This item was in our legislative budget one year ago. The need for it has grown, even with the year, as we have over 80 more men of college grade registered this autumn than a year ago. Students find it difficult to get rooms at any price, and room rents in private houses

are such as to make it a serious problem for many students who are working their way through college.

3. *For erecting and equipping an Addition to French Hall, \$25,000.* — French Hall is a teaching building attached to the modern range of greenhouses, and was built about three years ago. It was so planned that only half of the building, as it should eventually stand, was erected, and it is now proposed to complete the building. Our division of horticulture has expanded, both in number of departments and in number of students taking the work, to such a degree that both teachers and students are seriously inconvenienced by the present crowded condition.

Furthermore, until we get a satisfactory building for the divisions of the humanities and rural social science, instructors in those divisions have to find class rooms wherever most available. Probably for several years this addition to French Hall will have to be used considerably by departments not connected with the division of horticulture.

4. *For erecting an Addition to Draper Hall, \$25,000.* — This item has been asked for twice before. The present dining hall will not hold the student body. Moreover, the serving-room accommodations are entirely inadequate even for the present seating capacity of the dining hall. Hence the service is relatively costly and slow.

5. *For erecting a Dwelling to be occupied by the Registrar of the College, \$8,000.* — The trustees are not ready to adopt the general policy of erecting residences upon the grounds for members of the teaching staff. They feel that it is extremely desirable for the president to live upon the grounds, as is now the case. There are a few other administrative officers, also, whose presence on or near the grounds seems to be a distinct advantage. One of these is the registrar of the college, who has to be consulted frequently by students. The registrar now occupies a cottage at the entrance of the grounds, which is scarcely habitable. It will not pay to repair it, and it is not right to ask an officer of the institution to reside there under such conditions. The business-like thing, therefore, seems to be to erect a dwelling on college property, to be occupied by the registrar of the institution, on terms that will represent a reasonable interest to the college on the investment.

6. *For erecting and equipping a Tenement House for Farm Help, \$6,000.* — With the development of the live-stock interests, and particularly of the dairy herd, it has become imperative that quite a number of men should be housed near the college barns. Quarters formerly used for this purpose have been moved by the exigencies for new buildings, and other quarters must be provided.

7. *For providing Sewers for the College Estate, \$10,000.* — The college does not have an adequate system of sewage disposal. The minor sewers have become too small for present use. The recently erected buildings have been provided with cesspools, but it is clearly evident that a thoroughly modern and complete sewerage system should be installed. It is both necessary and desirable that this system should be worked out in harmony with the plan of the town of Amherst for disposing of sewage in that part of the village which adjoins the college estate. Plans are being matured for this co-operation, and it is desired to begin work on the sewers at the earliest possible moment.

8. *New Equipment for Farm, Dairy Building, Dining Hall, College Service, and for Miscellaneous Teaching Equipment for Various Departments, \$31,525.* — The college ought to have an annual income of not less than \$20,000 for keeping up the teaching equipment. In lieu of this regular income we are obliged to ask the Legislature each year for a list of items needed to keep the equipment of college service — farm, horticulture and laboratories — up to par.

9. *For Repairs and Minor Improvements, \$20,760.* — The same observations apply with respect to general repairs. The inventory of college buildings Dec. 1, 1911, exceeded \$500,000. Twenty thousand dollars a year for general repairs is, therefore, 4 per cent. of the inventory value of the college buildings.

10. *For General Improvements, \$35,135.* — This includes an addition to the poultry plant, an addition to the young stock barn, portable hog houses, a piggery, the development of the campus and miscellaneous improvements.

All of which is respectfully submitted,

KENYON L. BUTTERFIELD,

*President.*

## STATISTICS OF THE COLLEGE.

TABLE I. — Attendance.

	Registration Nov. 30, 1910.	Registration Nov. 30, 1911.
Senior class, . . . . .	47	85
Junior class, . . . . .	87	97
Sophomore class, . . . . .	110	127
Freshman class, . . . . .	158	168
	<u>402</u>	<u>477</u>
Graduate students, . . . . .	15	15
Unclassified students, . . . . .	17	29
Total doing work of college grade, . . . . .	434	521
Short courses: —		
Winter school, . . . . .	64	113
Poultry course, . . . . .	51	74
Summer school, . . . . .	229	153
Beekeepers' course, . . . . .	20	16
	<u>364</u>	<u>356</u>
Total, . . . . .	798	877

TABLE II. — Legislative Budget, 1911.

ITEMS.	Amount asked.	Amount granted.
1. Special appropriations: —		
Improvements, west experiment station, . . . . .	\$7,500 00	\$7,500 00
Enlargement of Draper Hall, . . . . .	25,000 00	—
Dormitory, . . . . .	25,000 00	—
Dairy building and equipment, . . . . .	75,000 00	75,000 00
Department equipment, . . . . .	15,000 00	10,000 00
Repairs, . . . . .	20,000 00	15,000 00
General improvements, . . . . .	25,000 00	15,000 00
	<u>\$192,500 00</u>	<u>\$122,500 00</u>
2. Increase in current annual appropriations: —		
Administration, . . . . .	\$4,250 00	\$4,250 00
Maintenance and equipment, . . . . .	43,250 00	13,250 00
Investigation, . . . . .	5,000 00	—
Instruction, . . . . .	22,500 00	12,000 00
Short courses and extension, . . . . .	15,000 00	5,000 00
Inspection service, . . . . .	—	—
	<u>\$90,000 00</u>	<u>\$34,500 00</u>
Previous appropriation, . . . . .	142,000 00	142,000 00
Total, . . . . .	<u>\$232,000 00</u>	<u>\$176,500 00</u>



TABLE III. — *Statistics of the Extension Service, 1910-11.*

	ENROLLMENT.		
	1910.	1911.	Total.
Ten weeks' winter course, . . . . .	65	113	-
Special poultry course, . . . . .	51	74	-
Farmers' week-course, . . . . .	559	830	-
Beekeepers', . . . . .	19	16	-
Summer school, . . . . .	228	153	-
Conference rural social workers, . . . . .	325	247	-
Correspondence courses, . . . . .	106	370	-
Totals, . . . . .	1,363	1,803	-
Total number enrolled in short courses at the college (two years), . . . . .	-	-	3,166

Several organizations have held meetings two days in length at the college; no accounting is made of the attendance at these.

*Statistics of Extension Work done away from the College.*

	1910.	1911.	Total.
Lectures and demonstrations:—			
Requested, . . . . .	123	600	723
Impossible to give, . . . . .	69	222	291
Lectures and demonstrations given, . . . . .	54	378	432
Attendance (no actual account, but fully), . . . . .	-	-	20,000
Education trains:—			
Boston & Albany:—			
Days on road, . . . . .	4	None.	-
Stops made, . . . . .	18	None.	-
Springfield trolley:—			
Days on road, . . . . .	3	None.	-
Stops made, . . . . .	13	None.	-
Lectures and demonstrations given on both trains, . . . . .	250	None.	-
Total attendance at lectures (hundreds of others visited the train), . . . . .	-	-	9,000
Exhibits at fairs, expositions, etc.:—			
Exhibits at fairs, . . . . .	6	10	16
Lectures and demonstrations given, . . . . .	32	69	101
Attendance both years, . . . . .	-	-	3,000
Demonstration orchards:—			
Requests for orchards on file, . . . . .	31	99	130
New orchards planted, . . . . .	4	4	8
Renovation plots, . . . . .	2	2	4
Massachusetts Agricultural College Agricultural Improvement Association:—			
Membership, . . . . .	-	110	110
Boys' and girls' corn and potato clubs:—			
Number of clubs, . . . . .	125	350	-
Number enrolled, . . . . .	8,300	16,900	-
Total number enrolled in two years, . . . . .	-	-	25,200
Conferences for community betterment:—			
Number held, . . . . .	2	4	6
Total number attending, . . . . .	-	-	1,000
Dairy improvement association:—			
Number organized, . . . . .	-	2	2
Requests for others, . . . . .	-	3	3
Number of members, . . . . .	-	52	52

*Statistics of Extension Work done away from the College — Con.*

	1909-10.	1910-11.	Total.
Massachusetts Poultry Association, meetings at college: —			
Attendance, . . . . .	75	75	150
Beekkeepers' convention: —			
Attendance, . . . . .	-	75	75
Polish farmers' day: —			
Attendance, . . . . .	-	95	95
Total number known to have been actually reached through the extension work during the two years, . . . . .	-	-	61,848

TABLE IV. — *Public Speakers for the Year.**A. Speakers at Sunday Services for Year ending Nov. 30, 1911.*

1910.

- Dec. 4. — Dr. Samuel A. Eliot, Boston.  
 Dec. 11. — Rev. Thomas Van Ness, Boston.

1911.

- Jan. 8. — Rev. Herbert A. Jump, New Britain, Conn.  
 Jan. 15. — Rev. Philip S. Moxom, Springfield.  
 Jan. 22. — Rev. Clarence F. Swift, Fall River.  
 Feb. 12. — Rev. Albert P. Fitch, Cambridge.  
 Feb. 19. — Rev. John W. Ballantine, Stafford Springs, Conn.  
 Feb. 26. — Rev. Jason N. Pierce, Oberlin, O.  
 Mar. 5. — Princ. H. S. Cowell, Ashburnham.  
 Mar. 12. — Rev. Herbert J. White, Hartford, Conn.  
 Mar. 19. — Rev. O. P. Gifford, Brookline.  
 Sept. 17. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.  
 Nov. 5. — Dr. L. Clark Seelye, Northampton.  
 Nov. 12. — Pres. M. L. Burton, Northampton.  
 Nov. 19. — Hon. George H. Utter, Westerly, R. I.  
 Nov. 26. — Mr. Frank P. Speare, Boston.

*B. Speakers at Wednesday Assemblies for Year ending Nov. 30, 1911.*

1910.

- Dec. 7. — Mr. Harry Kimball, Boston.

1911.

- Feb. 15. — Mr. J. B. Lewis, Boston.  
 Mar. 1. — Prof. Frank A. Updyke, Hanover, N. H.  
 Mar. 15. — Prof. Henry B. Wright, New Haven, Conn.  
 April 5. — Mr. George H. Cooper, Pittsfield.  
 April 12. — Prof. E. A. Ross, Madison, Wis.  
 May 10. — Prof. Edward M. Lewis, Williamstown.

1911.

- May 17. — Dr. Charles W. Eliot, Cambridge.  
 May 31. — Hon. George H. Utter, Westerly, R. I.  
 Sept. 20. — Dean George F. Mills, Massachusetts Agricultural College.  
 Sept. 27. — Mr. Evan F. Richardson, Millis.  
 Oct. 4. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.  
 Oct. 11. — Mr. Albert E. Roberts, New York, N. Y.  
 Oct. 18. — Dean George D. Olds, Amherst.  
 Oct. 25. — Prof. George M. Harper, Princeton, N. J.  
 Nov. 1. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.  
 Nov. 8. — Prof. Edward M. Lewis, Massachusetts Agricultural College.  
 Nov. 15. — Hon. Frank A. Hosmer, Amherst.  
 Nov. 22. — Prof. J. W. Crook, Amherst.

TABLE V. — *Statistics of Freshmen entering Massachusetts Agricultural College in September, 1911.*

A. *Home Addresses (classified by Towns and Cities).*

Amherst, . . . . .	4	Granby, Conn., . . . . .	1	Peabody, . . . . .	2
Arlington, . . . . .	2	Hanson, . . . . .	1	Peterboro, N. H., . . . . .	1
Ballston Spa, N. Y., . . . . .	1	Hanson (South), . . . . .	2	Pittsfield, . . . . .	1
Barranquilla, Colombia, S.A., . . . . .	1	Hingham, . . . . .	2	Plymouth, . . . . .	1
Barnstable (West), . . . . .	1	Kingston, . . . . .	2	Revere, . . . . .	2
Barre, . . . . .	1	Lancaster, . . . . .	1	Rock, . . . . .	1
Becket, . . . . .	1	Lancaster (South), . . . . .	1	Rockport, . . . . .	1
Beverly, . . . . .	1	Lanesville, . . . . .	1	Rutherford, N. J., . . . . .	1
Boston, . . . . .	13	Lee, . . . . .	1	Sandwich, . . . . .	1
Bridgeport, Conn., . . . . .	1	Leominster, . . . . .	1	Sheffield, . . . . .	1
Brockton, . . . . .	2	Lincoln (South), . . . . .	1	Shelburne, . . . . .	1
Brookfield (North), . . . . .	1	Littleton, . . . . .	1	Sherborn, . . . . .	2
Brookline, . . . . .	1	Ludlow, . . . . .	1	Somerville, . . . . .	3
Brooklyn, N. Y., . . . . .	2	Lynn, . . . . .	1	South Hadley Falls, . . . . .	1
Buckland, . . . . .	1	Malden, . . . . .	1	Southington, Conn., . . . . .	1
Buffalo, N. Y., . . . . .	1	Marshfield, . . . . .	1	Springfield, . . . . .	3
Burlington, . . . . .	1	Mattapan, . . . . .	1	Springfield (West), . . . . .	1
Campello, . . . . .	2	Melrose, . . . . .	9	Sudbury (South), . . . . .	1
Canton, China, . . . . .	1	Melrose Highlands, . . . . .	2	Sunderland, . . . . .	2
Catasauqua, Pa., . . . . .	1	Mendon, . . . . .	2	Swampscott, . . . . .	1
Chelsea, . . . . .	3	Middletown, Conn., . . . . .	1	Taunton, . . . . .	1
Chesterfield, . . . . .	1	Milford, . . . . .	1	Topsfield, . . . . .	1
Chicopee Falls, . . . . .	1	Montague, . . . . .	2	Wakefield, . . . . .	2
Dana (North), . . . . .	1	Natick, . . . . .	1	Waltham, . . . . .	5
Darien, Conn., . . . . .	1	Newburyport, . . . . .	4	Ware, . . . . .	1
Dartmouth (North), . . . . .	2	New Haven, Conn., . . . . .	2	Warren, . . . . .	1
Deerfield, . . . . .	1	Newton, . . . . .	1	Wellesley, . . . . .	1
Dover, . . . . .	2	Newton (West), . . . . .	1	Westford, . . . . .	1
Doylestown, Pa., . . . . .	1	Newtonville, . . . . .	1	Weymouth (East), . . . . .	1
Dracut, . . . . .	1	New York, N. Y., . . . . .	2	Winchendon, . . . . .	1
Duxbury (South), . . . . .	1	Northampton, . . . . .	2	Winthrop, . . . . .	3
Enfield, . . . . .	1	Norwood, . . . . .	1	Worcester, . . . . .	7
Evans Mills, N. Y., . . . . .	2	Oak Bluffs, . . . . .	1		
Georgetown, . . . . .	1	Orange, . . . . .	1		
Glens Falls, N. Y., . . . . .	1	Oxford, . . . . .	1		

*B. Home Addresses (classified by Countries and States).*

	Number.	Per Cent.		Number.	Per Cent.
China, . . . . .	1	.60	New York, . . . . .	9	5.39
Connecticut, . . . . .	7	4.19	Pennsylvania, . . . . .	2	1.20
Massachusetts, . . . . .	145	86.82	South America, . . . . .	1	.60
New Hampshire, . . . . .	1	.60			
New Jersey, . . . . .	1	.60		167	100.00

*C. Home Addresses (classified by Counties of Massachusetts).*

	Number.	Per Cent.		Number.	Per Cent.
Barnstable, . . . . .	2	1.38	Middlesex, . . . . .	36	24.83
Berkshire, . . . . .	6	4.14	Nantucket, . . . . .	-	-
Bristol, . . . . .	1	.69	Norfolk, . . . . .	6	4.14
Dukes, . . . . .	1	.69	Plymouth, . . . . .	13	8.97
Essex, . . . . .	13	8.97	Suffolk, . . . . .	22	15.17
Franklin, . . . . .	8	5.52	Worcester, . . . . .	21	14.48
Hampden, . . . . .	6	4.14			
Hampshire, . . . . .	10	6.89		145	100.01

*D. Nativity of Parents.*

	Number.	Per Cent.
Neither parent foreign born, . . . . .	132	79.04
Both parents foreign born, . . . . .	22	13.17
Father (only) foreign born, . . . . .	8	4.79
Mother (only) foreign born, . . . . .	5	3.00
	167	100.00

*E. Education of Father.*

	Number.	Per Cent.
Common school, . . . . .	82	49.10
High school, . . . . .	44	26.35
Business school, . . . . .	13	7.79
College or university, . . . . .	21	12.57
No statistics, . . . . .	7	4.19
	167	100.00

*F. Religious Census.*

	MEMBERSHIP.		PREFERENCE.		TOTALS.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist, . . . . .	15	8.98	1	.60	16	9.58
Catholic, . . . . .	11	6.59	3	1.80	14	8.38
Congregational, . . . . .	46	27.54	17	10.18	63	37.72
Episcopal, . . . . .	13	7.79	2	1.20	15	8.98
Hebrew, . . . . .	5	3.00	—	—	5	3.00
Methodist, . . . . .	13	7.79	7	4.19	20	11.97
Miscellaneous, . . . . .	3	1.80	6	3.59	9	5.39
Presbyterian, . . . . .	4	2.40	—	—	4	2.40
Unitarian, . . . . .	4	2.40	10	5.98	14	8.38
Universalist, . . . . .	3	1.80	4	2.40	7	4.19
	117	71.09	50	29.94	167	99.99

*G. Occupation of Fathers.*

	Number.	Per Cent.
Agriculture and horticulture (practical), . . . . .	37	22.16
Artisans, . . . . .	33	19.76
Business, . . . . .	50	29.94
Deceased or no statistics, . . . . .	15	8.98
Miscellaneous, . . . . .	14	8.38
Professional, . . . . .	16	9.58
Retired, . . . . .	2	1.20
	167	100.00

*H. Intended Vocations of Students.*

	Number.	Per Cent.
Agriculture or horticulture (practical), . . . . .	69	41.31
Agriculture or horticulture (professional), . . . . .	52	31.14
Professions, . . . . .	5	3.00
Undecided or no statistics, . . . . .	38	22.76
Engineering, . . . . .	3	1.80
	167	100.01

*I. Farm Experience.*

	Number.	Per Cent.
Brought up on a farm, . . . . .	43	25.75
Not brought up on a farm and having had practically no farm experience, . . . . .	64	38.32
Not brought up on a farm, but having had some farm experience, . . . . .	60	35.93
	167	100.00

*J. Miscellaneous Statistics.*

Average age, . . . . .	19.17 years.
Number applying for student labor, . . . . .	99 (59.28 per cent).
Number boarding at Draper Hall, . . . . .	129 (77.24 per cent).

TABLE VI. — *Statistics of Freshman Class.*

Number of applications,		281
Admitted,	188	
Matriculated,	168	
Failed to report,	20	
Total,	188	
Rejected,	93	
Total,		281
Admitted on certificate,		110
Admitted on examination,		29
Admitted on certificate and examination,		29
		168
Admitted without condition,		115
Admitted with condition,		53
		168

TABLE VII. — *Gifts.*

*Massachusetts Agricultural Experiment Station. — List of Gifts for the Year ending Nov. 30, 1911.*

German Kali Works, New York City, . . . . .	{ 200 pounds kainit. 1 ton high-grade sulfate of potash.
The Jarecki Chemical Company, Cincinnati, O.,	{ 1,200 pounds carbonate of potash.
Vermont Marl Company, Brattleborough, Vt., . .	200 pounds calcined phosphate.
Wilcox Fertilizer Company, Mystic, Conn., . . .	11 tons shell marl.
Rogers & Hubbard Company, Middletown, Conn.,	{ 300 pounds dry-ground fish.
Werner Extract Company, Mechanicsville, Ill., .	125 pounds dry-ground acid fish.
Alphano Humus Company, New York City, . . .	200 pounds dissolved bone.
J. Bolgiana & Son, Baltimore, Md., . . . . .	200 pounds Werner's phosphate.
S. D. Woodruff & Sons, Orange, Conn., . . . . .	150 pounds Alphano humus.
W. Atlee Burpee & Co., Philadelphia, Pa., . . .	1 packet seed of "My Maryland" tomato.
Joseph Dixon Crucible Company, Boston, Mass.,	3 pounds sample "Woodruff" potatoes.
Detroit White Lead Works, Detroit, Mich., . .	Novelties in vegetable and flower seeds.
L. W. Ferdinand & Co., Boston, Mass., . . . . .	1 gallon Dixon's silica-graphite paint.
Frederick Feeder Company, Perkaskie, Pa., . .	2 gallons Jap. asphalt paint.
Poultry Dust Bath Company, Whiting, Ind., . .	1 quart can glue cement.
National Safety Soap Company, Wilmington, O.,	2 automatic feeders.
Sterling Chemical Company, Cambridge, Mass., .	100 pounds Dustyne.
Boston Dry Food Hopper Company, Boston, Mass.,	1 "Kling" hame fastener.
Robert Essex Incubator Company, Buffalo, N.Y.,	{ 5 gallons Sterlingworth San José scale killer. 5 gallons Sterlingworth lime and sulfur wash. 5 feed hoppers. 1 Essex model incubator. 2 Essex model brooders.

*Library. — List of Principal Gifts for the Year ending Nov. 30, 1911.*

American Guernsey Cattle Club, Wm. H. Caldwell, M. A. C., 1887, Secretary, . . . . .	Guernsey herd registers.
American Jersey Cattle Club, New York City, . .	Jersey herd register, 1902-10, 10 volumes.
American Shorthorn Breeders' Association, . . .	Herd books.
Amherst Club, Amherst, Mass., . . . . .	Wallace's Year Book of Trotting and Pacing, 2 volumes.
Bowker, William H., Boston, Mass., M. A. C., 1871.	Government documents and miscellaneous books.
Depew, Hon. Chauncey M., . . . . .	Complete set of his writings, 8 volumes.
Chamberlain, Dr. J. S., Amherst, Mass., . . . .	Experiment station bulletins.
City Library Association, Springfield, Mass., . .	Proceedings of the American Association for the Advancement of Science.
Filer, H. B., M. A. C., 1906, . . . . .	Buffalo park reports, 4 volumes.
Holstein-Friesian Association of America, . . .	Herd books.
Indiana Academy of Science, . . . . .	Proceedings, 16 volumes.
Iowa Academy of Science, . . . . .	Proceedings, 16 volumes.

*Library. — List of Principal Gifts for the Year ending Nov. 30, 1911 — Con.*

Jones, Hon. J. W., Columbia, Tenn., . . . .	American jack stock studbook, volumes 1-8.
Kansas Academy of Science, . . . . .	Transactions, 15 volumes.
Lodge, Hon. Henry Cabot, . . . . .	United States government publications.
Massachusetts State Board of Agriculture, . . . .	11 cases of early American agricultural periodicals, etc.
Massachusetts State Library, . . . . .	Massachusetts public documents.
Michigan Academy of Science, . . . . .	Proceedings, 12 volumes.
New York State Library, . . . . .	New York public documents.
Percheron Society of America, . . . . .	Percheron studbooks.
Queensland Department of Agriculture, . . . .	Queensland Agricultural Journal, 16 volumes.
Reliable Poultry Journal Publishing Company, Quincy, Ill., . . . . .	16 volumes.
Root, A. J. & Co., Medina, O., . . . . .	Bee books.
Smithsonian Institution, Washington, D. C., . . . .	Harriman Alaska Expedition, 11 volumes.
Stoeckel, Hon. Carl, Norfolk, Conn., . . . . .	Litchfield County University Club publications, volumes 1-4.
Stone, Dr. George E., Amherst, Mass., . . . . .	Magazines and bulletins.
United States Department of Agriculture, Washington, D. C., . . . . .	Foreign and domestic agricultural publications.
United States Monetary Commission, Washington, D. C., . . . . .	Complete set of publications.
University of Wisconsin, Madison, Wis., . . . . .	Transactions of the Wisconsin Academy of Arts and Sciences, and publications of the University of Wisconsin.
Waugh, Mrs. F. A., Amherst, Mass., . . . . .	Magazines and books.
Williams, Mrs. Mary E., Amherst, Mass., . . . . .	Books.

*Academic Departments. — List of Gifts for the Year ending Nov. 30, 1911.*

Col. John E. Thayer, Lancaster, Mass., . . . . .	Valuable collection of 234 bird skins.
New York Zoological Society, . . . . .	Skeletons of an American deer and a South American tapir.
James A. Hyslop, M. A. C., 1908, . . . . .	Collection of skins of 17 small mammals and 14 birds from Washington State.
Rev. J. M. Lewis, North Westport, Mass., . . . .	A new variety of the common mouse.
William R. Bent, M. A. C., 1912, . . . . .	Duck skin.
R. R. Parker, M. A. C., 1912, . . . . .	Marine worms and fishes.
G. A. Post, M. A. C., 1913, . . . . .	Ostrich egg from east coast of Africa; also small collection of miscellaneous birds' eggs.
Dr. H. T. Fernald, Amherst, Mass., . . . . .	Albino shrew.
G. N. Willis, M. A. C., 1905, . . . . .	Miscellaneous birds' eggs.
D. N. West, M. A. C., 1902, . . . . .	Natural asbestos rock and samples in processes of manufacture from Black Lake, Quebec, Can.
A. F. McDougall, M. A. C., 1913, . . . . .	Quartz crystals and small collection of invertebrate fossils.
M. S. Hazen, M. A. C., 1910, . . . . .	Samples of crushed Florida phosphate rock dust, and acid phosphate; shark's teeth from phosphate rock; specimens of coal, minerals, etc., from coal mines near Moosic, Pa.
J. A. Harlow, M. A. C., 1912, . . . . .	Quartz crystals.
Ozone Pure Airifier Company, Chicago, Ill., . . . .	Ozone Pure Airifier.
Field Force Pump Company, Elmira, N. Y., . . . .	Nozzles.
Goulds Manufacturing Company, Seneca Falls, N. Y., . . . . .	Nozzles.
Perth-Amboy Chemical Company, New York, N. Y., . . . . .	Formaldehyde.
Root Company, Medina, O., . . . . .	Collection of smokers and sundry tools; feeders; collection of standard beehives enameled for exhibition purposes; mounted specimens of their products, such as sections, etc.; transportation cages for live bees; queen mailing boxes and complete queen rearing outfit. Total value about \$50.
W. T. Falconer Manufacturing Company, Jamestown, N. Y., . . . . .	Collection of hives, sections, wax foundation, and beekeepers' implements.
E. M. Nichols, Lyonsville, Mass., . . . . .	Samples of hives; collection of bottom boards and covers; feeders, etc.
The American Paper Products Company, St. Louis, Mo., . . . . .	Samples of "Appco Shipsafe," honey transportation cases.
J. E. Crane, Middlebury, Vt., . . . . .	One Crane honey shipping case.
E. H. Dewey, Great Barrington, Mass., . . . . .	Two Dewey foundation fasteners.

*Academic Departments.—List of Gifts for the Year ending Nov. 30, 1911—Con.*

D. S. Hall, South Cabot, Vt., . . . . .	Models of Hall's frames.
J. L. Byard, Southborough, Mass., . . . . .	One colony of superior Italian bees.
A. A. Byard, West Chesterfield, N. H., . . . . .	Newly invented Byard foundation fastener.
American Sugar Refining Company, Granite Street, Boston, Mass., . . . . .	Exhibit of 12 samples of sugar products.
Arthur C. Miller, Providence, R. I., . . . . .	Miller's newly invented foundation fastener and hive tool.
American Can Company, Chicago, Ill., . . . . .	Large collection of types of cans for shipping honey.
O. M. Smith, Florence, Mass., . . . . .	Smith's hive tool.
H. H. Jepson, Boston, Mass., . . . . .	Various minor implements.
New York State Association of Beekeepers' Societies (through courtesy of W. F. Marks, Clifton Springs, N. Y.), . . . . .	1 writing tablet as a sample of propaganda used in increasing interest in bees and honey among school children.
Dr. James B. Paige, M. A. C., 1882, . . . . .	1 swarm catcher.
O. F. Fuller, Blackstone, Mass., . . . . .	1 complete outfit for commercial queen rearing.
L. A. Aspinwall, Jackson, Mich., . . . . .	1 Aspinwall hive.
Jesse Carpenter, Jr., M. A. C., 1912, . . . . .	Washington insects.
W. E. Dickinson, M. A. C., 1907, Hakalau, Hawaii, . . . . .	Hawaiian mantid.
H. T. Cowles, M. A. C., 1910, San Tusco, P. R., . . . . .	Porto Rican insects.
W. V. Tower, M. A. C., 1903, San Juan, P. R., . . . . .	Porto Rican lepidoptera. West Indian scale insects.
Dr. G. C. Crampton, Amherst, Mass., . . . . .	Cuban lepidoptera.
P. P. Cardin, M. A. C., 1909, Santiago de las Vegas, Cuba, . . . . .	Cuban insects.
C. W. Hooker, Mayaguez, P. R., . . . . .	Coleoptera, etc., from Wisconsin.
C. C. Gowdey, M. A. C., 1908, Entebbe, Uganda, . . . . .	African insects.
Dr. H. T. Fernald, Amherst, Mass., . . . . .	Nantucket insects.
R. H. Van Zwaluwenburg, M. A. C., 1913, U. J., . . . . .	Mexican insects.
C. A. Frost, M. A. C., South Framingham, Mass., . . . . .	Ichneumonidae.
C. C. Gowdey, M. A. C., 1908, Entebbe, Uganda, . . . . .	Indian scale insects.
J. N. Summers, M. A. C., 1907, Melrose Highlands, Mass., . . . . .	European and American coleoptera.
United States Bureau of Entomology (through H. P. Wood, M. A. C., 1907), . . . . .	Collection of ticks.
W. S. Regan, M. A. C., 1908, Amherst, Mass., . . . . .	Work of the carpenter worm.
United States Bureau of Entomology, Melrose Highlands, Mass., . . . . .	Imported parasites of the gypsy and brown-tail moths.
Dr. F. H. Chittenden, Bureau of Entomology, Washington, D. C., . . . . .	Southern truck crop insects.
Dr. G. C. Crampton, Amherst, Mass., . . . . .	Hemiptera from Syria.
H. A. Ballou, M. A. C., 1895, Barbados, W. I., . . . . .	Insects from Barbados.
Dr. G. C. Crampton, Amherst, Mass., . . . . .	Hymenoptera from the Riviera.
Q. S. Lowry, M. A. C., 1913, . . . . .	Mantipsa and eupsalis.
T. H. Jones, M. A. C., 1908, Washington, D. C., . . . . .	Entomological books.
C. W. Hooker, Mayaguez, P. R., . . . . .	Entomological pamphlets and photographs.
Field Force Pump Company, Elmira, N. Y., . . . . .	"Empire King" pump and accessories.
Deming Company, Salem, O., . . . . .	Barrel pump and nozzle frame.
Turner Brass Works, Sycamore, Ill., . . . . .	Two types of gasoline torch.
California Spray Chemical Company, Watsonville, Cal., . . . . .	Sample of zinc arsenite.
Frank N. Hale, Woonsocket, R. I., . . . . .	Sample of entomoid.
Merrimac Chemical Company, Boston, Mass., . . . . .	Samples of Swift's arsenate of lead.
Sherwin-Williams Company, Cleveland, O., . . . . .	Sample of soil fungicide and insecticide.
Carbolineum Wood Preserving Company, New York, N. Y., . . . . .	Sample of "Avenarius Carbolineum."
Manhattan Oil Company, New York, N. Y., . . . . .	Sample of "Spray on."
Hon. E. B. White, Leesburg, Va., . . . . .	Pure-bred two-year-old Percheron stallion (loan).
Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C., . . . . .	Pure-bred Morgan stallion, Red Oak (loan).
L. A. Nichols, M. A. C., 1871, Chicago, Ill., . . . . .	{ 3 100-foot steel tapes.
	{ 4 jointed range poles.
	{ 4 sets marking pins.
	{ 20 eggs for hatching.
	{ 2 white Leghorn males.
	{ File of "Farm Poultry."
	{ 50 eggs for hatching.
Rockandotte Farm, Southborough, Mass., . . . . .	Discount on heating apparatus, brooder house, amounting to about \$70.
Henry D. Smith, Rockland, Mass., . . . . .	{ 2 separators (1 hand, 1 power) (loan).
DeLaval Separator Company, . . . . .	{ 1 cutaway separator (for demonstration) (loan).
Sharpless Separator Company, . . . . .	{ 2 separators (1 hand, 1 power) (loan).
Vermont Farm Machine Company, . . . . .	{ 1 hand separator with belt attached (loan).
International Harvester Company, . . . . .	{ 1 hand separator (loan).
Creamery Packing Manufacturing Company, . . . . .	{ Several sanitary pipe fittings (loan).
P. R. Zeigler & Co., . . . . .	{ 1 sterilac milk pail.



## REPORT OF THE TREASURER

FOR THE FISCAL YEAR ENDING NOV. 30, 1911.

### BALANCE SHEET.

	DR.	CR.
<b>1910.</b>		
Dec. 1. To cash on hand, . . . . .	\$5,664 38	
To cash on deposit, . . . . .	19,980 42	
<b>1911.</b>		
Nov. 30. To special appropriation receipts, State Treasurer, . . . . .	90,065 88	
By special appropriation disbursements, . . . . .		\$94,745 20
To experiment station receipts, . . . . .	63,277 10	
From State Treasurer, . . . . . \$13,500 00		
From United States Treasurer, . . . . . 30,000 00		
From other sources, . . . . . 19,777 10		
By experiment station disbursements, . . . . .		64,986 68
To current accounts receipts, . . . . .	216,555 22	
From United States Treasurer, Morrill fund, . . . . . \$16,666 66		
From United States Treasurer, Nelson fund, . . . . . 16,666 67		
From State Treasurer, endowment fund, . . . . . 10,613 32		
From State Treasurer, maintenance, . . . . . 35,000 00		
From State Treasurer, scholarship, . . . . . 15,000 00		
From State Treasurer, instruction, . . . . . 47,500 00		
From State Treasurer, Extension department, . . . . . 15,000 00		
From State Treasurer, agricultural education department, . . . . . 5,000 00		
From State Treasurer, veterinary department, . . . . . 1,000 00		
From State Treasurer, student labor, . . . . . 7,500 00		
From State Treasurer, graduate school, . . . . . 2,500 00		
From other sources, . . . . . 44,108 57		
By current account disbursements, . . . . .		215,941 81
To student trust funds receipts, . . . . .	66,308 10	
By student trust funds disbursements, . . . . .		62,251 38
By experiment station trust funds disbursements, . . . . .		257 40
By cash on hand, . . . . .		8,229 09
By cash on deposit, . . . . .		15,439 54
	\$461,851 10	\$461,851 10

STATEMENT OF THE FIRST NATIONAL BANK OF AMHERST WITH THE  
MASSACHUSETTS AGRICULTURAL COLLEGE.

		DR.	CR.
<b>1910.</b>			
Dec. 1.	Balance on hand, . . . . .	\$40,168 47 <sup>1</sup>	
<b>1911.</b>			
Nov. 30.	Deposits, . . . . .	468,207 93	
	Interest, . . . . .	497 79	
	Disbursements as per warrants, . . . . .		\$468,897 79
	Balance on hand, . . . . .		39,976 40 <sup>1</sup>
		\$508,874 19	\$508,874 19

<sup>1</sup> These amounts are greater Dec. 1, 1910, by \$20,188.05, and Nov. 30, 1911, \$24,536.86, on account of outstanding checks.

## SPECIAL APPROPRIATIONS.

NAME OF APPROPRIATION.	Date made.	Amount of Appropriation.	Amount previously expended.	Amount expended during Fiscal Year.	Amount expended to Date.	Amount received from State Treasurer.	Balance on Hand with State Treasurer.
Zoology building, . . . . .	1909	\$80,000 00	\$66,771 03	\$13,248 32	\$80,017 35	\$80,017 35 <sup>1</sup>	-
Animal husbandry building, . . . . .	1910	10,000 00	4,166 35	5,833 65	10,000 00	10,000 00	-
Investigation as to cranberry growing, . . . . .	1910	15,000 00	12,799 81	2,200 69	15,000 00	15,000 00 <sup>2</sup>	-
Laboratory for pomology, . . . . .	1910	12,000 00	1,223 38	10,776 62	12,000 00	12,000 00	-
Land, . . . . .	1910	17,500 00	11,797 11	-	11,797 11	11,797 11	\$65 98
Poultry husbandry, . . . . .	1910	5,000 00	-	5,001 00	5,001 00	5,001 00 <sup>1</sup>	-
Repairs and improvements, . . . . .	1910	25,000 00	16,640 06	8,359 94	25,000 00	25,000 00	-
Teaching and office equipment, . . . . .	1910	10,000 00	2,984 13	7,015 87	10,000 00	10,000 00	-
Equipment for laboratory for entomology and zoology, . . . . .	1910	15,000 00	5,872 19	9,127 81	15,000 00	15,000 00	-
Dairy building, . . . . .	1911	75,000 00	1,804 87	11,014 99	12,819 86	7,948 24	67,051 76
Equipment, . . . . .	1911	10,000 00	-	3,355 23	3,355 23	2,804 29	7,195 71
Repairs, . . . . .	1911	15,000 00	-	4,579 31	4,579 31	3,889 63	11,160 37
Small buildings, . . . . .	1911	15,000 00	-	7,792 32	7,792 32	6,484 28	8,515 72
West experiment station, . . . . .	1911	7,500 00	200 00	5,105 18	5,305 18	4,420 15	3,079 85
Architects' fees, . . . . .	-	-	1,150 57	1,197 79	2,348 36	-	-
Farm buildings, . . . . .	-	-	-	138 48	138 48	-	-
		\$312,000 00	\$125,409 00	\$94,745 20	\$220,154 20	\$209,312 05	\$97,069 39

<sup>1</sup> From State Treasurer and other sources.      <sup>2</sup> \$12,736.25 was paid by State Treasurer direct.

CURRENT ACCOUNTS.  
*Disbursements and Receipts.*

ACCOUNTS.	Disbursements from Dec. 1, 1910, to Nov. 30, 1911.	Receipts from Dec. 1, 1910, to Nov. 30, 1911.	Apportionment for Year ending Nov. 30, 1911.	Balance to Credit.
Administration, . . . . .	\$6,233 96	\$2 36	\$10,000 00	\$3,768 40
Agricultural division, . . . . .	22,788 40	19,052 37	4,000 00	263 97
Agricultural economics, . . . . .	91 28	-	100 00	8 72
Agricultural education, . . . . .	5,705 78	17 67	4,968 70	-719 41
Botanical, . . . . .	1,442 56	769 55	700 00	26 99
Chemical, . . . . .	3,520 50	2,328 43	800 00	-392 07
Dean's office, . . . . .	202 45	-	200 00	-2 45
Entomological, . . . . .	1,084 82	275 79	850 00	40 97
Extension work, . . . . .	20,811 41	2,864 87	12,534 60	-5,411 94
Floriculture, . . . . .	3,499 93	2,761 82	1,100 00	361 89
Forestry, . . . . .	392 77	50	500 00	107 73
General horticulture, . . . . .	2,585 00	659 80	2,000 00	74 80
General maintenance, . . . . .	39,136 73	10,573 42	35,000 00	6,436 69
Graduate school, . . . . .	1,339 18	120 00	3,586 81	2,367 63
Grounds, . . . . .	1,900 61	1 70	2,200 00	301 09
Library, . . . . .	5,542 46	436 91	5,000 00	-105 55
Landscape gardening, . . . . .	433 72	256 93	250 00	73 21
Language and literature, . . . . .	598 99	-	900 00	301 01
Market gardening, . . . . .	4,413 12	2,293 74	2,400 00	280 62
Mathematics and physics, . . . . .	361 75	10	500 00	138 35
Military, . . . . .	1,939 42	24 79	1,900 00	-14 63
Physical education, . . . . .	497 60	119 00	400 00	21 40
Political science, . . . . .	85 07	-	25 00	-60 07
Pomology, . . . . .	3,425 41	1,156 58	1,800 00	-468 83
President's office, . . . . .	873 68	28 44	900 00	54 76
Registrar, . . . . .	302 13	-	300 00	-2 13
Salaries, . . . . .	84,132 15	-	85,034 00	901 85
Treasurer's office, . . . . .	764 18	-	800 00	35 82
Veterinary, . . . . .	1,343 35	17 50	1,771 45	445 60
Zoölogy, . . . . .	493 40	346 30	100 00	-47 10
State Treasurer:—				
Endowment fund, . . . . .	-	10,613 32	-	-
Maintenance, . . . . .	-	35,000 00	-	-
Scholarship, . . . . .	-	15,000 00	-	-
Instruction, . . . . .	-	47,500 00	-	-
Extension department, . . . . .	-	15,000 00	-	-
Agricultural education, . . . . .	-	5,000 00	-	-
Veterinary, . . . . .	-	1,000 00	-	-
Student labor fund, . . . . .	-	7,500 00	-	-
Graduate school, . . . . .	-	2,500 00	-	-
United States Treasurer:—				
Morrill fund, . . . . .	-	16,666 66	-	-
Nelson fund, . . . . .	-	16,666 67	-	-
Balance beginning fiscal year, Dec. 1, 1910, . . . . .	\$215,941 81	\$216,555 22	\$180,620 56	\$16,011 50
Balance on hand Nov. 30, 1911, . . . . .	25,824 63	-	-	-7,224 18
	\$241,766 44	\$241,766 44	\$180,620 56	\$8,787 32

<sup>1</sup> This amount is greater by \$3,155.78 on account of architects' fees, which amount has been transferred to the accounts under special appropriations.

*Summary.*

	Disbursements.	Receipts.
By cash on hand Dec. 1, 1910, . . . . .	—	\$25,211 22
By institution receipts Nov. 30, 1911, . . . . .	—	44,108 57
By State Treasurer's receipts Nov. 30, 1911, . . . . .	—	139,113 32
By United States Treasurer's receipts Nov. 30, 1911, . . . . .	—	33,333 33
To total disbursements, . . . . .	\$215,941 81	—
Bills receivable Dec. 1, 1910, deducted, . . . . .	—	\$241,766 44
Bills payable Dec. 1, 1910, deducted, . . . . .	1,668 77	2,187 72
Bills receivable Nov. 30, 1911, . . . . .	\$214,273 04	\$239,578 72
Bills payable Nov. 30, 1911, . . . . .	3,059 45	2,265 82
Balance, . . . . .	24,512 05	—
	\$241,844 54	\$241,844 54

*Comparative Disbursements and Receipts for 1910-11.*

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1910.	1911.	1910.	1911.
Administration, . . . . .	\$4,729 04	\$6,233 96	\$30 07	\$2 36
Agricultural division, . . . . .	22,028 79	22,788 40	16,339 90	19,052 37
Agricultural economics, . . . . .	112 60	91 28	—	—
Agricultural education, . . . . .	5,047 21	5,705 78	15 91	17 67
Botanical, . . . . .	994 05	1,442 56	259 34	769 55
Chemical, . . . . .	2,137 73	3,520 50	2,075 14	2,328 43
Dean's office, . . . . .	232 36	202 45	36	—
Entomology, . . . . .	515 29	1,084 82	251 61	275 79
Extension work, . . . . .	12,336 03	20,811 41	1,745 63	2,864 87
Floriculture, . . . . .	2,987 80	3,499 93	2,495 93	2,761 82
Forestry, . . . . .	—	392 77	—	50
General horticulture, . . . . .	2,436 18	2,585 00	805 51	659 80
General maintenance, . . . . .	32,405 40	39,136 73	10,739 37	10,573 42
Graduate school, . . . . .	1,413 19	1,339 18	—	120 00
Grounds, . . . . .	1,444 30	1,900 61	54 10	1 70
Library, . . . . .	5,083 89	5,542 46	567 51	436 91
Landscape gardening, . . . . .	258 21	433 72	123 90	256 93
Language and literature, . . . . .	539 69	598 99	1 00	—
Market gardening, . . . . .	4,970 60	4,413 12	2,604 94	2,293 74
Mathematics and physics, . . . . .	251 74	361 75	1 12	10
Military, . . . . .	1,657 52	1,939 42	53 25	24 79
Physical education, . . . . .	566 41	497 60	137 85	119 00
Political science, . . . . .	7 05	85 07	—	—
Pomology, . . . . .	3,237 78	3,425 41	1,398 70	1,156 58
President's office, . . . . .	721 91	873 68	15 25	23 44
Options on land, . . . . .	125 00	—	115 00	—
Registrar, . . . . .	249 12	302 13	—	—
Salaries, . . . . .	71,124 91	84,132 15	143 32	—
Treasurer's office, . . . . .	753 75	764 18	34 69	—
Veterinary, . . . . .	777 42	1,343 35	5 90	17 50
Zoölogy, . . . . .	392 73	493 40	275 41	346 30
State Treasurer:—				
Endowment fund, . . . . .	—	—	10,613 32	10,613 32
Maintenance, . . . . .	—	—	33,000 00	35,000 00
Scholarship, . . . . .	—	—	15,000 00	15,000 00
Instruction, . . . . .	—	—	40,000 00	47,500 00
Extension department, . . . . .	—	—	8,125 00	15,000 00
Agricultural education, . . . . .	—	—	5,000 00	5,000 00
Veterinary, . . . . .	—	—	1,000 00	1,000 00
Student labor fund, . . . . .	—	—	7,500 00	7,500 00
Graduate school, . . . . .	—	—	2,500 00	2,500 00
United States Treasurer:—				
Morrill fund, . . . . .	—	—	16,666 67	16,666 66
Nelson fund, . . . . .	—	—	13,333 33	16,666 67
	\$179,537 70	\$215,941 81	\$193,029 03	\$216,555 22
Balance beginning of fiscal year, . . . . .	—	—	11,719 89	25,211 22
Balance at close of fiscal year, . . . . .	25,211 22 <sup>1</sup>	25,824 63	—	—
	\$204,748 92	\$241,766 44	\$204,748 92	\$241,766 44

<sup>1</sup> This amount is greater by \$3,155.78 on account of architect's fees, which amount has been transferred to the accounts under special appropriations.

EXPERIMENT STATION.  
*Disbursements and Receipts.*

ACCOUNTS.	Disbursements from Dec. 1, 1910, to Nov. 30, 1911.	Receipts from Dec. 1, 1910, to Nov. 30, 1911.	Apportionment for Year ending Nov. 30, 1911.	Balance to Credit.
Administration, . . . . .	\$1,669 79	\$123 79	\$2,085 00	\$539 00
Agriculture, . . . . .	4,864 07	2,128 14	2,300 00	—435 93
Asparagus, . . . . .	748 63	—	500 00	—248 63
Botanical, . . . . .	1,577 35	20 82	1,500 00	—56 53
Chemical, . . . . .	9,809 16	7,165 66	2,400 00	—243 50
Cranberry, . . . . .	4,038 98	4,232 00	1,000 00	1,193 02
Entomological, . . . . .	588 10	2 50	700 00	114 40
Fertilizer, . . . . .	—	6,094 83	—	6,094 83
Freight, . . . . .	294 49	—	450 00	155 51
Feed law, . . . . .	2,891 44	3,000 00	—	1,676 45
Graves orchard, . . . . .	194 79	—	300 00	105 21
Horticulture, . . . . .	1,439 97	4 36	1,350 00	—85 61
Library, . . . . .	161 56	—	300 00	138 44
Meteorology, . . . . .	322 16	—	400 00	77 84
Publications, . . . . .	1,726 40	—	3,000 00	1,273 60
Salaries, . . . . .	33,899 31	—	36,136 19	2,236 88
Treasurer's office, . . . . .	182 12	—	350 00	167 88
Veterinary, . . . . .	233 16	5 00	250 00	16 84
Hatch fund, . . . . .	—	15,000 00	—	—
Adams fund, . . . . .	—	15,000 00	—	—
State fund, . . . . .	—	10,500 00	—	—
Tobacco experiments, . . . . .	340 20	—	200 00	—140 20
	\$64,986 68	\$63,277 10	\$53,221 19	\$13,789 90
Balance beginning of fiscal year, . . . . .	—	5,799 94	—	—1,210 40
Balance on hand Nov. 30, 1911, . . . . .	4,090 36	—	—	—
	\$69,077 04	\$69,077 04	\$53,221 19	\$12,579 50

*Experiment Station Trust Fund.*

ACCOUNT.	Disbursements for Year ending Nov. 30, 1911.	Balance brought forward Dec. 1, 1910.
Cranberry growers' contribution account, . . . . .	\$257 40	\$257 40

*Comparative Disbursements and Receipts, 1910-11.*

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1910.	1911.	1910.	1911.
Administration, . . . . .	\$1,722 57	\$1,669 79	\$32 80	\$123 79
Agriculture, . . . . .	5,286 14	4,864 07	2,963 67	2,128 14
Asparagus, . . . . .	736 59	748 63	—	—
Botanical, . . . . .	1,283 19	1,577 35	28 70	20 82
Chemical, . . . . .	9,228 18	9,809 16	6,660 08	7,165 66
Cranberry, . . . . .	1,504 29	4,038 98	1,958 54	4,232 00
Entomology, . . . . .	562 81	588 10	1 20	2 50
Fertilizer, . . . . .	—	—	5,880 00	6,094 83
Freight, . . . . .	445 03	294 49	85	—
Feed law, . . . . .	3,580 61	2,891 44	3,000 00	3,000 00
Graves orchard, . . . . .	350 81	194 79	119 00	—

## Comparative Disbursements and Receipts, 1910-11—Con.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1910.	1911.	1910.	1911.
Horticulture, . . . . .	\$1,530 18	\$1,439 97	\$2 37	\$4 36
Library, . . . . .	289 62	161 56	—	—
Meteorology, . . . . .	299 03	322 16	—	—
Publications, . . . . .	1,953 86	1,726 40	—	—
Salaries, . . . . .	31,438 00	33,899 31	15 52	—
Treasurer's office, . . . . .	370 74	182 12	—	—
Veterinary, . . . . .	218 64	238 16	—	5 00
Hatch fund, . . . . .	—	—	15,000 00	15,000 00
Adams fund, . . . . .	—	—	14,000 00	15,000 00
State fund, . . . . .	—	—	10,500 00	10,500 00
Tobacco experiments, . . . . .	317 78	340 20	—	—
Cranberry association, . . . . .	544 17 <sup>1</sup>	—	544 17	—
Expert services, . . . . .	12 40	—	85 00	—
	\$61,674 64	\$64,986 68	\$60,791 90	\$63,277 10
Balance beginning of fiscal year, . . . . .	—	—	6,682 68	5,799 94
Balance on hand Nov. 30, 1911, . . . . .	5,799 94	4,090 36	—	—
	\$67,474 58	\$69,077 04	\$67,474 58	\$69,077 04

<sup>1</sup> Transferred to cranberry growers' contribution account.

## AGRICULTURAL DIVISION.

## Disbursements and Receipts for Fiscal Year ending Nov. 30, 1911.

	Disbursements.	Receipts.
Office, . . . . .	\$370 30	\$27 54
Academic:—		
Maintenance, . . . . .	\$120 25	\$10 10
Equipment, . . . . .	103 95	1 50
Miscellaneous, . . . . .	164 60	—
Student labor, . . . . .	219 22	—
	\$608 02	\$11 60
Farm:—		
Labor, . . . . .	\$10,393 69	\$3,098 73
Dairy, . . . . .	1,769 76	12,194 08
Teams, . . . . .	527 12	125 00
Horses, . . . . .	501 33	908 72
Cattle, . . . . .	4,627 06	710 08
Swine, . . . . .	199 29	151 15
Field crops, . . . . .	1,037 92	1,518 33
Repairs, . . . . .	538 67	—
Improvements, . . . . .	282 19	20
Student labor, . . . . .	1,164 00	9 84
Contingent, . . . . .	119 34	16 91
Tools, . . . . .	271 17	50
Freight and express, . . . . .	96 06	—
Poultry, . . . . .	282 48	279 69
	\$21,810 08	\$19,013 23
Division totals, . . . . .	\$22,788 40	\$19,052 37

*Summary.*

	DR.	CR.
By total division receipts, . . . . .		\$19,052 37
By bills receivable, . . . . .		1,167 78
By net apportionment, . . . . .		4,000 00
To total disbursements, . . . . .	\$22,788 40	
To bills payable, . . . . .	153 13	
To balance, . . . . .	1,278 62	
	\$24,220 15	\$24,220 15

*Inventory of Quick Assets.*

	Nov. 30, 1910.	Nov. 30, 1911.
Inventory of produce, . . . . .	\$4,999 13	\$4,728 73
Inventory of cattle, . . . . .	10,042 00	10,823 00
Inventory of swine, . . . . .	340 00	485 00
Inventory of horses, . . . . .	4,400 00	4,080 00
Inventory of poultry, . . . . .		614 25
	\$19,781 13	\$20,730 98

## HORTICULTURAL DIVISION.

*Disbursements and Receipts for Fiscal Year ending Nov. 30, 1911.*

	Disbursements.	Receipts.
Floriculture, . . . . .	\$3,490 93	\$2,761 82
Forestry, . . . . .	392 77	50
General horticulture, . . . . .	2,585 00	659 80
Grounds, . . . . .	1,900 61	1 70
Landscape gardening, . . . . .	433 72	256 93
Market gardening, . . . . .	4,413 12	2,293 74
Pomology, . . . . .	3,425 41	1,156 58
	\$16,150 56	\$7,131 07

*Summary.*

	DR.	CR.
By total division receipts, . . . . .		\$7,131 07
By bills receivable, . . . . .		861 39
By apportionment, . . . . .		10,250 00
To total division disbursements, . . . . .	\$16,650 56	
To bills payable, . . . . .	101 83	
To balance, . . . . .	1,490 07	
	\$18,242 46	\$18,242 46

*Inventory of Quick Assets.*

	Nov. 30, 1910.	Nov. 30, 1911.
Inventory of supplies, . . . . .	\$496 00	\$1,064 00



## INVENTORY — REAL ESTATE.

*Land (Estimated Value).*

Baker place, . . . . .	\$2,500 00
Bangs place, . . . . .	2,350 00
Clark place, . . . . .	4,500 00
College farm, . . . . .	37,000 00
Harlow farm, . . . . .	3,284 63
Kellogg farm, . . . . .	5,868 45
Louisa Baker place, . . . . .	5,636 91
Old creamery place, . . . . .	1,000 00
Pelham quarry, . . . . .	500 00
Westcott place, . . . . .	2,250 00
Allen place, . . . . .	500 00
Charmbury place, . . . . .	450 00
Loomis place, . . . . .	415 00
Hawley & Brown place, . . . . .	675 00
Newell farm, . . . . .	2,800 00

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 \$69,729 99
*College Buildings (Estimated Value).*

Animal husbandry building, . . . . .	\$10,000 00
Chemical laboratory, . . . . .	8,000 00
Clark hall, . . . . .	67,500 00
Cold-storage laboratory, . . . . .	12,000 00
Dairy barn and storage, . . . . .	30,000 00
Dining hall, . . . . .	35,000 00
Drill hall and gun shed, . . . . .	10,000 00
Durfee range and glass houses, old, . . . . .	10,000 00
Durfee range and glass houses, new, . . . . .	15,000 00
Entomology building, . . . . .	80,000 00
Farmhouse, . . . . .	2,500 00
French hall, . . . . .	17,000 00
Horse barn, . . . . .	5,000 00
Horticultural barn, . . . . .	2,500 00
Horticultural tool shed, . . . . .	2,000 00
Machinery barn, . . . . .	4,000 00
Mathematical building, . . . . .	6,000 00
North dormitory, . . . . .	25,000 00
Physics laboratory, . . . . .	5,500 00
Poultry feed house, . . . . .	1,400 00
Poultry brooder house, . . . . .	1,000 00
Poultry laying houses, . . . . .	1,300 00
Poultry colony houses, . . . . .	470 00
Power plant, . . . . .	13,000 00
President's house, . . . . .	12,000 00
Quarantine barn, . . . . .	200 00
Small plant house, with vegetable cellar and cold graperly, . . . . .	4,700 00
South dormitory, . . . . .	35,000 00
Stone chapel, . . . . .	30,000 00
Three houses on Stockbridge Road, . . . . .	5,000 00
Veterinary laboratory and stable, . . . . .	23,500 00
Waiting station, . . . . .	500 00
Wilder hall, . . . . .	37,500 00
Young stock barn, . . . . .	6,500 00

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 \$519,070 00

*College Equipment (Estimated Value).*

Agricultural division:—	
Academic, . . . . .	\$3,901 80
Dairy school, . . . . .	1,723 82
Farm, . . . . .	26,687 05
Agricultural education, . . . . .	711 95
Botanical department, . . . . .	7,816 52
Chemical laboratory, . . . . .	7,100 00
College supplies, . . . . .	205 40
Dean's office, . . . . .	108 50
Dining hall, . . . . .	3,341 57
Entomological laboratory, . . . . .	6,495 32
Extension department, . . . . .	1,775 05
Fire apparatus, . . . . .	950 10
Floriculture, . . . . .	6,336 25
Forestry, . . . . .	306 35
General horticulture, . . . . .	9,448 65
General maintenance, . . . . .	65,663 16
Landscape gardening, . . . . .	4,462 61
Language and literature, . . . . .	189 01
Library, . . . . .	63,227 85
Market gardening, . . . . .	893 59
Military, . . . . .	1,207 22
Pomology, . . . . .	2,130 28
Physical education, . . . . .	2,142 33
Physics and mathematics, . . . . .	5,443 94
President's office, . . . . .	1,013 20
Registrar's office, . . . . .	261 51
Textbooks, . . . . .	307 45
Treasurer's office, . . . . .	901 50
Trophy room, . . . . .	1,273 85
Veterinary laboratory, . . . . .	7,685 40
Water mains, . . . . .	7,850 00
Zoölogical laboratory, . . . . .	8,915 28
Zoölogical museum, . . . . .	6,179 93
	<hr/>
	\$256,656 44

*Experiment Station Buildings (Estimated Value).*

Agricultural laboratory and glass houses, . . . . .	\$15,000 00
Agricultural barns, . . . . .	5,000 00
Agricultural glass house, . . . . .	500 00
Agricultural farmhouse, . . . . .	1,500 00
Plant and animal chemistry laboratory, . . . . .	30,000 00
Plant and animal chemistry barns, . . . . .	2,500 00
Plant and animal chemistry dairy, . . . . .	2,000 00
Six poultry houses, . . . . .	600 00
Entomological laboratory and glass house, . . . . .	850 00
	<hr/>
	\$57,950 00

*Experiment Station Equipment (Estimated Value).*

Agricultural laboratory, . . . . .	\$6,033 05
Botanical laboratory, . . . . .	4,722 55
Chemical laboratory, . . . . .	17,707 85
Director's office, . . . . .	3,716 50
Entomological laboratory, . . . . .	22,799 98
Horticultural laboratory, . . . . .	1,120 00
Meteorology laboratory, . . . . .	1,304 80
Poultry department, . . . . .	409 85
Treasurer's office, . . . . .	433 50
Veterinary laboratory, . . . . .	80 00
	\$58,328 08

*Inventory Summary.*

Land, . . . . .	\$69,729 99
College buildings, . . . . .	519,070 00
College equipment, . . . . .	256,656 44
Experiment station buildings, . . . . .	57,950 00
Experiment station equipment, . . . . .	58,328 08
	\$961,734 51

## STUDENTS' TRUST FUND ACCOUNTS.

	Disburse- ments for Year ending Nov. 30, 1911.	Receipts for Year ending Nov. 30, 1911.	Balance on Hand Nov. 30, 1911.	Balance brought for- ward Dec. 1, 1910.
Athletics, . . . . .	\$5,697 71	\$6,664 45	\$3,536 65	\$2,569 91
Dining hall, . . . . .	37,436 23	42,191 68	-1,690 80	-6,446 25
Louisa Baker estate, . . . . .	213 14	-	-	213 14
Keys, . . . . .	23 00	24 50	30 50	29 00
College signal, . . . . .	1,917 03	2,054 11	550 16	413 08
Student deposits, . . . . .	4,481 93	4,897 98	554 55	138 50
Creamery house, . . . . .	240 90	235 50	35 81	41 20
Trophy room, . . . . .	506 66	839 00	608 57	276 23
Harlow farm, . . . . .	262 11	125 00	-164 63	-27 52
Text books, . . . . .	5,931 25	5,208 70	382 04	1,104 59
Kellogg farm, . . . . .	169 93	137 50	35 69	68 12
Y. M. C. A., . . . . .	12 35	-	-	12 35
Musical association, . . . . .	70 82	40 00	-	30 82
1912 index, . . . . .	1,274 57	1,274 83	23 77	23 51
Public speaking council, . . . . .	9 96	9 96	-	-
Dramatic association, . . . . .	200 00	200 00	-	-
Uniforms, . . . . .	3,652 23	2,160 15	239 62	1,731 10
1913 index, . . . . .	151 56	2,447 74	93 18	-
Balance on hand Dec. 1, 1910, . . . . .	\$62,251 38	\$66,308 10	\$6,090 54	\$6,651 56
Balance on hand Nov. 30, 1911, . . . . .	-	178 39	-1,855 43	-6,473 77
	4,235 11	-	-	-
	\$66,486 49	\$66,486 49	\$4,235 11	\$178 39

## DETAILED STATEMENT OF DINING HALL.

	Liabilities.	Resources.
Dec. 1, 1910, overdraft, . . . . .	\$6,446 25	-
Nov. 30, 1911, provisions purchased, . . . . .	37,436 23	-
Nov. 30, 1911, outstanding bills, . . . . .	1,643 66	-
Nov. 30, 1911, total collections, . . . . .	-	\$42,191 68
Nov. 30, 1911, total collections outstanding, . . . . .	-	1,962 31
Nov. 30, 1911, inventory, . . . . .	-	1,600 50
Balance, . . . . .	228 35	-
	\$45,754 49	\$45,754 49

The average cost of board per week for the fiscal year was \$3.86.

ENDOWMENT FUND.<sup>1</sup>

	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

<sup>1</sup> This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

*Burnham Emergency Fund.*

	Market Value Dec. 1, 1911.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at \$910, . . . . .	\$1,820 00	\$2,000 00	\$80 00
Two bonds Western Electric Company 5s, at \$1,020, . . . . .	2,040 00	2,000 00	100 00
One bond United Fruit Company 5s, . . . . .	-	-	50 00
On June 1, 1911: — The United Fruit Company's bond matured; we received, . . . . . \$1,000 00			
On Aug. 2, 1911: — We purchased the Newell land for pasture and made a partial payment of, . . . . . 800 00			200 00
The balance was paid by the State.			
Unexpended balance Dec. 1, 1910, . . . . .	-	-	400 90
	\$3,860 00	\$4,000 00	\$830 90
Disbursements for fiscal year ending Nov. 30, 1911, . . . . .	-	-	230 35
Cash on hand Dec. 1, 1911, . . . . .	-	-	\$600 55

*Library Fund.*

Five bonds New York Central & Hudson River Railroad Company 4s, at \$940, . . . . .	\$4,700 00	\$5,000 00	\$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$940, . . . . .	4,700 00	5,000 00	200 00
Two shares New York Central & Hudson River Railroad Company stock, at \$106, . . . . .	212 00	200 00	10 50
Amherst Savings Bank, deposit, . . . . .	167 77	167 77	6 68
	\$9,779 77	\$10,367 77	\$417 18
Transferred to College library account, . . . . .	-	-	417 18

## SPECIAL FUNDS.

*Endowed Labor Fund (the Gift of a Friend of the College).*

	Market Value Dec. 1, 1911.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at \$910.	\$1,820 00	\$2,000 00	\$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$940.	1,880 00	2,000 00	80 00
One bond New York Central Railroad debenture 4s.	940 00	1,000 00	40 00
Amherst Savings Bank, deposit.	143 39	143 39	5 72
One bond Metropolitan Street Railway, Kansas City Company 5s, at,	980 00	1,000 00	50 00
	\$5,763 39	\$6,143 39	\$255 72
Unexpended balance Dec. 1, 1910,	-	-	986 39
	-	-	\$1,242 11
One Kansas City Metropolitan Street Railway Bond, purchased Jan. 10, 1911,	-	-	994 72
Cash on hand Dec. 1, 1911,	-	-	\$247 39

*Whiting Street Scholarship Fund.*

One bond New York Central debenture 4s,	\$940 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit,	271 64	271 64	10 84
	\$1,211 64	\$1,271 64	\$50 84
Unexpended balance Dec. 1, 1910,	-	-	57 63
	-	-	\$108 47
Disbursements for scholarships for fiscal year ending Nov. 30, 1911,	-	-	90 00
Cash on hand Dec. 1, 1911,	-	-	\$18 47

*Hills Fund.*

Northampton Institution for Savings, deposit,	\$1,180 00	\$1,180 00	\$44 66
One bond American Telephone and Telegraph Company 4s,	910 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad debenture 4s,	940 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad debenture 3½s,	820 00	1,000 00	35 00
Two bonds Metropolitan Street Railway of Kansas City 5s, at \$980,	1,960 00	2,000 00	100 00
Three bonds Pacific Telephone and Telegraph Company 5s, at \$995,	2,985 00	3,000 00	150 00
One bond Western Electric Company 5s,	1,020 00	1,000 00	50 00
Boston & Albany Railroad stocks, at \$221,	801 12	362 00	31 68
Amherst Savings Bank, deposit,	72 75	72 75	2 88
	\$10,688 87	\$10,614 75	\$494 22
Unexpended balance Dec. 1, 1910,	-	-	618 46
	-	-	\$1,112 68
On Jan. 10, 1911: —			
One bond of the Metropolitan Street Railway of Kansas City was purchased for	\$994 72		
Disbursements by floriculture and botanical departments for fiscal year ending Nov. 30, 1911,	288 51		1,283 23
Overdraft Dec. 1, 1911,	-	-	\$170 55

*Mary Robinson Fund.*

	Market Value Dec. 1, 1911.	Par Value.	Income.
Northampton Institution for Savings, deposit, . . . . .	\$820 00	\$820 00	\$31 04
Boston & Albany Railroad stock, at \$221, . . . . .	82 88	38 00	3 32
Unexpended balance Dec. 1, 1910, . . . . .	\$902 88	\$858 00	\$34 36
Cash on hand Dec. 1, 1911, . . . . .	-	-	55 53
			\$89 89

*Grinnell Prize Fund.*

Ten shares New York Central & Hudson River Railroad stock, . . . . .	\$1,060 00	\$1,000 00	\$52 50
Unexpended balance Dec. 1, 1910, . . . . .	-	-	193 24
Disbursement for prizes, . . . . .	-	-	\$245 74
Cash on hand Dec. 1, 1911, . . . . .	-	-	50 00
			\$195 74

*Gassett Scholarship Fund.*

One bond New York Central & Hudson River Railroad debenture 4s, . . . . .	\$940 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit, . . . . .	11 64	11 64	44
Unexpended balance Dec. 1, 1910, . . . . .	\$951 64	\$1,011 64	\$40 44
Disbursements for scholarships for fiscal year ending Nov. 30, 1911, . . . . .	-	-	36 37
Cash on hand Dec. 1, 1911, . . . . .	-	-	\$76 81
			66 30
			\$10 51

*Massachusetts Agricultural College (Investment).*

One share New York Central & Hudson River Railroad stock, . . . . .	\$106 00	\$100 00	\$5 25
Unexpended balance Dec. 1, 1910, . . . . .	-	-	50 20
Cash on hand Dec. 1, 1911, . . . . .	-	-	\$55 45

*Danforth Keyes Bangs Fund.*

Two bonds Pacific Telephone and Telegraph Company 5s, at \$995, . . . . .	\$1,990 00	\$2,000 00	\$100 00
Two bonds Union Electric Light and Power Company 5s, at \$990, . . . . .	1,980 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s, at \$910, . . . . .	1,820 00	2,000 00	80 00
Interest from student loans, . . . . .	-	-	6 28
Unexpended balance Dec. 1, 1910, . . . . .	\$5,790 00	\$6,000 00	\$286 28
Cash on hand Dec. 1, 1911, . . . . .	-	-	345 29
			\$631 57

*John C. Cutter Fund.*

	Market Value Dec. 1, 1911.	Par Value.	Income.
One bond Pacific Telephone and Telegraph Company 5s, Unexpended balance Dec. 1, 1910, . . . . .	\$995 00 —	\$1,000 00 —	\$50 00 28 33
Cash on hand Dec. 1, 1911, . . . . .	—	—	\$78 33

SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN  
TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Burnham emergency fund, . . . . .	\$600 55
Endowed labor fund, . . . . .	247 39
Whiting Street scholarship fund, . . . . .	18 47
Mary Robinson fund, . . . . .	89 89
Grinnell prize fund, . . . . .	195 74
Gassett scholarship fund, . . . . .	10 51
Massachusetts Agricultural College investment, . . . . .	55 45
Danforth Keyes Bangs fund, . . . . .	531 57
John C. Cutter fund, . . . . .	78 33
	\$1,827 90
Hills fund overdraft, . . . . .	170 55
	\$1,657 35

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, 1911. 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.*

AMHERST, Dec. 12, 1911.

HISTORY OF SPECIAL FUNDS.

Burnham emergency fund: —

A bequest from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college have voted that the fund be kept intact, and that the income from it be used for the college for such purposes as they believe to be for its best interest, \$5,000 00

Library fund: —

The library of the college at the present time contains about 30,000 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 \$1,215. These were the largest bequests, and amount now 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:—

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. Claflin, 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 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

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\$41,100 00



## PRIZES.

Sophomore prize in botany, given by Prof. A. V. Osmun of the department of botany, to that member of the sophomore class who presents the best herbarium in the regular course (this prize was first offered in 1908 with the hope that it might stimulate a greater interest on the part of the students in this line of work), — . . . . .	\$5 00
Special prize, given by the Western Alumni Association to that member of the sophomore class who during his first two years has shown the greatest improvement in scholarship, character and example, . . . . .	25 00
	<hr/>
	\$30 00

FRED C. KENNEY,  
*Treasurer.*







# THE M. A. C. BULLETIN

## AMHERST, MASS.

Vol. IV. No. 4.

For May, 1912.

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No. 31

### CATALOGUE

OF THE

## MASSACHUSETTS

## AGRICULTURAL COLLEGE,

1911-1912.

FORTY-NINTH ANNUAL REPORT.

PART II.



BOSTON:  
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,  
18 POST OFFICE SQUARE.

1912.



Without excluding other scientific and classical studies, and including military tactics to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.— *Acts of Congress, July 2, 1862.*

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# MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST.

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CATALOGUE, 1911-1912.

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BOSTON:  
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,  
18 POST OFFICE SQUARE.  
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APPROVED BY  
THE STATE BOARD OF PUBLICATION.



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THE MASSACHUSETTS  
AGRICULTURAL COLLEGE.

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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.

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

# CALENDAR.

1912-13.

## REGULAR COURSES.

### 1912.

January 1, Monday, 1 P.M., . . . . .	Winter recess ends; chapel.
January 29, Monday, . . . . .	Semester examinations begin.
February 5, Monday, 1 P.M., . . . . .	Second semester begins; chapel.
February 22, Thursday, . . . . .	Half holiday, Washington's Birth-day.
March 29, Friday, 6 P.M., . . . . .	Spring recess begins.
April 8, Monday, 1 P.M., . . . . .	Spring recess ends.
April 19, Friday, . . . . .	Half holiday, Patriot's Day.
May 30, Thursday, . . . . .	Holiday, Memorial Day.
June 3, Monday, . . . . .	Senior examinations begin.
June 10, Monday, . . . . .	Non-senior examinations begin.
June 15-19, Saturday-Wednesday, . . . . .	Commencement.
June 19-22, Wednesday-Saturday, . . . . .	Entrance examinations.
September 4-7, Wednesday-Saturday, . . . . .	Entrance examinations.
September 11, Wednesday, 1.30 P.M., . . . . .	First semester begins; chapel.
November 27-December 2, Wednesday, 1 P.M.-Monday, 1.10 P.M., chapel.	
December 20, Friday, 6 P.M., . . . . .	Winter recess begins.

### 1913.

January 6, Monday, 1.10 P.M., . . . . .	Winter recess ends; chapel.
January 24, Friday, . . . . .	Semester examinations begin.
February 3, Monday, 1.10 P.M., . . . . .	Second semester begins; chapel.
March 28, Friday, 6 P.M., . . . . .	Spring recess begins.
April 7, Monday, 1.10 P.M., . . . . .	Spring recess ends.
May 30, Friday, . . . . .	Holiday, Memorial Day.
May 31, Saturday, . . . . .	Senior examinations begin.
June 7, Saturday, . . . . .	Non-senior examinations begin.
June 14-18, Saturday-Wednesday, . . . . .	Commencement.
June 18-21, Wednesday-Saturday, . . . . .	Entrance examinations.



## MASSACHUSETTS AGRICULTURAL COLLEGE.

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**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 the various 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-years course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. 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 farmers' week. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, railway and trolley specials, lecture courses, demonstrations, etc.

**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 colleges and high schools, for scientific experts in chemistry, entomology and botany, 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, physics 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 major courses are offered.

LOCATION AND EQUIPMENT. — The agricultural college is located in the town of Amherst. The grounds comprise more than 500 acres, lying about a mile north of the village center. 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.

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

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### MEMBERS OF THE CORPORATION.

	TERM EXPIRES
DAVIS R. DEWEY of Cambridge, . . . . .	1912
M. FAYETTE DICKINSON of Brookline, . . . . .	1912
WILLIAM H. BOWKER of Concord, . . . . .	1913
GEORGE H. ELLIS of West Newton, . . . . .	1913
CHARLES E. WARD of Buckland, . . . . .	1914
ELMER D. HOWE of Marlborough, . . . . .	1914
NATHANIEL I. BOWDITCH of Framingham, . . . . .	1915
WILLIAM WHEELER of Concord, . . . . .	1915
ARTHUR G. POLLARD of Lowell, . . . . .	1916
CHARLES A. GLEASON of New Braintree, . . . . .	1916
FRANK GERRETT of Greenfield, . . . . .	1917
HAROLD L. FROST of Arlington, . . . . .	1917
CHARLES H. PRESTON of Danvers, . . . . .	1918
FRANK A. HOSMER of Amherst, . . . . .	1918

### MEMBERS EX OFFICIO.

His Excellency Governor EUGENE N. FOSS, *President of the Corporation.*  
 KENYON L. BUTTERFIELD, *President of the College.*  
 DAVID SNEDDEN, *State Commissioner of Education.*  
 J. LEWIS ELLSWORTH, *Secretary of the State Board of Agriculture.*

### OFFICERS OF THE CORPORATION.

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 CHARLES A. GLEASON of New Braintree, *Vice-President.*  
 J. LEWIS ELLSWORTH of Worcester, *Secretary.*  
 FRED C. KENNEY of Amherst, *Treasurer.*  
 CHARLES A. GLEASON of New Braintree, *Auditor.*

### STANDING COMMITTEES OF THE CORPORATION.<sup>1</sup>

#### *Committee on Finance.*

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

<sup>1</sup> The president of the college is *ex officio* member and secretary of standing committees.



*Committee on Course of Study and Faculty.*

WILLIAM WHEELER, <i>Chairman.</i>	DAVID SNEDDEN.
WILLIAM H. BOWKER.	ELMER D. HOWE.
M. FAYETTE DICKINSON.	DAVIS R. DEWEY.
FRANK A. HOSMER.	

*Committee on Farm.*

NATHANIEL I. BOWDITCH, <i>Chairman.</i>	CHARLES A. GLEASON.
FRANK GERRETT.	GEORGE H. ELLIS.

*Committee on Horticulture.*

J. LEWIS ELLSWORTH, <i>Chairman.</i>	ELMER D. HOWE.
DAVIS R. DEWEY.	HAROLD L. FROST.

*Committee on Experiment Department.<sup>1</sup>*

CHARLES H. PRESTON, <i>Chairman.</i>	ARTHUR G. POLLARD.
J. LEWIS ELLSWORTH.	CHARLES E. WARD.
HAROLD L. FROST.	

*Committee on Buildings and Arrangement of Grounds.*

WILLIAM H. BOWKER, <i>Chairman.</i>	FRANK GERRETT.
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CHARLES H. PRESTON.	

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 FRANK P. NEWKIRK of Easthampton.  
 WILLIAM E. PATRICK of Warren.  
 JOHN J. ERWIN of Wayland.  
 R. HENRY RACE of North Egremont.

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

## OFFICERS OF THE INSTITUTION.

### THE FACULTY.

[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.]

- KENYON L. BUTTERFIELD, A.M., LL.D., . . . . . President's House.  
 President of the College and Head of Division of Rural Social Science.
- GEORGE F. MILLS, A.M., . . . . . 46 Amity Street.  
 Dean of the College and Professor of Languages and Literature.
- CHARLES H. FERNALD, Ph.D., . . . . . 3 Hallock Street.  
 Honorary Director of the Graduate School.
- WILLIAM P. BROOKS, Ph.D., . . . . . 28 Northampton Road.  
 Director of the Experiment Station and Lecturer on Soil Fertility.
- WILLIAM D. HURD, M.Agr., . . . . . 82 Pleasant Street.  
 Director of the Extension Service.
- FRANK A. WAUGH, M.Sc., . . . . . Massachusetts Agricultural College.  
 Head of Division of Horticulture and Professor of Landscape Gardening.
- JAMES A. FOORD, M.Sc., . . . . . Nutting Avenue.  
 Head of Division of Agriculture and Professor of Farm Administration.
- ROBERT J. SPRAGUE, Ph.D., . . . . . North Amherst.  
 Head of Division of the Humanities and Professor of Economics and Sociology.
- JOSEPH B. LINDSEY, Ph.D., . . . . . 47 Lincoln Avenue.  
 Goessman 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, Chairman of Division of Science.
- GEORGE E. STONE, Ph.D., . . . . . Mount Pleasant.  
 Professor of Botany.
- PHILIP B. HASBROUCK, B.Sc., . . . . . 130 Pleasant Street.  
 Professor of Physics and Registrar of the College.
- 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 and Acting Director of the Graduate School.
- GEORGE C. MARTIN, C.E., Captain 18th U. S. Infantry,  
 35 North Prospect Street.  
 Professor of Military Science and Tactics.

EDWARD A. WHITE, B.S.,	Mount Pleasant.
Professor of Floriculture.	
WILLIAM R. HART, A.M.,	97 Pleasant Street.
Professor of Agricultural Education.	
FRED C. SEARS, M.Sc.,	Mount Pleasant.
Professor of Pomology.	
FRED C. KENNEY,	Mount Pleasant.
Treasurer of the College.	
ROBERT W. NEAL, A.M.,	7 Woodside Avenue.
Associate Professor of English.	
JOSEPH S. CHAMBERLAIN, Ph.D.,	16 North Prospect Street.
Associate Professor of Organic and Agricultural Chemistry.	
WILLIAM P. B. LOCKWOOD, B.Sc.Agr.,	5 East Pleasant Street.
Associate Professor of Dairying.	
ELMER K. EYERLY, A.M.,	Amity Street.
Associate Professor of Rural Sociology.	
FREDERICK F. MOON, A.B., M.F.,	6 Allen Street.
Associate Professor of Forestry.	
JOHN A. McLEAN, A.B., B.Sc.Agr.,	Prospect House.
Associate Professor of Animal Husbandry.	
JOHN C. GRAHAM, B.Sc.,	North Amherst.
Associate Professor of Poultry Husbandry.	
GUY C. CRAMPTON, Ph.D.,	86 Pleasant Street.
Associate Professor of Entomology.	
S. FRANCIS HOWARD, <sup>1</sup> M.Sc.,	10 Allen Street.
Assistant Professor of Chemistry.	
A. VINCENT OSMUN, M.Sc.,	North Amherst.
Assistant Professor of Botany.	
SIDNEY B. HASKELL, B.Sc.,	5 Fearing Street.
Assistant Professor of Agronomy.	
CLARENCE E. GORDON, Ph.D.,	Nutting Avenue.
Assistant Professor of Zoölogy and Geology.	
EDGAR L. ASHLEY, A.M.,	Prospect House.
Assistant Professor of German.	
ANDERSON A. MACKIMMIE, A.B.,	Nutting Avenue.
Assistant Professor of French.	
ALEXANDER E. CANCE, Ph.D.,	9 Fearing Street.
Assistant Professor of Agricultural Economics.	
BURTON N. GATES, Ph.D.,	42 Lincoln Avenue.
Assistant Professor of Beekeeping.	
EDWARD M. LEWIS, A.M.,	29 Amity Street.
Assistant Professor of English and Assistant Dean of the College.	
CHARLES A. PETERS, Ph.D.,	6 High Street.
Assistant Professor of Inorganic and Soil Chemistry.	
CURRY S. HICKS, B.Sc.,	8 Allen Street.
Assistant Professor of Physical Education and Hygiene.	
FREDERICK L. YEAW, B.Sc.,	25 North Prospect Street.
Assistant Professor of Market Gardening.	

<sup>1</sup> On leave of absence.

GEORGE S. GAGE, Ph.D.,	42 Lincoln Avenue.
Assistant Professor of Animal Pathology.	
GEORGE N. HOLCOMB, A.B., S.T.B.,	Bolton.
Lecturer in History.	
FRANK W. RANE, M.F.,	Boston.
Lecturer in Forestry.	
C. ROBERT DUNCAN, B.Sc.,	31 North Prospect Street.
Instructor in Mathematics.	
CHARLES R. GREEN, B.Agr.,	Mount Pleasant.
Librarian.	
ALVAH J. NORMAN, M.Sc.,	7 Phillips Street.
Extension Instructor in Pomology.	
GEORGE F. E. STORY, B.Sc.,	10 Allen Street.
Extension Instructor in Dairying.	
ARTHUR K. HARRISON,	8 Allen Street.
Instructor in Landscape Gardening.	
CHESTER A. BUTMAN, B.Sc.,	Prospect House.
Instructor in Physics.	
WILLARD A. WATTLES, A.M.,	Mount Pleasant.
Instructor in English.	
WILLIAM L. HARMOUNT, A.B.,	Nutting Avenue.
Instructor in French.	
ELVIN L. QUAIFFE, B.Sc.Agr.,	9 Fearing Street.
Instructor in Animal Husbandry.	
WILLIAM L. MACHMER, A.M.,	Kendrick Place.
Instructor in Mathematics.	
ARTHUR N. JULIAN, B.A.,	50 Pleasant Street.
Instructor in German.	
HOWARD DE F. WIDGER, B.A.,	13 Spring Street.
Instructor in English and Public Speaking.	
WILLARD A. TURNEE, Ph.B.,	31 Amity Street.
Assistant in Chemistry.	
HELENA GOESSMANN, Ph.M.,	44 Amity Street.
Assistant in English.	
SAMUEL R. PARSONS, B.Sc.,	9 Fearing Street.
Assistant in Mathematics and in Military Science.	
FREDERICK A. McLAUGHLIN, B.Sc.,	120 Pleasant Street.
Assistant in Botany.	
HERBERT J. BAKER, B.Sc.,	— — — — —
Assistant in Agronomy.	
HAROLD S. ADAMS, B.A.,	32 North Prospect Street.
Assistant in Chemistry.	

## GRADUATE ASSISTANTS.

LEONARD S. McLAINE, B.Sc.,	84 Pleasant Street.
Assistant in Zoölogy.	
MARCUS T. SMULYAN, B.Sc.,	Nutting Avenue.
Assistant in Botany.	

WILLIAM S. REGAN, B.Sc., . . . . .	84 Pleasant Street.
Assistant in Entomology.	
RAYMOND G. SMITH, B.Sc., . . . . .	5½ East Pleasant Street.
Assistant in Botany.	

## OTHER COLLEGE OFFICERS.

EDWIN H. FORRISTALL, M.Sc., . . . . .	Massachusetts Agricultural College.
Farm Superintendent.	
RALPH J. WATTS, B.Sc., . . . . .	Nutting Avenue.
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P. C. SCHROYER, . . . . .	120 Pleasant Street.
Assistant Engineer.	
CLARENCE A. JEWETT, . . . . .	112 Pleasant Street.
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Foreman, Department of Floriculture.	
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Miss LULIONA N. BARKER, . . . . .	9 Phillips Street.
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Clerk to the Dean and Registrar.	
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Miss LINA FISHER, . . . . .	— — — — —
Stenographer, Department of Chemistry.	
Miss GLADYS E. RUSSELL, . . . . .	— — — — —
Stenographer, Division of Horticulture.	

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WILLIAM D. HURD, M.Agr., . . . . .	82 Pleasant Street.
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EARNEST D. WAID, B.Agr., . . . . .	17 Fearing Street.
Assistant Director.	

- CHARLES H. WHITE, B.Sc., . . . . . North Uxbridge.  
Field Agent.
- ALVAH J. NORMAN, B.Sc., . . . . . 7 Phillips Street.  
Horticulture.
- GEORGE F. E. STORY B.Sc., . . . . . 10 Allen Street.  
Dairying and Animal Husbandry.
- Miss MABEL R. CASE, . . . . . Draper Hall.  
Clerk to the Director.

## OFFICERS OF THE EXPERIMENT STATION.

---

WILLIAM P. BROOKS, Ph.D., Director.	28 Northampton Road.
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 PLANT AND ANIMAL CHEMISTRY.

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EDWARD B. HOLLAND, M.Sc., Associate Chemist, in charge of Research Division.	28 North Prospect Street.
FRED W. MORSE, Ph.D., Research Chemist.	44 Pleasant Street.
HENRI D. HASKINS, B.Sc., In charge of Fertilizer Division.	Amherst House.
PHILIP H. SMITH, In charge of Feed and Dairy Division.	102 Main Street.
LEWELL S. WALKER, B.Sc., Assistant.	19 Phillips Street.
JAMES C. REED, B.Sc., Assistant.	Nutting Avenue.
RUDOLF W. RUPRECHT, B.Sc., Assistant.	31 Amity Street.
GEORGE R. PIERCE, Assistant.	North Amherst.
CARELTON P. JONES, Assistant.	— — —
JOSEPH P. HOWARD, Collector.	North Amherst.
HARRY J. ALLEN, Assistant.	Amherst.
JAMES R. ALCOCK, Assistant in Animal Nutrition.	North Amherst.

## DEPARTMENT OF AGRICULTURE.

- WILLIAM P. BROOKS, Ph.D., . . . . . 28 Northampton Road.  
Agriculturist.
- H. J. FRANKLIN, Ph.D., . . . . . Wareham.  
In charge of Cranberry Investigation.
- EDWIN F. GASKILL, B.Sc., . . . . . North Amherst.  
Assistant Agriculturist.

## DEPARTMENT OF HORTICULTURE.

- FRANK A. WAUGH, M.Sc., . . . . . Massachusetts Agricultural College.  
Horticulturist.
- FRED C. SEARS, M.Sc., . . . . . Mount Pleasant.  
Pomologist.
- JACOB K. SHAW, Ph.D., . . . . . 1 Allen Street.  
Assistant Horticulturist.

## DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

- GEORGE E. STONE, Ph.D., . . . . . Mount Pleasant.  
Botanist and Vegetable Pathologist.
- GEORGE H. CHAPMAN, M.Sc., . . . . . 13 Fearing Street.  
Assistant Botanist.
- EDWARD A. LARRABEE, B.Sc., . . . . . Clark Hall.  
Assistant Botanist.

## DEPARTMENT OF ENTOMOLOGY.

- HENRY T. FERNALD, Ph.D., . . . . . 44 Amity Street.  
Entomologist.
- BURTON N. GATES, Ph.D., . . . . . 42 Lincoln Avenue.  
Apiarist.
- ARTHUR I. BOURNE, B.A., . . . . . 66 North Pleasant Street.  
Assistant in Entomology.

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- JAMES B. PAIGE, B.Sc., D.V.S., . . . . . 42 Lincoln Avenue.  
Veterinarian.

## DEPARTMENT OF METEOROLOGY.

- JOHN E. OSTRANDER, A.M., C.E., . . . . . 35 North Prospect Street.  
Meteorologist.
- ROYAL N. HALLOWELL, . . . . . Massachusetts Agricultural College.  
Observer.

## OTHER OFFICERS OF THE EXPERIMENT STATION.

- HERBERT J. BAKER, . . . . . Massachusetts Agricultural College.  
Secretary to the Director.
- Mrs. LUCIA G. CHURCH, . . . . . 4 Hallock Street.  
Stenographer, Director's Office.



- Miss F. ETHEL FELTON, . . . . . 9 Phillips Street.  
Stenographer, Department of Plant and Animal Chemistry.
- Miss BRIDIE O'DONNELL, . . . . . Hadley.  
Stenographer, Department of Entomology.
- Miss ALICE M. HOWARD, . . . . . North Amherst.  
Stenographer, Department of Plant and Animal Chemistry.
- Miss JESSIE V. CROCKER, . . . . . Sunderland.  
Stenographer, Department of Botany.

## COMMITTEES OF THE FACULTY.<sup>1</sup>

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1911-12.

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### CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.  
 Associate Professor EYERLY.  
 Assistant Professor CANCE.

### COMMENCEMENT.

Professor PAIGE.  
 Professor WELLINGTON.  
 Captain MARTIN.  
 Professor WHITE.  
 Mr. KENNEY.  
 Mr. DUNCAN.

### COURSE OF STUDY.

Professor HART.  
 Professor WAUGH.  
 Professor FOORD.  
 Professor SPRAGUE.  
 Professor OSTRANDER.  
 Associate Professor CHAMBERLAIN.

### DISCIPLINE (ADVISORY).

Professor MILLS.  
 Professor HASBROUCK.  
 Captain MARTIN.  
 Assistant Professor GORDON.  
 Assistant Professor MACKIMMIE.  
 Assistant Professor LEWIS.

### EMPLOYMENT.

Professor SEARS.  
 Mr. KENNEY.  
 Assistant Professor HASKELL.

### ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.  
 Assistant Professor OSMUN.  
 Assistant Professor ASHLEY.  
 Assistant Professor PETERS.  
 Mr. MACHMER.  
 Mr. WATTLES.

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<sup>1</sup> The president of the college is ex officio member of these standing committees.

## GRADUATE SCHOOL.

Professor FERNALD.  
Professor LINDSEY.  
Professor PAIGE.  
Professor STONE.  
Professor SEARS.  
Assistant Professor GORDON.

## LIBRARY.

Professor STONE.  
Professor BROOKS.  
Professor WELLINGTON.  
Assistant Professor CANCE.

## PHYSICAL EDUCATION AND ATHLETICS.

Professor PAIGE.  
Assistant Professor LEWIS.  
Assistant Professor HICKS.

## SCHEDULE.

Professor OSTRANDER.  
Associate Professor NEAL.  
Associate Professor LOCKWOOD.

## SCHOLARSHIP.

Assistant Professor GORDON.  
Professor MILLS.  
Professor HASBROUCK.  
Assistant Professor MACKIMMIE.  
Assistant Professor LEWIS.

## STUDENT LIFE.

Professor HURD.  
Associate Professor CHAMBERLAIN.  
Associate Professor McLEAN.  
Assistant Professor HASKELL.  
Assistant Professor MACKIMMIE.  
Assistant Professor LEWIS.  
Assistant Professor HICKS.

## UNCLASSIFIED STUDENTS.

Professor WHITE.  
Associate Professor LOCKWOOD.  
Assistant Professor PETERS.



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THE COLLEGE.

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## ADMISSION.

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### A. APPLICATION FOR ADMISSION.

Correspondence about 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 on or before June 1 of the year in which 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 considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways:—

1. By presenting certificate from a school approved for such privilege by this college.
2. By presenting certificate from any school approved by the college entrance examination boards.
3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present not less than seven of the necessary fourteen credits in all. Those 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.<sup>1</sup>

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

*Schedule for Entrance Examinations, June 21–24, 1912.* — The examinations in June will follow this schedule: —

*First Day.*

- 1 P.M. Registration.<sup>2</sup>  
1.15–5 P.M. Latin (A and B).

*Second Day.*

- 8 A.M. Plane geometry.  
10 A.M. Chemistry.  
11.30 A.M. United States history and civics.  
2 P.M. Algebra.  
3.30 P.M. Physics.  
4.30 P.M. Elective English.

*Third Day.*

- 8 A.M. Required English.  
11 A.M. Solid geometry, agriculture.  
2 P.M. History, required and elective.  
5 P.M. Botany.

*Fourth Day.*

- 8 A.M. French, German, required and elective.  
1 P.M. Greek, and all one-half credit electives, except those already noted.

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<sup>1</sup> *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects applicants may be admitted, upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject: namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

<sup>2</sup> Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.



*Schedule for Entrance Examinations in September.* — In September, 1912, the examinations will be given September 11–14, inclusive, and will follow the order indicated for June, beginning September 11 at 1 P.M.

### C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five 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, of which nine are required and five are elective.<sup>1</sup>

(a) The following nine units are required: —

<i>Language.</i>	
English, . . . . .	3
French or German, . . . . .	2

<i>History and Civics.</i> <sup>2</sup>	
United States history and civics, . . . . .	½
History (elective), . . . . .	1
(a) Ancient history.	
(b) Medieval and modern history.	
(c) English history.	
(d) General history.	

<i>Mathematics.</i>	
Algebra, through progressions, . . . . .	1½
Plane geometry, . . . . .	1

(b) In addition to the requirements under (a), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

<i>Language.</i>	
English in addition to requirements, . . . . .	1
French in addition to requirements, . . . . .	2 or 1 <sup>3</sup>
German in addition to requirements, . . . . .	2 or 1 <sup>3</sup>

<sup>1</sup> After September, 1913, the entrance credits will be divided as follows: 8½ from group A, 5½ from group B.

<sup>2</sup> Hereafter one unit in history will be required. In group (a) of the requirement for entrance United States history and civics will be put on the same basis with the other history requirement.

<sup>3</sup> If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

Greek, . . . . .	2 or 3
Latin, . . . . .	2 or 3
Latin A, including Cæsar and Cicero or prose composition, 2;	
Latin B, including Virgil and prose composition, 1.	

*History.*

In addition to requirements, . . . . . 1, 2, or 3

*Mathematics, and Other Sciences.*

Solid geometry, . . . . .	$\frac{1}{2}$
Trigonometry, . . . . .	$\frac{1}{2}$
Chemistry, . . . . .	1
Physiography, . . . . .	$\frac{1}{2}$
Physiology, . . . . .	$\frac{1}{2}$
Agriculture, <sup>1</sup> . . . . .	$\frac{1}{2}$ or 1
Botany, <sup>1</sup> . . . . .	$\frac{1}{2}$ or 1
Geology, <sup>1</sup> . . . . .	$\frac{1}{2}$
Physics, <sup>1</sup> . . . . .	1
Zoölogy, <sup>1</sup> . . . . .	$\frac{1}{2}$
Commercial geography, <sup>2</sup> . . . . .	$\frac{1}{2}$
Drawing, <sup>2</sup> . . . . .	$\frac{1}{2}$
Manual training, <sup>2</sup> . . . . .	$\frac{1}{2}$ 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 1).

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 certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.

**D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.<sup>3</sup>**

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address sub-station 84, New York City.

**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.

<sup>1</sup> Note-book required as part of preparation will be credited as part of the examination.

<sup>2</sup> Certification necessary in these subjects; no examinations given.

<sup>3</sup> In alphabetical order by subjects.

**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 Stevens'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, some of the experiments being quantitative. The keeping of a note-book is required.

**COMMERCIAL GEOGRAPHY.** — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

**DRAWING.** — Applicants may offer either freehand or mechanical drawing, or both. They 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 them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable 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."

**ENGLISH.** — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by cer-

tification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience and thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The list of books for 1912 is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1912: —

(a) For reading and composition practice: Shakspeare's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(b) For thorough study and practice: Shakspeare's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

*English Grammar and Composition.* — Command of correct and

clear English (spoken or written) 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, paragraphs, and the different kinds of whole composition, including letter writing, 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 narration, description and easy exposition and argument based upon simple outlines. 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.

*Literature.* — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(a) 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 which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. 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., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspeare's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "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," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(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. For this close reading are provided a play, a group of poems, an oration and an essay, as follows:—

Shakspeare's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

*Examination.*<sup>1</sup>—However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, 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 second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the

<sup>1</sup> Read in connection with this statement the first three paragraphs under "English," pp. 29, 30.

books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form 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 other works, and the periods of literary history to which they belong.

ENGLISH, ELECTIVE. — To secure a fourth entrance credit in English, the applicant should do (a) the full equivalent of three years' work (required English), and also (b) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined. In order, however, that examination questions may be prepared, the applicant for examination should notify the Department of English by the first of June preceding the examinations, stating which English subject or subjects he wishes to present.

*Subjects accepted.* — The applicant may offer (a) any one of the subjects stated hereunder, or (b) any two of these subjects in combination.

- (a) History of American literature.
- (b) History of English literature (or lives of the great authors).
- (c) Classics *other than those read to meet the three-credit requirement, the applicant to present a complete list of his readings for all four years.* The reading for the fourth credit should be of the same detailed, careful kind as is given the books prescribed for "Reading and Practice" in the official list of entrance requirement readings.

- (d) Advanced composition.
- (e) History of the English language.
- (f) Advanced high school grammar.

*Advanced Standing in College.* — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.



*Presentation of Note-books and Themes.* — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

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

1. 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.

2. Three credit units 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.

HISTORY.<sup>1</sup> — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not 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 an outline map.

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.

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

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<sup>1</sup> Hereafter one unit in history will be required, United States history and civics being placed upon the same basis with the other history requirement.

1. 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.

2. Three credit units 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 Cati-line; 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.

MANUAL TRAINING. — 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.

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 should 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;" 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."

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

For physiography, Davis's "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 a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recog-

dition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

#### 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. 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, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.

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

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

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

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

9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

#### G. UNCLASSIFIED STUDENTS.

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

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

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

5. 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 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

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

7. 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 four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

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

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

## COURSES OF INSTRUCTION.

### A. TABLE OF UNDERGRADUATE SUBJECTS.

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

#### FRESHMAN YEAR.

##### *First Semester.*

[All work required.]

Chemistry, . . . . .	3
Algebra, . . . . .	3
Solid geometry, <sup>1</sup> . . . . .	2
English, . . . . .	4
Public speaking (at option of instructor), . . . . .	1
French or German, <sup>2</sup> . . . . .	4
Drill, . . . . .	1
Hygiene, . . . . .	1
College life (attendance without credit).	
	18 or 19

##### *Second Semester.*

[All work required.]

Animal husbandry, . . . . .	2
Chemistry, . . . . .	3
Trigonometry, . . . . .	3
Algebra, . . . . .	2
English, . . . . .	4
Public speaking (if not taken in semester <sup>1</sup> ), . . . . .	1
French or German, . . . . .	4
Drill, . . . . .	1
Physical education, . . . . .	1
	20 or 21

#### SOPHOMORE YEAR.

##### *First Semester.*

[All work required.]

Agronomy, . . . . .	3
Physics, . . . . .	5
Zoölogy, . . . . .	3
English, . . . . .	2
French or German, . . . . .	3
Tactics, . . . . .	1
Drill, . . . . .	1
	18

<sup>1</sup> To be taken in course when not offered for entrance.

<sup>2</sup> Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

*Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

		[Required.]
Elementary horticulture,	. . . . .	2
Botany,	. . . . .	4
English,	. . . . .	2
Agricultural industry,	. . . . .	3
Drill,	. . . . .	1
Tactics,	. . . . .	1
Physical education,	. . . . .	1
		<hr/>
		14

		[Elective.]
French or German,	} Each 3 hours. Any two, . . . . .	6
Animal husbandry,		
Geology,		
Physics,		
Chemistry,		
Surveying,		
		<hr/>
		20

## JUNIOR AND SENIOR YEARS.

[Effective to June, 1912, only.]

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Military science, two credits each semester of junior year,	4
Physical education, one credit (second semester),	1
Political science (Course 1, Economics),	3
English,	3

[Elective.]

Unless otherwise stated, elective courses to the end of the college year of 1911-12 are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare.

**MAJORS.**

Beginning with September, 1912, a plan of major courses will become operative. For statement, see Addendum.

**STARRED COURSES.**

Courses the number of which is marked with a star are announced provisionally only.



## B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 10, page 10 of the Rules.]

### DIVISION OF AGRICULTURE.

Professor FOORD.

#### AGRONOMY.

Assistant Professor HASKELL, Dr. BROOKS, Mr. BAKER.

##### *Required Course.*

1. SOILS AND FERTILIZERS. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture hours. Credit, 3.

Assistant Professor HASKELL.

##### *Elective Courses.*

3. FIELD AND FORAGE CROPS. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3.

Assistant Professor HASKELL.

4. ADVANCED FIELD CROPS. — This course takes up the question of breeding and improvement of the crops studied in Agronomy 3; study of seed stock as offered in the market, testing of germination, purity and estimation of valuation; and the methods of production, harvesting and curing. Prerequisites, Agronomy 3 and Botany 2. Juniors and seniors; 1 laboratory period and 2 lecture periods weekly. Credit, 3.

Assistant Professor HASKELL.

5. **ADVANCED SOILS.** — A field, laboratory and lecture course on soils; their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisites, Agronomy 1 and Chemistry 2. Juniors and seniors; 1 lecture period and 1 four-hour laboratory period weekly. Credit, 3.

Assistant Professor HASKELL.

6. **DRAINAGE AND IRRIGATION.** — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required to take an area of wet or swampy land and to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 8. Juniors and seniors; 1 four-hour laboratory period and 1 lecture period weekly. Credit, 3.

Assistant Professor HASKELL.

8. **MANURES AND FERTILIZERS.** — 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. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. For seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3.

Dr. BROOKS.

### **ANIMAL HUSBANDRY.**

Associate Professor McLEAN, Mr. QUAIFFE.

#### *Required Courses.*

2. **ELEMENTARY JUDGING.** — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live-stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 judging laboratories each week. Credit, 2.

Associate Professor McLEAN and Mr. QUAIFFE.

*Elective Courses.*

3. BREEDS AND TYPES OF LIVE STOCK.<sup>1</sup> — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Prerequisite, Animal Husbandry 2. Text-book, Plumb's "Breeds and Types of Farm Animals." Sophomores; 1 lecture and 2 laboratories. Credit, 3.

Associate Professor McLEAN and Mr. QUAIFFE.

5. PRINCIPLES OF BREEDING. — Prerequisite, Zoölogy 1. Text-book, Davenport's "Principles of Breeding." Juniors; 3 lectures. Credit, 3.

Associate Professor McLEAN.

6. LIVE-STOCK MANAGEMENT. — 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, breaking to drive, driving, 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. Prerequisite, Animal Husbandry 4. Juniors; 1 laboratory. Credit, 1.

Mr. QUAIFFE.

8. ADVANCED STOCK JUDGING. — 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 of the various breeds of stock in the State. Judging teams to represent the college will be largely selected from this class. Prerequisite, Animal Husbandry 4. Juniors; 2 laboratory periods. Credit, 2.

Associate Professor McLEAN.

9. FEEDING AND MANAGEMENT. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production; a similar study of beef animals and beef production. Prerequisite, Animal Husbandry 4. Text-book, Henry's "Feeds and Feeding." Three lectures. Credit, 3.

Associate Professor McLEAN.

<sup>1</sup> Formerly Course 4; will be given in fall semester in 1912-13, elective to qualified sophomores.

10. FEEDING AND MANAGEMENT. — A continuation of Course 9, dealing in a similar manner with horses, sheep and swine. Prerequisite, Course 9. Seniors; 3 lectures a week. Credit, 3.

Associate Professor McLEAN.

11. HERD AND STUD-BOOK STUDY. — An advanced course of the study of the breeds of live stock, familiarizing the student with the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours a week. Credit, 2.

Associate Professor McLEAN.

### DAIRYING.

Associate Professor LOCKWOOD, MR. STORY.

#### *Elective Courses.*

1. MILK AND ITS COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 5; 2 lecture hours and 1 laboratory period. Credit, 3.

Associate Professor LOCKWOOD.

2. BUTTERMILKING. — A study of hand and factory separators, separator instruction and cream separation; handling milk and cream for buttermaking on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof; practical mechanics as applied to the creamery. Prerequisite, Course 1; 2 laboratory periods and 1 lecture hour. Credit, 3.

Associate Professor LOCKWOOD.

3. DAIRY BACTERIOLOGY. — A study of bacteriology relative to market milk and dairy work. Prerequisite, Courses 1 and 2; 2 laboratory periods and 1 lecture hour.

Associate Professor LOCKWOOD.

4. MARKET MILK AND MILK PRODUCTS. — A study of market milk conditions, extent and development of the business; supply

and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese; condensed milk; cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Courses 1, 2 and 3; 1 laboratory period and 2 lecture hours. Credit, 3. Associate Professor LOCKWOOD.

5. DAIRYING. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work, principles of creaming, separators, elementary butter making, proper method of handling milk and cream, and the relation of market milk to the public health. One lecture, 1 two-hour laboratory period. Credit, 2.

Associate Professor LOCKWOOD.

#### FARM ADMINISTRATION.

Professor FOORD.

##### *Elective Courses.*

3. FARM BUILDINGS AND MACHINERY. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Agronomy 1, Animal Husbandry 2 and Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor FOORD.

4. FARM MANAGEMENT. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor FOORD.

**POULTRY HUSBANDRY.**

Associate Professor GRAHAM.

*Elective Courses.*

1. **ELEMENTS OF POULTRY CULTURE.** — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter egg production, breeds and types of poultry. Two lectures. Credit, 2. Associate Professor GRAHAM.

2. **ELEMENTS OF POULTRY CULTURE.** — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Two lectures. Credit, 2. Associate Professor GRAHAM.

3. **POULTRY PRACTICE WORK.** — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking, dressing and packing poultry, also sorting and preparing eggs for market. Must be preceded by or accompanied by Course 1. One laboratory period. Credit, 1. Associate Professor GRAHAM.

4. **INCUBATION AND BROODING.** — 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. This course must be preceded or accompanied by Course 2. One to 3 credits. Time to be arranged. Associate Professor GRAHAM.

5. **PEN MANAGEMENT.** — 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. Prerequisite, Course 1. One credit. Time to be arranged. Associate Professor GRAHAM.

6. **POULTRY MANAGEMENT.** — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes laying out and planning poultry buildings of all kinds, the mating of fowls and the preparing of birds for exhibition. Poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited

by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Two lectures, 1 laboratory period. Credit, 3.

Associate Professor GRAHAM.

7. **ADVANCED POULTRY JUDGING.** — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. One lecture and 2 laboratory periods. Credit, 3.

Associate Professor GRAHAM.

9. **MARKET POULTRY AND POULTRY PRODUCTS.** — 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. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. One lecture or conference period and laboratory work. Laboratory periods to be arranged. Credit, 3.

Associate Professor GRAHAM.

## DIVISION OF HORTICULTURE.

Professor WAUGH.

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

### *Required Courses (General).*

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Mr. NORMAN.

### *Elective Courses (General).*

3. PLANT MATERIALS. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, 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. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — 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. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. [Not given in 1912-13.]. Credit, 3.



**FLORICULTURE.**

Professor WHITE.

*Elective Courses.*

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.

Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite, Floriculture 1; 7 hours. Credit, 4.

Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3.

Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.

Professor WHITE.

**FORESTRY.**

Associate Professor MOON, Mr. RANE.

*Elective Courses.*

1, 2. DENDROLOGY AND SILVICULTURE. — These two subjects run parallel throughout the year. Under dendrology, the habits and needs of trees are studied, their distribution, soil and moisture requirements, growth, etc. Under silviculture are taken up the life history of trees and stands; tree characteristics, how modified; the concept of a forest and its subdivisions; methods of reproduction, both natural and artificial, with both theoretical and practical work in thinnings and nursery practice. Course 1 prerequisite to Course 2. Juniors; 3 lectures weekly, with 4 additional hours of optional field work. Credit, 3. Associate Professor MOON.

3, 4. ADVANCED FORESTRY. — Forestry 3 consists of an advanced course in forestry, in which forest economics, policy and law, forest mensuration, forest management and lumbering are taken up. Prerequisites, Forestry 1 and 2. Three lectures. Credit, 3.

Associate Professor MOON.

\*5, \*6. SILVICS AND SILVICULTURE. — Courses consisting entirely in field work, running parallel with Forestry 3 and 4. Factors of site, silvical habits of trees, forest description and type mapping, reproduction, nursery practice, including the laying out of seed beds, forest mensuration and practical work in the various methods of making thinnings and reproduction cuttings. First given, 1912-13. Four hours. Credit, 2.

Associate Professor MOON.

**LANDSCAPE GARDENING.**

Professor WAUGH, Mr. HARRISON.

*Elective Courses.*

1. ELEMENTS OF LANDSCAPE GARDENING. — 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. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Mr. HARRISON.

2. ELEMENTS OF LANDSCAPE GARDENING. — As stated under Course 1. Prerequisite, Course 1. Mr. HARRISON.

3. GENERAL DESIGN. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens and parks and private grounds; written reports of individual problems. Seniors; prerequisite, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Professor WAUGH.

4. GENERAL DESIGN. — As stated under Course 3. Prerequisite, Course 3. Professor WAUGH.

5. THEORY OF LANDSCAPE ART. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor WAUGH.

6. ARCHITECTURE. — 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; 2 hours. Credit, 2. (Alternating with Course 10.) Mr. HARRISON.

7. CIVIC ART. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor WAUGH.

8. CIVIC ART. — As stated under Course 7. Prerequisite, Course 7. Professor WAUGH.

10. CONSTRUCTION AND MAINTENANCE. — 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. Two hours. Credit, 2. (Alternating with Course 6 and not to be given in 1912-13.) Mr. HARRISON.

**MARKET GARDENING.**

Assistant Professor YEAW.

*Elective Courses.*

2. **ELEMENTS OF MARKET GARDENING.** — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3.

Assistant Professor YEAW.

3. **ADVANCED MARKET GARDENING.** — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3.

Assistant Professor YEAW.

**POMOLOGY.**

Professor SEARS, Mr. NORMAN, Mr. REES.

*Elective Courses.*

1. **PRACTICAL POMOLOGY.** — *General.* — 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 stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3.

Professor SEARS.

2. **PRACTICAL POMOLOGY.** — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3.

Professor SEARS.

3. **SYSTEMATIC POMOLOGY.** — A study of the varieties of the different fruits and of nomenclature, with critical descriptions;

special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3.

Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3.

Professor SEARS.

6. SPRAYING. — 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. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2.

Professor SEARS.

### DRAWING.

Mr. HARRISON.

#### *Elective Courses.*

1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Juniors; 6 hours. Credit, 3.

Mr. HARRISON.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3.

Mr. HARRISON.

**DIVISION OF SCIENCE.**

Professor PAIGE.

**BOTANY.**

Professor STONE, Assistant Professor OSMUN, Mr. McLAUGHLIN.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

*Required Courses.*

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4. Assistant Professor OSMUN.

*Elective Courses.*<sup>1</sup>

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2.

Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.

Professor STONE and Assistant Professor OSMUN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5.

Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7.

Professor STONE.

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<sup>1</sup> Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.

Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9.

Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5.

Professor STONE and Mr. McLAUGHLIN.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11.

Professor STONE and Mr. McLAUGHLIN.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4.

Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13.

Professor STONE.



### GENERAL AND AGRICULTURAL CHEMISTRY.

Professor J. B. LINDSEY, Professor CHARLES WELLINGTON, Associate Professor JOSEPH S. CHAMBERLAIN, Assistant Professor CHARLES A. PETERS. Assistants, WILLIAM A. TURNER, HAROLD S. ADAMS.

[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 other 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 who intend following 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 the fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., 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.<sup>1</sup>]

#### *Required Courses.*

1. GENERAL CHEMISTRY. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements. Students presenting chemistry for entrance are given slightly different laboratory work. Kahlen-

<sup>1</sup> Changes have been made in the numbering and names of certain courses heretofore given as shown in the following table:

FORMER NUMBER AND NAME (CATALOGUE, 1910-11, WITH SUPPLEMENT).	NEW NUMBER AND NAME.
Course 3. — General chemistry.	Course 3. — Qualitative analysis.
Courses 9 and 10. — Quantitative analysis.	Course 9. — Quantitative analysis. Includes former 9 and 10.
Courses 17 and 18. — Chemical practice in agriculture.	Courses 10 and 11. — Agricultural chemical analysis.
Not given previously.	Course 12. — Special work in agricultural analysis.
Not given previously.	Course 14. — Special work in physiological and organic agricultural chemistry.
Not given previously.	Course 15. — Physical chemistry.
Not given previously.	Course 16. — Special work in physical chemistry.
Not given previously.	Course 18. — History of chemistry.

berg's "Outlines of Chemistry" is used as a text. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Assistant Professor PETERS and Mr. ADAMS.

2. GENERAL CHEMISTRY. — *The Metals*. — A continuation of Course 1. A study of the common metals used in the arts. The laboratory work takes the synthetic form, and the student prepares fewer substances in larger quantities. Sulfur and arsenic insecticides and superphosphates are made in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Freshmen; lectures, 2 hours; laboratory, 2 hours. Prerequisite, Course 1. Credit, 3. Assistant Professor PETERS and Mr. ADAMS.

#### *Elective Courses.*

3. QUALITATIVE ANALYSIS. — *Basic*. — A course in the systematic analysis of metallic salts. Many of the processes used in exact analysis are studied here. Special attention is given to the treatment of colloidal solutions and to the application of the law of mass action. Designed for *sophomores*, and should be taken by all intending to study chemistry further. Text, Gooch and Browning's "Outlines of Qualitative Analysis," with Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2. First offered in 1912-13. Lecture, 1 hour; laboratory, 4 hours. Credit, 3. Assistant Professor PETERS and Mr. TURNER.

4. QUALITATIVE ANALYSIS. — *Acidic*. — A continuation of Course 3. Assistant Professor PETERS and Mr. TURNER.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It 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, proteins, etc. The work forms a foundation for courses in physiological chemistry

and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4. Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

6. As stated under Course 5.

Associate Professor CHAMBERLAIN.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry*, the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc. *Course 8, Organic Agricultural Chemistry*, the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals. Also, the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

8. As stated under Course 7.

Associate Professor CHAMBERLAIN.

9. QUANTITATIVE ANALYSIS. — Instruction in this course includes the gravimetric and volumetric determinations of the commoner metals and non-metals in minerals, ores and industrial products. After closely following detailed methods of analysis, if time permits the student is directed in the discrimination between

various methods as to their accuracy and adaptability for special purposes. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisite, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Mr. TURNER.

10. AGRICULTURAL CHEMICAL ANALYSIS. — In this course and Course 11 the methods previously studied, and other approved methods which appear from time to time, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Mr. TURNER.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Mr. TURNER.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work, and who have had Courses 5 and 6, 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 5 and 6 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. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

[\*12, \*14, \*16. GENERAL STATEMENT. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry.

A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

\*12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. First offered in 1912-13. Seniors; laboratory, 10 hours. Credit, 5.

Professor WELLINGTON and Assistant.

\*14. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — In this course, as in Courses 12 and 16, 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, etc. Prerequisite, Course 13. First offered in 1912-13. Seniors; laboratory, 10 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

\*16. SPECIAL WORK IN PHYSICAL CHEMISTRY. — Special topics of agricultural importance assigned to each student. Prerequisite, Course 15. First offered in 1912-13. Seniors; laboratory, 10 hours. Credit, 5.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of modern physical chemistry. Prerequisites, Courses 1, 2, 3, 4, 9 and 10. First offered in 1912-13. Seniors; lectures, 2 hours; laboratory 2 hours. Credit, 3.

18. HISTORY OF CHEMISTRY. — This will consist of 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 some length. More particular attention will be

given to the questions of plant and animal industry. Chemists are strongly advised to take this course. First offered in 1912-13. Seniors; lectures, 2 hours. Credit, 2.

Professor WELLINGTON.

### ENTOMOLOGY.

Professor FERNALD, Associate Professor CRAMPTON, Assistant Professor GATES, Mr. REGAN, ———.

#### *Elective Courses.*

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Juniors; 3 lecture periods. Students electing Course 1 must also take Course 2. Credit, 3.

Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3.

Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. *Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. *Histology.* — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. *Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their

merits and defects; tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Professor FERNALD, Associate Professor CRAMPTON,  
MR. REGAN and \_\_\_\_\_

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

5. FOREST INSECTS. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2. One lecture and 2 two-hour laboratory or field exercises. Credit, 3.

Professor FERNALD.

8. BEEKEEPING. — This course comprises a general consideration of the biology of the honey bee and of practical beekeeping. Some topics covered are: phylogeny, life history, general behavior and instincts, structure, products, relations of bees to plants and 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 to the industry, are considered. So far as possible the work is made individual in constructing materials and apparatus.

Juniors; Seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures; 1 two-hour laboratory period. Credit, 3.

Assistant Professor GATES.

\*10. ADVANCED BEEKEEPING. — A course in advanced beekeeping will probably be offered in 1912-13.

### MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. PARSONS.

#### *Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3.

Mr. MACHMER and Mr. PARSONS.

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

Mr. MACHMER.

3. SOLID GEOMETRY. — 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." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2.

Mr. DUNCAN.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — 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." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.

Professor HASBROUCK and Captain MARTIN.



*Elective Courses.*

6.<sup>1</sup> PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Mr. DUNCAN and Mr. PARSONS.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4; 3 hours a week. Credit, 3.

Professor OSTRANDER.

8.<sup>1</sup> DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7; 5 hours. Credit, 5.

Professor OSTRANDER.

10.<sup>1</sup> ADVANCED SURVEYING. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. [Not given in 1912-13.] Text-book and lectures; 6 hours. Credit, 5.

Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. [Not given in 1912-13.] Text-book and lectures; 3 hours. Credit, 3.

Professor OSTRANDER.

12.<sup>1</sup> ELEMENTARY STRUCTURES. — An elementary course in roof and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911-12. Credit, 3.

Professor OSTRANDER.

13.<sup>1</sup> MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — Text-book and lectures; 5 hours. Not given in 1911-12. Credit, 5.

Professor OSTRANDER.

15. APPLIED MECHANICS. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3.

Professor OSTRANDER.

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<sup>1</sup> Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13 and 17 respectively in the previous catalog.

14.<sup>1</sup> DESCRIPTIVE GEOMETRY.—An elementary course; given only in 1911-12; 5 hours. Credit, 3. Professor OSTRANDER.

### PHYSICS.

Professor HASBROUCK, Captain MARTIN, Mr. BUTMAN.

[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.*

1. GENERAL PHYSICS.—General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours' class-room work and 1 laboratory period. Credit, 5.  
Professor HASBROUCK and Mr. BUTMAN.

#### *Elective Courses.*

2. GENERAL PHYSICS.—Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.  
Mr. BUTMAN.

3. OPTICAL INSTRUMENTS AND LIGHT.—Three-hour lecture course open to juniors and seniors; 3 hours. Credit, 3.  
Mr. BUTMAN.

4. ELECTRICITY AND HEAT.—Three-hour lecture and laboratory course open to juniors and seniors; 3 hours. Credit, 3.  
Mr. BUTMAN.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

<sup>1</sup> Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13, 14 and 17 respectively in the previous catalog.

**VETERINARY SCIENCE.**

Professor PAIGE, Assistant Professor GAGE.

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

*Elective Courses.*

1. **INTRODUCTORY BACTERIOLOGY.** — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor PAIGE and Assistant Professor GAGE.

2. **BACTERIOLOGY.** — A continuation of Course 1, taking up more advanced problems. Professor PAIGE and Assistant Professor GAGE.

3. **VETERINARY SCIENCE.** — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. **VETERINARY SCIENCE.** — As stated under Course 3. Professor PAIGE.

**ZOÖLOGY AND GEOLOGY.**

Assistant Professor GORDON, Mr. MCLAINE.

**ZOÖLOGY.***Required Courses.*

1. **ELEMENTARY ZOÖLOGY.** — This course in a general way constitutes the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

*Elective Courses.*

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 4. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3.

GRADUATE COURSES. — See "Graduate School."

Assistant Professor GORDON.

## GEOLOGY.

*Elective Courses.*

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

**DIVISION OF THE HUMANITIES.**

Professor SPRAGUE.

**ECONOMICS AND SOCIOLOGY.**

Professor SPRAGUE.

*Required Course.*

1. **POLITICAL ECONOMY.** — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system, the principles of production, exchange and consumption. This course will take up such topics as value, rentals, population, labor and its problems, capital, interest and profits, systems and factors of production, tariffs and commerce. Students will be called upon to analyze industrial plants in actual operation. Text-books, lectures and general discussions; a required course, but it may be taken in either junior or senior year; 3 hours. Credit, 3. Professor SPRAGUE.

*Elective Courses.*

2. **INDUSTRIAL PROBLEMS.** — A course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3. Professor SPRAGUE.

3. **SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS.** — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorces, race suicide, crime and prison reform, poverty and its relief, social effects of low wages, child labor, overwork, immigration and congestion of population. The later weeks of the semester will be given to a short introduction to sociological theory. The correctional and charitable institutions of Massachusetts will be studied in considerable detail. Readings, lectures, papers; 3 hours. Credit, 3. Professor SPRAGUE.

4. **MODERN SOCIAL REFORM MOVEMENTS.** — The history of property and its vital issues in modern times. The socialistic systems, anarchy and communism. Systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life. Educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment. The crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course follows Economics 3. Three hours. Credit, 3.  
Professor SPRAGUE.

5. **PUBLIC FINANCE, MONEY AND BANKING.** — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. Readings, lectures and discussions; 3 hours. Credit, 3.  
Professor SPRAGUE.

6. **ECONOMIC HISTORY.** — This course will be divided between the economic history of Europe and that of America. An outline history will be followed with special study of selected epochal periods and important topics. Three hours. Credit, 3.  
Professor SPRAGUE.

8. **ANTHROPOLOGY; THE HISTORY OF HUMAN CIVILIZATION.** — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth 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 conditions, will constitute the subject matter of the course. Three hours. Credit, 3.  
Professor SPRAGUE.

### **HISTORY AND GOVERNMENT.**

Associate Professor EYERLY, Mr. HOLCOMB.

#### *Elective Courses.*

1. **ELEMENTS OF POLITICAL SCIENCE.** — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and work-

ing of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.

Associate Professor EYERLY.

2. LOCAL POLITICAL INSTITUTIONS. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3.

Associate Professor EYERLY.

3. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

MR. HOLCOMB.

5. THE HISTORY OF IDEALS. — This course treats history from the idealistic rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3.

MR. HOLCOMB.

**LANGUAGES AND LITERATURE.**

Professor MILLS.

**LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.**

Associate Professor NEAL, Assistant Professor LEWIS, Mr. WATTLES, Mr. WIDGER, Miss GOESSMANN.

*Required Courses.*

1, 2. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought Building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor NEAL, Mr. WATTLES, Mr. WIDGER and Miss GOESSMANN.

3. SOPHOMORE ENGLISH.<sup>1</sup> — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.

Assistant Professor LEWIS and Mr. WATTLES.

4. SOPHOMORE ENGLISH.<sup>1</sup> — As stated under Course 3. Prerequisite, Course 3. Mr. WATTLES and Miss GOESSMANN.

*Elective Courses in English Language and Journalism.*

7. EXPOSITORY WRITING.<sup>2</sup> — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors. [Not offered in 1912-13.] Two hours, with a third hour at the option of the instructor. Credit, 2.

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8. EXPOSITORY WRITING.<sup>2</sup> — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some attention also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. [Not offered in 1912-13.] Two hours, with a third hour at the option of the instructor. Credit, 2.

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<sup>1</sup> The rule that "students whose work in Courses 1, 2, and 3 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English," has been repealed by faculty vote.

<sup>2</sup> These courses are to be substituted for the courses previously given under the same numbers as Composition Training Courses.



9, 10. RURAL JOURNALISM. — The courses in journalism 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 merely the application of journalistic principles in getting and suitably presenting material adapted to the non-urban 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. Professional ideals are regarded as being practically involved in all parts of the work undertaken. Members of the classes have this year been supplying, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes turn in copy regularly for publication or other disposition, as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election of subjects for the junior-senior years, in order that the most helpful program of work may be arranged.

9A. *Introduction to Journalism.* — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. [Heretofore given as 9B.] Two hours, with a third hour at option of the instructor. Credit, 2.  
Associate Professor NEAL.

9B. *Journalistic Practice.* — The gathering and preparation of material for publication. The class may be organized as a staff. Prerequisite, 9A or its equivalent. [Heretofore given as 9A, Agricultural Journalism. Omitted in 1911-12.] Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

9C. *Advanced Journalistic Practice.* — Informal; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of

current topics, may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1.

Associate Professor NEAL.

10A. *Reporting*. — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 9A and 10A are the foundation courses in journalism. Students admitted to 10A who have not had 9A will be required to do extra work. Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

10B. *Journalistic Practice*. — As stated under 9B.

10C. *Advanced Journalistic Practice*. — As stated under 9C.

17. ADVANCED COMPOSITION AND LITERATURE. — The reading and study of writings that are typical of literary style or form, especially in description and narration, and the writing of exercises involving problems of the same general cost as those illustrated by the readings. A good deal of fiction will probably be read, of which more or less will be found in the novels and short stories of our own day. On this study will be based the work in composition. Primarily for seniors but open to juniors. [Not given in 1911-12.] Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

#### *Elective Courses in Literature.*

9, 10. CULTURAL READING. — The substitution of other work for these courses is probable.

Associate Professor NEAL.

13. ENGLISH WRITERS AND THOUGHT. — Studies, laboratory problems, readings, and reports in some period of English literature. In 1911-12, Chaucer to the sixteenth century. Three hours. Credit, 3.

Associate Professor NEAL.

14. ENGLISH WRITERS AND THOUGHT. — As in Course 13. In 1911-12, the sixteenth century to Shakspeare. Three hours. Credit, 3.

Associate Professor NEAL.

15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Three hours. Credit, 3.

Assistant Professor LEWIS.

16. ENGLISH LANGUAGE AND LITERATURE. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Three hours. Credit, 3. Assistant Professor LEWIS.

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types; in 1911-12, Tennyson. Three hours. Credit, 3. Associate Professor NEAL.

*Required Courses (Public Speaking).*

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Voice exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1.  
Mr. WIDGER.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.  
Mr. WIDGER.

*Elective Courses.*

\*8. ORATORY.<sup>1</sup>— Speeches on assigned topics; prescribed reading; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1.  
Mr. WIDGER.

9. DEBATING. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.  
Mr. WIDGER.

10. DRAMATIC READING.<sup>1</sup>— Exercises for voice and gesture; a study of the elements of vocal expression and action; expressional reading of selections in prose and poetry; presentation of scenes from plays. Prerequisite, Course 3; 1 hour. Credit, 1.  
Mr. WIDGER.

<sup>1</sup> It is expected that Courses 8 and 10 will be combined into a 2-hour course as Occasional Oratory.

**LANGUAGES AND LITERATURE: GERMAN.**

Assistant Professor ASHLEY, Mr. JULIAN.

*Required Courses.*

1. **ELEMENTARY GERMAN.** — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering 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. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. JULIAN.

2. **ELEMENTARY GERMAN.** — As stated under Course 1. Prerequisite, Course 1. Mr. JULIAN.

3. **INTERMEDIATE GERMAN.** — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor ASHLEY.

3A. **INTERMEDIATE GERMAN.** — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. JULIAN.

4. **INTERMEDIATE GERMAN.** — As stated under Course 3. Prerequisite, Course 3. Assistant Professor ASHLEY.

4A. **INTERMEDIATE GERMAN.** — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3. Mr. JULIAN.

5. **ADVANCED GERMAN.** — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.

Assistant Professor ASHLEY.

*Elective Courses.*

6. ADVANCED GERMAN. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor ASHLEY.

7. MODERN GERMAN. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3.

Assistant Professor ASHLEY.

8. MODERN GERMAN. — As stated under Course 7.

Assistant Professor ASHLEY.

9. SCIENTIFIC GERMAN. — Reading of modern magazine articles and works in German of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3.

Assistant Professor ASHLEY.

10. SCIENTIFIC GERMAN. — As stated under Course 9.

Assistant Professor ASHLEY.

11. GERMAN LITERATURE. — 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. Prerequisite, Course 6 or 10.

Assistant Professor ASHLEY.

12. GERMAN LITERATURE. — As stated under Course 11.

Assistant Professor ASHLEY.

**LANGUAGES AND LITERATURE: FRENCH.**

Assistant Professor MACKIMMIE, Mr. HARMOUNT.

*Required Courses.*

1. ELEMENTARY FRENCH. — A beginning course. Thieme and Effinger's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.

Mr. HARMOUNT.

2. ELEMENTARY FRENCH. — As stated under Course 1. Prerequisite, Course 1. Mr. HARMOUNT.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE, Mr. HARMOUNT.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.

Assistant Professor MACKIMMIE.

#### *Elective Courses.*

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.

Assistant Professor MACKIMMIE.

7, 8. SCIENTIFIC FRENCH. — This course is intended to continue and enlarge the scientific readings begun in the freshman and sophomore years. It will consist of the reading of a scientific reader, outside readings and reports, and the careful reading of some recent work or series of articles in the subject in which the student is taking his major. Prerequisite, the required French or its equivalent. Intended principally for juniors. Three hours. Credit, 3.

Mr. HARMOUNT.

9, 10. FRENCH LITERATURE FROM 1852. — The outline is intended as a suggestion. The exact subject-matter of the course will be determined when the men are enrolled. The object of this

course is to give an introduction to the movements of French literature in the past fifty years. In the drama readings from Augier, A. Dumas, fils, Delavigne; in the novel from Flaubert, the de Goncourts, Zola; in criticism from Taine, Renan and Sainte Beuve; for the literary history of the period Lanson's *Histoire de la littérature française*. Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.

Assistant Professor MACKIMMIE.

### **LANGUAGES AND LITERATURE: SPANISH.**

Assistant Professor MACKIMMIE.

#### *Elective Courses.*

1. **ELEMENTARY SPANISH.** — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

2. **MODERN SPANISH AUTHORS.** — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

### **LANGUAGES AND LITERATURE: MUSIC.**

Assistant Professor ASHLEY.

#### *Elective Courses.*

1. **HISTORY AND INTERPRETATION OF MUSIC.** — History of music among the ancients; medieval religious 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. One hour. Credit, 1.

Assistant Professor ASHLEY.

2. **HISTORY AND INTERPRETATION OF MUSIC.** — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.

Assistant Professor ASHLEY.

## DIVISION OF RURAL SOCIAL SCIENCE.

PRESIDENT BUTTERFIELD.

### AGRICULTURAL ECONOMICS.

Assistant Professor CANCE.

#### *Required Courses.*

2. AGRICULTURAL INDUSTRY AND RESOURCES. — 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. Sophomores; 3 hours. Credit, 3. Assistant Professor CANCE.

#### *Elective Courses.*

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider 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; determination of price; speculation; problems of land tenure and land values; taxation of land values; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Assistant Professor CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — 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 present conditions and the history 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, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agri-



cultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3.

Assistant Professor CANCE.

[6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and business relations of agricultural organization for profit. (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of 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, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Lectures, text, assigned reading and practical exercises; 2 hours. [Not given in 1912-13.] Credit, 2.

Assistant Professor CANCE.]

7. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems, — land tenure; size of farms; causes affecting land values; private property in land; taxation of farm values; special problems, — cost of producing farm products; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 or 3 hours a week. Credit, 2 or 3.

Assistant Professor CANCE.

8. THE AGRICULTURAL MARKET. — This course contemplates a fundamental 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. Such topics as supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like will be taken up. The

characteristics and possibilities of the New England market will be given special attention. Lectures, readings, assigned studies and field work. [Not offered in 1913-14.] Juniors and seniors; 2 or 3 hours a week. Credit, 2 or 3. Assistant Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Assistant Professor CANCE.

10. SEMINAR. — As stated in Course 9.  
Assistant Professor CANCE.

### AGRICULTURAL EDUCATION.

Professor HART, Associate Professor MORTON.

#### *Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.

Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3.

Professor HART.

3. RURAL SCHOOL PROBLEMS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2.

Professor HART.

4. RURAL SCHOOL PROBLEMS. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical

sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.

Professor HART, Associate Professor MORTON.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school supervision, and rural school surveys, etc. Seniors and graduate students; 2 hours. Credit, 2.

Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.

Professor HART.

### RURAL SOCIOLOGY.

Associate Professor EYERLY, President BUTTERFIELD, Professor HART, Mr. HOLCOMB.

#### *Elective Courses.*

2. THE RURAL COMMUNITY. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.

President BUTTERFIELD and Associate Professor EYERLY.

3. THE LITERATURE OF RURAL LIFE. — 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 hours. Credit, 3.

Mr. HOLCOMB.

4. RURAL LAW. — 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; 1 hour. Credit, 1.

Professor HART.

5. THE SOCIAL CONDITIONS OF THE RURAL PEOPLE. — Composition of the rural population; vital statistics; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3. Associate Professor EYERLY.

6. SOCIOLOGICAL ASPECTS OF CO-OPERATION AMONG FARMERS. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Given in 1912-13; not given in 1913-14.] Associate Professor EYERLY.

7. RURAL INSTITUTIONS. — 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. Special attention given to the rural family and the rural church; 3 hours. Credit, 3. Associate Professor EYERLY.

8. THE STATE AND THE FARMER. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal

system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3.

Associate Professor EYERLY.

9. THE SOCIAL PSYCHOLOGY OF RURAL LIFE. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face to face groups; psychological effects of isolation, relative security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3.

Associate Professor EYERLY.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the grange, the farmers' union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3.

Associate Professor EYERLY.

11. SOCIOLOGICAL ASPECTS OF CURRENT AGRICULTURAL QUESTIONS. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3.

Associate Professor EYERLY.

13. SEMINAR.

Associate Professor EYERLY.

## GENERAL DEPARTMENTS.

### MILITARY SCIENCE AND TACTICS.

Captain MARTIN, Mr. PARSONS.

[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-years 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 (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

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. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about \$15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit \$15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

*Required Courses.*

1. FRESHMAN DRILL. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1.

Captain MARTIN, Mr. PARSONS.

2. FRESHMAN DRILL. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.

Captain MARTIN, Mr. PARSONS.

3. SOPHOMORE DRILL. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1.

Captain MARTIN, Mr. PARSONS.

4. SOPHOMORE DRILL. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.

Captain MARTIN, Mr. PARSONS.

5. SOPHOMORE TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.

Captain MARTIN.

6. SOPHOMORE TACTICS. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.

Captain MARTIN.

7. JUNIOR DRILL. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1.

Captain MARTIN, Mr. PARSONS.

8. JUNIOR DRILL. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.

Captain MARTIN.

9. JUNIOR TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1.

Captain MARTIN.

10. JUNIOR TACTICS. — As stated under Course 9. Juniors; 1 hour. Credit, 1.

Captain MARTIN.

*Elective Courses.*

11. SENIOR DRILL. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.

Captain MARTIN.

12. SENIOR DRILL. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.

Captain MARTIN.

**PHYSICAL EDUCATION AND HYGIENE.**

Assistant Professor HICKS.

HYGIENE.

*Required Courses.*

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.

Assistant Professor HICKS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]



*Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1.

Assistant Professor HICKS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.

Assistant Professor HICKS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 2), 1.

Assistant Professor HICKS.

4. GRADED GYMNASTICS. — As stated under Course 3.

Assistant Professor HICKS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 2), 1.

Assistant Professor HICKS.

6. HEAVY GYMNASTICS. — As stated under Course 5.

Assistant Professor HICKS.

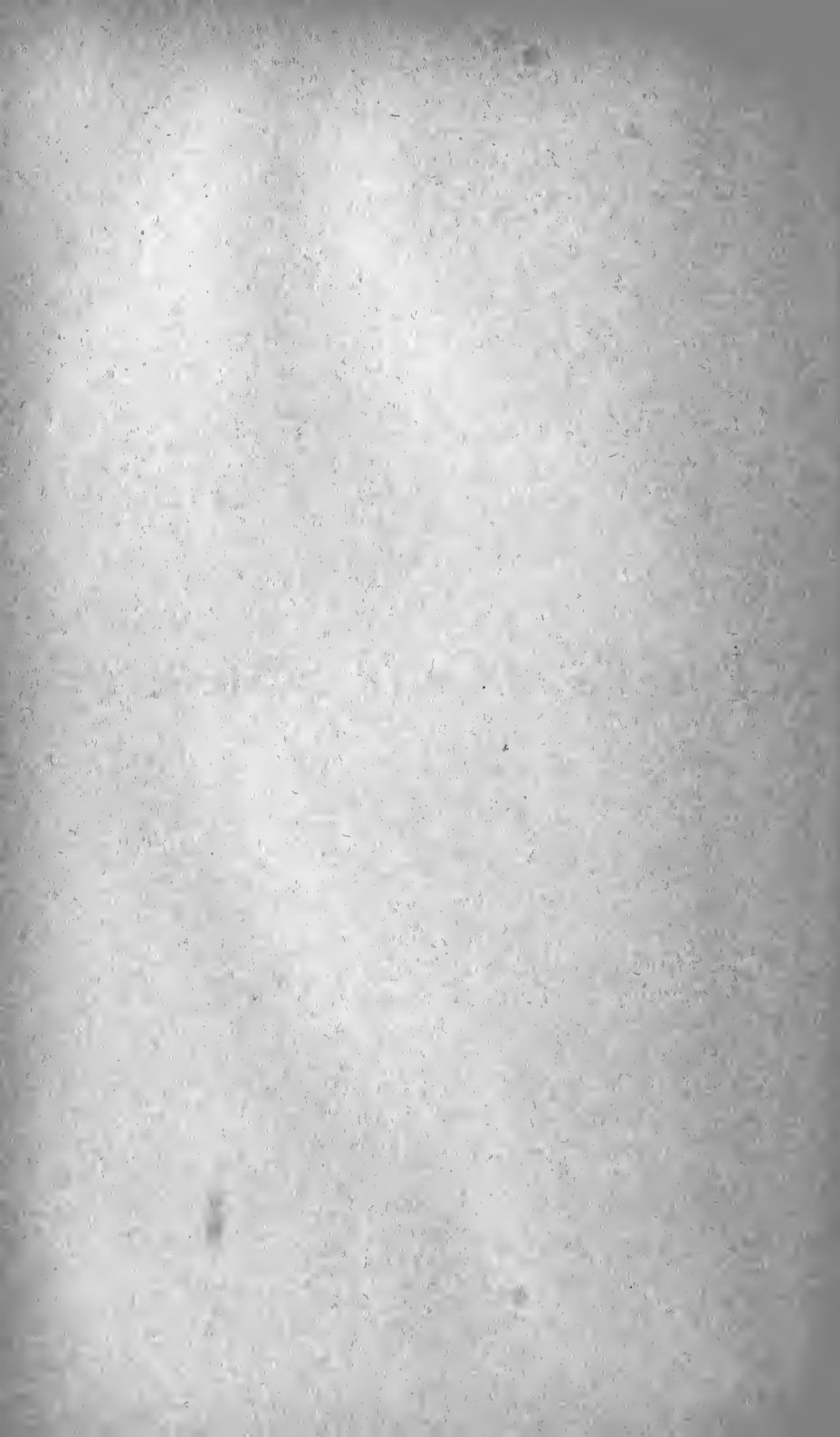
*Elective Courses.*

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.

Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7.

Assistant Professor REYNOLDS.



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THE GRADUATE SCHOOL.

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## THE GRADUATE SCHOOL.

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

HENRY T. FERNALD, Ph.D., Acting Director of the Graduate School and Professor of Entomology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and 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 agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

### ADMISSION.

Admission to the graduate school will be granted:—

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor 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 admission to the graduate school should be presented to the director of the school. Full statements of the

applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

#### NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary

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.

A description of the equipment of the various departments is given under "General Information."

#### 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 research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other 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. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

#### FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, 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 degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is 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 devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is \$10, and for the degree of doctor of philosophy, \$25.

#### COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science:—

Agriculture.	Horticulture.
Botany.	Mathematics and physics.
Chemistry.	Veterinary science.
Entomology.	

Available as a minor subject for the degree of master of science:—

Zoölogy.

#### COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy:—

Botany.	Entomology.
Chemistry.	Horticulture.



Available for a minor subject for the degree of doctor of philosophy:—

Agriculture.  
Botany.  
Chemistry.

Entomology.  
Horticulture.  
Zoölogy.

#### GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

##### (a) *Major Courses.*

**BOTANY.** — The following subjects in botany may be studied:—

- (a) Vegetable physiology.
- (b) Vegetable pathology.
- (c) Mycology.
- (d) Ecology.
- (e) Taxonomy.
- (f) Phylogeny.
- (g) History of botany.
- (h) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

**CHEMISTRY.** — The department of chemistry is prepared to offer advanced courses in the following subjects:—

- (a) Inorganic chemistry.
- (b) General organic chemistry.
- (c) Physiological chemistry.
- (d) Qualitative and quantitative analysis.
- (e) Analyses of fertilizers, cattle feeds, dairy products, soils, insecticides, sugars, and of any other materials of an agricultural nature.

Instruction may also be obtained in special problems relating to the chemistry of soils, plants and animals. Students are taught how to conduct original investigations. Further information may be secured by consulting the chemical staff of the department.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(a) *Morphology*. — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(b) *Ecology*. — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(c) *Economic Entomology*. — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(d) *Systematic Entomology*. — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(e) *Seminar*. — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(f) *Required Readings*. — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(g) *Thesis*. — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

- (a) Systematic pomology.
- (b) Pomological practice.
- (c) Commercial pomology.
- (d) Systematic, practical and commercial olericulture.
- (e) Greenhouse plants and problems.
- (f) Floriculture.
- (g) Landscape gardening.
- (h) Plant breeding and general evolution.
- (i) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

It is probable that the work in horticultural subjects will soon be considerably developed and modified.

(b) *Minor Courses*.

ZOOLOGY. — Courses in zoölogy are available as a minor for the degrees of master of science and doctor of philosophy. The nature

of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character; depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from twelve to sixteen hours per week, pursued for a year and a half.

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THE SHORT COURSES

AND

THE EXTENSION SERVICE.

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## THE SHORT COURSES AND THE EXTENSION SERVICE.

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Under the usual definition of extension activities, Short Courses are not strictly extension work. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the Director of the Extension Service, in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few weeks or a few days, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as is possible.

### A. THE SHORT COURSES.

#### ORGANIZATION AND DESCRIPTION.

The work is organized thus:—

Short Courses given at the College.

1. Winter School.

- (a) Ten Weeks' Winter Course.
- (b) Poultry Course.
- (c) Farmers' Week.
- (d) Beekeepers' Course.
- (e) Packing School.

2. Summer School.

- (a) The Summer School (General Course).<sup>1</sup>
- (b) Conference for Rural Leaders.

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<sup>1</sup> Omitted in 1912.

## ENROLLMENT, 1910-11.

Ten Weeks' Winter Course, . . . . .	113
Special Poultry Course, . . . . .	74
Farmers' Week, . . . . .	830
Beekeepers' Course, . . . . .	16
Summer School, . . . . .	153
Conference of Rural Social Workers, . . . . .	247
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Total, . . . . .	1,433

*Short Courses at the College (Winter School; Summer School).*

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows:—

Registration fee, . . . . .	\$5
Furnished rooms with private families, per week, . . . . .	\$1-\$3
Board at college dining hall, per week, . . . . .	\$4
Board with private families, per week, . . . . .	\$4-\$5

Students in either 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 \$1.25 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 before entering. Practical experience in farm, garden, orchard or greenhouse work will be 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.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 6, 1913, in order to begin work promptly on the morning of Jan. 7, 1913.

COURSES IN THE TEN WEEKS' WINTER SCHOOL (JAN. 2 TO MARCH 8, 1912). — The following courses were given:—

1. Soil Fertility. Director HURD and Assistant Director WAID. Three exercises a week for ten weeks.
2. Field Crops. Assistant Professor HASKELL. Three exercises each week for ten weeks.
3. Breeds and Breeding. Associate Professor MCLEAN and Mr. QUAIFE. Three exercises weekly, with appointed hours for stock judging.
4. Feeding and Management. Associate Professor MCLEAN and Mr. QUAIFE. Two exercises weekly.



5. Dairying. Associate Professor LOCKWOOD, Mr. STORY and assistants. Three one-hour and two two-hour periods.
6. Dairy Bacteriology. Associate Professor LOCKWOOD. Two exercises each week.
7. Animal Diseases and Stable Sanitation. Dr. PAIGE. Two exercises each week.
8. Poultry Course. Associate Professor GRAHAM. Lectures with one or two demonstration periods per week.
9. Fruit Growing. Professor SEARS. Five exercises each week for ten weeks.
10. Market Gardening. Assistant Professor YEAW. Three lectures and one afternoon practicum each week for ten weeks.
11. Landscape Gardening. Professor WAUGH and Mr. HARRISON. Twenty exercises.
12. Floriculture. Professor WHITE. Five exercises each week.
13. Forestry. Associate Professor MOON. One lecture a week for ten weeks.
14. Botany. Assistant Professor OSMUN and Mr. McLAUGHLIN. Three exercises each week.
15. Entomology. Professor FERNALD and assistants. Three exercises each week.
16. The Development of the Community. Two periods a week for ten weeks.
17. Farm Buildings and Machinery. Professor FOORD. One exercise a week for ten weeks.
18. Farm Accounts. Professor FOORD. One exercise each week.
19. Mechanics. Professor LOCKWOOD and Mr. WALLACE. One exercise of two hours each week.
20. Meat, Meat Production and Marketing on the Farm. Mr. HINKLEY, of Armour & Co.
21. Rural Sanitary Science. Assistant Professor GAGE. Two one-hour exercises per week.

THE ONE WEEK POULTRY COURSE (WINTER SCHOOL, MARCH 4 TO 8, 1912). — In order to give a large number of poultry men, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, etc., a convention was held on the dates given above. The week was filled with practical talks and demonstrations. Some of the leading professional and practical men in this country were engaged to supplement the work of the regular faculty. No charges aside from cost of room and board were made for this course.

FARMERS' WEEK (WINTER SCHOOL, MARCH 11 TO 15, 1912). — In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, is given. The regular college equipment is used, and the work of the regular

faculty will be supplemented by lectures and demonstrations given by eminent men.

The work is divided into three sections: (1) General agriculture, to include farm management, farm crops, dairying, animal breeding and feeding, veterinary science and bacteriology; (2) Horticulture, to include fruit growing, market gardening, floriculture and forestry; (3) Farmers' wives' section, including lectures and demonstrations in home economics, cookery and problems of home making.

Features of the week will be the evening lectures by specialists along agricultural lines, the conference pertaining to problems of rural betterment aside from practical agricultural topics, a corn and grain show, and others.

The Massachusetts Dairymen's Association, M. A. C. Agricultural Improvement Association and other organizations hold their annual meetings at the college this week.

**BEEKEEPERS' COURSE (WINTER SCHOOL, MAY 29 TO JUNE 12, 1912).** — The college has recently come into possession of a number of swarms of bees which, with the other equipment to be added, will afford a fine opportunity for those interested to get some practical information on this subject. The course will be under the direction of Dr. Burton N. Gates. The following courses will be given: —

1. Practical Phases of Beekeeping. Assistant Prof. BURTON N. GATES.
2. Crops for Honey Bees. Dr. WILLIAM P. BROOKS.
3. Relation of Bees to the Pollination of Plants. Prof. GEORGE E. STONE.
4. Origin and Evolution of the Honey Bee. Prof. HENRY T. FERNALD.
5. Bees and Beekeepers' Supplies. Dr. JAMES B. PAIGE.

**PACKING SCHOOL (WINTER SCHOOL, FEB. 12 TO 24, 1912).** — The greatest need in New England fruit growing is acknowledged to be proper grading and packing of the fine fruit that is already being grown. To give all who desire it the best of instruction in this subject, a two weeks' course in packing was arranged between the dates given above. The work consisted of grading and packing apples in boxes and barrels. Special lectures and demonstrations were arranged for those who attended, on the subjects of planting, fertilizing, pruning, spraying and the management of orchards.

**THE SUMMER SCHOOL (GENERAL COURSE).** — The very successful summer school of agriculture and country life which has been held by the college for the last five years will be omitted in 1912. In 1913 it will be resumed, with the addition of new courses, more instructors and covering a broader scope of work.

A bulletin giving the courses, instructors and other information will be issued in March, 1913.

CONFERENCE FOR RURAL LEADERS (SUMMER SCHOOL, JUNE 28 TO JULY 3, 1912). — The Conference for Rural Leaders which has been held as a closing feature of the summer school will take place as usual, except at an earlier date (June 28 to July 3 inclusive).

The Federation of Churches of Massachusetts, the State Library Commission, Massachusetts Civic League, the New England Home Economics Association, the County Work of the Y. M. C. A. and the State Board of Education have each decided to co-operate with the college by furnishing teachers and lecturers for their respective sections. The State Grange and the State Board of Health have been asked to co-operate in a similar manner.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation, etc. The evenings will be given over to music and lectures by the most eminent men, who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1911.

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.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village improvement societies, home makers, school officers, and all others interested in community development, are cordially invited to attend this conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published next May and can be had by making application for it.

## B. THE EXTENSION SERVICE.

### ORGANIZATION AND DESCRIPTION.

1. Special Days for Foreigners; Agricultural Organizations, etc.; Polish Farmers' Day.
2. Instruction given away from the College.
  1. Correspondence Courses.
  2. Lecture Courses and Demonstrations.

3. Conferences for Community Development.
4. Extension Schools of Agriculture.
5. Educational Trains (Steam and Trolley).
6. Educational Exhibits, with Lectures and Demonstrations at Fairs.
7. Demonstration Orchards.
8. Dairy Improvement Associations.
9. The M. A. C. Agricultural Improvement Association.
10. Agricultural Surveys.
11. Advisory Work with Individuals, State Institutions, etc.
12. Publications, "Facts for Farmers," etc.
13. Student Extension Work.
14. Faunce Demonstration Work.
15. Boys and Girls' Clubs.
16. Demonstration Plots.
17. Traveling Libraries.
18. Co-operation with Various Organizations already in Existence.
19. District Field Agents.
20. Information by Correspondence, etc.

1. *Special Days for Foreigners, Associations, etc.*

Days are set aside for especial attention to the interests of foreigners, of agricultural organizations, etc.

AGRICULTURAL ORGANIZATIONS. — It has been especially pleasing to the college to have organizations such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners' and Breeders' Associations, and others of a similar nature meet frequently at the college. Usually, a program of one or two days is provided, largely by the college faculty. These meetings serve the twofold purpose of giving the members of these organizations a chance to inspect the equipment and see the work that is being carried on by the college, and it also gives the college men a chance to find out the needs of the men engaged in the various lines of agriculture. It is to be hoped that organizations like those named above and others will continue to meet at the college even more frequently than in the past.

POLISH FARMERS' DAY. — In order to show the Polish farmer — who forms a large part of the population of this section of the Connecticut valley — what the college has to offer him, a Polish Farmers' Day was held in 1911. This was such a success that a like day was held March 28, 1912. Members of the faculty gave lectures which were interpreted by Mr. Wolski of Holyoke; some of the Polish farmers who have made a success of farming also gave talks. The Y. M. C. A. co-operates with the college in this work, and Dr. Tupper of the Immigration Department and Mr. Rudman, county secretary for Franklin County, addressed the gathering.

Mr. John Romaszkiwisc, president of the Polish American Alliance, also gave an address.

2. *Instruction given away from the College.*

An abstract follows of the instruction that is given away from the college. The abstract divides this instruction into correspondence courses and instruction not included in the correspondence course.

CORRESPONDENCE COURSES. — The correspondence courses are offered by the Massachusetts Agricultural College in response to calls from all sections of the State, from people who desire agricultural information but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

METHOD OF CONDUCTING CORRESPONDENCE WORK. — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason our courses are conducted principally by especially prepared lessons. The subject-matter of these lessons partakes somewhat of the lectures that are given to the college classes. Whenever possible we recommend one or two books which ought to be purchased and read along with the course. Other books are recommended for collateral reading, which oftentimes can be obtained from the local libraries.

The courses are especially recommended to Y. M. C. A.'s, granges and other farmers' clubs for study. It is to be hoped that grange lecturers, club secretaries or some other interested person will organize study classes. If the size of the class, or the interest which the members take in the subject, is sufficient, we shall be pleased to send a representative of the college to the class from time to time to discuss the work and offer suggestions. A description of the correspondence courses follows: —

1. Soil and Soil Improvement. Director W. D. HURD. The cost of the course is \$1.

2. Manures and Fertilizers. Director W. D. HURD. The cost of the course is \$1.
3. Field Crops. Assistant Prof. SIDNEY B. HASKELL. The cost of the course is \$1.
4. Farm Dairying. Prof. W. P. B. LOCKWOOD. The cost of the course is \$1.
5. Fruit Growing. Prof. F. C. SEARS and Mr. A. J. NORMAN. The cost of the course is \$1.
6. Market Gardening. Assistant Prof. F. L. YEAW. The cost of the course, including the textbook, is \$2.50.
7. Animal Feeding. Mr. G. F. STORY. The cost of the course is \$1.
8. Floriculture. Prof. E. A. WHITE. Part I. The general culture of plants, including those grown out of doors as well as those grown under glass. Part II. Greenhouse construction and heating. Part III. Carnation culture. Part IV. Rose culture. The cost of each part, not including the textbook, is \$1.
9. Farm Accounts. Prof. J. A. FOORD. The cost of the course is \$1.
10. Agriculture in the Common Schools. Assistant Prof. F. B. JENKS. The cost of the course is \$1.
11. Agricultural Education. Prof. W. R. HART. The cost of the course is \$1.
12. Beekeeping. Assistant Prof. B. N. GATES. The cost of the course is \$1.
13. Forestry. Associate Prof. F. F. MOON. The cost of the course is \$1.
14. Shade Tree Management. Prof. G. E. STONE. The cost of the course is \$1.
15. Entomology. Prof. H. T. FERNALD. The cost of the course is \$1.
16. Poultry. Associate Prof. J. C. GRAHAM. The cost of the course is \$1.

*Enrollment for Correspondence Courses.*— Students may enroll in the correspondence courses any time between September 1 of each year and the following 1st of June. It has been found advisable not to run the courses during the summer, because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months. We are better equipped than we were last year to handle the great number of students who desire these courses, and we hope to be able to handle all the students who enroll; nevertheless, it will be well to enroll early so as to be sure of getting in before the enrollment closes.

Enrollment must be made on the card which is furnished by the college. This will entitle the student to a suitable set of covers for the courses, and other privileges.

*Expenses of the Correspondence Courses.*— In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of \$1 for each course, except in Course 8, where it is necessary to charge \$1 for each of the four parts, as each part is really a course in itself. This fee is payable strictly in advance,

when the enrollment card is sent. The first lesson of the course will not be sent until the enrollment fee is paid.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is used to defray the expenses of postage and materials which are used in preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of the text-book, when one is used, is in addition to this enrollment fee. We strongly urge all students to purchase one or two books to be used in connection with each course, because they can be kept and used for reference purposes after the course is completed. We have made arrangements with the Johnson Book Company, Amherst, Mass., to handle all of these books at reduced rates.

For a catalogue of books and prices address the Johnson Book Company, Amherst, Mass.

Remittances should be made by money order or check.

LECTURE AND DEMONSTRATION COURSES AWAY FROM THE COLLEGE. — The renewed and unprecedented interest in agriculture and rural life makes many more calls on the college for lectures and demonstrations than can be met. These calls come from all sorts of organizations, and the audiences are usually of good size and comprised of interested people, who are eager to get the latest scientific information to use in their work.

CONFERENCES ON COMMUNITY BETTERMENT. — Largely as an outgrowth of inspiration received in our Summer School and Conference, meetings have been held in West Newbury, Sandwich, Walpole, Rowe and Kingston, where subjects of community betterment were discussed. The whole State is alive to this question, and many similar meetings are known to be contemplated for the near future.

EXTENSION SCHOOLS OF AGRICULTURE. — There has been a call from different parts of the State for instruction of a more systematic and far-reaching nature than can be given in a single lecture or demonstration. Extension schools, five days in length, have been planned for West Brookfield, Walpole, Shelburne and Kingston. Several other applications for similar schools are already in file.

EDUCATIONAL TRAINS (STEAM AND TROLLEY). — In 1910, co-operating with the State Board of Agriculture, the State Forester and the Boston & Albany and Springfield trolley systems, a steam train (four cars) and a trolley train (five cars) were run through western Massachusetts. Stops of from one and one-half to two

hours were made at Westfield, Pittsfield, Cheshire, North Adams, Chester, Springfield, Enfield, New Salem, Athol, Templeton, Barre, Ware, Palmer, East Brookfield, Worcester, Westborough, South Framingham, Milford, Amherst, South Hadley, Russell, Huntington, North Wilbraham, Brimfield, Sturbridge, Charlton, Oxford, Holden and Sterling. Inquiries have already come in asking when more of this kind of work will be carried on.

EDUCATIONAL EXHIBITS, LECTURES AND DEMONSTRATIONS AT FAIRS. — During the last two years the college has made extensive exhibits at fairs held in Barnstable, Worcester, Clinton, Greenfield, Amherst, Northampton, Topsfield, South Framingham and Amesbury; also at the New England Corn Show, the National Corn Show, Columbus, O., the Massachusetts Corn Show and the New England Industrial Exposition. At each fair five or six short practical talks and demonstrations have been given each day. Fair managers and the general public have been very appreciative of this work.

DEMONSTRATION ORCHARDS. — New orchards of from four to six acres each have been planted by the college in the towns of West Newbury, Westhampton, Sturbridge, Medway, Granville, Enfield and North Adams. Renovation plots have been selected in Hardwick, North Adams and North Grafton.

DAIRY IMPROVEMENT ASSOCIATIONS. — Two of these have been started during the year, one in the Connecticut valley and one in Norfolk County. Other sections of the State desire the college to organize similar associations, but so far we have been unable to find men to act as official testers.

THE M. A. C. AGRICULTURAL IMPROVEMENT ASSOCIATION. — This is an organization of ex-students of this college, banded together for the purpose of improving plants, animals and the conditions of rural life. There are now 110 members. The usefulness of this organization depends almost entirely on the ability of the college to furnish proper supervision for the organization and direction of the work.

AGRICULTURAL SURVEYS. — Through these surveys an attempt is made, by systematic study, to find out the exact conditions of farm management, including dairying, orcharding, poultry raising and other specialties, the income which is derived from these, and the facilities for marketing products. An inquiry into the social, educational, religious and moral life of rural communities is also made. Under the direction of Dr. Alexander E. Cance and two assistants, a



fairly comprehensive survey of the town of Belchertown was made during the past summer.

**ADVISORY WORK WITH STATE INSTITUTIONS, INDIVIDUALS, ETC.** — From letters received from about 28 State institutions, it is evident that co-operation on the part of the college in the handling of the agricultural plants connected with these institutions would be warmly welcomed and is much desired. Some of these institutions have already been visited and help has been given. A large number of individuals have applied to the college for expert advice and help. It is possible to send men to only a small percentage of those who have asked for this personal help.

**EXTENSION SERVICE PUBLICATIONS.** — Each year, bulletins and circulars descriptive of the various short courses have been published. Each month, "Facts for Farmers" has been issued, and is much sought after. The titles of the pamphlets already published are as follows: "Directions for Selecting Corn for Exhibition," "Fall Spraying for Massachusetts Orchards," "The Possibility of Keeping Bees," "Some Good Books for Farmers and Others interested in the Affairs of the Country," "Pruning of Shade Trees," "Top Grafting Fruit Trees," "Feeding for Milk Production," "Home-mixed Fertilizers," "Summer Spraying," "The Feeding and Care of Chicks hatched artificially," "Home Vegetable Gardening," "Fruit for Exhibitions," "Pig Feeding," "Clean Milk." A list of desirable books on agriculture and rural social science is usually kept on hand for distribution.

**STUDENT EXTENSION WORK.** — About 30 of our college students have been doing volunteer work in the smaller towns near Amherst during the past two years. The communities reached have been Cushman, Sunderland, Leverett, Shutesbury, Pelham, Belchertown, South Amherst, Hadley, South Hadley, North Hadley, Dwight, Granby, Conway, Ashfield, Hatfield, Shelburne Falls, Three Rivers, Cummington and Northampton. The work has consisted chiefly in teaching English to foreigners, coaching school athletic teams, supervising contests, organizing debating societies, giving talks on clean living, conducting religious services, giving musical entertainments, teaching Bible classes, acting as judges at grange fairs, etc.

**THE FAUNCE DEMONSTRATION FARM.** — This farm, located at Sandwich, has been under the direction of a committee from our faculty, of which the Director of the Extension Service is chairman. The farm has demonstrated beyond a doubt that small fruits, vege-

tables and poultry can be raised at a profit on Cape Cod. Through the work of this farm the whole community has taken on new life. The superintendent of the farm, Mr. A. W. Doolittle, has taught agriculture in the schools of the village, and has given much help to the farmers of Barnstable County by his personal visits to farms.

**BOYS' AND GIRLS' CLUBS.** — This work has been under the direction of Prof. W. R. Hart and Assistant Prof. F. B. Jenks of the Department of Agricultural Education. The large numbers enrolled, and the interest that has been shown on the part of school superintendents, parents and pupils, will attest to the value of these clubs as a means of turning the attention of the young people in our smaller towns to the possibilities open to them in their home communities.

**DEMONSTRATION FIELD PLOTS.** — Aside from the work done by the members of the M. A. C. Agricultural Improvement Association, little has been done toward placing demonstration plots in different sections of the State. Co-operating with the Bureau of Plant Industry of the United States Department of Agriculture, four demonstration pasture plots have been placed on farms in the vicinity of Amherst, for a study of some method of improving the typical hill pastures of Massachusetts.

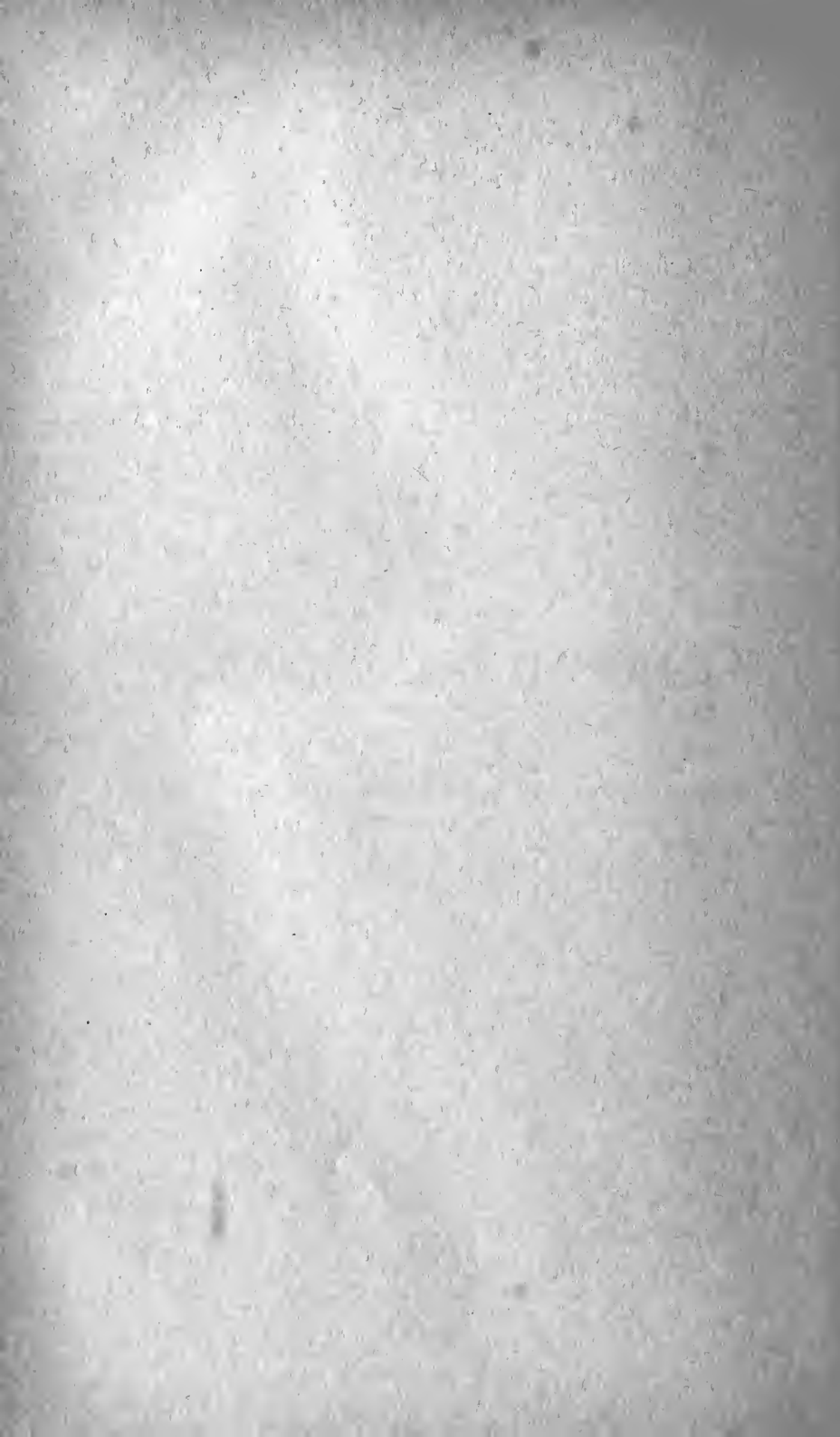
**TRAVELING LIBRARIES.** — Through the generosity of several of the leading publishers of agricultural books, in donating about 160 of the latest books on various agricultural subjects, the college has been able to place in circulation four traveling libraries. These they loaned to the libraries of small towns for a few weeks at a time, and the books are loaned to those interested in reading them. These libraries are in great demand.

**CO-OPERATION WITH EXISTING ORGANIZATIONS.** — The aim of those in charge of the Extension Service has, from the start, been to co-operate with existing organizations so far as possible. During the past two years we have co-operated with the State Board of Agriculture, the State Board of Health, the State Dairy Bureau, the State Grange, the Boston Chamber of Commerce, the Springfield Board of Trade, the county work of the Y. M. C. A., several village improvement associations, the Tent Evangelistic Work in western Massachusetts, the Y. M. C. A.'s of Worcester and Springfield, men's clubs in churches, women's clubs, the schools of a number of towns, and other agencies interested in the rural problem.

**DISTRICT FIELD AGENTS.** — Mr. Charles H. White (M. A. C. 1909) is now devoting part time to the work of field agent in southern Worcester County. Mr. White visits farms, and is ready,

on consultation by farmers, to bring to the men the best advice the experts at the college can give. He attends grange meetings, farmers' institutes, and co-operates with all sorts of organizations on the arrangement of programs. He is available for conferences at all times with farmers on questions of farm management.

Through the Short Courses and the Extension Service, an effort is made to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such helps as have been spoken of. Letters should be addressed to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.



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# GENERAL INFORMATION.

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## GENERAL INFORMATION.

### A. FINANCIAL AND ADMINISTRATIVE.

#### STUDENT EXPENSES.

**TUITION.** — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$40 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.

**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 bed rooms. 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 \$1.25 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 \$4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

#### EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, \$40 a year; foreigners, \$120 a year.

	Low.	High.
Room in college dormitories or in private houses, . . . . .	\$39 00	\$110 00
Board in college dining hall, \$4 a week, . . . . .	144 00	144 00
Laundry, 50 cents to 85 cents a week, . . . . .	18 00	30 00
Military uniform, first year, . . . . .	13 50	13 50
Laboratory fees, . . . . .	2 00	20 00
Books, stationery and other miscellaneous, . . . . .	23 50	32 50
	<hr/>	<hr/>
	\$240 00	\$350 00

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various student 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 furniture in dormitories, 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 \$250 and \$350 per year.

#### *Laboratory Fees.*

The following laboratory fees are at present charged. The schedule is subject to modification without previous announcement in the catalogue.

	Per Semester.
<b>Botany: —</b>	
Graduates, . . . . .	\$4 00
Courses 2, 3, . . . . .	3 00
Course 4, . . . . .	2 00
Course 5, . . . . .	1 00
Courses 7, 9, 11, 13, . . . . .	3 00
<b>Chemistry: —</b>	
Courses 1, 2, 11, 13, 14, each, . . . . .	3 00
Courses 4, 5, 6, each, . . . . .	4 00
Courses 9, 10, 15, 17A, B, C or D, 18A, B, C or D, . . . . .	5 00
<b>Entomology: —</b>	
Graduate, . . . . .	3 00
Entomology 3, . . . . .	3 00
Entomology 4, . . . . .	3 00
<b>Landscape gardening: —</b>	
Landscape gardening 1, 2, . . . . .	2 50
Landscape gardening 3, 4, 7, 8, . . . . .	4 00
Landscape gardening 6, . . . . .	1 00
Drawing 1, 2, . . . . .	2 50
<b>Zoölogy: —</b>	
Elementary 1, . . . . .	2 00
Invertebrate 3, . . . . .	4 00
Vertebrate 4, . . . . .	4 00



## STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending upon the college to furnish them with work, and many 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 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 remember that, owing to the large number of applications for employment, no one man can receive a large amount of work through the college.

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 thirty or more students are employed at the dining hall. Applications for student labor should be made directly to the president. Applicants are required to present a certificate, signed by parent or guardian and by one of the selectmen or aldermen of the town or city in which they reside, showing that the applicant needs the assistance. Students whose department or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDEY STUDENTS. — In the last year or two 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 semester. This rule is strictly adhered to, and no student will be allowed to register in his classes until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester 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 semester he is more than one week in arrears in his payment for board.

All money due for student labor shall be applied on account toward any bills that a student may owe to the institution.

### B. COLLEGE ACTIVITIES.

#### GENERAL EXERCISES.

Chapel exercises are held four mornings each week. On Wednesday, instead of chapel 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 four 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 the 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. Under its direction voluntary Bible classes are conducted during the winter months. 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 Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

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 "Signal," 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, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology and landscape gardening.

## C. ACADEMIC AND DEPARTMENTAL.

### DEGREES.

Those who complete a four-years 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-years 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 1912 are:—

AGRICULTURE.—The Grinnell prizes (first, second and third), given by the Hon. William Clafin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are \$25, \$15 and \$10.

BOTANY.—The Hills prizes (amounting to \$35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, \$15; for the best collection of Massachusetts trees and shrubs, \$10; for the best collection of Massachusetts woods, \$10. No collection deemed unworthy of a prize will be considered. In 1912, a prize of \$5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

GENERAL IMPROVEMENT.—The Western Alumni Association prize (\$25) is 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.

PUBLIC SPEAKING.—The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations 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 deliver-

ing 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.

#### MILITARY DIPLOMAS.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the department of military science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

#### EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyor's pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. 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 food stuffs available for the use of the New England farmer, are included in the equipment for this work.

**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 sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station 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.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, 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. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

**CHEMISTRY.** — The department of chemistry occupies an entire building, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 84 students and that on the third floor 100 students. The laboratories for beginners have 80 working tables, which accommodate 180 students in sections. Each table is supplied with reagents and apparatus for independent work. Well-equipped organic, physiological and quantitative laboratories for advanced students are also provided. The weighing room connected with the quantitative laboratory has 11 balances. The equipment includes a valuable

and growing collection of specimens and samples of rocky minerals, soils, raw and manufactured fertilizers, food, 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. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërotors, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

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.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are 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. — *Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical 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. 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, 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, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. 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.

FARM ADMINISTRATION. — The college farm of 190 acres is under the 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 work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. 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.

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 com-



prehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of 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 specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

**FORESTRY.** — The aim of the course in forestry is to prepare men for the advanced study in forestry schools, and at the same time, by laying particular stress on local conditions, to enable them to handle the farm wood lot in the same scientific manner as the rest of the farm. The college is well situated for forestry study. There is a good forest nursery on the college grounds; also two typical farm wood lots. In the vicinity are considerable areas of typical New England forest land.

**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 6 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.

**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, aboriculture, 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 library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and department are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

**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 a laboratory particularly equipped for floriculture and 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, 2 wye levels, a dumpy level, 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.

**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 room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium

is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY.—The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these 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 extensive 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 and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. 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 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

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.

**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 (when completed), which will accommodate 500 layers and furnish facilities for student work in pen management; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses, and 11 colony brooder houses. 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 Barred Plymouth Rocks, White Plymouth Rocks, White Wyandottes, Columbian Wyandottes, single-comb Rhode Island Reds, Light Brahmas, Buff Orpingtons and single-comb White Leghorns. 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 furnish 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. Inter-college 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.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology 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 are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. 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 bacteriology 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.

ZOÖLOGY. — 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. On the second floor is a laboratory, 20 by 32 feet, for advanced work. 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. Small aquaria and vivaria will be added.

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 ex-

hibition purposes. The gallery has 1 large wall case and 2 floor cases, with space for 10 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 5 P.M. The curator is Assistant Professor Gordon.

#### PRIZES AWARDED FOR THE YEAR 1911.

GRINNELL PRIZES. — First prize, \$25, Herman Alfred Pauly; second prize, \$15, Robert Delano Lull; third prize, \$10, Nathaniel Herbert Hill. The Macmillan Prize in Agriculture, consisting of one set of the "Cyclopedia of American Agriculture," to be awarded to the member of the junior class writing the best essay on any subject covered by the work of the division of agriculture: prize awarded to Mr. Howard Archibald Turner, 1912.

BOTANICAL PRIZES. — For the best herbarium submitted by a member of the sophomore class, \$5, Mr. Lewis Floyd Drury.

GENERAL IMPROVEMENT PRIZE. — 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; \$25, Mr. Nils Paul Larsen.

MILITARY HONORS. — The following-named cadet officers 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, the first five graduating as honor men in the military department and the next five as distinguished graduates in the department. Honor graduates: Cadet Col. Samuel Reynolds Parsons; Cadet Maj. Allyn Parker Bursley; Cadet Maj. Harold Francis Willard; Cadet Capt. Arthur Harris Sharpe; Cadet Capt. Percy William Pickard. Distinguished graduates: Cadet Capt. Irving Craig Gilgore; Cadet Capt. Edward Arthur Larrabee; Cadet Capt. Frederick Adams McLaughlin; Cadet Capt. Herbert Jonathan Baker; Cadet First Lieut. Phileas Armand Racicot.

#### SECRETARIES OF ALUMNI ASSOCIATIONS AND CLASSES.

Alumni Secretaries' Association of the Massachusetts Agricultural College.

*Secretary:* RALPH J. WATTS, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.

*Secretary:* SIDNEY B. HASKELL, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.

*Secretary:* SIDNEY B. HASKELL, 1904, Amherst, Mass.

Alumni Club of Massachusetts.

*Clerk:* H. LINWOOD WHITE, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.

*Secretary:* CHARLES L. BROWN, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.

*Secretary:* JOHN ASHBURTON CUTTER, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.

*Secretary:* CLARENCE H. GRIFFIN, 1904, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.

*Secretary:* CHARLES A. TIRRELL, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.

*Secretary:* THOMAS F. HUNT, 1905, Berkeley, Cal.



*Class Secretaries.*

Class of	SECRETARY.	Secretary's Address.
1871	E. E. Thompson, . . .	5 Jaques Avenue, Worcester, Mass.
1872	S. T. Maynard, . . .	Northborough, Mass.
1873	C. Wellington, . . .	Amherst, Mass.
1874	D. G. Hitchcock, . . .	Warren, Mass.
1875	M. Bunker, . . .	Newton, Mass.
1876	C. Fred Deuel, . . .	Amherst, Mass.
1877	Atherton Clark, . . .	Newton, Mass.
1878	C. O. Lovell, . . .	5 Bromfield Street, Boston, Mass.
1879	R. W. Swan, . . .	41 Pleasant Street, Worcester, Mass.
1880	Alvan Fowler, . . .	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills, . . .	55 North Prospect Street, Burlington, Vt.
1882	G. D. Howe, . . .	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey, . . .	Amherst, Mass.
1884	—	—
1885	E. W. Allen, . . .	1923 Biltmore Street, Washington, D. C.
1886	Dr. Winfield Ayres, . . .	616 Madison Avenue, New York City.
1887	F. H. Fowler, . . .	Shirley, Mass.
1888	H. C. Bliss, . . .	14 Mechanic Street, Attleborough, Mass.
1889	C. S. Crocker, . . .	2453 Carpenter Street, Philadelphia, Pa.
1890	David Barry, . . .	Amherst, Mass.
1891	H. T. Shores, . . .	117 Elm Street, Northampton, Mass.
1892	H. M. Thomson, . . .	Amherst, Mass.
1893	F. A. Smith, . . .	Turner Hill, Ipswich, Mass.
1894	S. F. Howard, . . .	Amherst, Mass.
1895	E. A. White, . . .	Amherst, Mass.
1896	A. S. Kinney, . . .	South Hadley, Mass.
1897	C. A. Peters, . . .	Amherst, Mass.
1898	—	—
1899	D. A. Beaman, . . .	Rio Piedras, Porto Rico.
1900	E. K. Atkins, . . .	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering, . . .	Dover, Mass.
1902	H. L. Knight, . . .	United States Department of Agriculture, Washington, D. C.
1903	G. D. Jones, . . .	North Amherst, Mass.
1904	P. F. Staples, . . .	North Grafton, Mass.
1905	P. F. Williams, . . .	Auburn, Ala.
1906	Richard Wellington, . . .	Geneva, N. Y.
1907	J. N. Summers, . . .	48 Copeland Street, Campello, Mass.
1908	J. A. Hyslop, . . .	Bureau of Entomology, Washington, D. C.
1909	C. S. Putnam, . . .	Walpole, N. H.
1910	F. L. Thomas, . . .	Amherst, Mass.
1911	L. M. Johnson, . . .	Newtown, Conn.



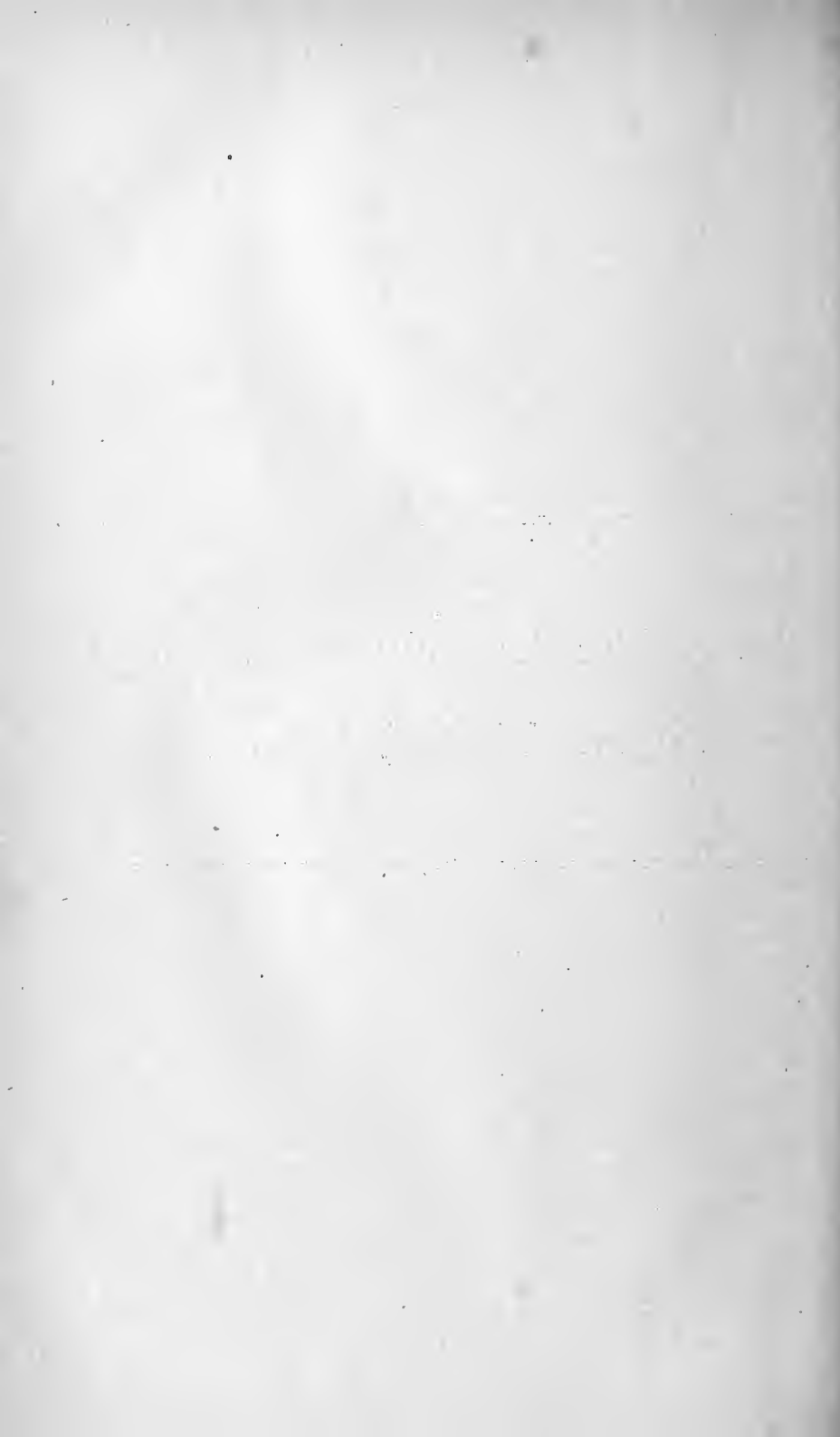
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DEGREES CONFERRED AND  
ROLL OF STUDENTS.

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## DEGREES CONFERRED—1911.

### DOCTOR OF PHILOSOPHY.

Shaw, Jacob Kingsley, North Amherst, University of Vermont, B.Sc.,  
Massachusetts Agricultural College, M.Sc., 1908.

Summers, John Nicholas, Campello, Massachusetts Agricultural College,  
B.Sc., 1907.

### MASTER OF SCIENCE.

Smith, Philip Henry, Amherst, Massachusetts Agricultural College, B.Sc.,  
1897.

Whitmarsh, Raymond Dean, Amherst, Massachusetts Agricultural College,  
B.Sc., 1908.

### BACHELOR OF SCIENCE (B.Sc.).

Adams, James Fowler, . . . . .	Melrose.
Allen, Park West, . . . . .	Westfield.
Baker, Herbert Jonathan, . . . . .	Selbyville, Del.
Barrows, Raymond Corbin, . . . . .	Stafford Springs, Conn.
Bentley, Arnold Gordon, . . . . .	Hyde Park.
Blaney, Herbert Wardwell, . . . . .	Swampscott.
Brown, Edgar Morton, . . . . .	Merrick.
Bursley, Allyn Parker, . . . . .	West Barnstable.
Conant, Arthur Theodore, . . . . .	Sunderland.
Damon, Charles Murray, . . . . .	Haydenville.
Davis, Egbert Norton, . . . . .	South Framingham.
Davis, Irving Wilder, . . . . .	Lowell.
Gilgore, Irvin Craig, . . . . .	Central Square, N. Y.
Hill, Nathaniel Herbert, . . . . .	Princeton, N. J.
Jenks, Albert Roscoe, . . . . .	Three Rivers.
Johnson, Leonard Matthews, . . . . .	Easthampton.
Labouteley, Gaston Edward, . . . . .	Lynn.
Larrabee, Edward Arthur, . . . . .	Medford.
Lull, Robert Delano, . . . . .	Windsor, Vt.
McGraw, Frank Dobson, . . . . .	Fall River.
McLaughlin, Frederick Adams, . . . . .	Lee.
Morse, Henry Bowditch, . . . . .	Salem.
Nagai, Isaburo, . . . . .	Tokyo, Japan.
Nickerson, George Payne, . . . . .	Amherst.
Nielsen, Gustaf Arnold, . . . . .	West Newton.
Ostrolenk, Bernhard, . . . . .	Gloversville, N. Y.
Parsons, Samuel Reynolds, . . . . .	North Amherst.

Patch, Roland Harrison, . . . . .	Wenham.
Pauly, Herman Alfred, . . . . .	Plainfield, Vt.
Pickard, Percy William, . . . . .	Hopedale.
Piper, Ralph Waldo, . . . . .	South Acton.
Prouty, Philip Herman, . . . . .	Shrewsbury.
Racicot, Phileas Armand, . . . . .	Lowell.
Robinson, Ralph Cushing, . . . . .	Boston.
Sharpe, Arthur Harris, . . . . .	Saxonville.
Smith, Clarence Albert, . . . . .	Northampton.
Smith, Raymond Goodale, . . . . .	Lynn.
Stevenson, Lomas Oswald, . . . . .	Hackensack, N. J.
Titus, Willard McCready Snow, . . . . .	New Braintree.
Warren, Edward Erving, . . . . .	Leicester.
Whitney, Raymond Lee, . . . . .	Brockton.
Willard, Harold Francis, . . . . .	Leominster.
Winn, Ervin Lawrence, . . . . .	Holden.

## ROLL OF STUDENTS.

### SENIOR CLASS.

Ackerman, Arthur John, . . . . .	Worcester, . . . . .	7 South College.
Baker, Horace Mitchell, . . . . .	Selbyville, Del., . . . . .	South College Tower.
Beals, Carlos Loring, . . . . .	Sunderland, . . . . .	5 South College.
Beers, Rowland Trowbridge, . . . . .	Billerica, . . . . .	8 North College.
Bent, William Richard, . . . . .	Marlborough, . . . . .	2 North College.
Bodfish, Edward Hill, . . . . .	West Barnstable, . . . . .	Plant House.
Boland, Eric Nichols, . . . . .	South Boston, . . . . .	17 South College.
Brett, Alden Chase, <sup>1</sup> . . . . .	North Abington, . . . . .	81 Pleasant Street.
Brown, Merle Raymond, . . . . .	Greenwich Village, . . . . .	92 Main Street, Amherst.
Burr, Frederick Huntington, . . . . .	Worthington, . . . . .	88 Pleasant Street.
Caldwell, Lawrence Sanborn, . . . . .	Lynnfield Center, . . . . .	Kappa Sigma House.
Carpenter, Jesse, Jr., <sup>1</sup> . . . . .	Attleborough, . . . . .	Kappa Sigma House.
Castle, Fred Arlo, . . . . .	Roseburg, Ore., . . . . .	13 South College.
Clapp, Raymond Kingsley, . . . . .	Westhampton, . . . . .	Theta Chi House.
Curran, Daniel Joseph, . . . . .	Marlborough, . . . . .	2 North College.
Deming, Winfred Griswold, . . . . .	Wethersfield, Conn., . . . . .	16 South College.
Dodge, Albert Wesley, <sup>1</sup> . . . . .	Hamilton, . . . . .	14 North College.
Fagerstrom, Leon Emanuel, . . . . .	Worcester, . . . . .	12 South College.
Fisherick, Warren Francis, . . . . .	Amherst, . . . . .	26 South Pleasant Street.
Fitts, Frank Orus, . . . . .	North Amherst, . . . . .	Chemical Laboratory.
Fitzgerald, John Joseph, . . . . .	Holyoke, . . . . .	75 Pleasant Street.
Fowler, George Scott, . . . . .	Wayland, . . . . .	44 Pleasant Street.
Gallagher, James Andrew, . . . . .	North Wilmington, . . . . .	3 North College.
Gaskill, Lewis Warren, . . . . .	Hopedale, . . . . .	6 South College.
Gelinas, Louis Edmond, . . . . .	North Adams, . . . . .	4 South College.
Gibbs, Robert Morey, . . . . .	Chester, . . . . .	Plant House.
Gibson, Lester Earl, . . . . .	Melrose, . . . . .	Kappa Sigma House.
Gray, Frank Leonard, . . . . .	East Boston, . . . . .	21 Fearing Street.
Hall, Henry Bass, <sup>1</sup> . . . . .	Northampton, . . . . .	Paradise Road.
Hall, Horace Whitney, <sup>1</sup> . . . . .	Newton Center, . . . . .	P. O. Building, Amherst.
Hallowell, Royal Norton, . . . . .	Jamaica Plain, . . . . .	South College Tower.
Hamblin, Stephen Francis, . . . . .	Marston Mills, . . . . .	94 Pleasant Street.
Harlow, Joseph Alvin, . . . . .	Turners Falls, . . . . .	Kappa Sigma House.
Heald, Jay Morrill, . . . . .	Watertown, . . . . .	10 South College.
Hemenway, Thomas, . . . . .	Nashua, N. H., . . . . .	17 South College.
Hickey, Francis Benedict, <sup>1</sup> . . . . .	Brockton, . . . . .	C. S. C. House.
Hills, Frank Burrows, <sup>1</sup> . . . . .	Bernardston, . . . . .	8 South College.
Holland, Henry Lucine, . . . . .	Amherst, . . . . .	28 North Prospect Street.
Hubert, Benjamin Franklin, . . . . .	White Plains, Ga., . . . . .	48 E. Pleasant Street.
Kingsbury, Arthur French, . . . . .	Medfield, . . . . .	Theta Chi House.
Lamson, Robert Ward, . . . . .	Amherst, . . . . .	51 Pleasant Street.
Lin, Dau Yang, . . . . .	Shanghai, China, . . . . .	21 Fearing Street.
Lodge, Charles Albert, . . . . .	Manchester, . . . . .	87 Pleasant Street.
Lloyd, Edward Russell, <sup>1</sup> . . . . .	Boston, . . . . .	15 North College.
Madison, Francis Spink, . . . . .	East Greenwich, R. I., . . . . .	Veterinary Laboratory.
Martin, James Francis, . . . . .	Amherst, . . . . .	19 South East Street.
McGarr, Thomas Anthony, . . . . .	Worcester, . . . . .	3 North College.
Merkle, George Edward, . . . . .	Amherst, . . . . .	North East Street.
Merrill, Fred Sawyer, . . . . .	Danvers, . . . . .	C. S. C. House.
Moreau, Theodore Joseph, . . . . .	Turners Falls, . . . . .	10 South College.

<sup>1</sup> Work incomplete.

Mueller, Alfred Frederick, . . .	Jamaica Plain, . . .	4 South College.
Noyes, Harry Alfred, . . .	Marlborough, . . .	79 Pleasant Street.
O'Flynn, George Bernhard, . . .	Worcester, . . .	Kappa Gamma Phi House.
Parker, Ralph Robinson, . . .	Malden, . . .	C. S. C. House.
Pearson, Charles Cornish, . . .	Arlington, . . .	18 South College.
Peckham, Curtis, . . .	New Bedford, . . .	7 North College.
Philbrick, William Edwin, . . .	Taunton, . . .	18 South College.
Pierpont, John Edwards, . . .	Williamsburg, . . .	C. S. C. House.
Pratt, Marshall Cotting, . . .	Holderness, N. H., . . .	Kappa Sigma House.
Puffer, Stephen Perry, . . .	North Amherst, . . .	8 North College.
Raymond, Arthur Nathaniel, . . .	Leominster, . . .	9 North College.
Reed, Robert Edward, <sup>1</sup> . . .	Abington, . . .	Theta Chi House.
Robinson, Earle Johnson, <sup>1</sup> . . .	Hingham, . . .	8 South College.
Rockwood, Lawrence Peck, . . .	Waterbury, Conn., . . .	116 Pleasant Street.
Sanctuary, William Crocker, . . .	Amherst, . . .	Mill Valley.
Sellew, Lewis Raymond, . . .	Natick, . . .	Plant House.
Shaw, Ezra Ingram, . . .	Amherst, . . .	East Street.
Southwick, Benjamin Gilbert, . . .	Buckland, . . .	11 North College.
Stack, Herbert James, . . .	Conway, . . .	French Hall.
Terry, Leon, <sup>1</sup> . . .	Springfield, . . .	12 North College.
Torrey, Ray Ethan, . . .	North Leverett, . . .	Clark Hall.
Tower, Daniel Gordon, . . .	Roxbury, . . .	15 South College.
Tupper, George Wilbur, . . .	Roxbury, . . .	C. S. C. House.
Turner, Howard Archibald, . . .	Dorchester, . . .	Plant House.
Wales, Robert Webster, . . .	North Abington, . . .	Kappa Sigma House.
Walker, Herman Chester, . . .	Marlborough, . . .	16 South College.
Warner, Roger Andrew, <sup>1</sup> . . .	Sunderland, . . .	Theta Chi House.
Weaver, William Jack, . . .	Alandar, . . .	15 North College.
Whitney, Charles Everett, . . .	Wakefield, . . .	10 North College.
Wilbur, Emory Sherman, . . .	East Wareham, . . .	79 Pleasant Street.
Wilde, Earle Irving, . . .	Taunton, . . .	2 South College.
Williams, Edward Roger, . . .	Concord, . . .	12 South College.
Williams, Silas, . . .	Fall River, . . .	Theta Chi House.
Wood, Howard Holmes, . . .	Shelburne Falls, . . .	15 South College.
Young, Edwin Burnham, . . .	Dorchester, . . .	11 North College.

## JUNIOR CLASS.

Adams, Winfred Frederic, <sup>1</sup> . . .	East Leverett, . . .	83 Pleasant Street.
Allen, Harry Willis, . . .	Amherst, . . .	South Street, West Pelham.
Anderson, Oscar Gustaf, <sup>1</sup> . . .	East Pepperell, . . .	Entomological Building.
Angier, Harris William, . . .	Westborough, . . .	88 Pleasant Street.
Baird, Harry Albert, <sup>1</sup> . . .	Somerville, . . .	29 Lincoln Avenue.
Baker, Dean Foster, . . .	Fairhaven, . . .	116 Pleasant Street.
Barber, George Ware, <sup>1</sup> . . .	Franklin, . . .	13 North College.
Bevan, Lawrence Algur, <sup>1</sup> . . .	Newtonville, . . .	84 Pleasant Street.
Blake, Ralph Cedric, <sup>1</sup> . . .	Wollaston, . . .	President's House, M. A. C.
Birdsall, Webster Jennings, <sup>1</sup> . . .	Otego, N. Y., . . .	Kappa Sigma House.
Borden, Ralph James, . . .	Fall River, . . .	7 North College.
Brewer, Charlesworth <sup>1</sup> Herbert, . . .	Mt. Vernon, N. Y., . . .	C. S. C. House.
Brown, Herbert Augustine, <sup>1</sup> . . .	Saxonville, . . .	Brooks Farm.
Burby, Lawrence Walter, <sup>1</sup> . . .	Chicopee Falls, . . .	88 Pleasant Street.
Bursley, Harold Barrows, . . .	Peabody, . . .	Theta Chi House.
Caldwell, David Story, . . .	South Byfield, . . .	9 North College.
Carver, John Stuart, . . .	Roslindale, . . .	C. S. C. House.
Chun, Woon Young, <sup>1</sup> . . .	Shanghai, China, . . .	90 Pleasant Street.
Clark, Norman Russell, <sup>1</sup> . . .	Worcester, . . .	Theta Chi House.
Cobb, Joseph Boyd, <sup>1</sup> . . .	Chicopee Falls, . . .	5 North College.
Cole, Arlin Tower, . . .	West Chesterfield, . . .	Pease Avenue, care of Mr. Reed.
Cole, Flora Atwood, . . .	Newton, . . .	10 Draper Hall.
Coleman, Isaac <sup>1</sup> , . . .	Amherst, . . .	12 North College.

<sup>1</sup> Work incomplete.



Cooper, Everett Hanson, . . .	Wakefield, . . .	14 North College.
Cory, Harold, <sup>1</sup> . . .	Rutherford, N. J., . . .	15 Boston Street.
Covill, Joseph Warren, <sup>1</sup> . . .	West Roxbury, . . .	7 South College.
Cristman, Clyde Edward, . . .	Dalton, . . .	Pease Avenue, care of Mr. Reed.
Culley, Frank Hamilton, . . .	Marshalltown, Ia., . . .	77 Pleasant Street.
Curtis, Harold William, . . .	Belchertown, . . .	Entomological Building.
Daniel, Edward Stephen Coen, . . .	Osterville, . . .	15 Fearing Street.
Dayton, James Wilson, . . .	South Norwalk, Conn., . . .	15 Boston Street.
Dooley, Thomas Patrick, <sup>1</sup> . . .	South Boston, . . .	35 East Pleasant Street.
Drury, Lewis Floyd, . . .	Rutland, . . .	120 Pleasant Street.
Edminster, Albert Franklin, . . .	Brooklyn, N. Y., . . .	5 South College.
Eisenhaure, John Louis, <sup>1</sup> . . .	North Reading, . . .	Brooks Farm.
Ellis, Benjamin Ward, . . .	Plymouth, . . .	Clark Hall.
Ells, Gordon Waterman, . . .	Haverhill, . . .	116 Pleasant Street.
Fay, Robert Sedgwick, . . .	Monson, . . .	84 Pleasant Street.
Forbush, Wallace Clifford, . . .	Rutland, . . .	79 Pleasant Street.
French, James Dudley, . . .	Hyde Park, . . .	116 Pleasant Street.
Gaskill, Ralph Hicks, . . .	Amherst, . . .	15 Hallock Street.
Godvin, Thomas Joseph, <sup>1</sup> . . .	Jamaica Plain, . . .	75 Pleasant Street.
Gore, Harold Martin, . . .	Wollaston, . . .	11 South College.
Greenleaf, George Freeman, <sup>1</sup> . . .	Brockton, . . .	21 Fearing Street.
Griggs, Frederick David, . . .	Chicopee Falls, . . .	5 North College.
Harris, Burton Adams, . . .	Wethersfield, Conn., . . .	84 Pleasant Street.
Hasey, Willard Harrison, <sup>1</sup> . . .	Campello, . . .	87 Pleasant Street.
Hatch, Herbert Tilden, . . .	Beverly, . . .	East Experiment Station.
Headle, Herbert Wallace, . . .	Bolton, . . .	Plant House.
Headle, Marshall, . . .	Bolton, . . .	Plant House.
Holden, James Loomis, . . .	Palmer, . . .	5 McClellan Street.
Howe, Glover Elbridge, . . .	Marlborough, . . .	11 South College.
Howe, Ralph Wesley, . . .	East Dover, Vt., . . .	Wilder Hall.
Huntington, Samuel Percy, . . .	Lynn, . . .	96 Pleasant Street.
Hutchings, Herbert Colby, . . .	South Amherst, . . .	87 Pleasant Street.
Hyland, Harold Wilson, <sup>1</sup> . . .	Weymouth, . . .	Old Insectary.
Jones, Harold Frederick, . . .	Campello, . . .	West Experiment Station.
Jordan, Simon Miller, . . .	Rutherford, N. J., . . .	9 South College.
Kelley, Albert Joseph, . . .	Roxbury, . . .	35 East Pleasant Street.
Kelley, Bernard Jenkins, <sup>1</sup> . . .	Harwichport, . . .	Brooks Farm.
Kenney, Frederick Alfred, <sup>1</sup> . . .	Charlestown, . . .	Theta Chi House.
Larsen, Nils Paul, . . .	Bridgeport, Conn., . . .	Clark Hall.
Lesure, John Warren Thomas, . . .	Fitchburg, . . .	94 Pleasant Street.
Little, Willard Stone, . . .	Newburyport, . . .	66 Pleasant Street.
Lowry, Quincy Shaw, <sup>1</sup> . . .	Canton, . . .	6 South College.
Lundgren, Arthur Robert, . . .	Orange, . . .	Theta Chi House.
Lyon, Harold, . . .	Somerville, . . .	13 Phillips Street.
Macone, Joseph Augustine, . . .	Concord, . . .	1 North College.
Mallett, George Alfred, . . .	Bridgeport, Conn., . . .	13 North College.
Matz, Julius, <sup>1</sup> . . .	Boston, . . .	112 Pleasant Street.
Mayer, John Lawrence, . . .	South Boston, . . .	35 East Pleasant Street.
McDougall, Allister Francis, . . .	Westford, . . .	6 North College.
Moir, William Stuart, . . .	Boston, . . .	Theta Chi House.
Murray, Joseph Wilbur, . . .	Holyoke, . . .	96 Pleasant Street.
Neal, Ralph Thomas, . . .	Mattapan, . . .	Old Insectary.
Nichols, Norman Joseph, . . .	Everett, . . .	Mathematics Building.
O'Brien, James Leo, <sup>1</sup> . . .	Wayland, . . .	19 Hallock Street.
Packard, Clyde Monroe, . . .	Springfield, . . .	Cottage Hospital, Kellogg Avenue.
Pease, Lester Newton, . . .	Meriden, Conn., . . .	84 Pleasant Street.
Pillsbury, Joseph James, <sup>1</sup> . . .	West Bridgewater, . . .	8 South Prospect Street.
Post, George Atwell, <sup>1</sup> . . .	Richmond Hill, N. Y., . . .	Theta Chi House.
Roberts, Clarence Dwight, <sup>1</sup> . . .	Edinburgh, Scot., . . .	Brooks Farm.
Roehrs, Herman Theodore, <sup>1</sup> . . .	New York, N. Y., . . .	Kappa Sigma House.

<sup>1</sup> Work incomplete.

Rosebrooks, Walter Edwin, . . .	Millbury, . . . . .	15 Hallock Street.
Samson, Stuart Dodds, . . . .	Grand Isle, Vt., . . . .	Kappa Sigma House.
Selden, John Lincoln, <sup>1</sup> . . . .	Northampton, . . . . .	6 Ahwaga Avenue, Northampton.
Serex, Paul, Jr., . . . . .	Jamaica Plain, . . . . .	116 Pleasant Street.
Sheehan, Dennis Anthony, <sup>1</sup> . . .	South Lincoln, . . . . .	1 North College.
Shute, Carl August, <sup>1</sup> . . . . .	Hampden, . . . . .	14 South College.
Streeter, Charles Marsh, . . . .	Brimfield, . . . . .	79 Pleasant Street.
Thayer, Clark Leonard, . . . . .	Enfield, . . . . .	West Experiment Station.
Tucker, Waldo Guy, . . . . .	Lynn, . . . . .	Mathematics Building.
Tupper, Arthur Somerville, . . .	Roxbury, . . . . .	C. S. C. House.
Van Zwaluwenburg, Reyer Herman,	Rutherford, N. J., . . . . .	East Experiment Station.
Walker, Charles Dexter, . . . . .	Greenwich Village, . . . . .	14 South College.
Whitney, Francis Wellington, <sup>1</sup> . .	Wellesley, . . . . .	4 North College.
Zabriskie, George 2d, <sup>1</sup> . . . . .	New York City, . . . . .	83 Pleasant Street.

## SOPHOMORE CLASS.

Abbott, Leslie Elmer, . . . . .	Sandwich, . . . . .	Care of Mr. E. F. Gaskill.
Allen, Carl Murdough, . . . . .	Holyoke, . . . . .	87 Pleasant Street.
Allen, Henry Dickinson, <sup>1</sup> . . . . .	Lynn, . . . . .	82 Pleasant Street.
Anapolsky, Morris, <sup>1</sup> . . . . .	Boston, . . . . .	11 Amity Street.
Anderson, Leslie Oscar, <sup>1</sup> . . . . .	Concord, . . . . .	7 Nutting Avenue.
Baker, Warren Sears, <sup>1</sup> . . . . .	Wollaston, . . . . .	116 Pleasant Street.
Besser, Sidney Stokes, . . . . .	Gilbertville, . . . . .	3 Nutting Avenue.
Black, Harold Cotting, <sup>1</sup> . . . . .	Falmouth, . . . . .	3 Pleasant Street.
Bokelund, Chester E., <sup>1</sup> . . . . .	Worcester, . . . . .	66 Pleasant Street.
Bragg, Ralph Stanley, . . . . .	Milford, . . . . .	Mt. Pleasant, care of Professor White.
Brewer, Harold William, <sup>1</sup> . . . . .	Mount Vernon, N. Y., . . . . .	C. S. C. House.
Brooks, Arthur Winslow, . . . . .	Enfield, . . . . .	Chemical Laboratory.
Brown, Harry Dunlap, . . . . .	Lowell, . . . . .	82 Pleasant Street.
Bullard, Alvan Henry, . . . . .	South Framingham, . . . . .	5 McClellan Street.
Calvert, Melville Bradford, <sup>1</sup> . . . .	New London, Conn., . . . . .	56 Pleasant Street.
Campbell, Malcolm David, . . . . .	Still River, . . . . .	35 East Pleasant Street.
Christie, Edward Wheeler, . . . . .	North Adams, . . . . .	29 Lincoln Avenue.
Churchill, George Clarence, . . . .	Worcester, . . . . .	58 Pleasant Street.
Clark, Ernest Samuel, Jr., . . . . .	Tolland, . . . . .	82 Pleasant Street.
Clay, Harold Johnson, . . . . .	North Cambridge, . . . . .	21 Fearing Street.
Clegg, Frank Jackson, . . . . .	Fall River, . . . . .	C. S. C. House.
Coe, Alfred Lyne, . . . . .	Cazenovia, N. Y., . . . . .	79 Pleasant Street.
Cole, Herbert Elmer, <sup>1</sup> . . . . .	Manchaug, . . . . .	Plant House.
Coleman, David Augustus, . . . . .	South Framingham, . . . . .	108 Pleasant Street.
Damon, Samuel Reed, <sup>1</sup> . . . . .	Kingston, R. I., . . . . .	Kappa Sigma House.
Davies, Lloyd Garrison, <sup>1</sup> . . . . .	Peabody, . . . . .	75 Pleasant Street.
Davis, Ralph Edward, . . . . .	Southbury, Conn., . . . . .	77 Pleasant Street.
Davis, William Ashmun, . . . . .	Sunderland, . . . . .	79 Pleasant Street.
Dearing, Newton Howard, . . . . .	Brookline, . . . . .	7 Nutting Avenue.
Demond, Robert Norton, . . . . .	North Adams, . . . . .	Care of Mr. E. H. Forristall.
Dexter, Evans King, . . . . .	Mattapoissett, . . . . .	31 East Pleasant Street.
Dunbar, Erving Walker, . . . . .	North Weymouth, . . . . .	7 Nutting Avenue.
Edgerton, Almon Morley, <sup>1</sup> . . . . .	West Springfield, . . . . .	6 Nutting Avenue.
Edwards, Edward Clinton, <sup>1</sup> . . . . .	Salem, . . . . .	Nutting Avenue, care of R. J. Watts.
Eldridge, Harold Lockwood, . . . .	Wareham, . . . . .	North College, College Store.
Foster, Stuart Brooks, <sup>1</sup> . . . . .	West Somerville, . . . . .	96 Pleasant Street.
Freeborn, Stanley Barron, . . . . .	Ware, . . . . .	116 Pleasant Street.
Freedman, Samuel Leavitt, . . . . .	Roxbury, . . . . .	101 Pleasant Street.
Frost, Robert Theodore, . . . . .	New York, N. Y., . . . . .	85 Pleasant Street.
Frye, Carl Raymond, . . . . .	South Hadley Falls, . . . . .	116 Pleasant Street.
Fuller, George, . . . . .	Deerfield, . . . . .	86 Pleasant Street.
Gibson, David Wyman, . . . . .	Groton, . . . . .	116 Pleasant Street.
Grebin, Mark Anthony, <sup>1</sup> . . . . .	North Hadley, . . . . .	North Hadley.

<sup>1</sup> Work incomplete.

Griffin, William Gerald, . . . .	South Hadley Falls, . . . .	35 East Pleasant Street.
Hadfield, Harold Frederick, . . . .	North Adams, . . . .	29 Lincoln Avenue.
Handy, Ralph Ellis, . . . .	Cataumet, . . . .	10 North College.
Harris, Rodney Wells, . . . .	Wethersfield, Conn., . . . .	77 Pleasant Street.
Hayden, William Vassall, <sup>1</sup> . . . .	Beverly, . . . .	13 South College.
Hazen, Edward Leonard, . . . .	Springfield, . . . .	Care of Mr. E. H. Forristall.
Heath, Chester Blanchard, . . . .	Needham, . . . .	4 North College.
Hebard, Emory Blodgett, . . . .	Holland, . . . .	3 Fearing Street.
Heffron, Frederick, . . . .	Sherborn, . . . .	108 Pleasant Street.
Hogg, Lawrence Jagger, . . . .	Lawrence, . . . .	13 Fearing Street.
Howard, Lewis Phillips, . . . .	North Easton, . . . .	19 Hallock Street.
Hutchinson, John Gouverneur, . . . .	Arlington, . . . .	8 Allen Street.
Hutchinson, Raymond Ernest, <sup>1</sup> . . . .	South Hanson, . . . .	35 East Pleasant Street.
Ingham, Earl Morris, . . . .	Granby, . . . .	86 Pleasant Street.
Jacobs, Loring Humphrey, . . . .	Wellesley, . . . .	25 Pleasant Street.
Jenney, Herbert Hedge, . . . .	South Boston, . . . .	6 Nutting Avenue.
Johnson, Rollin Eugene, . . . .	Templeton, . . . .	120 Pleasant Street.
Jones, Dettmar Wentworth, . . . .	Melrose, . . . .	66 Pleasant Street.
Kilbourn, Walton Goss, . . . .	South Lancaster, . . . .	85 Pleasant Street.
Kriebel, Addison Reiff, <sup>1</sup> . . . .	Norristown, Pa., . . . .	81 Pleasant Street.
Leach, Benjamin Robert, . . . .	Methuen, . . . .	13 Phillips Street.
Leete, Richard Fowler, . . . .	Mount Kisco, N. Y., . . . .	66 Pleasant Street.
Levine, Henry Walter, . . . .	Roxbury, . . . .	101 Pleasant Street.
Lincoln, Murray Danforth, . . . .	North Raynham, . . . .	19 Hallock Street.
Lucas, Hoyt Dennis, . . . .	West Springfield, . . . .	1 Allen Street.
MacDonald, Daniel Alfred, <sup>1</sup> . . . .	Walpole, . . . .	67 Pleasant Street.
Major, Joseph, . . . .	Rutherford, N. J., . . . .	58 Pleasant Street.
Melloon, Ralph Reid, . . . .	Lowell, . . . .	Mt. Pleasant, care of Mr. Greene.
Merkle, Frederick Grover, . . . .	Amherst, . . . .	North East Street.
Morrison, Harold Ivory, . . . .	Melrose, . . . .	77 Pleasant Street.
Morse, Harold John, <sup>1</sup> . . . .	Townsend, . . . .	75 Pleasant Street.
Needham, Lester Ward, <sup>1</sup> . . . .	Springfield, . . . .	Kappa Sigma House.
Nicolet, Tell William, . . . .	Fall River, . . . .	85 Pleasant Street.
Nicolet, Theodore Arthur, <sup>1</sup> . . . .	Fall River, . . . .	85 Pleasant Street.
Nissen, Harry, . . . .	Boston, . . . .	85 Pleasant Street.
Norton, Leslie Howard, . . . .	Newport, R. I., . . . .	79 Pleasant Street.
Nute, Raymond Edwin, . . . .	Fall River, . . . .	9 Fearing Street.
Oertel, John Thomas, <sup>1</sup> . . . .	South Hadley Falls, . . . .	116 Pleasant Street.
Palmer, John Philip, <sup>1</sup> . . . .	Portsmouth, N. H., . . . .	Care of President Butter- field.
Parker, Ervine Franklin, . . . .	Poquonock, Conn., . . . .	81 Pleasant Street.
Payne, Roland Alfred, . . . .	Wakefield, . . . .	North Amherst.
Pellett, John Doubleday, . . . .	Worcester, . . . .	Theta Chi House.
Peters, Chester Harry, . . . .	Brown Station, N. Y., . . . .	116 Pleasant Street.
Petersen, Peverill Oscar, . . . .	Concord, . . . .	7 Nutting Avenue.
Porter, Bennett Allen, . . . .	Amherst, . . . .	R. D. 1, No. 25, Amherst.
Powers, Richard Henry, <sup>1</sup> . . . .	Malden, . . . .	9 South College.
Read, Frederick William, . . . .	Boston, . . . .	7 Nutting Avenue.
Rees, Harry Launcelot, . . . .	Monson, . . . .	3 Fearing Street.
Reid, George Alexander, . . . .	Worcester, . . . .	52 Lincoln Avenue.
Robinson, Herbert Calvin, . . . .	Haverhill, . . . .	75 Pleasant Street.
Russell, Alden Hesseltine, . . . .	Watertown, . . . .	7 Nutting Avenue.
Sahr, Gabriel Arthur, <sup>1</sup> . . . .	Boston, . . . .	60 Pleasant Street.
Sanford, Clarence Higgins, . . . .	Allston, . . . .	Cottage Hospital, Kellogg Avenue.
Sherman, Joel Powers, . . . .	Hyannis, . . . .	4 North College.
Shirley, John Newton, . . . .	South Duxbury, . . . .	30 North Prospect Street.
Simmons, George Walker, <sup>1</sup> . . . .	Amsterdam, N. Y., . . . .	35 East Pleasant Street.
Slein, Owen Francis, . . . .	New Braintree, . . . .	9 Nutting Avenue.
Small, Francis Willard, <sup>1</sup> . . . .	North Truro, . . . .	35 North Prospect Street.
Smith, Leon Edgar, . . . .	Brighton, . . . .	85 Pleasant Street.

<sup>1</sup> Work incomplete.

Smith, Leone Ernest, . . . .	Leominster, . . . .	116 Pleasant Street.
Stevens, Arthur Eben, . . . .	Brockton, . . . .	79 Pleasant Street.
Strange, Sarah Josephine, . . . .	Marshfield, . . . .	6 Draper Hall.
Sullivan, Arthur James, . . . .	Rochester, N. Y., . . . .	19 Hallock Street.
Tarbell, Munroe Gifford, . . . .	Brimfield, . . . .	College Store, North College.
Taylor, Arthur Wright, . . . .	Feeding Hills, . . . .	13 Fearing Street.
Taylor, Leland Hart, . . . .	Peabody, . . . .	75 Pleasant Street.
Thurston, Arthur Searle, . . . .	Everett, . . . .	9 Fearing Street.
Tower, Alfred Leigh, . . . .	Sheffield, . . . .	120 Pleasant Street.
Tsang, Oong Hyuen, . . . .	Shanghai, China, . . . .	26 Lincoln Avenue.
Upton, Ernest Franklin, . . . .	Salem, . . . .	Nutting Avenue, care of R. J. Watts.
Walker, Nathaniel Kennard, . . . .	Malden, . . . .	83 Pleasant Street.
Walker, Raymond Philip, . . . .	Taunton, . . . .	120 Pleasant Street.
Warner, Raymond Winslow, . . . .	Sunderland, . . . .	Care of Mr. E. H. Forristall.
Webster, Louis Armstrong, . . . .	Blackstone, . . . .	82 Pleasant Street.
Weigel, Arthur George, . . . .	Lawrence, . . . .	13 Hallock Street.
Wells, Nathan Holmes, <sup>1</sup> . . . .	Kennebunk, Me., . . . .	Prospect House.
Wheeler, Chester Eaton, . . . .	Lowell, . . . .	87 Pleasant Street.
Whidden, Burton Clark, . . . .	Waltham, . . . .	81 Pleasant Street.
Whippen, Charles Warren, . . . .	Lynn, . . . .	13 Phillips Street.
White, Samuel Alexander, . . . .	Boston, . . . .	12 Hallock Street.
Williams, George Edward, <sup>1</sup> . . . .	Belchertown, . . . .	Belchertown.
Wing, John Govan, . . . .	Somerville, . . . .	116 Pleasant Street.
Wood, Henry Joseph, . . . .	Mendon, . . . .	82 Pleasant Street.
Wooley, Harold Curtis, <sup>1</sup> . . . .	Malden, . . . .	Kappa Sigma House.

## FRESHMAN CLASS.

Alden, Charles Harold, . . . .	Amherst, . . . .	East Pleasant Street.
Allen, Francis Ellwood, . . . .	Melrose, . . . .	10 Allen Street.
Anderson, Herbert Henry, . . . .	Ware, . . . .	13 Hallock Street.
Archibald, Herbert Hildreth, . . . .	Waltham, . . . .	120 Pleasant Street.
Baird, Earle Fairbank, . . . .	Waltham, . . . .	120 Pleasant Street.
Banister, Seth Warren, . . . .	Westford, . . . .	30 North Prospect Street.
Barnes, Dwight Fletcher, . . . .	Marshfield, . . . .	3 Nutting Avenue.
Bartlett, Emory Haynes, . . . .	Enfield, . . . .	12 Cottage Street.
Bartlett, Edward Russell, . . . .	Newburyport, . . . .	66 Pleasant Street.
Bartley, Hastings Newcomb, . . . .	Sandwich, . . . .	77 Pleasant Street.
Beebe, William Carleton, . . . .	Evans Mills, N. Y., . . . .	Prospect House.
Beers, Norman Lauer, . . . .	Somerville, . . . .	21 Fearing Street.
Bemis, Willard Gilbert, . . . .	North Brookfield, . . . .	12 Cottage Street.
Bennett, John Ingram, . . . .	Boston, . . . .	77 Pleasant Street.
Bisbee, Eleanor, . . . .	Arlington Heights, . . . .	Draper Hall.
Bishop, Chester Allen, . . . .	Peterboro, N. H., . . . .	79 Pleasant Street.
Bishop, Herbert Walker, <sup>1</sup> . . . .	Doylestown, Pa., . . . .	79 Pleasant Street.
Bittinger, Fritz John, . . . .	Plymouth, . . . .	96 Pleasant Street.
Boyer, Edward E. Hale, . . . .	Lynn, . . . .	Northampton Road.
Braley, Merton Loring, . . . .	Rock, . . . .	East Experiment Station.
Bredemeier, Carl, . . . .	Buffalo, N. Y., . . . .	86 Pleasant Street.
Bronson, Harold Julius, . . . .	Buckland, . . . .	Walker Hall.
Brooks, Gardner Milton, . . . .	Newton, . . . .	9 Allen Street.
Buttrick, John Willard, . . . .	Melrose, . . . .	31 North Prospect Street.
Cale, Gladstone Hume, . . . .	West Springfield, . . . .	79 Pleasant Street.
Callard, John Case, . . . .	Winthrop, . . . .	40 Amity Street.
Cande, Donald Hopkins, . . . .	Pittsfield, . . . .	83 Pleasant Street.
Chase, Alexander Baxter, Jr., . . . .	West Barnstable, . . . .	13 Fearing Street.
Churchill, Chester Albert, . . . .	Brockton, . . . .	Angus's Cottage.
Clare, Frederick Henry, . . . .	Mattapan, . . . .	-
Clark, Arthur Lincoln, . . . .	Jamaica Plain, . . . .	35 East Pleasant Street.
Clark, Ellis Fred, . . . .	Granby, Conn., . . . .	Theta Chi House.
Clark, George Henry, <sup>1</sup> . . . .	Sherborn, . . . .	3 Nutting Avenue.

<sup>1</sup> Work incomplete.

Clark, Saxon Dickinson, . . .	Springfield, . . .	120 Pleasant Street.
Clough, Maurice Joseph, . . .	Swampscott, . . .	30 North Prospect Street.
Cohen, Samuel Adams, . . .	Roxbury, . . .	101 Pleasant Street.
Dalrymple, Andrew Campbell, . . .	Revere, . . .	3 McClellan Street.
Damon, Leon Blanchard, . . .	Melrose, . . .	31 North Prospect Street.
Darling, Homer Chester, <sup>1</sup> . . .	Mendon, . . .	15 Hallock Street.
Day, George Allen, . . .	Warren, . . .	12 Cottage Street.
Dole, Sumner Alvord, . . .	Bardwell's Ferry, . . .	Walker Hall.
Donnell, George Edwin, . . .	Burlington, . . .	10 Tyler Place.
Doran, William Leonard, . . .	North Dartmouth, . . .	35 East Pleasant Street.
Draper, Earle Sumner, . . .	Milford, . . .	C. S. C. House.
Eaton, Paul Baker, . . .	Wakefield, . . .	83 Pleasant Street.
Estes, Ralph Carey, . . .	Lancaster, . . .	79 Pleasant Street.
Fairbank, Harvey Nathan, . . .	Sudbury, . . .	Care of E. F. Gaskill.
Fales, Gerald, . . .	Worcester, . . .	75 Pleasant Street.
Farrar, Stuart Kittridge, . . .	Springfield, . . .	Kappa Sigma House.
Fisher, Leonard Cyrus, <sup>1</sup> . . .	Norwood, . . .	35 East Pleasant Street.
Fitzgerald, Daniel James, <sup>1</sup> . . .	Worcester, . . .	75 Pleasant Street.
Flebut, Alpha John, . . .	Amherst, . . .	27 McClellan Street.
Fox, Everett Bailey, . . .	Dracut, . . .	East Experiment Station.
Gare, Edward John, . . .	Northampton, . . .	13 Phillips Street.
Gibbs, Robert Burley, . . .	Ballston Spa, N. Y., . . .	3 Nutting Avenue.
Goodwin, Malcolm Noyes, . . .	Newburyport, . . .	66 Pleasant Street.
Grant, Harold Davidson, . . .	Melrose, . . .	3 McClellan Street.
Griggs, Raymond Bradford, . . .	Chicopee Falls, . . .	84 Pleasant Street.
Hager, Clayton Marden, . . .	Somerville, . . .	9 Nutting Avenue.
Hall, George Morris, . . .	Brookline, . . .	Lincoln Block.
Hall, Roderick Chesley, . . .	Worcester, . . .	29 Pleasant Street.
Harper, James Edward, . . .	New Haven, Conn., . . .	29 Lincoln Avenue.
Harper, Raymond Wires, . . .	Barre, . . .	Hatch Experiment Barn.
Harvey, Russell Wilton, . . .	Lanesville, . . .	44 Pleasant Street.
Haskell, Willis Henry, Jr., . . .	Brooklyn, N. Y., . . .	15 Beston Street.
Haskins, Leroy Everett, . . .	Taunton, . . .	120 Pleasant Street.
Hatfield, William Hollis, . . .	Wellesley, . . .	30 North Prospect Street.
Hathaway, Isaac, . . .	Kingston, . . .	Care of E. F. Gaskill.
Haug, Chester Amos, . . .	New York, N. Y., . . .	15 Fearing Street.
Hawes, Clayton Prescott, . . .	North Dartmouth, . . .	35 East Pleasant Street.
Heartz, Forrest Oscar, . . .	Melrose Highlands, . . .	35 Amity Street.
Hildreth, Paul Hughes, . . .	Newtonville, . . .	8 Allen Street.
Hill, Charles Chase, . . .	Melrose Highlands, . . .	Pease Avenue.
Hotis, Ralph P., . . .	Evans Mills, N. Y., . . .	52 Amity Street.
Houghton, Arthur Reginald, . . .	South Lancaster, . . .	C. S. C. House.
Hyde, George Frederick, . . .	North Dana, . . .	79 Pleasant Street.
Hyde, Harold Gilmore, . . .	Winchendon, . . .	29 North Prospect Street.
Jackson, John Carleton, . . .	Sherborn, . . .	15 Hallock Street.
Johnson, Arthur, . . .	Bridgeport, Conn., . . .	Brooks Farm.
Johnson, Bernard Pol, . . .	New York, N. Y., . . .	College Store, North College.
Jordan, Perley Balch, . . .	Topsfield, . . .	31 North Prospect Street.
Joubert, Sylvester Gordon, . . .	Middletown, Conn., . . .	31 Lincoln Avenue.
Kane, Paul Vincent, . . .	Worcester, . . .	Brooks Farm.
Karnan, Parker Robert, . . .	Hyde Park, . . .	31 Lincoln Avenue.
Kelliher, Jerome Joseph, . . .	Montague City, . . .	75 Pleasant Street.
Kennedy, Thomas James, . . .	South Hadley Falls, . . .	Brooks Farm.
Kilbon, Ralph Gillette, <sup>1</sup> . . .	Springfield, . . .	19 Pleasant Street.
Komp, William H. Wood, <sup>1</sup> . . .	Rutherford, N. J., . . .	82 Pleasant Street.
Koplovitz, Samuel, . . .	Chelsea, . . .	112 Pleasant Street.
Lane, Merton Chesleigh, . . .	South Duxbury, . . .	Pleasant Street, care of Mr. Root.
LeDuc, Ashley Cudworth, . . .	Chesterfield, . . .	13 Hallock Street.
Lewis, Daniel James, . . .	Hanson, . . .	120 Pleasant Street.
Lewis, John Kirby, . . .	New Haven, Conn., . . .	52 Lincoln Avenue.

<sup>1</sup> Work incomplete.

Lincoln, Irving Bowin, <sup>1</sup>	Glens Falls, N. Y.,	55 Pleasant Street.
Little, Harold Greenleaf,	Newburyport,	66 Pleasant Street.
Lovejoy, John Sumner,	Newburyport,	12 Cottage Street.
MacDonald, Norman Duncan, <sup>1</sup>	Melrose,	47 Pleasant Street.
MacNeil, Ralph Langdell,	Chelsea,	52 Amity Street.
Macy, Philip Arthur,	Oak Bluffs,	12 Cottage Street.
Mahan, Harold Butterworth,	Boston,	13 Phillips Street.
Marsh, Franklin Winter,	Amherst,	9 Woodside Avenue.
Marsh, Herbert Verner,	Greenfield,	79 Pleasant Street.
Masse, Sidney Merton, <sup>1</sup>	Dorchester,	3 McClellan Street.
McKechnie, Ray Farrar, <sup>1</sup>	Natick,	5 McClellan Street.
McLain, Ralph Emerson,	Melrose,	10 Allen Street.
Melican, George Deady, <sup>1</sup>	Worcester,	66 Pleasant Street.
Moberg, Carl David,	Campello,	5 McClellan Street.
Moberg, Eldon Samuel,	Campello,	5 McClellan Street.
Montague, Enos James,	Northampton,	Nutting Avenue, care of Mr. Plumb.
Moore, Elbert Francis, <sup>1</sup>	Waltham,	81 Pleasant Street.
Moore, Roger Henry,	Beverly,	79 Pleasant Street.
Munger, George Draper,	Worcester,	-
Murray, John Kean,	Winthrop,	Mt. Pleasant, care of Mr. Greene.
Navas, Miguel,	New York,	56 Pleasant Street.
Norton, Chester Harold,	Chelsea,	2 Allen Street.
Parmenter, Ernest Brigham,	Dover,	79 Pleasant Street.
Patten, Merrill Campbell,	Brighton,	52 Lincoln Avenue.
Patterson, Robert Earley,	Dorchester,	9 Woodside Avenue.
Pendleton, Harlow Libby,	Dorchester,	31 North Prospect Street.
Perkins, Olney Hilton, <sup>1</sup>	Brockton,	55 Pleasant Street.
Perry, Gerald Eugene,	Amherst,	17 Amity Street.
Phillips, Ralph Edward,	Mendon,	15 Hallock Street.
Pike, Joseph Stevens, Jr.,	Somerville,	3 Nutting Avenue.
Poole, Joseph Ellsworth,	Needham,	-
Po, Shue Lo,	Canton, China,	31 Lincoln Avenue.
Potter, George Raymond,	Ludlow,	1 Allen Street.
Price, James Albert,	New York, N. Y.,	15 Boston Street.
Prouty, Langdon,	Littleton,	35 East Pleasant Street.
Quincy, Knight,	Rosindale,	35 East Pleasant Street.
Ray, George Burrill,	Hingham,	Brooks Farm.
Rendall, Raymond Eaton,	Melrose,	Lincoln Avenue and Amit Street.
Rhoades, Paul Whitney,	Malden,	2 Allen Street.
Rogers, Harold Merriman,	Southington, Conn.,	Mt. Pleasant, care of Professor Sears.
Saben, Maxwell Boehm,	Newport, R. I.,	83 Pleasant Street.
Sauchell, Vincent, <sup>1</sup>	Waterbury, Conn.,	11 High Street.
Sauter, John Martin,	Turners Falls,	75 Pleasant Street.
Scott, Lincoln Bain,	Melrose,	3 McClellan Street.
Sears, William Richardson,	Arlington,	31 East Pleasant Street.
Severance, Verne Lincoln,	South Hanson,	Pleasant Street, care of Mr. Root.
Seton, George Patrick,	Darien, Conn.,	31 East Pleasant Street.
Shaylor, Fred Wright, <sup>1</sup>	Lee,	Kappa Sigma House.
Sherman, Milton Francis,	South Lincoln,	Dickinson House.
Simon, Isaac Barney,	Revere,	Brooks Farm.
Smith, Francis Albert, <sup>1</sup>	West Newton,	29 McClellan Street.
Smith, Philip Lawrence, <sup>1</sup>	Kingston,	East Experiment Station.
Spofford, Chester Porter,	South Groveland,	66 Pleasant Street.
Strauss, Abraham, <sup>1</sup>	Boston,	101 Pleasant Street.
Taft, Richard Craig,	Oxford,	88 Pleasant Street.
Tarr, Lester Winslow,	Rockport,	44 Pleasant Street.
Thayer, Granville Marty'n,	South Hanson,	15 Boston Street.

<sup>1</sup> Work incomplete.

Tonry, Albert Joseph, . . .	Winthrop, . . .	17 South College.
Tower, William Reginald, . . .	Sheffield, . . .	120 Pleasant Street.
Tower, Ralph Ernest, . . .	Becket, . . .	Brooks Farm.
Towne, Edwin Chester, . . .	Waltham, . . .	19 Pleasant Street.
Upton, Raymond Melville, . . .	Peabody, . . .	19 Hallock Street.
Vinal, Stuart Cunningham, . . .	East Weymouth, . . .	8 Allen Street.
Warner, Lewis Pomeroy, <sup>1</sup> . . .	Sunderland, . . .	13 Phillips Street.
Weed, Frank Hammond, <sup>1</sup> . . .	Great Neck, L. I., . . .	83 Pleasant Street.
Wellington, Benjamin, . . .	Waltham, . . .	Care of E. F. Gaskill.
White, Homer Beethoven, . . .	Melrose, . . .	35 South Pleasant Street.
White, Harry Dexter, . . .	Boston, . . .	56 Pleasant Street.
White, Henry Harrison, . . .	West Peabody, . . .	79 Pleasant Street.
Whitmore, Philip Ferry, . . .	Sunderland, . . .	13 Phillips Street.
Whorf, Paul Francis, . . .	Forest Hills, . . .	87 Pleasant Street.
Wilkins, Alfred Emerson, . . .	Wakefield, . . .	83 Pleasant Street.
Wiley, Harold Cleland Clancey, <sup>1</sup> . . .	Orange, . . .	101 Pleasant Street.
Williams, Donald, <sup>1</sup> . . .	Catasauqua, Pa., . . .	C. S. C. House.
Williams, Henry Chester, <sup>1</sup> . . .	Topsfield, . . .	21 McClellan Street.
Wright, Elvin Stanley, . . .	Worcester, . . .	15 Fearing Street.

## UNCLASSIFIED STUDENTS.

Chambers, Maude Burdick, . . .	Harpers Ferry, W. Va., . . .	3 Fearing Street.
Chow, Tse Ki, . . .	Canton, China, . . .	Care of Professor White.
Chu, Alfred Wen, . . .	Tientsin, China, . . .	90 Pleasant Street.
Crosby, Stanley, . . .	Warren, . . .	Theta Delta Chi House.
Dearth, Newman, . . .	Ashland, . . .	86 Pleasant Street.
Fisher, Earl Jarvis, . . .	Falmouth, . . .	23 Pleasant Street.
Fuller, Richard, . . .	Salem, . . .	6 Nutting Avenue.
Goodnow, Edna Minnie, . . .	Amherst, . . .	15 Spring Street.
Hart, Edward Haskell, . . .	Falmouth, . . .	86 Pleasant Street.
Howe, James Sullivan, Jr., . . .	Brookline, . . .	Prospect House.
Kaulback, Hugh Arms, . . .	Greenfield, . . .	Care of Professor Gaskill.
Kennedy, Worthington Chester, . . .	Hardwick, . . .	15 Hallock Street.
Liang, Foo Tso, . . .	Canton, China, . . .	90 Pleasant Street.
Mott, Percival, . . .	Nashua, N. H., . . .	81 Pleasant Street.
Moyle, John, Jr., . . .	Groton, . . .	77 Pleasant Street.
Nash, Henry Clark, Jr., . . .	Amherst, . . .	67 Pleasant Street.
Noble, Howard Ermy, . . .	Tyngsborough, . . .	"Lovers Lane."
O'Brien, Daniel William, . . .	Wayland, . . .	Brooks Farm.
Pease, Willard Noah M., . . .	Altoona, Pa., . . .	North Amherst.
Phelps, Benjamin Austin, . . .	Northampton, . . .	8 Allen Street.
Prouty, LeRoy Fletcher, . . .	Rockland, . . .	15 Hallock Street.
Rae, George Little, . . .	Needham Heights, . . .	3 Nutting Avenue.
Ray, Frederick Almar, . . .	Hyde Park, . . .	116 Pleasant Street.
Richards, Edwin Henry, . . .	Hartford, Conn., . . .	2 Allen Street.
Selkregg, Edwin Reimund, . . .	Amherst, . . .	12 Cottage Street.
Stanford, Ernest Elwood, . . .	Rowe, . . .	71 South Pleasant Street.
Taplin, Warren Hartt, . . .	Colorado Springs, Col., . . .	13 Hallock Street.
Trider, George Henry, . . .	Waltham, . . .	19 Pleasant Street.
Wright, George Ellery, . . .	Brockton, . . .	29 North Prospect Street.

<sup>1</sup> Work incomplete.

## SUMMARY BY CLASSES.

Graduate students, . . . . .	17
Senior class, . . . . .	85
Junior class, . . . . .	97
Sophomore class, . . . . .	127
Freshman class, . . . . .	169
Unclassified students, . . . . .	29
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Total, . . . . .	524

## GEOGRAPHICAL SUMMARY.

Massachusetts, . . . . .	443
New York, . . . . .	25
Connecticut, . . . . .	20
New Hampshire, . . . . .	6
New Jersey, . . . . .	5
Pennsylvania, . . . . .	4
Rhode Island, . . . . .	4
Vermont, . . . . .	2
Colorado, . . . . .	1
Delaware, . . . . .	1
Georgia, . . . . .	1
Virginia, . . . . .	1
West Virginia, . . . . .	1
Iowa, . . . . .	1
Maine, . . . . .	1
China, . . . . .	7
Scotland, . . . . .	1
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Total, . . . . .	524

## GRADUATE STUDENTS — CANDIDATES FOR A DEGREE.

Allen, Rodolphus Harold, . . . . .	Fall River.
B.Sc., Massachusetts Agricultural College, 1910.	
Anderson, David Wadsworth, . . . . .	Manchester, N. H.
B.Sc., New Hampshire State College, 1910.	
Bartlett, Oscar Christopher, . . . . .	Westhampton.
B.Sc., Massachusetts Agricultural College, 1909.	
Bourne, Arthur Israel, . . . . .	Amherst.
A.B., Dartmouth College, 1907.	
Crossman, Samuel Sutton, . . . . .	Needham.
B.Sc., Massachusetts Agricultural College, 1909.	
Holland, Edward B., . . . . .	Amherst.
B.Sc., Massachusetts Agricultural College, 1892; M.Sc., Massachusetts Agricultural College; 1898.	
Hourdequin, Leon Remy, . . . . .	Brooklyn, N. Y.
A.B., Williams College, 1911.	
McLaine, Leonard Septimus, . . . . .	New York, N. Y.
B.Sc., Massachusetts Agricultural College, 1910.	
Merrill, Joseph Henry, . . . . .	Danvers.
B.Sc., Dartmouth College, 1905.	



Smulyan, Marcus Thomas, . . . . .	Amherst.
B.Sc., Massachusetts Agricultural College, 1909.	
Thomas, Frank Lincoln, . . . . .	Athol.
B.Sc., Massachusetts Agricultural College, 1910.	
Thompson, Edward Joseph, . . . . .	Cambridge.
B.Sc., Harvard College, 1911.	
Watkins, John Bedford, . . . . .	Midlouthian, Va.
B.Sc., Virginia Polytechnic, 1911.	
Regan, William Swift, . . . . .	Northampton.
B.Sc., Massachusetts Agricultural College, 1908.	

## GRADUATE STUDENTS — NOT CANDIDATES FOR A DEGREE.

Adams, Harold Stanard, . . . . .	Pittsfield.
A.B., Williams College, 1911.	
Butler, Aubrey Bickford, . . . . .	Chelsea.
A.B., Dartmouth College, 1911.	
Crocker, Bartow, . . . . .	Cambridge.
B.Sc., Harvard College, 1911.	



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ADDENDUM.

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## ADDENDUM.

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### MAJORS.

#### GENERAL STATEMENT.

Beginning with September, 1912, a plan of major courses will become operative for members of the junior and senior classes. A major will consist of 30 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 department. 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.

#### CLASS OF 1913.

Since it will not be possible for the class of 1913 to conform fully with the regulations concerning majors given above, the following regulations will apply to them in making their elections: —

As stated below, the minimum semester credits will be 15 hours, the maximum 21 hours, and the members of the class of 1913 will fill out their elective cards with these facts in mind. For the class of 1913 the required work after the sophomore year is to be counted as follows: —

5 credits in the junior year in Military Science and Physical Education.

3 credits in Economics 1.

3 credits in English; other subjects in the Humanities, or Rural Social Science.

Each member of 1913 must obtain on June 5, from the registrar, an elective card to be filled out with his election of courses for the senior year.

Members of 1913 must from the list given below choose any instructor as his adviser. After the card has been filled out for both semesters of the senior year, and has received the approval of the adviser, it must be returned to the registrar's office on or before June 15.

**RULES.**

**RULE 1. *Election.*** — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

**RULE 2. *Minimum Credits.*** — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

**RULE 3. *Maximum Credits.*** — The maximum number of credits for any semester of the junior or senior year shall be 21.

**RULE 4. *Humanities and Rural Social Science.*** — A minimum of 15 credit hours in the Divisions of the Humanities and of Rural Social Science shall be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

**RULE 5. *Advisers.*** — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student 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 30 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 is required to take 30 hours in his major and 15 hours in the Divisions of the Humanities and of Rural Social Science, making a total of 45 hours. He is allowed free choice for the remaining part of his required hours, this remainder amounting to 15 hours minimum for the two years, or 35 hours maximum.

**RULE 7. *Registration.*** — No upper classman 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 on June 5.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and will counter-sign the same.

(3) Each course card must be filled out, giving the name of student, with his college address, also the name of parent or guardian,

with the home address. When the elections have been entered on this card, and the balance of hours added by the student, the card must be returned to the registrar not later than June 15.

**RULE 8. Changes.** — Applications for changes may be made to the dean in writing at any time, and, when approved by him and by the committee on scholarship, become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

### LIST OF MAJORS.

#### Agriculture.

Prof. JAMES A. FOORD, Adviser.

Course.	Credit.
Agronomy 3, . . . . .	3
Agronomy 6, . . . . .	3
Animal Husbandry 5, . . . . .	3
Animal Husbandry 6, . . . . .	1
Animal Husbandry 9, . . . . .	3
Dairying 1, . . . . .	3
Dairying 2, . . . . .	3
Farm Administration 3, . . . . .	3
Farm Administration 4, . . . . .	3
Chemistry 7, . . . . .	3
Veterinary Science 1, . . . . .	3

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#### Agronomy.

Assistant Prof. SIDNEY B. HASKELL, Adviser.

Course.	Credit.
Agronomy 3, . . . . .	3
Agronomy 4, . . . . .	3
Agronomy 5, . . . . .	3
Agronomy 6, . . . . .	3
Agronomy 8, . . . . .	3
Animal Husbandry 5, . . . . .	3
Animal Husbandry 9, . . . . .	3
Farm Administration 4, . . . . .	3
Chemistry 7, . . . . .	3
Chemistry 8, . . . . .	3

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30

**Animal Husbandry.**

Associate Prof. J. ALLAN McLEAN, Adviser.

Course.	Credit.
Agronomy 3, . . . . .	3
Animal Husbandry 5, . . . . .	3
Animal Husbandry 6, . . . . .	1
Animal Husbandry 8, . . . . .	2
Animal Husbandry 9, . . . . .	3
Animal Husbandry 10, . . . . .	3
Animal Husbandry 11, . . . . .	2
Dairying 1, . . . . .	3
Farm Administration 3, . . . . .	3
Farm Administration 4, . . . . .	3
Veterinary Science 3, . . . . .	3
	<hr/>
	29

**Dairying.**

Associate Prof. WILLIAM P. B. LOCKWOOD, Adviser.

Course.	Credit.
Animal Husbandry 5, . . . . .	3
Animal Husbandry 6, . . . . .	1
Animal Husbandry 8, . . . . .	2
Animal Husbandry 9, . . . . .	3
Animal Husbandry 11, . . . . .	2
Dairying 1, . . . . .	3
Dairying 2, . . . . .	3
Dairying 3, . . . . .	3
Dairying 4, . . . . .	3
Farm Administration 3, . . . . .	3
Farm Administration 4, . . . . .	3
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	29

**Poultry Husbandry.**

Associate Prof. JOHN C. GRAHAM, Adviser.

Course.	Credit.
Poultry Husbandry 1, . . . . .	2
Poultry Husbandry 2, . . . . .	2
Poultry Husbandry 3, . . . . .	1
Poultry Husbandry 4, . . . . .	1-3
Poultry Husbandry 5, . . . . .	1
Poultry Husbandry 6, . . . . .	3
Poultry Husbandry 7, . . . . .	3
Poultry Husbandry 9, . . . . .	3
Pomology 1, . . . . .	3
Agronomy 3, . . . . .	3
Animal Husbandry 5, . . . . .	3
Animal Husbandry 9, . . . . .	3
Veterinary Science 1, . . . . .	3
	<hr/>
	31



**General Horticulture.**

Prof. FRANK A. WAUGH, Adviser.

This major will consist of courses selected from the Departments of Pomology, Floriculture, Market Gardening, Landscape Gardening and Forestry, to suit the particular needs of the student. In special cases, courses from the Department of Agronomy will also be counted toward the major in general horticulture.

**Floriculture.**

Prof. EDWARD A. WHITE, Adviser.

Course.	Credit.
Floriculture 1, . . . . .	4
Floriculture 2, . . . . .	4
Floriculture 3, . . . . .	3
Floriculture 4, . . . . .	3
Horticulture 3, . . . . .	3
Horticulture 4, . . . . .	3
Entomology 1, . . . . .	3
Market Gardening 2, . . . . .	3
Botany 2, . . . . .	4
	30

*Note.* — Horticulture 3 and 4 is a junior subject; but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

**Forestry.**

Associate Prof. FRANK F. MOON, Adviser.

Course.	Credit.
Forestry 1, . . . . .	3
Forestry 2, . . . . .	3
Forestry 3, . . . . .	3
Forestry 4, . . . . .	3
Forestry 5, . . . . .	2
Forestry 6, . . . . .	2
Entomology 5, . . . . .	3
Horticulture 3, . . . . .	3
Horticulture 4, . . . . .	3
Botany 13, . . . . .	4
	29

**Landscape Gardening.**

Prof. FRANK A. WAUGH, Adviser.

Course.	Credit.
Landscape Gardening 1, . . . . .	3
Landscape Gardening 2, . . . . .	3
Landscape Gardening 3, . . . . .	3
Landscape Gardening 4, . . . . .	3
Landscape Gardening 5, . . . . .	2
Landscape Gardening 6, . . . . .	2
Landscape Gardening 7, . . . . .	3
Landscape Gardening 8, . . . . .	3
Drawing 1, . . . . .	3
Drawing 2, . . . . .	3
Horticulture 3, . . . . .	3
	<hr/>
	31

Landscape Gardening 6 will probably be given quite differently in alternate years, and thus should be open to *both* juniors and seniors.

Courses for juniors *only*: Landscape Gardening, 1, 2, Drawing, 1 and 2.

Courses for seniors and graduates *only*: Landscape Gardening, 7 and 8.

Courses open to juniors and seniors, both if possible: Horticulture 3 and 4 and possibly Landscape Gardening 3 and 4.

This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

**Pomology.**

Prof. FRED C. SEARS, Adviser.

Course.	Credit.
Pomology 1, . . . . .	3
Pomology 2, . . . . .	3
Pomology 3, . . . . .	3
Pomology 4, . . . . .	3
Botany 5, . . . . .	2
Botany 7, . . . . .	5
Agronomy 6, . . . . .	3
Farm Administration 3, . . . . .	3
Farm Administration 4, . . . . .	3
Entomology 1, . . . . .	3
	<hr/>
	31

**Agricultural Chemistry.**

Assistant Prof. CHARLES A. PETERS, Adviser.

Course.	Credit.
Chemistry 5, . . . . .	5
Chemistry 6, . . . . .	5
Chemistry 9, . . . . .	5
Chemistry 10, . . . . .	5
Chemistry 11, . . . . .	5
Chemistry 12, 14 or 16, . . . . .	5
Chemistry 13, . . . . .	3
Chemistry 15, . . . . .	3
Chemistry 18, . . . . .	2
	<hr/>
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suited to be taken in connection with Chemistry.

**Economic Entomology.**

Prof. HENRY T. FERNALD, Adviser.

Course.	Credit.
Entomology 1, . . . . .	3
Entomology 2, . . . . .	2
Entomology 3, . . . . .	4
Entomology 4, . . . . .	4
Entomology 5, . . . . .	3
Entomology 8, . . . . .	3
Botany 3, . . . . .	4
Botany 4, . . . . .	2
Zoölogy 3, . . . . .	3
Zoölogy 4, . . . . .	3
	<hr/>
	31

A major in Economic Entomology does not necessarily include all the entomological subjects, as implied at the top of this list.

**Plant Physiology and Pathology.**

Prof. GEORGE E. STONE, Adviser.

Course.	Credit.
Botany 3, . . . . .	4
Botany 4, . . . . .	2
Botany, 10, . . . . .	4 or 5
Botany 14, . . . . .	4
Chemistry 5, . . . . .	5
Chemistry 6, . . . . .	5
Entomology 1, . . . . .	3
Entomology 2, . . . . .	2
	<hr/>
	29 or 30

**Agricultural Education.**

Prof. WILLIAM R. HART, Adviser.

Course.	Credit.
Agricultural Education 1, . . . . .	3
Agricultural Education 2, . . . . .	3
Agricultural Education 3, . . . . .	2
Agricultural Education 4, . . . . .	3
Dairying 5, . . . . .	2
Farm Administration 3, . . . . .	3
Floriculture 1, . . . . .	4
Poultry Husbandry 1, . . . . .	2
Poultry Husbandry 2, . . . . .	2
Market Gardening 2, or Agronomy 3, . . . . .	3
Botany 5, . . . . .	2
	29

A minimum of 15 credit hours should be elected by the student from the group of subjects offered by the Divisions of the Humanities and of Rural Social Science. Not less than 3 credit hours must be taken in each division.

## ELECTIVE COURSES OFFERED IN DIVISION OF HUMANITIES.

## ELECTIVE COURSES OFFERED IN DIVISION OF RURAL SOCIAL SCIENCE.

Economics and Sociology	History and Government	English	Modern Languages	Agricultural Economics	Agricultural Education	Rural Sociology
1 Elementary Economics	1 Elements of Political Science	7 Expository Writing	7 Scientific French 11 German Literature	1 Meaning of Education	3 Literature of Rural Life	
3 Social Institutions and Social Problems	3 History of New England	9a. Introductory Rural Journalism (2 hrs.) 9b. Journalistic Prac. (2 hrs.) 9c. Adv. Journalistic Practices (1 hr.) (Ind.)	9 French Literature	7 Problems in Agr. Econ. (2 hrs. Ind.)	3 Methods (2 hrs. Ind.)	7 Rural Institutions
5 Public Finance, Money, Banking	5 History of Ideals	13 English Writers and Thought	1 Elementary Spanish	9 Seminar (Ind.)	5 Seminar (Ind.)	5 Social Conditions of Rural People
		15 English Language and Literature	9 Scientific German	5 Historical and Comparative Agr.		9 Social Psychology of Rural Life
		P. S. 9 Debating (Ind.) (2 hrs.)	7 Modern German			11 Soc. Aspects of Current Agric. Quest.
		17 Adv. Comp. and Literature (2 hrs.)				
2 Industrial Problems	2 Local Political Institutions	1 History of Music (Ind. evening)	8 Scientific French		2 Vocational Educ.	13 Seminar
4 Mod. Soc. Ref. Movements		8 Expository Writing (technical)	10 French Literature	5 Co-operation in Agr. (2 hrs. Ind.)	4 Teachers' Agric.	4 Rural Law (Ind.) 6 Soc. Aspects of Co-op. among Farmers
6 Economic History		10a. Reporting and News Writing (2 hrs.) 10b. Jour. Prac. (2 hrs.) 10c. Adv. Jour. Prac. (1 hr.) (Ind.)	2 Modern Spanish Authors	10 Seminar (Ind.)	6 Seminar (Ind.)	8 The State and the Farmer.
8 Anthropology		14 English Writers and Thought	10 Scientific German	4 Elements of Agric. Economics		10 Farmers' Organizations
		16 English Language and Literature	8 Modern German			2 Rural Community
		18 Advanced Literature	2 History of Music (Ind.)			
		P. S. 8 Occasional Oratory				

Ind. = hours may be arranged independent of schedule.

**SUMMARY.**

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the Divisions of Humanities and of Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 or more than 21. (See Rules 2 and 3.)

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# MASSACHUSETTS AGRICULTURAL COLLEGE



The College  
The Graduate School  
The Extension Service  
The Experiment Station



THE  
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1912

College Calendar

1913



1912

September 4-7 . . . . .	Entrance Examinations
September 11 . . . . .	First Semester Begins
November 27 . . . . .	Thanksgiving Recess Begins
December 2 . . . . .	Thanksgiving Recess Ends
December 20 . . . . .	Christmas Recess Begins

1913

January 6 . . . . .	Christmas Recess Ends
February 3 . . . . .	Second Semester Begins
March 28 . . . . .	Spring Recess Begins
April 7 . . . . .	Spring Recess Ends
May 30 . . . . .	Memorial Day, Holiday
June 14-18 . . . . .	Commencement
June 18-21 . . . . .	Entrance Examinations





**I**T IS the purpose of this pamphlet to describe briefly the various phases of the mission of the Massachusetts Agricultural College.

In particular it outlines the college instruction offered as a preparation for the agricultural vocations, and contains general information of interest to prospective college students.

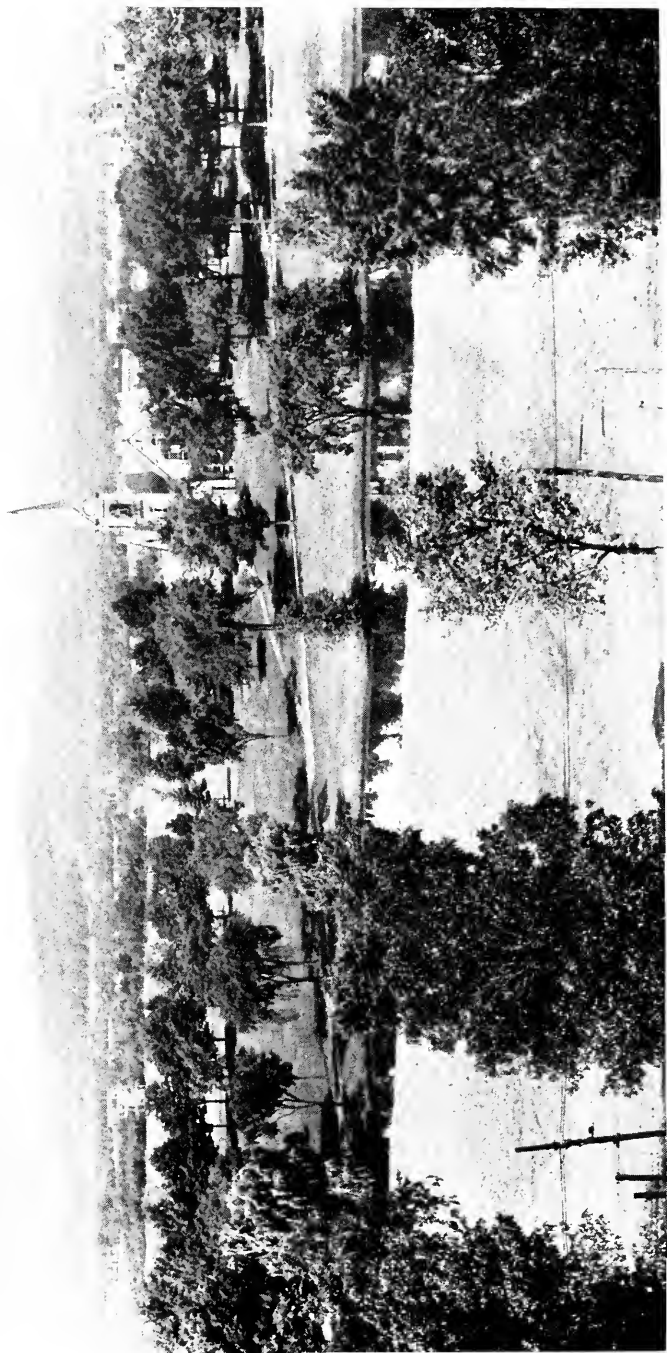
Any person contemplating a college education is invited to ask for a complete catalog of the institution.

Special reports, announcements and bulletins are issued by the Experiment Station and by the Extension Service; all are for free distribution.

Copies of this illustrated booklet will be sent upon request.

**KENYON L. BUTTERFIELD,**  
President.

Amherst, Mass.



In the Connecticut Valley



Massachusetts Agricultural College is designed primarily to benefit the agriculture and rural life of the state, and incidentally that of the nation.

In its attempt to meet this obligation the College recognizes three types of endeavor which are at the same time distinct and coördinate. The first is that of investigation; the methods here followed are those of research, experimentation and the agricultural survey. By scientific research there is gained a knowledge of the fundamental natural laws which govern the growth of plants and animals. The purpose of experimentation is to ascertain the best methods of applying to actual operations the general principles which are revealed by research. The term "agricultural survey" is used to designate that form of investigation which seeks to determine by a careful study the exact agricultural status, in all its phases, of a given community; thus as a result of a thorough agricultural survey of a locality it would be known for what crops the soil and climate are best adapted, what cultural methods will be found most profitable, and the extent to which each agricultural enterprise is or may be carried; the economic phase of agriculture also becomes a part of such a study; facts regarding cost of production, transportation, methods and cost of distribution, supply and demand, may all be brought together and placed at the service of the farmer.

The individual farmer may by years of experience and close study learn for himself much of what is here suggested; but not all farmers can afford to learn these things by personal experience. Since it is desirable from an economic standpoint that every acre of land be so cultivated as to produce a maximum crop, it is clearly the legitimate function of the state to undertake these large projects which result in added material prosperity not only to the individual, but to the country as well.

The second method employed by the College in the fulfilment of its mission is that of teaching those who enroll as resident students. Some of the agricultural vocations for which its students are trained are those

of practical farming, including dairying, gardening and orcharding; professional experts in landscape gardening, botany, chemistry, entomology and similar departments; specialists in agricultural science or practice, such as teachers, investigators and extension workers employed in agricultural colleges, experiment stations and the United States Department of Agriculture; experts in fertilizer and other agricultural business enterprises; social workers for rural communities, such as country teachers, clergymen, Y. M. C. A. secretaries and similar professions in which service to the rural people is the chief object. Not only does the College attempt to better equip men for successful careers, but it aims also to educate them in the principles of good citizenship, to inspire in them a desire to render service to society, and to acquaint them with the social, economic and governmental problems of the day.

The third phase of the task of the College is regarded to be that of disseminating agricultural knowledge to all people of the state and of assuming an attitude of leadership or of coöperation in various projects, educational, social or economic, which tend to benefit agriculture and country life. This type of work is organized as the Extension Service.



Scene North of the Campus

## History

The Massachusetts Agricultural College was chartered in 1863 and admitted its first class of students four years later. The institution received its original endowment from the federal government through the so-called "Morrill Act;" but its first buildings were provided for by local subscription, and the funds for maintenance, additional buildings, equipment and land have been granted by the state.

During the past few years the College has constantly grown in numbers; in 1901 there were enrolled 134 regular students; five years later the attendance had increased to 219, and in 1911 to 475. Not only has the number of resident students increased, but by the work of the Experiment Station and through the various Short Courses and other forms of Extension Service, the influence of the institution throughout the state is now felt more strongly than formerly.



## Location

The College is located in the Connecticut valley twenty-five miles north of Springfield and ninety-eight miles west of Boston. The estate of over 500 acres lies about a mile north of the village of Amherst. The natural surroundings of inspiring beauty soon endear the student to the place and create memories long to be cherished.

Electric cars pass the College from the railway stations and connect the village with Northampton, Holyoke and Springfield.

# Entrance Requirements

The requirements for admission are similar to those of other New England colleges in that they are based on the satisfactory completion of a four years' high-school course or its equivalent. The requirements may be met by examination, by credentials of the Regents of the State of New York or by a satisfactory certificate presented from an approved academy or high school. Women are accepted on the same conditions as are men.

Entrance requirements are stated in the form of units, one unit being the equivalent of four or five recitations a week for a school year. In the schedule printed below, the nine units of group A are required; enough more studies must be selected from group B to make a total of fourteen, the necessary number for admission.

## GROUP A. REQUIRED.

English, . . . . .	3
French or German, . . . . .	2
United States History and Civics, . . . . .	$\frac{1}{2}$
History (elective), . . . . .	1
(a) Ancient History.	
(b) Medieval and Modern History.	
(c) English History.	
(d) General History.	
Algebra, through progressions, . . . . .	$1\frac{1}{2}$
Plane Geometry, . . . . .	1
Total, . . . . .	9

## GROUP B. SELECT SUBJECTS AMOUNTING TO FIVE UNITS.

English in addition to requirements, . . . . .	1
French in addition to requirements, . . . . .	2 or 1
German in addition to requirements, . . . . .	2 or 1
Greek, . . . . .	2 or 3
Latin, . . . . .	2 or 3
History in addition to requirements, . . . . .	1, 2 or 3
Solid Geometry, . . . . .	$\frac{1}{2}$
Trigonometry, . . . . .	$\frac{1}{2}$
Chemistry, . . . . .	1
Physiography, . . . . .	$\frac{1}{2}$
Physiology, . . . . .	$\frac{1}{2}$
Agriculture, . . . . .	$\frac{1}{2}$ or 1
Botany, . . . . .	$\frac{1}{2}$ or 1
Geology, . . . . .	$\frac{1}{2}$
Physics, . . . . .	1
Zoölogy, . . . . .	$\frac{1}{2}$
Commercial Geography, . . . . .	$\frac{1}{2}$
Drawing, . . . . .	$\frac{1}{2}$
Manual Training, . . . . .	$\frac{1}{2}$ or 1

# Courses

The regular college course is ordinarily completed in four years; at the end of this period the student is graduated with the degree of Bachelor of Science. The program of studies followed during the course has two objects: one to offer the student a comprehensive and fairly thorough preparation for the agricultural vocation which he may choose; the other to afford him a liberal college education without regard for future occupation. Thus in the past men have found the course an admirable foundation for business, law, medicine and other professions.

The work of the first two years is largely prescribed and is taken in the following studies:

## IN THE FRESHMAN YEAR.

Algebra,  
Animal Husbandry,  
Chemistry,  
English,  
French or German,  
Hygiene,  
Military Drill and Physical  
Education,  
Public Speaking,  
Solid Geometry,  
Trigonometry.

## IN THE SOPHOMORE YEAR.

Agricultural Industry  
Agronomy,  
Animal Husbandry,  
Botany,  
Chemistry,  
English,  
French or German  
Geology,  
Horticulture,  
Military Drill and Physical  
Education,  
Physics,  
Surveying,  
Zoölogy.

For the junior and senior years a liberal elective system is in operation. Fourteen teaching departments of the College present major courses; at the close of his sophomore year a student elects work in one of these departments and thereafter studies chiefly that group of subjects which in the judgment of his college advisor will best prepare him for the life work which he has chosen. While pursuing this program of work, however, the student is required to take a certain number of courses in the humanities and in rural social science, but he still has time for a considerable amount of additional work which he may choose with freedom.

At present major courses may be elected in the departments listed below; on succeeding pages of this booklet will be found a brief description of the purpose and opportunities of these majors, and information also as to the equipment available and courses given.

## Major courses now offered:

In Agriculture: Agriculture,  
Agronomy,  
Animal Husbandry,  
Dairying,  
Poultry Husbandry.

In Horticulture: General Horticulture,  
Floriculture,  
Forestry,  
Landscape Gardening,  
Pomology.

In Science: Agricultural Chemistry,  
Economic Entomology,  
Plant Physiology and  
Pathology.

In Rural Social Science: Agricultural Education.



The Farm and Farm Buildings

## Agriculture

The major in agriculture is arranged for those who wish to prepare for the work of the general farm; students who wish to specialize in farm administration are also advised to elect the major in agriculture. In addition it offers to students who have not definitely decided to specialize along a single line an opportunity to study more carefully the different branches of agriculture.

The work may be arranged to suit the needs of the individual student but it will be made up largely of technical courses offered in the different departments of the division of agriculture together with chemistry and veterinary science. The equipment for the work includes the college farm of about 250 acres, well stocked and equipped, in addition to the special apparatus available for the different departments.

For those with some capital to invest, the opportunities for successful farming are excellent in New England, and few lines of business offer equal advantages to those who are fond of country life. There is also a constant demand for well-trained men with practical experience as farm superintendents and managers. The organization of separate departments of farm administration or farm management in the agricultural colleges of the country is comparatively recent and for some time to come there is likely to be a demand for good teachers of this work. In all these lines practical experience is essential to success and those who major in agriculture are advised to spend all the vacations of their college course in actual work upon good farms.



# Agronomy

The purpose of the major in agronomy is to train men to fulfil the technical requirements of teaching and investigational work in the field of crop production. The department has available for teaching purposes the college farm, on which are produced all the crops commonly raised on the general farm in New England, the agricultural department of the Experiment Station which carries on a large number of fertilizer experiments, variety tests, and the like, and laboratories equipped for soil and for seed study.



Haying

Students electing the major in agronomy are required to take several courses in the department itself, courses in organic chemistry, in bacteriology and such work in the departments of farm administration and animal husbandry as is closely related to agronomy. In addition, students are urged to elect courses in vegetable pathology and economic entomology. The aim is to give the student such training as will aid him in solving the new problems which are constantly arising in field work in crop production.



Farm Barns

# Animal Husbandry

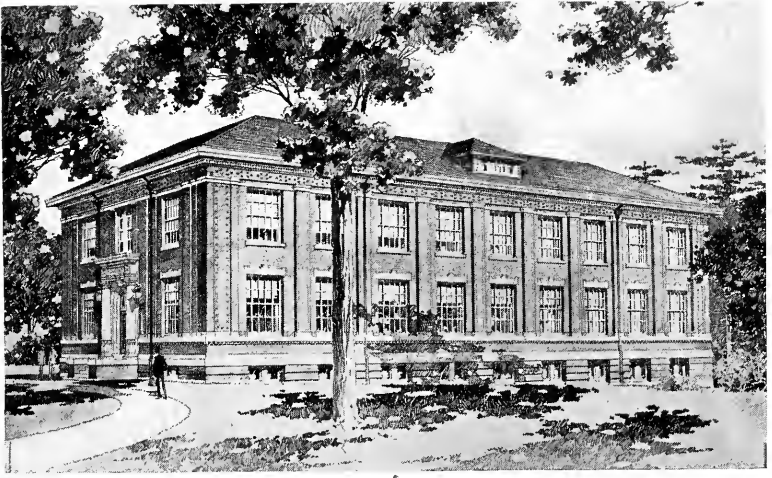
Those deciding upon animal husbandry as their major pursue studies in the feeding, breeding, management and judging of live stock; they are also advised to elect courses in other agricultural subjects and in veterinary science.

This department has at its disposal a stock-judging arena which is utilized as a class room, for demonstrations and for stock shows. The college herd of cows, its stable of horses and other groups of animals, comprise the breeds and types of live stock of chief economic importance in New England and are used constantly by the department of animal husbandry for teaching purposes.

Instruction in this department is of such a nature as to afford students a clear insight into the scientific principles of animal breeding and in addition to furnish them a practical knowledge of the entire management of live stock on the farm, for show purposes, or in enterprises where the breeding and improvement of animals is the chief end in view



Part of the College Herd



Flint Laboratory—Dairying

## Dairying

The purpose of the course in dairying is to afford the student a training in the economical production of milk and in the best methods of making and handling market milk and farm dairy products.

The equipment consists of a new dairy building, costing \$85,000, that will accommodate one hundred students in the laboratories. These laboratories are fully equipped with up-to-date dairy apparatus. Along with this equipment there is available for use the college certified milk plant which produces certified milk for the Boston market.

The course consists of work in milk analysis, dairy bacteriology, market milk and cream and the manufacture of butter and other dairy products. In addition to these is studied economical milk production; types and breeds of dairy cattle; their breeding, feeding, care, management and selection; general problems of farm management, farm buildings and farm bookkeeping. The course consists of lectures, text-book work and the actual handling of materials and stock.

More and better opportunities are opening each year for teachers, dairy farm superintendents, foremen and dairymen that have training and experience.

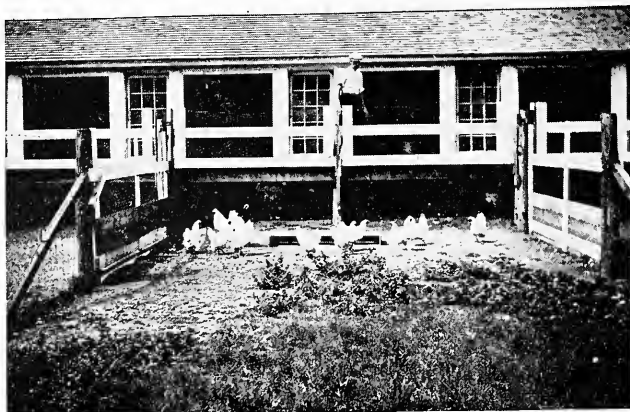
# Poultry Husbandry

The purposes of the major in poultry husbandry are: first, to give a broad scholastic training in this subject both scientific and practical; second, to prepare young men and women to raise poultry more profitably as a side line on the farm or as the main enterprise; third, to furnish opportunity for students to prepare themselves for teaching or experiment station work.

The poultry plant occupies an area of seven acres of land and at present has the following equipment at its disposal: a laying house divided into 20 pens; an open-pipe brooder house that will accommodate about 1,200 chicks; an incubator cellar with demonstration building above; laboratories for killing, picking, dressing, caponizing and fattening; a well fitted shop for poultry carpentry; a large feed and storage building containing a laboratory for poultry mechanics, equipped with feed grinders, bone cutters, feed cutters, etc.; a large number of colony houses; and twenty varieties of birds, numbering about 1,600.

The increased demand and good prices for poultry products, the ideal soil and good climate, make Massachusetts a very desirable field for poultry culture. That poultry is the most profitable class of animals on the farm is practically the universal verdict among farmers who give some attention to their fowls.

The demand for managers of poultry farms and instructors in poultry husbandry in high schools and colleges is rapidly increasing and at present a large number of positions offering good salaries cannot be filled because young men are not to be found who have had both scientific and practical training.





Wilder Hall—Horticulture

## General Horticulture

This major is designed to prepare students for work in the growing of fruits and vegetables, with some slight attention to ornamental planting. The program of studies required is varied to suit the needs of individuals; in this way the student may emphasize either pomology, market gardening, floriculture, forestry or landscape gardening. A considerable demand exists for teachers of horticulture in colleges and high schools and such persons are required to have a working knowledge of the several branches enumerated.

A large area of the college estate is set aside for use by the department of horticulture. There is also found on the grounds a large collection of trees, shrubs and herbaceous plants from the study of which the student may gain a wide knowledge of plant materials.

Wilder Hall is the administrative seat of the division of horticulture. Here are found several business offices, class rooms and laboratories.

# Floriculture

This department aims to give men a thorough knowledge of the growing of all commercial florist crops both under glass and outdoors. It also aims to acquaint men with methods to be followed in growing all conservatory plants so that those men who have charge of large private estates where cut flowers and ornamental plants are grown may be familiar with all branches of this work. The course is therefore planned for the young man who wishes to engage in the florist business for himself and for the man who intends to work for another either in a commercial range or on a private estate. The courses are planned to give both scientific and technical information along all lines.

The department is splendidly equipped with a new range where florist crops are grown under the best possible conditions; these houses are up-to-date in every respect. The old range serves to illustrate older methods of construction as well as to house many specimen plants of the conservatory type. There are numerous progressive florist establishments in the vicinity and frequent observation trips are taken to acquaint students with methods followed on these ranges.

The demand for graduates on commercial ranges has not been as large as in some other branches of horticulture but there is an increasing demand for these men. Florists are becoming alive to the fact that an education is as essential for success in this line as in any other and there is an increasing number of openings every year for men on commercial places. The larger number of graduates, however, go on private estates or into experiment stations or college work. The call for men in these lines during the last few years has been greater than the supply.



French Hall—Floriculture and Market Gardening

# Forestry

The forestry work in the Massachusetts Agricultural College differs from that in the well-known forestry schools in the fact that it is given to students of undergraduate grade. Most of the separate forestry schools require graduation from college before admission to their forestry courses is allowed. Forestry work in this institution has two principal purposes: (a) to give farmers, farm superintendents, landscape gardeners and others a good general working knowledge of the elementary principles of for-



estry; (b) to prepare men for graduate work in the advanced forestry schools. When elected as a major the courses will tend chiefly toward the latter.

The large tracts of woodland located in the vicinity of the college illustrate many forestry problems and afford ample opportunity for practical demonstrations of forestry methods. A large amount of practical work enters into the program of this major.

# Landscape Gardening

Students who graduate from the courses in landscape gardening find positions in city park work, in the care of trees, as assistants to established landscape gardeners, and a certain number of them after sufficient practical experience take up profitably landscape gardening on their own account; men who have followed this calling have for the most part met with eminent success. The courses in this line have been well developed through several years' experience and the department is



Practical Work in Landscape Gardening

adequately equipped with instructors, laboratories, apparatus and materials.

Field work, the preparation of planting and grading plans, and text-book study are required in this course. For purposes of observation and study, classes in landscape gardening make frequent visits to parks and large private estates in Amherst and nearby cities and towns.

The landscape gardening laboratories are located in Wilder Hall.



# Pomology

The courses in pomology are planned with a view to equipping the student with both theoretical and practical knowledge of the subject. Special emphasis is laid upon actual field work and every student is required to go into the orchards and perform such operations as pruning, spraying and fertilizing. To provide for this work the department is assigned about 30 acres of orchards, vineyards and small fruit plantations. It also has all the most improved implements and apparatus for cultivating, spraying and pruning.

Another phase of the work which is given special prominence is that of packing and marketing fruit. The department is equipped with a thoroughly modern fruit storage house which has a capacity of 3,000 barrels; in this building is a large class room for work in packing and, in addition, five storage rooms.

The work in pomology is divided into four courses: (1) plant propagation in which the student is taught all the methods of multiplying plants such as cuttings, grafting and budding; (2) practical pomology where such work as laying out orchards, pruning, spraying and fertilizing is taught; (3) systematic pomology or a study of the fruits themselves; in this work the college is supplied with a large number of varieties of all the different classes of fruits, while collections are exchanged with many other colleges from Maine to Oregon; and (4) commercial pomology or the packing and marketing of fruits.

There is always a demand for men of energy and ability who have been thoroughly trained in pomology. Some of them go into agricultural colleges or experiment stations, others become managers on farms or estates, while still others take up work for themselves in raising fruit.



Spraying in the College Orchard

# Agricultural Chemistry

The major in agricultural chemistry allows men to gain sufficient knowledge of chemistry to be able to apply it to agriculture and the chemical problems with which agriculture is surrounded.

The major work is built on the courses in general chemistry and qualitative analysis and consists of three rather distinct lines of work: organic and physiological chemistry, quantitative analysis, and physical chemistry; each line is separate and distinct and at the same time correlated and dependent. Particular attention is given to the examination of a variety of agricultural material such as fertilizers, cattle feeds, soils, dairy products and farm crops.

A whole building is given to the department, the different kinds of work having their own special rooms. A well equipped chemical library is at the disposal of the student.

The graduates who have followed chemistry while in college are now spread over all parts of the world. Some have connected themselves with the government and state agricultural work in Washington and the experiment stations of several states. Many are chemists in fertilizer works, acid plants and other agricultural industries. Still others have followed their inclination to do executive work and have become managers and owners of chemical plants connected with agriculture. Opportunity is offered for advanced study leading to the degree of Master of Science.



Chemistry Laboratory



Laboratory for Entomology and Zoölogy

## Economic Entomology

The primary purpose of the major in economic entomology is to train those taking it in the methods of controlling injurious insects and the best ways in which their ravages may be checked. The courses are arranged in such a way as to supply this knowledge as a part of the training of the student whether he expects to become a market gardener, a florist, a forester, or to deal with some other class of crops. For this purpose there is provided probably the best and largest entomological building in the country; a large collection of insects in their different stages, microscopes for the finer work, spraying apparatus, and many other facilities, make it possible to give the work in an unusually complete manner.

The subject is begun in the junior year in a broad introductory way covering general principles applicable in all sections of agriculture. In the senior year the work is largely individual and is intended so far as possible to meet the special needs of each person, fitting into his plans for his future occupation. The call for men specially trained in this subject has also led to the establishment of graduate courses; men taking these become experiment station, state or government entomologists, or teachers of the subject; for well-trained men in these lines there is a constant demand.

# Plant Physiology and Pathology

It is the aim of the major electives in botany to supply information and to train students in special lines of botany closely related to agriculture. As students elect these subjects with different purposes in mind, the various courses differ widely in the degree of technical training afforded.

The equipment for this work includes a building, greenhouses, microscopes and very complete apparatus. Practically two courses are offered in plant pathology. One gives the student an opportunity to study the common diseases of plants and their remedies; on this subject a large amount of literature, including experiment station bulletins, is to be had in the laboratory; this course is designed especially for horticultural and agricultural students who wish to become more pro-



Clark Hall—Botany

ficient in recognizing fungous and bacterial diseases of plants and methods of control. A more technical course is also given, having for its object a study of the life histories of economic fungi and bacteria; this is designed as a foundation for those who wish to pursue further studies in plant pathology and allied subjects.

An extensive course is given in experimental plant physiology which is correlated with physiological chemistry; this affords a foundation for further work in plant physiology and allied subjects and fits one for teaching agriculture in secondary schools.

The course in shade-tree management and the physiology and pathology of trees includes a comprehensive study of the structure and diseases of shade trees, and is designed as a fundamental course for those engaged in city forestry, tree warden and park work, and for professional tree surgeons.

# Agricultural Education

The primary purpose of this major is the preparation of teachers of agriculture and the related sciences. Some of the courses given in the department are valuable for all students of social questions aside from this primary aim. At present a large proportion of the major is given by the department of agricultural education, the other courses being taken in the various scientific and technical departments of the College; the entire equipment of these departments is at the service of those preparing to teach, just as for other students. The work prescribed for individual students depends upon their previous training in science, technical studies and practical experience. Experience in farm operations reaching through a complete cycle of production and marketing will be required of all applying for certificates to teach agriculture.

Opportunities for teachers of agriculture are increasing rapidly; at the present time, the compensation for this work is more attractive than in most other lines of teaching. In 1911 forty-six requests for teachers of agriculture came to the office of the department of agricultural education. The average salary, when stated, was \$1,000 per year and in some cases \$2,000 a year was named as the sum to be paid. These requests came from nearly all parts of the country.



Veterinary Laboratory



Chapel and Library

## Other Departments

Not all departments offering elective courses during the junior and senior years are represented by the majors as previously outlined. Thus at present no major course is presented in the departments of market gardening, farm administration or rural sociology; in fact, however, these departments and others offer various elective courses which well cover their subjects. Comprehensive courses are also available in bacteriology, veterinary science, bee keeping, mathematics and engineering, physics, zoölogy, economics and sociology, history and government, English and modern languages.

Military drill and physical education are required of all students for three years and are optional the last year.

For all departments of the institution there are offered the advantages of a well-equipped library, for which purpose the first floor of the Chapel building is used. Here are collected nearly 40,000 bound volumes. In the reading room is found an ample supply of daily, weekly and monthly publications, many of which are scientific in character. The students voluntarily make an extensive use of the library.

## Unclassified Students

Occasionally there apply for admission to the College mature men or women who are unable to spend at the institution the time required to finish the complete course. Usually such persons desire to obtain the best training possible in one or two years for some special branch of practical agriculture or horticulture. That such applicants may be benefited by the College, they are admitted as unclassified students: that is, they are not a member of any of the four regular classes but may take college studies with those pursuing the full course. Only those are permitted to enroll as unclassified students who are at least twenty-one years old and who have completed a high-school course; other special regulations also apply to such students after entering.

## The Graduate School

College graduates may under prescribed conditions enter the graduate school. Advanced study may be elected in agriculture, botany, chemistry, entomology, horticulture, mathematics, veterinary science and zoölogy. The degree of Master of Science requires one and a half years' study and the degree of Doctor of Philosophy requires three years.

For several years the graduate courses have been well patronized but the development of the school has been delayed by lack of necessary funds. Recently a director of the graduate school has been engaged who will thoroughly organize the work and extend the field of its service.

There is always a demand for experts with the special training afforded by a graduate school of agriculture and invariably an attractive position awaits the man who completes the work required for an advanced degree.

A limited number of graduate assistantships are available at the College for men qualified to render laboratory or teaching assistance, and who at the same time wish to engage in post-graduate study.



Stock Judging at West Brookfield Extension School  
(First Agricultural Extension School to be held in New England)

## Short Courses and Extension Service

It is through the organization of Short Courses and various types of Extension Service that the College seeks to perform its mission of carrying agricultural knowledge and of rendering assistance in other forms to all the people of the state who have rural interests.

Early in January the winter school of agriculture opens and continues ten weeks; the last week of this term is devoted especially to instruction in poultry husbandry. Following the winter school comes the farmers' week; this is a four days' meeting at the College with a series of lectures and demonstrations devoted chiefly to agriculture, horticulture and home economics; several hundred men and women who find it impossible to leave home for a longer period visit the College annually on this occasion and find much to assist them in their practical problems on the farm and in the home.

Later in the spring a bee keepers' course is offered and during the vacation months a summer school of agriculture and country life is held; this usually terminates with a special conference for rural social workers.

The Extension Service activities away from the College are represented in part by correspondence and lecture courses, itinerant schools of agriculture, demonstration orchards, traveling libraries, boys' and girls' corn and potato clubs, and district field agents.



# The Experiment Station

The Agricultural Experiment Station of Massachusetts is located on the estate of the Agricultural College and is a part of that institution. Here are conducted extensive experimental projects dealing with agricultural practices, and experts are constantly engaged in scientific research seeking to discover new laws of nature and their application to the agricultural industry.

Some of the problems in which the experiment station is at present particularly interested are those connected with the use of fertilizers, plant breeding, plant diseases and insects, orcharding and poultry husbandry.

Students fitting themselves for positions in experiment stations are thus fortunate in their opportunity to observe these methods and results of scientific study and to come into personal relation with those already experienced in their own profession.

The Experiment Station issues technical bulletins giving the results of its investigations, and its officers annually answer thousands of inquiries of a practical or scientific nature.



One of the Experiment Station Buildings

# Student Life

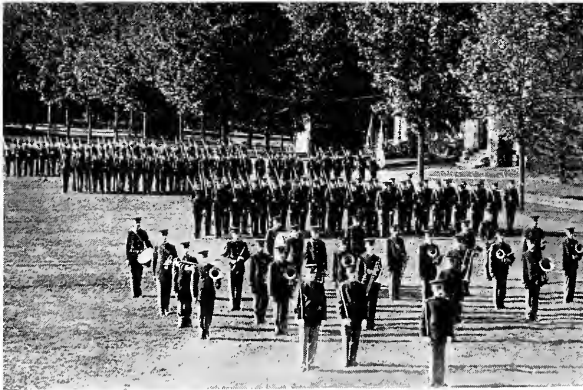
Student life at M. A. C. has many attractive features and offers large opportunity for leadership.

All students are members of the Social Union; this organization is the expression of a desire on the part of students and faculty to provide a definite means of stimulating a democratic social spirit among all students, alumni and officers of the College. This purpose of the Union is carried out in part through a series of entertainments and informal social gatherings which are held on Saturday evenings during the autumn and winter months and which are free to members of the college community. The students have also purchased suitable furnishings for a reading and lounging room on the first floor of North College dormitory and have equipped in connection with this a game room and a trophy room. The Union is supported by a small annual fee which is collected from all students at the opening of the college year.



Social Union Room

A body of students consisting of five seniors and four juniors are elected as a "Senate;" the function of these men is to govern general matters pertaining to student life, to establish and enforce certain rules for student conduct, and to represent before the faculty the interests of the student body.



Battalion

The Y. M. C. A. endeavors to promote Christian character among all the men of the College, and to enlist the men in Christian and social service wherever an opportunity for this is presented. To this end weekly meetings are held, and during a part of the year Bible study classes are conducted; the members assume social, educational and religious leadership in Amherst and in the nearby towns, by organizing boys' clubs, conducting Bible classes, teaching foreigners and furnishing musical entertainments.

A Catholic club has also been organized.

A prominent place is given to intercollegiate athletics; relations are maintained with Amherst, Dartmouth, Williams, Brown, Springfield and other New England colleges. The principal sports participated in are



M. A. C. Students Teaching English to Polish People



Hockey Team, 1911 - 12

football, baseball, track, hockey and tennis; a large area of land is available for an enclosed athletic field and recreation ground, and it is expected that funds will soon be provided to properly fit this land for use.

A rifle club was organized a few years ago and has met with singular success in both its indoor and outdoor meets. A band is maintained in

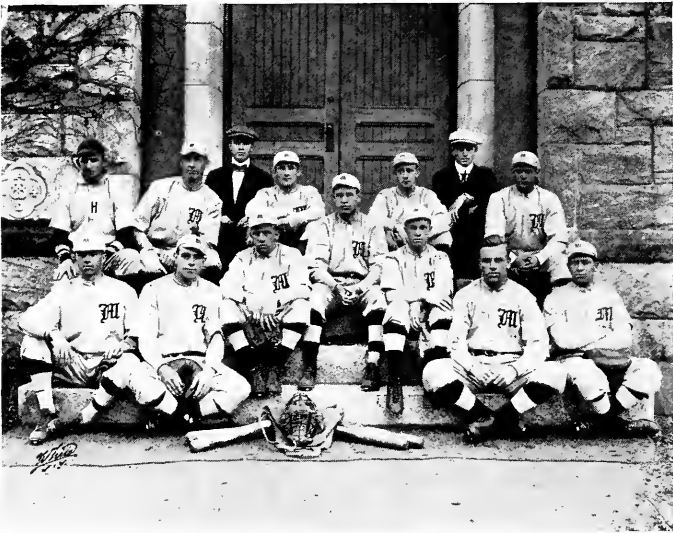
connection with the military department. Musical, debating and dramatic clubs attract those interested in these activities. Several professional societies also exist, chiefly in the departments of agriculture, horticulture and entomology. Stock and fruit judging teams annually represent the College in public contests.

A college newspaper and a year book are published by the students.

Secret societies hold a prominent place in the student life of the College; at present there are nine such organizations, several of them being affiliated with national Greek letter fraternities.

Various purely social activities are managed by committees elected from the student body.

College classes are scheduled for five days each week, Saturday being left free. Ordinarily the students are brought together in the chapel on four days for simple devotional exercises and for announcements; on the fifth day a general assembly is held, before which some prominent man not connected with the College frequently speaks. During a portion of the year, Sunday services are held at 9:15 a. m.; a clergyman or distinguished layman is secured for such gatherings.



Baseball Team, 1912

## The Cost

For the most part the students at M. A. C. live economically; necessary expenses are moderate and the various phases of student life have not the expensive features which prevail at many institutions. Tuition is free to residents of Massachusetts; thus the main items of expense are those for board, room, laundry, books, military uniform, taxes voluntarily assessed for the support of various student activities, and miscellaneous personal expenses. The average student spends about \$300 a year, although the amount varies with each individual.

## Living Accommodations

At present the College has two small dormitories which together contain rooms for about sixty-five men; upperclassmen have the first choice in selecting these quarters. Two students occupy a suite of two or three rooms; the cost of these unfurnished suites, steam heated and lighted by electricity, ranges from \$39 to \$66 per year for each occupant. Efforts have been made to secure appropriations from the legislature for added dormitory facilities, but thus far without success.



North College Dormitory

Most of the students, therefore, are obliged to live in private houses located near the college grounds. Such rooms should be secured well in advance whenever possible as the demand for them is great. Comfortable rooms may be rented at prices varying from \$1.25 to \$3.00 a week for each student; they are generally furnished either completely or in part, lighted, heated and cared for.

The College manages a large dining hall where board may be obtained at reasonable cost; the price of board is usually about \$4.00 per week. A lunch room is also operated in connection with the regular dining hall.



The Dining Hall

## To Needy Students

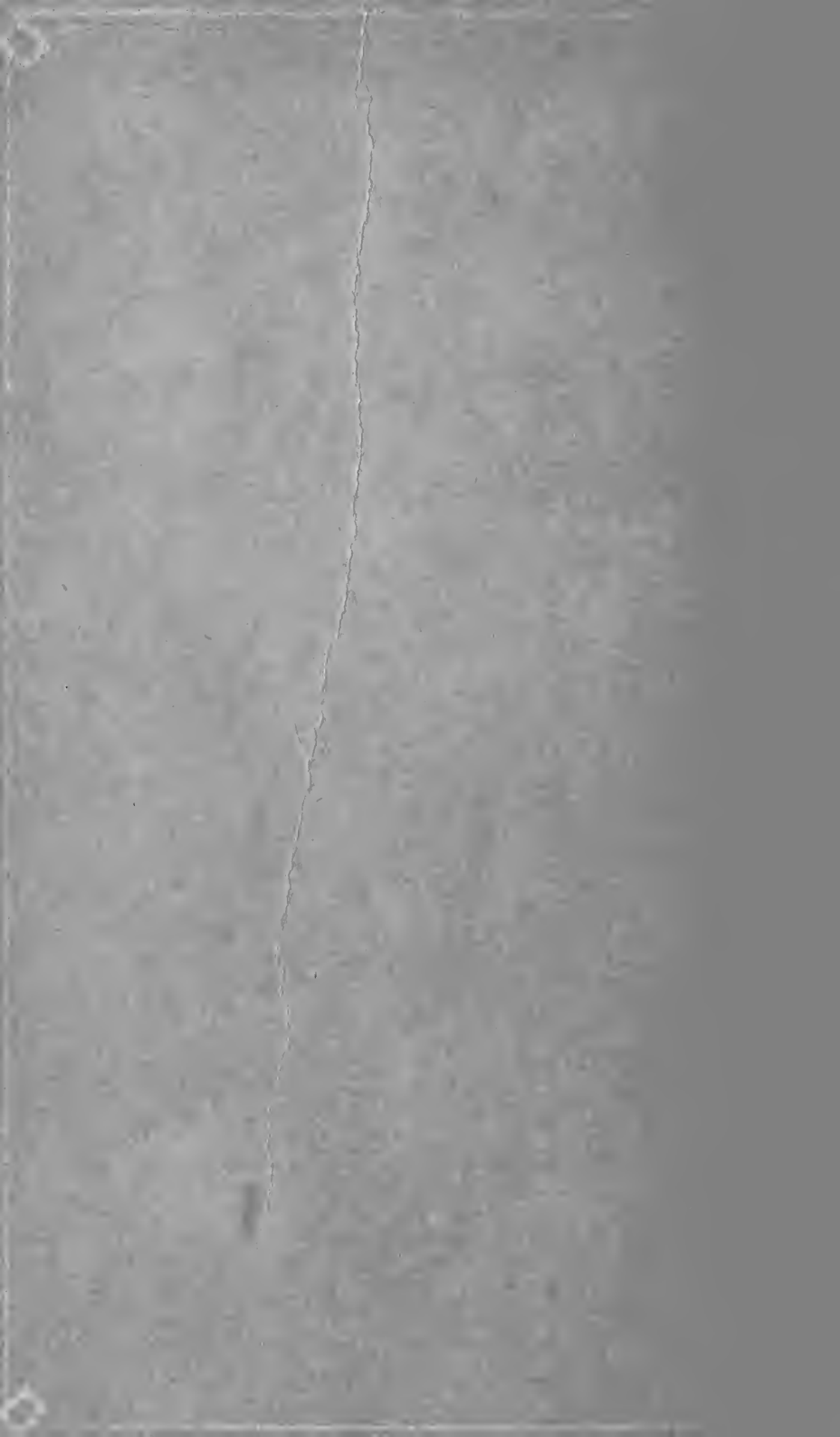
Many of the students of M. A. C. are obliged to earn a part of their expenses and a few are dependent entirely upon their own efforts for a college education. The College is glad to help needy students both by offering them employment in some department or by obtaining work for them away from the institution. The most responsible positions at the College are the most remunerative and are assigned to students who have been at the institution for some time; accordingly the newcomer should not expect to earn as much money his first year as he sees some of the older men earning. It is not advisable for a student to attempt his college course until he has enough ready money to carry him through a good part of his first year, as under existing circumstances it is practically impossible for him to pay all his expenses from the outset and at the same time do creditable class-room work.

In all cases consideration has to be given to the efficiency and ability as well as to the need of the applicant for work.

Occasionally there come opportunities for vacation work for men who are specializing in certain departments. Experience gained in this manner is usually of large value to the men as it gives them additional training as well as assisting them financially.









Massachusetts Agricultural College

THE EXTENSION SERVICE

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# SHORT COURSES



AMHERST, MASS.

1913



**THE  
M. A. C. BULLETIN**

**AMHERST, MASS.**

**Volume IV Number 6 October 1912**



**COLLEGE POND**

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## DATES OF SHORT COURSES 1913.

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Ten Weeks Course . . . . .	Jan. 6 to Mar. 14
Apple Packing School . . . . .	Jan. 23 to 28
Farmers' Week . . . . .	Mar. 17 to 21
Polish Farmers' Day . . . . .	Mar. 27
Beekeepers' Course . . . . .	May 28 to June 11
Beekeepers' Convention . . . . .	June 11 and 12
Summer School . . . . .	July 1 to 29
Conference for Rural Leaders . . . . .	July 29 to Aug. 1
Poultry Convention . . . . .	July 28 to 30

## THE TEN WEEKS COURSES.

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### ANNOUNCEMENT.

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The short courses at the Massachusetts Agricultural College are offered to meet the needs of those, both young and old, who want to study principles and modern methods in agriculture, and who for various reasons are unable to attend the four year courses. 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.

Instruction will be given by the regular faculty of the college by means of lectures, recitations, laboratory and practical work; from time to time they will be assisted by non-resident lecturers on special subjects. The work in the class-room will be supplemented by demonstration work in the laboratory, dairy room, greenhouse and stables. The library of over 30,000 carefully selected volumes offers exceptional opportunities for special study in agriculture, horticulture, and related sciences.

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 Dairy Industry, Floriculture, or Horticulture, must 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.

## FACULTY.

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- KENYON L. BUTTERFIELD—President and Head of Division of Rural Social Science.
- ALEXANDER E. CANCE—Associate Professor of Agricultural Economics.
- W. D. CLARK—Professor of Forestry.
- SAMUEL COONS—Instructor in Dairying.
- HENRY T. FERNALD—Professor of Entomology.
- JAMES A. FOORD—Professor of Farm Administration.
- GEORGE S. GAGE—Assistant Professor of Animal Pathology.
- BURTON S. GATES—Assistant Professor of Beekeeping.
- JOHN C. GRAHAM—Associate Professor of Poultry Husbandry.
- CHARLES R. GREEN—Librarian.
- WILLIAM R. HART—Professor of Agricultural Education.
- SIDNEY B. HASKELL—Assistant Professor of Agronomy.
- WILLIAM D. HURD—Director of The Extension Service.
- WILLIAM P. B. LOCKWOOD—Associate Professor of Dairying.
- E. M. McDONALD—Instructor in Agronomy.
- F. A. McLAUGHLIN—Assistant in Botany.
- JOHN A. McLEAN—Associate Professor of Animal Husbandry.
- A. V. OSMUN—Associate Professor of Botany.
- JAMES B. PAIGE—Professor of Veterinary Science.
- ELVIN L. QUAIFFE—Instructor in Animal Husbandry.
- RALPH W. REES—Extension Instructor in Pomology.
- FRED C. SEARS—Professor of Pomology.
- ROBERT J. SPRAGUE—Professor of Economics.
- EDWARD A. WHITE—Professor of Floriculture
- F. L. YEAW—Assistant Professor of Market Gardening.

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## NON-RESIDENT LECTURERS.

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To supplement the work given by the regular faculty, a number of men who have made conspicuous successes in their chosen fields will be engaged for lectures and demonstrations.

## COURSES OF INSTRUCTION.

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### A. Agricultural Group.

#### 1. Soil Fertility.

*Professor Haskell*

The nature of soils, their chemical and physical properties. The improvement of "run-down" land. Tillage. Green manuring. Crop rotation. Drainage. Stable manures, their value, composition, preserving and application. Commercial fertilizers, their nature. Materials which furnish the different elements. Fertilizers for different crops, the duplication of formulae. Lime and liming. Three exercises a week for ten weeks.

#### 2. Field Crops.

*Mr. McDonald*

The reproduction of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work will give the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Three exercises each week for ten weeks. Course 1 (Soil Fertility) required.

#### 3. Breeds and Breeding.

*Professor McLean and Mr. Quaije*

This course gives attention chiefly to dairy cattle, and covers, as well as the time will allow, characteristics of the breeds, comparative judging and scoring of dairy breeds, together with some of the more practical problems and principles of breeding. The college herd furnishes good material for judging practice. Three lecture periods and 2 two-hour judging periods each week.

#### 4. Feeding and Management.

*Professor McLean and Mr. Quaije*

A short time will be given to the composition of feed stuffs and the principles of nutrition, including a study of the feed stuffs and their effect on production. Specific problems of management, chiefly of dairy stock, will be considered, and practice given in compounding rations according to the most accepted standards. Two exercises weekly.

#### 5. Dairying.

*Professor Lockwood, Mr. Coons and Assistants*

Milk and milk production, creaming methods. Babcock and



acid tests. Market milk handling. Ripening cream and butter making. Dairy buildings, lighting, ventilation and sanitation.

3 one-hour and  $\left\{ \begin{array}{l} 2 \text{ two-hour periods} \\ 2 \text{ three-hour periods} \end{array} \right.$

The new dairy building will be used this year for the first time. Course limited to 80 students.

#### 6. Dairy Bacteriology.

*Professor Lockwood*

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 exercises each week.

#### 7. Animal Diseases and Stable Sanitation.

*Doctor Paige*

Lectures upon some of the common diseases of live stock, giving special attention to methods of prevention, care and sanitation. The treatment of emergencies and accidents. How to keep animals healthy. Two exercises each week.

#### 8. Poultry Course.

*Professor Graham*

The course will consist of lectures on poultry house construction, winter egg production, incubation and brooding, feeds and feeding and marketing poultry and eggs. Besides the lectures, there will be one or two demonstration periods per week, depending upon the size of the class. Demonstrations or practical work will be given on killing, picking, and caponizing, sorting and packing eggs for market, judging fowls for egg production, studying types, and studying construction of incubators and brooders. Our present equipment will enable us to demonstrate various methods in housing and feeding. Practical work in running incubators will be given to as many as our equipment will accomodate. Five exercises a week for ten weeks.

### B. Horticultural Group.

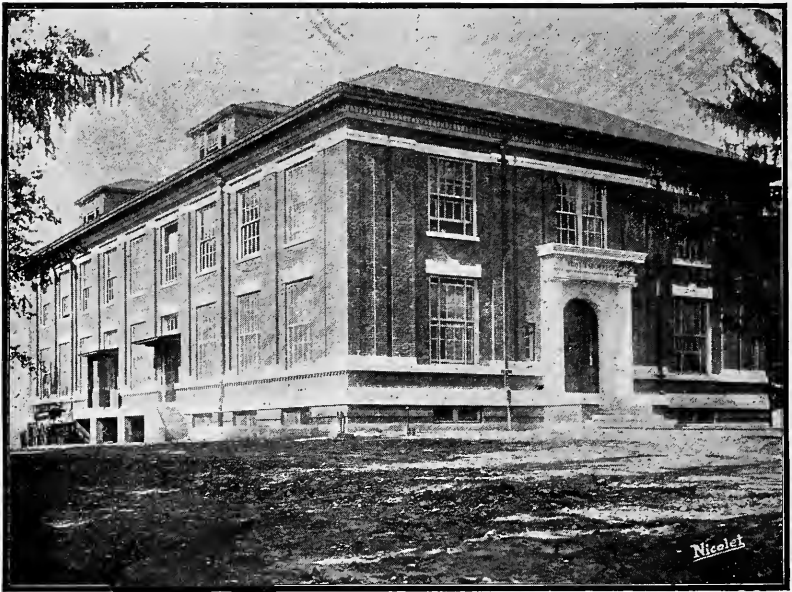
#### 9. Fruit Growing.

*Professor Sears*

The work in this course will deal with the practical side of the growing and marketing of fruits. Especial attention will be 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. Text books and lectures, supplemented with demonstrations; and whenever possible, actual work by the student. Five exercises each week for ten weeks.

Students electing Horticulture will also be required to take Course 1, and it is recommended that they take Courses 14 and 15.



FLINT LABORATORY—DAIRY BUILDING

**10. Market Gardening.**

*Professor Yeaw*

A general survey of the market gardening business, together with a study of the most important problems involved, such as location, soils, fertilizers, crops, systems of cropping, markets and marketing. Three lectures each week for ten weeks.

**11. Landscape Gardening.**

*Mr. Harrison*

The general principles underlying the art, with special reference to modern American methods. The various styles of gardening, the simpler problems, and some notice of the most important American masterpieces. Twenty exercises. Class limited to 15.

**12. Floriculture.***Professor White*

This course is outlined with the idea of furnishing young men who have not the time to devote to a longer course, with the theoretical and practical considerations which are essentials for success in Floriculture. The course will cover, as thoroughly as time will permit, those aspects of the work of special interest to the grower. Some of the topics to be considered are greenhouse construction, greenhouse details, such as ventilators, gutters, benches, etc., greenhouse furnishings and equipment, heating, florists' crops and florists' trade.

The lecture work will all be given in the mornings; the afternoons will be devoted to practical work in the greenhouses. All taking the course should bring a working suit. Saturdays there will be special trips to some of the most up-to-date floricultural establishments in the state. Many of these will be in the vicinity of the college, but one trip of two or three days' duration will be made through the eastern part of the state, especially in the vicinity of Boston. These visits to the practical men have been most helpful in previous years. "Write-ups" of each trip are part of the course.

In addition to the regular lecture work of the course, it is expected that lectures will be given by experts in growing special crops, such as roses, carnations, violets and orchids. The co-operation of several of the most up-to-date florists has been secured for these lectures. Five exercises each week.

Students electing this course will also be obliged to take Courses 1, 14 and 15.

**13. Forestry.***Professor Clark*

Lectures given to acquaint short course students with the importance of conserving the forests and forest products. The value of the forests to the state and nation. Special attention given to the handling of the farm wood lot. One lecture a week for ten weeks.

**C. Related Sciences.****14. Botany.***Professor Osmun and Mr. McLaughlin*

A study of the structure, function, and diseases of greenhouse, garden, orchard and field crops, together with methods of prevention, including spraying and the application of fungicides. One period each week will be devoted to laboratory work. Three exercises each week.

**15. Entomology.***Professor Fernald and assistants*

A study of the insects causing most injury to farm, orchard, garden and greenhouse crops, and methods for their destruction or control. Animal parasites and their prevention. Three exercises each week.

**16. New England Agriculture and Country Life.**

A course designed to acquaint Short Course students with the possibilities for the several lines of agriculture in New England. The work of the leading state organizations which are helping to build up New England country life will be presented by officers of each organization. This course is required of all Short Course students and takes the place of attendance at chapel and assembly, which was formerly required. Two hours a week.

**17. Farm Buildings.***Professor Foord*

A brief discussion of the principles that apply to the location, planning and arrangement of farm buildings in New England. The water supply and fencing problems will be briefly discussed. One exercise a week for ten weeks.

**18. Farm Accounts.***Professor Foord*

Practical work in keeping farm accounts and records. A simple system by which profits and losses of the farm may be traced to their original sources. One exercise a week, each exercise to equal two hours.

**19. Mechanics.***Professor Lockwood and Mr. Schroyer*

Care of boilers, engines and dairy machinery, installing and lining shafts and pulleys; calculating speeds of pulleys, etc. Cement foundations and floors. Plans for farm and dairy buildings. One exercise of two hours each week.

**20. Rural Sanitary Science.***Dr. Gage*

The following subjects will be considered: Significance of sanitary science, theories of disease, dirt and its dangers, drinking water and its protection, sewage, methods of disposal and purification, ventilation, foods, flies and mosquitoes in relation to sanitation, disinfectants, etc. Two exercises a week.

**21. Beekeeping.***Dr. Gates*

This course is designed as a general practical survey of the maintenance of bees not only for their products, but as an adjunct to

modern agriculture. Special effort is made to correlate the subject with the various phases of horticulture, namely, fruit growing, cranberry culture, market gardening and green house crops. Although the season of the year limits practical manipulation of bees, some first-hand experience will be afforded in their handling and in the construction of apparatus. Particular emphasis is laid upon the most recent and approved appliances and systems of manipulation. The large collection of appliances of the College, from throughout the world, affords exceptional opportunity for the serious apiculturist. Twenty lectures and laboratory periods. (Eight or ten two-hour periods will be attempted.)



COLD STORAGE PLANT

## 22. Rural Improvement.

*Professor Waugh*

Civic art as applied to rural conditions. The improvement of roads, street trees, school houses and grounds, public buildings, farm buildings, farm planning, etc. The organization and management of village and country improvement societies. One lecture a week.

# TEN WEEKS COURSE SCHEDULE—1913

	MORNING HOURS				AFTERNOON HOURS			
	1ST HR.	2ND HR.	3RD HR.	4TH HR.	1ST HR.	2ND HR.	3RD HR.	4TH HR.
MONDAY	Fruit Gr. Dairy Land. Gard.	Botany An. Hus.	Soil Fert.	Floricult. Fld. Crops Mkt. Gard.	But. Mak. 1 & 2 Mkt. Milk 3 An. Hus. 2	But. Mak. 1 & 2 Mkt. Milk 3 An. Hus. 2	But. Mak. 1 & 2 Poult. Rec. Farm Accts.	Farm Accts.
TUESDAY	Fruit Gr. Dairy	Fd. and Mgt. Ent.	Soil Fert.	Floricult. Fld. Crops	But. Mak. 1 & 2 Mkt. Milk 4 Floricult.	But. Mak. 1 & 2 Mkt. Milk 4 Floricult.	But. Mak. 1 & 2 Poultry Rec. Floricult.	Assembly
WEDNESDAY	Fruit Gr. Dairy Land. Gard.	Botany An. Hus.	Ent. Ru. San. Sc.	Floricult. An. Disease Poultry Farm Bldgs.	But. Mak. 3 & 4 Mkt. Milk 5 Babcock 1 and 2 Fruit Gr. Lab.	But. Mak. 3 & 4 Mkt. Milk 5 Babcock 1 and 2 Fruit Gr. Lab.	But. Mak. 3 & 4 Babcock 5 and 6 Fruit Gr. Lab.	Babcock 5 & 6 Fruit Gr. Lab.
THURSDAY	Soil Fert.	Fd. and Mgt. Ent.	Ru. San. Sc. Mkt. Gard.	Dairy Bact. Poultry Floricult.	But. Mak. 3 & 4 Mkt. Milk 6 Poult. Lab. 1 Bee Keep.	But. Mak. 3 & 4 Mkt. Milk 6 Poult. Lab. 1 Bee Keep.	But. Mak. 3 & 4	Assembly
FRIDAY	Ru. Imp. Bee Keep.	An. Hus.	Dairy Bact. Mkt. Gard. Forestry	Floricult. Poultry An. Disease	But. Mak. 5 & 6 Mkt. Milk 1 Babcock 3 and 4	But. Mak. 5 & 6 Mkt. Milk 1 Babcock 3 and 4	But. Mak. 5 & 6 An. Hus. 1	An. Hus. 1
SATURDAY	Floricult. An. Hus. 1 Fld. Crops 1	Floricult. An. Hus. 1 Fld. Crops 1	Floricult. An. Hus. 2 Fld. Crops 2	Floricult. An. Hus. 2 Fld. Crops 2	Floricult. But. Mak. 5 & 6 Mkt. Milk 2 Poult. 2 Mechanics	Floricult. But. Mak. 5 & 6 Mkt. Milk 2 Poult. 2 Mechanics	Floricult. But. Mak. 5 & 6	Floricult.

An. Hus. 1 same men as Dairy 1, 2, 3.

An. Hus. 2 same men as Dairy 4, 5, 6.

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## TEN WEEKS COURSE.

### Application Blank.

Those desiring to make application for admission to the Ten Weeks Course please fill out this blank.\*

Name (Mr., Mrs. or Miss).....

Date of Birth.....

Post Office..... Street Address.....

State..... Present Occupation.....

School last Attended.....

References.....

After consulting the schedule on page 12, place an X after each course you wish to take. Send this blank to the Director.

#### GROUP A

##### COURSE

1. Soil Fertility	3
2. Field Crops	3
3. Breeds and Breeding	5
4. Feeding and Management	2
5. Dairying	8
6. Dairy Bacteriology	2
7. Animal Diseases and Stable Sanitation	2
8. Poultry Course	5

#### GROUP C

##### COURSE

14. Botany	3
15. Entomology	3
16. New Eng. Agr. (Required)	0
17. Farm Buildings	1
18. Farm Accounts	1
19. Mechanics	1
20. Rural Sanitary Science	2
21. Beekeeping	2
22. Rural Improvement	1

##### HOURS

#### GROUP B

##### COURSE

9. Fruit Growing	5
10. Market Gardening	2
11. Landscape Gardening	2
12. Floriculture	5
13. Forestry	1

\* Those who have already made application for admission to the 1913 Short Courses will please also fill out this blank and send it to the Director.





## REQUIREMENTS FOR ADMISSION.

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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 will be an advantage. The courses are open to both men and women.

Students must be at least 18 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 13 of this bulletin. Those who register in courses in which the number of students is limited, are required, in order to hold a place in the course, to send the \$5 registration fee with the application blank. Those who do *not* register in limited courses, should pay the fee on the opening day of the courses, January 6.

It is sometimes necessary, when the registration becomes too large, to limit the numbers in certain courses. Those who are late in entering are admitted only on consent of the instructors of the courses.

Students should report to the Director on Monday, January 6, in order to begin work promptly on the morning of January 7.

## EXPENSES AND OTHER INFORMATION.

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A registration fee of \$5 is charged those who take the Ten Weeks Course. This fee is payable upon the opening day of the courses, unless, as stated above, the student is desirous of taking courses which have a limited enrollment.

Other expenses of taking this course are about as follows :

Furnished rooms in private families . . . .	\$1.50, \$3.00 per week
Board at College Dining Hall . . . .	\$4.00 per week
Board in private families . . . .	\$5.00, \$6.00 per week

A Lunch Counter is operated in connection with the College Dining Hall. Those who desire may obtain meals here à la carte at very reasonable prices.

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 \$1.25 for suit and cap.

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.

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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.”

In past years both regular and short course students in the college have been required to attend chapel daily and assembly once a week.

On account of lack of seats in the chapel, due to the increase of regular students, short course student in 1913 will not be required to attend chapel or assembly, but are required to attend the lectures on New England Agriculture which take the place of chapel and assembly.

## ORGANIZATIONS.

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During the past two years short 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 affairs. Its meetings are often addressed by well-known specialists. Membership is open to students of the short courses.

The M. A. C. Christian Association meetings conducted by students and outside speakers, are held regularly on Thursday evenings, at 6.45 o'clock, in the Stone Chapel. All short course students are cordially invited to attend these meetings.

## **THE LIBRARY.**

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The college library occupies the entire lower floor of the Chapel—library building—and contains nearly 30,000 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, 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 seven forty-five a. m. to nine p. m. every week day, excepting meal time, and from nine a. m. to two p. m. on Sundays. The librarian or his student assistants will always be on hand, ready and willing to be of assistance to short course students.

## **OTHER SHORT COURSES.**

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### **APPLE PACKING SCHOOL.**

**January 23—29, Inclusive.**

The work of this School, which will be conducted by the Department of Pomology, will be of a practical nature and include 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.

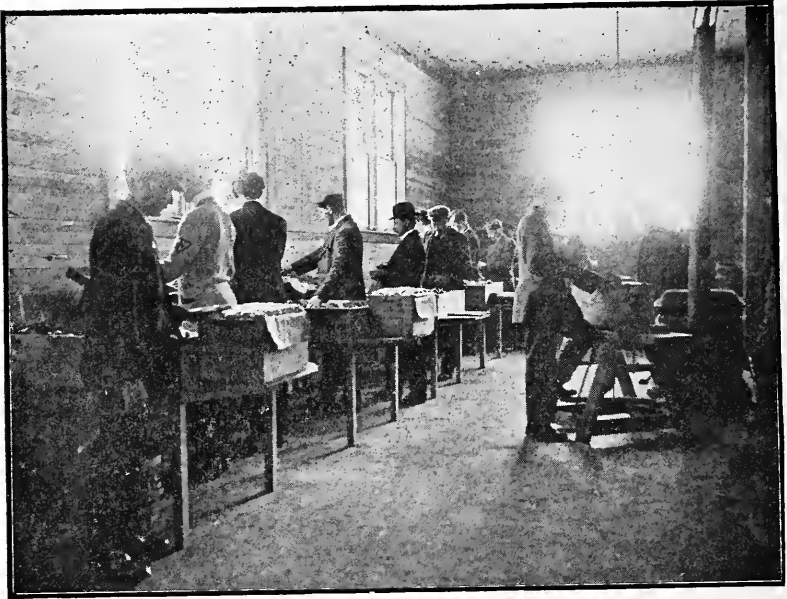
The work in packing will be supplemented by lectures on leading phases of commercial orcharding; such as planting, varieties, spraying, pruning, harvesting, marketing, and so forth.

A fee of \$5.00 to help pay for fruit and other materials used is charged for this course.

## FARMERS' WEEK.

March 17—21, 1913.

In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, will be given. The regular college equipment will be used, and the work of the regular faculty will be supplemented by lectures and demonstrations given by eminent men.



APPLE PACKING SCHOOL

The work will be divided into three sections: (1) General Agriculture, to include Farm Management, Farm Crops, Dairying, Animal Breeding and Feeding, Veterinary Science and Bacteriology; (2) Horticulture, to include Fruit Growing, Market Gardening, Floriculture and Forestry; (3) Farmers' Wives' Section, including lectures and demonstrations in Home Economics, Cookery and problems of Home-Making.

Features of the week will be the evening lectures by specialists along agricultural lines, the conference pertaining to problems of

rural betterment aside from practical agricultural topics, a corn and grain show, and others.

The Massachusetts Dairymen's Association, M. A. C. Agricultural Improvement Association and other organizations will hold their annual meetings at the college this week.

Complete program will be published and sent on request about February 15.

## **COURSE IN BEE KEEPING.**

May 28—June 11, 1913.

The college has recently come into possession of a number of swarms of bees which, with the other equipment to be added will afford a fine opportunity for those interested to get some practical information on this subject.

The course will be under the direction of Dr. Burton N. Gates. The following courses will be given :

- |   |                       |
|---|-----------------------|
| 1. Practical Phases of Bee Keeping,               | DR. BURTON N. GATES   |
| 2. Crops for Honey Bees,                          | DR. WILLIAM P. BROOKS |
| 3. Relation of Bees to the Pollination of Plants, | DR. GEORGE E. STONE   |
| 4. Origin and Evolution of the Honey Bee,         | DR. HENRY T. FERNALD  |
| 5. Bees, and Bee Keepers' Supplies,               | DR. JAMES B. PAIGE    |

## **ANNUAL CONVENTION AND FIELD DAY.**

June 11—12, Inclusive.

The features of this convention will be lectures, demonstrations by authorities of national reputation, as well as displays by inventors, manufacturers, supply merchants, and queen rearers.

### **A SPECIAL INVITATION**

Is extended to all beekeepers to display and demonstrate inventions, implements or methods. If table space is desired, or special equipment is to be prepared, notice should be sent to Dr. Burton N. Gates, Amherst, Mass. at least two or three weeks before the convention. The college will provide covered tables for the exhibits.

By correspondence in advance every effort will be made to arrange for the comfort of visitors.

## THE SUMMER SCHOOL.

July 1—29, 1913.

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### ANNOUNCEMENT.

The Summer School of Agriculture of the Massachusetts Agricultural College will open July 1, 1913, for a term of five weeks. This will be the sixth session of this Summer School, those of 1907 to 1911 having been highly successful. The experience of these five years will aid in making material improvements in the session of 1913.

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 and who can come to the College conveniently during the summer season. Extended courses will be offered for the benefit of such persons also.

The following courses will probably be offered in 1913:

Soils and Tillage	Bird Life
Field Crops	Insect Life
Domestic Animals	Entomology
Dairying	Bee Keeping
Poultry Husbandry	Home Economics
Fruit Growing	Domestic Science
Practical Gardening	Home and School Gardening
Trees and Shrubs	High School Agriculture
Forestry	Home Floriculture
Landscape Gardening	Agricultural Economics
Elementary Chemistry	Rural Sociology
Agricultural Chemistry	Rural Literature
Plant Life	Agricultural Education
Cryptogamic Botany	Organized Play and Recreation
	Arts and Crafts

From these courses it will be possible to make up programs of work suitable to the needs of almost everyone, but especially of school teachers, principals, superintendents, school committee-

men, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers, and those who have only a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs had better correspond with the Director of The Extension Service, who will gladly advise in all such matters.

Special courses covering two weeks are offered especially for clergymen, librarians and other rural leaders.

### GENERAL PLANS.

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From the courses offered, each student may elect courses of not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work is allowed by the Director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These will be on topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for the whole school will be planned for every Saturday. These excursions will be personally conducted by members of the Faculty, as heretofore. In the past, they have proven a very enjoyable feature of the work.

Round tables and special discussions will be arranged by various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school will be a feature of the general program. Several able lecturers are to be engaged for this course. Like everything else connected with the Summer School, this lecture course is entirely free to all students.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in this country. Anyone interested in problems pertaining to country life should not fail to attend. A descriptive circular can be had March 1, 1913.

### POULTRY CONVENTION.

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July 28—30, 1913.

In order to give a large number of poultry men who cannot come to the college for a longer time, practical instruction in modern

methods of breeding, feeding, poultry house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, etc., a convention lasting nearly a week will be held on the dates given above. The week will be filled with practical talks and demonstrations. Some of the leading professional and practical men in this country will be engaged to supplement the work of the regular faculty.

No charges aside from cost of room and board are made those who come for this course.

## CONFERENCE OF RURAL LEADERS.

July 30—August 2.

The Conference of Rural Leaders which has been held as a closing feature of the Summer School will take place as usual.

It is hoped the following organizations will co-operate with the College by furnishing teachers and lecturers for their respective sections: The Federation of Churches of Massachusetts. The State Board of Education, The Free Public Library Commission, The Massachusetts Civic League, The State Board of Health, The County Work of the Young Men's Christian Association, The National Board of the Young Women's Christian Association, The New England Home Economics Association, The Russell Sage Foundation and The State Grange.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation, etc. The evenings will be given over to music and lectures by the most eminent men who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1912.

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.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village



improvement societies, homemakers, school officers and all others interested in community development are cordially invited to attend this Conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published next June and can be had by making application for it.

## **HELPS FOR THOSE WHO CANNOT COME TO ANY OF THE SHORT COURSES.**

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### **Lecture Courses and Practical Demonstrations.**

The public lecture work of the faculty has been systematized. Granges, Farmers' Clubs, Young Men's Christian Associations, Boards of Trade, Women's Clubs, Village Improvement Societies and other organizations can secure lectures covering agricultural and allied subjects either singly, or courses of several lectures can be arranged for. Practical demonstrations, such as spraying, milk testing, stock judging, mixing fertilizers, fruit grading and packing, and others of a similar nature, will also be given when application is made for them. Organizations named above can arrange with the college to have a series of evening meetings, at which agricultural subjects and topics pertaining to rural life will be presented in a popular way. It should be understood that the number of men available for this work is at present limited; hence early application is desirable.

Send for circular giving lecturers' names and subjects.

### **Correspondence Courses.**

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So many calls have come to the college for lessons by correspondence that courses in Soils and Soil Improvement, Manures and Fertilizers, Field Crops, Farm Dairying, Fruit Growing, Market Gardening, Animal Feeding, Floriculture, Farm Accounts, Agriculture in the Elementary Schools, Agricultural Education, Beekeeping, Forestry, Shade Tree Management, and Entomology, have been prepared.

A small fee to cover the cost of postage, etc., is charged in each course.

Send for circular fully describing these.

## Other Extension Work.

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Through The Extension Service the Massachusetts Agricultural College endeavors to help all the people in the Commonwealth who are interested in securing agricultural information. A corps of field agents is being engaged to carry up-to-date information to all who ask for it.

The college is also helping the people of the state by equipping **agricultural trains**, by holding **extension schools** lasting five days in various sections of the state, by making **educational exhibits** at fairs, by starting **demonstration orchards** in every county, by helping in the organization of **crop and animal improvement societies**, by conducting **field experiments** to demonstrate the value of certain agricultural practices, by conducting **agricultural surveys**, by **giving advice** as to farm management, and by **answering thousands of inquiries** which come to us every year.

For further information regarding any of the short courses mentioned in this bulletin, or other lines of extension work, apply to

WILLIAM D. HURD,

Director of The Extension Service,

AMHERST, MASS.

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The Massachusetts Agricultural College offers full undergraduate courses in the different lines of Agriculture, Horticulture, Chemistry, Botany, Entomology, Veterinary Science, Bacteriology, Forestry and other sciences. For catalogue and other information, address the President,

KENYON L. BUTTERFIELD,

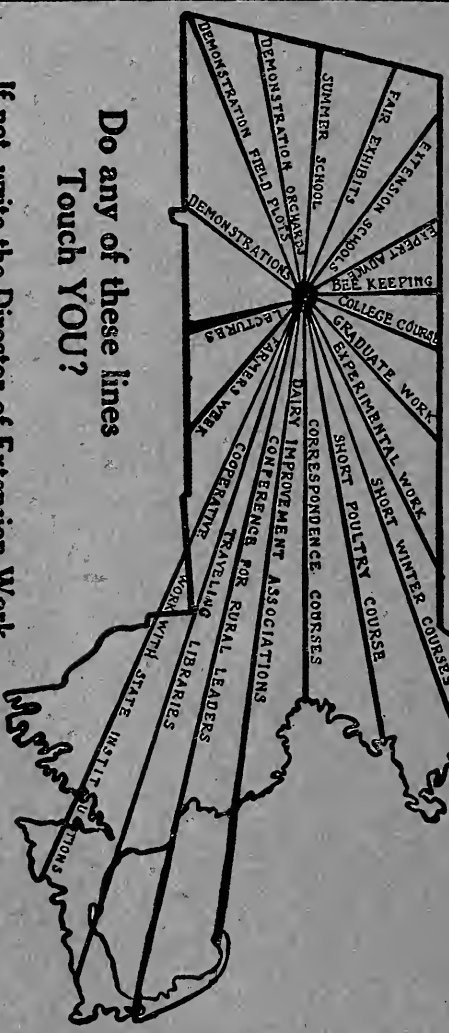
AMHERST, MASS.

Massachusetts Agricultural College.



# THE MASSACHUSETTS AGRICULTURAL COLLEGE

## COVERS THE STATE



**Do any of these lines  
Touch YOU?**

**If not, write the Director of Extension Work,  
Amherst, Mass.**

200







