TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1899.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1899.

☞ SEE LAST PAGE OF COVER.

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The following lectures have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the "Boston Evening Transcript." As here presented, the lectures are, as far as possible, printed in full, and reports of the discussions following the lectures are added, these, where it appeared necessary, having been carefully revised by the speakers.

The Committee on Lectures and Publication take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the lectures and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

AARON LOW,
J. H. BOWDITCH,
E. W. WOOD,
Committee on Lectures and Publication.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 7, 1899.

A stated meeting of the Society was holden today at eleven o'clock, the President in the chair.

This being the commencement of the term of office of the new board of Officers and Standing Committees, the President, FRANCIS H. APPLETON, delivered the usual annual address, as follows:

ADDRESS OF PRESIDENT APPLETON.

Members of the Massachusetts Horticultural Society:

The question again comes before me, What can I say to you that shall sufficiently tell you a story of our more recent work, and which you may not learn through the respective reports of the Secretary and Librarian, Treasurer and Superintendent of Building, and our several Committees — and which story shall tend to promote the chartered objects of this Society?

Permit me first to go back to a period when the matter of promoting better agriculture by organized effort was early planned, after a brief reference to the most systematic organized effort that we have before us, in this nation, at the present time.

At the United States Department of Agriculture, in Washington, we find, under its title, a most complete classification for all the working Bureaus and Divisions, and they doing scientific and practical work, earnestly directed, from the Secretary's (a Cabinet officer) office down, in their aim to do all that seems wise to

advance and protect the many agricultural industries throughout this extensive Nation.

So important a work is that of the Department of Agriculture, with its collections, from a business standpoint, that more substantial fireproof buildings, with greater economic arrangement of the interior than now exists, have from time to time been advised; and such advice should be given most careful thought and planning preparatory to the hoped-for time when Congress shall in due course authorize such improvements as shall be deemed wise.

In said Department horticultural matters have their place in the appropriate Bureaus and Divisions, as we recognize them in our varied work here by Committee designations, and in our Prize Lists, and otherwise.

Shortly before 1790 the men of government and business, General Washington and those who were his near associates, saw that the agricultural interests of the Nation — and the term "agricultural" was used in its broad sense — needed the stimulus of organization to advance the character and quantity of its products in order better to supply the markets of our land.

In New York, Massachusetts, Pennsylvania, and South Carolina, influential men of those States, in their centres of business, organized societies for the promotion of agriculture in its varied forms. The early agricultural societies, with their occasional — or annual — assembling of persons on Market or Fair Day, became promoters of agriculture and trade, composed in their membership of business and professional men of that period, who were closely in touch with the best financial methods and needs, and who had the general welfare of the Nation and State at heart.

At those assemblages, in the interest of agriculture (farming and horticulture, etc.), we have evidence that the participants had a care for the wise conduct of affairs of state, and that the selection of men of high character and well-directed purpose was not lost sight of as a factor in the advancement of the leading charge confided to their care.

They realized that public and private affairs were in the most wholesome condition when public office was administered most wisely.

In our own State a Society for Promoting Agriculture was

established in 1792, and, by its early influence, similar, but more local bodies were soon organized to promote the good work throughout the State, which enlisted the leading men of business in most of our counties. The publication then known as the "New England Farmer" was an early mouthpiece of these efforts, as were also the earliest publications of the parent Society.

Much was there published from the pen of the best informed men of those days to promote better work, more intelligent work; to encourage invention in the line of agricultural implements, or the importation of implements and live stock better adapted to the needs of our people, etc. Market gardening and general horticulture are a natural outgrowth of more intensive farming, and more intensive farming is the profitable type of farming for our New England agriculturist to adopt in his own and the State's interest.

Turning to the founding of this Society, we find, among those who were at the first meeting, men who, as patriot-farmers, had been interested in the establishing of the earliest agricultural societies, with the Hon. John Lowell in the chair. General H. A. S. Dearborn, of Roxbury, of horticultural fame, became first President, and drafted the first constitution; and the State was well represented in our early membership.

This Society first existed as a collection of active members, with little property, and members were sought and needed to give to the Society the living strength that was essential to its chartered objects. The activity and ability of that earnest early membership was then our capital, but money was sought to enhance possibilities in other directions.

Whatever simple prizes were early offered proved a great spur to improved horticulture, and stimulated a largely increased interest in horticulture among our men of wealth, and commercial growers. Without the former, horticulture would have advanced slowly indeed.

The demand for a high quality of products was an important result; and the Boston and Massachusetts markets responded in a manner that has always been a credit and an honor to this State.

Today, with the splendid record of success that this Society has achieved since the 17th of March, 1829, — seventy years, — measured by the results it can claim to have attained in many ways, by

the superb library of publications that has been wisely accumulated for horticultural study, with its unique card catalogue of plates, as well as card catalogue of other contents, and with its real estate on this site, all of which is forever dedicated to the cause of charitable horticultural advancement, as the Act of Incorporation states, — which is "for the purpose of encouraging and improving the science and practice of horticulture, and promoting the amelioration of the various species of trees, fruits, plants, and vegetables, and the introduction of new species and varieties; . . . to receive donations, bequests, and devises for promoting the objects of said Society," — today, I repeat, the Society has much to be proud of. With the influence that its exhibits have exercised around us, with the value to individuals that the Society has been by holding before all people a high standard of excellence as to what can and should be striven for, — with all these characteristics, the honor and value in our membership have greatly enhanced.

Thus also is the importance to the community of this Society to be gauged and appreciated.

While serving for several years upon your Library Committee, I became familiar with the great benefits that would result from increased shelf room; and then, at the request of that Committee, you approved of suggested improvements that gave a gallery, and consequent additional shelves. A wise continuity of purchases must be made to keep useful sets of publications complete; and the purchase of needed works, when a chance offers, is an important factor in keeping your library up to date. Its natural increase is inevitable, unless it is allowed to deteriorate, and it is safe to say that the latter is not your wish, so far as is wisely within our ability.

A variety of ideas for improving the accommodation for the general purposes of our Society have from time to time been presented to your Executive Committee, or the Society, in which I have taken part. All have been either in the direction of an improvement of the present site, or a change of site, with, in either case, far better and more liberal general accommodations. All have had my approval from a certain standpoint, but it has been decided inexpedient and undesirable to adopt either plan. The noise which surrounds this building, and which has been a great detriment to our work, could be greatly mitigated were a

smoother pavement to be laid on the adjoining streets, and such would seem to be a prospective benefit to all occupants of buildings in our neighborhood. Our work is of such a *pro bono publico* character that, with a fair concurrence of those owning and occupying buildings around us, is it not reasonable to suppose that the City would grant us a hearing, with the prospect of a favorable result in this direction?

Would that it might be possible for rubber tires to be required for *all city* vehicles, and rubber heels on shoes for all city horses! Thus, until automobile vehicles come into general use, the condition of the inhabitant of the city would become mitigated by more restful surroundings.

Would not such conditions delight *our* audiences, and spur on the workers in our midst in their charitable horticultural efforts while we remain at this location?

A certain guidance and control of the direction of city traffic, with paving on the several streets and boulevards suited to their several chief uses, is, I believe, found useful from both commercial and sanitary points of view in some parts of the world, and seems an appropriate thought at this time, and a respectful suggestion for the consideration of others.

Some years ago, I am informed, the authorities having in charge the State's newly made Back Bay land made a most attractive offer to this Society (I have been told without cost) of one-half of the square of land where the Institute of Technology now stands, if they would occupy it. Acceptance was then deemed against the Society's interest, and the offer was declined from necessity.

Should such a proposition come from State or City, at some future time, where the work of this Society could be conducted under its chartered obligations, with administration and library rooms in a main structure, and with an exhibition hall of ample size and well lighted attached upon the ground level, we might find a fortunate status confronting us.

With an exhibition hall into which teams, carrying plants, could be driven, and there unloaded safely from risk of frost, and where, at times of exhibitions, the aisles would be broad enough to allow invalid chairs to be pushed without undue inconvenience to pedestrians, we should possess that ideal condition of which few other localities could boast.

But this or any other change of location can only be possible when our present quarters are desired much more by others than by ourselves. Inducements in this direction have been courted without yet meeting with sufficient success.

The Royal (national) Agricultural Society of England publishes quarterly bulletins, which form their Transactions, and which are so much in demand at sale by non-members that they are a source of income to that Society, and are issued with perfect regularity.

Why should not our Society aim to establish her Transactions upon such a basis, in due time, that they shall become as desirable in their chosen line, and in proportion to our resources, as are the English Agricultural Society's in their chosen line? Whether they filled a place before the public that would be helpful and desirable would, in part, be shown by the demand for them, and from the amount of receipts from their sale.

At least let all who now contribute to their contents or their making combine to secure the prompt issue, in proper time, of what we now publish, which certainly can be easily possible if all will remember that promptness of action, and presentation of all papers and reports in form for the printer, are necessary factors.

Certainly our members can demand the receipt of Transactions on time; otherwise they become of inferior value, and proportionately a discredit to the Society.

My intimate connection, first, with the Bussey Institution at Harvard University for several years, and later with the State's Agricultural College and Experiment Stations, for a longer time, while my interest in these institutions still continues, enables me to bear witness to the excellent work done there for the cause of horticulture and for those who would be trained in agricultural principles, or taught to become working horticulturists. I must be permitted here to call special attention to that work which is being so earnestly done at Amherst and at said University, and which is in line with the chartered objects of our Society. There is ample room for all that can be accomplished to advance the knowledge of horticulture and horticultural methods at both places; and I believe that there is no line of work, if wisely applied, that can do more to advance the conditions of the surface of this Bay State, Massachusetts, directly

and indirectly, than can horticulture, which would conduce to a more intensive or a much higher quality of farming also.

All this will benefit Massachusetts because the surface of Massachusetts — her soil and its natural growth — yield most profit from intensive treatment, intelligent treatment, and the application of the results of scientific, beneficial investigations, and study that practical application has proved useful.

The interest in School Gardens and Children's Herbariums has increased much of recent years. At the last exhibition, in December, 1898, there was not space enough in both halls for the display of the children's herbariums. The quality of the work is reported excellent by the Committee. This yearly exhibition affords botanists an opportunity to study the variations of plants grown under different conditions, and to refresh their memories with views of plants not commonly seen, under favorable conditions. The gathering of such collections incites children to begin the study of plants, and is a great influence in cultivating the powers of observation, which are useful factors in advanced study and in after life. Its educational value is plain, and the regular succession of voluntary exhibitors shows that this value is appreciated by parents and those who are interested in the proper education of children.

The study of living plants in a school garden, though more difficult to start and sustain, has still greater value. But many plants can only be studied in the dry state and with colored plates. Without life and growth horticultural pursuits are impossible, and the reports of the establishment of children's gardens, as is the case, are encouraging and indicative of the widespread influence of this Horticultural Society.

I am one who believes that the courses of instruction in our more rural schools would be much more useful to their students if more of the teachers there were trained to understand, and were directed to teach, the natural sciences ; and to train those young minds more by teaching them of the wonderful ways that Nature works in, in many objects all about them.

Applicants for admission to our agricultural, farming, and horticultural institutions of learning are too often placed at a considerable disadvantage on account of no knowledge of those rudimentary studies that not only would help them better to understand more advanced instruction, but would enable them the

better to understand the practical work upon their own homes did they elect to remain there and take part in this care; this latter in addition to the increased power of observation that I have already mentioned.

Recognizing, as we do in our Society, the value of herbariums, I wish to take this opportunity to call attention to the merits and needs of the Gray Herbarium of Harvard University. This large collection of scientific specimens of plants has been developed through a long period of years, and with great care. It has formed the basis for the publication of many of the best botanical works produced in America, and its staff has for years been ever ready to give expert determinations of plants submitted for identification. The importance of having in our region an establishment of this kind should be clear, not only to botanists, but to all who are interested in horticulture, pharmacy, or any other occupation in which critical discrimination of plants is of fundamental importance. Through the scientific activity at the Gray Herbarium hundreds of newly discovered plants have been described and classified. Many of the species thus brought to light have a high value in horticulture, while others possess important therapeutic qualities. There is still much to be done in this way, and good reason to believe that the further scientific classification of plants — by bringing out species of economic value, new drugs, important acquisitions for horticulture and agriculture — will contribute much to human welfare and happiness. For these reasons it should be a matter of interest that one of the oldest, largest, and most thoroughly equipped herbariums in America should receive the support of which it now stands in pressing need.

During the past year we have authorized a permanent Committee on Forestry and Roadside Improvement, composed of most competent men, but it has been found difficult to prepare any form of action as yet. Perhaps legislative matters may be so presented that opportunities will be soon offered which will invite the action of the Society through our Committee.

Forestry and roadside improvements are most important factors in the teaching of economic action and care in the State's agricultural conditions. We must study probable future needs to decide what is best for us to do today in such matters, and be influenced by past experiences, in our own and other countries, in coming to conclusions.

In terminating these brief words of address I want to express, first, a regret. I had tried to find some complete account of those homes and gardens of early Boston which were once conspicuous for their distinguished architectural effect in the buildings and fences, and which marked an early period of horticultural beauty, effort, and appreciation of that art. My regret is that *in no single work* have I found so complete a collection of descriptions of those historic homes and gardens as is deserved by the facts.

Such a publication is certainly an omission in the history of this city, which, I believe, has made and is still to make history for itself of a truly noted and advanced character, considered æsthetically as well as from a business standpoint.

A beautiful work upon the more recent public buildings in this city has lately issued; may it be possible for a parallel work to issue on the historic subject to which I have referred? Had the "touch the button and it does the rest" kodak existed, in those early days, many such a work would have issued long ago; but memory must now be the kodak from whose films alone can such a work be completed.

And in conclusion, fellow-members, while we continue to remain in this building, and on this site, we must adapt ourselves to it as best we can; and make the most of its opportunities, overriding its inconveniences, if we cannot eliminate them.

I have been helped by a considerable number of people in presenting to you the several plans that I had hoped might be possible of execution, and I desire to thank them for their unsuccessful coöperation.

It is possible that a temporary stack-room for books, above our stairway in the front hall, with openings from the gallery, might relieve the very congested condition of our books, and bring many volumes into use that now are buried and sought for. I ask that the Library Committee give this matter consideration again.

Let me appeal to the Chairmen of all Committees again, to have all lectures and their reports ready early for the printer, so that they may not be a factor to prevent the prompt issue, in future, of our Transactions.

I have deemed it a distinguished honor to be permitted to hold the office of President for what will have been — God willing —

four years on Jan. 1, 1900, and I trust that this last year before we commence on the nineteen hundreds may see good work done to promote that which will be best for this Society under its chartered objects.

Hon. Virgil C. Gilman moved that the thanks of the Society be presented to the President for his annual address, valuable both for its historical information and its practical suggestions. This motion was unanimously passed, the question being put by Vice-President Benjamin P. Ware. The President briefly expressed his pleasure at the appreciation by the Society of his address.

The appropriations reported by the Executive Committee on the first Saturday in November, 1898, came up for final action, and were unanimously voted, as follows:

For Prizes and Gratuities for the year 1899:

For Plants	$2,000
For Flowers	2,668
For Fruits	1,732
For Vegetables	1,200
For Gardens, Greenhouses, etc.	500
Total	$8,100

The President, as Chairman of the Executive Committee, reported a recommendation that the Society make the following further appropriations for the year 1899:

For Gratuities for Native Plants	$50
For the increase and preservation of the Library	1,000
For the Committee on Lectures and Publication, this sum to include the income of the John Lewis Russell Fund	300
For the Committee of Arrangements, this sum to cover all extraordinary expenses of said Committee	400
For the Committee on School Gardens and Children's Herbariums, this sum to cover all incidental expenses of said Committee, and to be paid through the usual channels	250
For the salaries of the Treasurer and Superintendent and Secretary and Librarian	3,000

This report was unanimously adopted, and the appropriations recommended were voted.

The President, as Chairman of the Executive Committee, reported that that Committee had appointed Charles E. Richardson Treasurer and Superintendent of the Building, and Robert Manning Secretary and Librarian, for the year 1899.

Joseph H. Woodford announced the decease of Charles N. Brackett, for thirty-two years Chairman of the Committee on Vegetables, and nominated Warren Howard Heustis as Chairman of the Committee on Vegetables, and Joshua C. Stone to fill the vacancy in the Committee. After some discussion it was voted that the Secretary cast one ballot for these gentlemen, which was done, and they were declared by the Chair to be duly elected.

On motion of William C. Strong, it was voted that the Chair appoint a Committee of three to prepare a memorial of Mr. Brackett, and Mr. Woodford, Mr. Heustis, and Varnum Frost were accordingly appointed.

On motion of Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, it was voted that all premiums and gratuities awarded by that Committee be payable on the first of January, after such awards are made, as are all other awards.

The President added William P. Rich to the Committee on School Gardens and Children's Herbariums.

It was announced that the Schedule of Prizes for 1899 was ready, and also that a statement of the changes therein from the schedule for 1898 had been printed for distribution.

Also that the programme of lectures for the season of 1899 was ready, and the first lecture was announced by the President.

The meeting then adjourned to Saturday, February 4.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, January 14, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

This lecture was delivered on the John Lewis Russell foundation. The Committee regret that they are unable to present more than the following synopsis of it:

ANCIENT AND MODERN THEORIES OF DISEASE, WITH SPECIAL REFERENCE TO DISEASES OF PLANTS CAUSED BY PARASITIC FUNGI.

By WILLIAM T. SEDGWICK, Professor of Biology, Massachusetts Institute of Technology, Boston.

Perhaps next in importance among the great scientific discoveries of the century to the establishment of the theory of evolution has been our progress in the knowledge and interpretation of disease, whether of plants or of animals. In this direction the change in our point of view within the last hundred years has been enormous, and it is interesting and instructive to review briefly the history of opinion in regard to the causes of disease. Before doing this, however, we shall do well to remember that zoölogy and botany are now regarded not merely as distinct sciences, but also as hemispheres of one greater science, biology. In order to show the practical value of this point of view it need only be remembered that if plant life and animal life are, as we now believe, essentially similar, plant diseases and animal diseases may well resemble each other not only in character, but also in origin, and even as regards prevention.

Assuming the fundamental similarity of constitution and behavior which it is now admitted prevails between plants and animals, we must next remember that, in the words of Huxley, "the fundamental conception of a living body as a physical mechanism . . . is the distinctive feature of modern as contrasted with ancient physiology." Health and disease thus become to physiologists terms of precise and definite meaning, indicating, as they do, actual states or conditions of a living body. A moment's consideration will show that it is essentially no more difficult to comprehend the idea of a general state or condition of

a living body than a general state or condition of a lifeless body, such as a stone, a piece of iron, a watch, or a locomotive. Very much in the same sense that a watch is a time-piece, a living body is a life-piece. If a watch appears to be in good order and running well, we say that it is a good and normal time-piece, and if a plant appears to be in good order and doing well, we call it a normal or healthy plant, but if it is out of order, or not doing well, we say that it is in a state of disease. Health thus becomes the normal and disease the abnormal condition of the living mechanism. Again, the living machine may wear out. No matter how well cared for or how cleverly managed, old age finally creeps over it; and death is the final stoppage of the vital machinery.

A modern, scientific, and helpful view of the causes of disease is one which classifies them according to their place of origin and regards them as either (a) Intrinsic, or arising from within the body proper; or (b) Extrinsic, or arising outside the body or acting upon it from without. In other words, diseases may be held to be due either to defects in the constitution or construction of the vital mechanism — its timber or its workmanship — or else to external or unfavorable influences acting upon it. In other words, diseases may be said to be, according to their place of origin, either Constitutional or Environmental.

The human race in its development has held various and curious theories of disease both in respect to the diseases of plants and those of animals, but especially the latter. Savages and barbarous peoples, being eminently subjective, interpret diseased states or conditions as perversions of conditions like their own, with which, of course, they are most familiar. If, for example, they observe a person who is inattentive, unresponsive, or otherwise peculiar, they are apt to think of him as "absent-minded," or "out of his head;" but if absent-minded or out of his head, what more natural than that some demon should enter his head, take his place, and act strangely, or cause his body to act strangely in his absence. In this way savages and others have accounted for lunacy, hysteria, epilepsy, and delirium; and traces of such theorizing are common even today.

In the classical period a more physical and mechanical idea, one more in harmony with nature, prevailed, but yet sufficiently strange. This was the famous theory of the four humors. Traces of it linger until today. This theory supposed that health

consists in the proper mixture, and disease in the improper mixture, of four juices of the body, namely, blood, phlegm, yellow bile, and black bile, and today, even, we hear not infrequently of the "sanguine" temperament, the "phlegmatic" temperament, and the "melancholy" (black-bile) temperament.

With the growth of science and the study of health and disease, especially the study of anatomy and physiology, in the sixteenth and seventeenth centuries, the modern idea of the organism, whether plant or animal, as a physical mechanism, gradually grew up and our modern idea of the constitution or construction of the plant or animal body came into being. Little by little also the idea of the close relationship which subsists between organisms and their environments was developed, and when, in 1839, a disease of the scalp of man was traced to a parasitic fungus, while another fungus was found to be the cause of an infectious disease of silkworms, the foundations were laid for the modern "germ" theory of infectious diseases, which regards such diseases as due to microscopic organisms, many of them parastic fungi operating upon the plant or animal body from the environment.

A recognition of the dependence of plants upon environmental conditions was of course very ancient. We are told in the Bible of the barren fig tree which was saved, temporarily at least, from destruction by the proposition of the gardener to alter its environmental conditions by digging about and dunging it. We even have a recognition of parasitism in the case of the gourd which grew up and sheltered Jonah while he impatiently waited for the destruction of Nineveh, inasmuch as it was a worm which was sent in the night to attack and destroy the gourd. It is said that Pliny recognized the parasitism of the mistletoe. Very early, also, the excrescences which appear upon trees and other plants were interpreted as parasites, or at least as monsters, by virtue of their obvious analogy to certain so-called parasitic growths attached to human monsters. The term "parasite," although so common now in botany, is derived from animal life, a parasite being a person who, unbidden, eats beside another. The term is said to have been introduced in its modern sense into botany as recently as 1720. The microscope was a necessity before it was possible to discover most parasitic fungi.

Parasites were for a long time confounded with epiphytes. Parasitism seems, indeed, not necessarily, as is usually supposed,

an abnormal and strange development, at least in its beginnings, but simply a natural result of the universal struggle for existence. If, in the search for food, a plant or animal happens to come in contact with and feed upon another, it may easily happen that it shall gain great profit, but if this habit becomes so extended as to lead to the destruction of the host, obviously the parasite itself will also perish. It is easy to suppose that parasitism may have arisen from saprophytism, in which plants and animals feeding upon dead or waste organic matters happened to attach themselves to living plants or animals; and it is easy to see how, under these circumstances, great advantage might accrue to the saprophyte. It is even possible to imagine how the ranks of parasites, thinned by the destruction of their hosts, or otherwise, might be continually recruited from among the saprophytes.

The parasitic fungi have long been known in special cases to penetrate the tissues of their host. It has also been known that in their doing of this some solvent reagent was secreted by the fungus, and recent experiments of much interest have shown that it is possible to separate from particular fungi substances which will corrode and destroy vegetable tissues such as are attacked by similar fungi. The analogy here discoverable between the toxins of bacteria and these solvent reagents, or tissue-poisons, is very close, and we are obliged today to employ a similar term to describe the precise action of parasitic fungi to that now employed in bacteriology and to call the diseases which they produce not merely "zymotic," but rather "zymotoxic."

The chief practical importance of a clear understanding of the terms "health" and "disease" in botany is that we may the more readily comprehend the lines along which prevention of disease and the promotion of health must work. Obviously there are two directions, and only two. First, in the improvement of the mechanism, and second, in the control and amelioration of the environment. The former is a problem for plant physiologists for plant diseases, precisely as it is one for animal physiologists for animal diseases. The latter bears the same relation to plant life that sanitary science does to animal life, and there is reason to believe that the next few years will witness immense progress in the field of preventive medicine, or vegetable sanitation, for plant diseases. Sanitary science for plant life must follow essentially the same lines as for animal life. The prevention of the environmental

diseases of plants will consist in the one case, as in the other, largely in the control of parasites and the study of proper atmospheric or other environmental conditions, such as food and drink. It must consist in the promotion of cleanness, in the provision of a water supply free from infectious material, in the use of clean and wholesome utensils, in the abatement of dust, and the avoidance of infection from all sources.

Side by side with this control or amelioration of the environment will go eventually an important series of studies in the improvement of the organism itself considered as a physical mechanism. Unlike the history of the betterment of animal life, progress has been thus far in the improvement of plant life greater, perhaps, on the constitutional side, the destruction of the weak and sickly being tolerated among plants more even than among domestic animals, while it is absolutely out of the question in the human species. The greatest immediate improvement, therefore, in the control of the activities of parasitic fungi is likely to be along those lines where the greatest progress has already been made in animal sanitation, namely, in the control and improvement of the environment and in the establishment of a veritable hygiene or sanitary science for plant life. Whether this will go so far as to lead to the reënforcement of the organism by the antitoxins which shall neutralize the poisonous effects of the toxins produced by parasitic fungi or other enemies of plant life remains to be seen, but it is by no means impossible.

On motion of Benjamin P. Ware, introduced by brief complimentary remarks, a vote of thanks was given to Professor Sedgwick for his interesting and instructive address.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, January 21, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock. Neither the President nor either of the Vice-Presidents being present, Ex-President William C. Strong was elected chairman *pro tem.*

The following lecture was delivered:

Experimental Work in Field and Garden.

By Hon. Aaron Low, Hingham.

Mr. President and Members of the Massachusetts Horticultural Society:

In conducting experimental work on agricultural subjects there are so many contingencies to be taken into consideration, as to the changes of each season, that to demonstrate fully the value of any series of experiments they should be conducted through a number of years.

In an experiment conducted in a season like the one just past, which for the larger part was unusually moist, and with but a comparatively small amount of sunshine, the conditions of strong, healthy growth are wanting, and experiments conducted under such circumstances will surely fail of being satisfactory.

Every one who has studied into nature's laws finds how unerringly those laws perform the duties for which they were created.

In experiments the past season with varieties of vegetables, which, to grow successfully, and insure the development of the best qualities, must have an abundance of sunshine, they must, in the lack of that condition, have proved inferior in quality and product.

As the object of this paper is to give the results of experiments the past season with a variety of vegetables, there may be something learned from failures as well as from the most successful results.

I will, therefore, give you briefly a statement of the several experiments, and if there are points which may be of benefit to you in your future farming operations, the experiments will not have been made in vain.

As the experiments were made on but few of the many kinds cultivated, if those present desire to discuss the merit of any of those varieties omitted, we shall be pleased to do so; also, any question connected with the experiments given I will gladly answer.

Experiment No. 1. — As the Pea is one of the first vegetables to be planted in the spring, and quite an important crop for early marketing, I would first call your attention to an experiment in its cultivation.

A piece of light sandy soil was ploughed April 16th and planted on the 17th as follows: Rows were furrowed three feet apart; blood, bone, and potash fertilizer was scattered in the drills and well mixed with the soil. The varieties planted were two rows of Alaska, two rows of Nott's Excelsior, and two rows of Advancer. The vines grew finely and bore abundantly. The Alaska was the earliest, giving peas well-filled June 20th. Nott's Excelsior June 23d. The Advancers were not in condition for picking until July 6th. Nott's Excelsior is similar to the American Wonder in size of pod and fineness of quality, but as it is a much stronger-growing variety it will be likely to supersede the Wonder. The second plot in my pea experiment was planted some ten days later, and the All Soluble brand of fertilizer was used. The varieties planted were Nott's Excelsior and American Wonder. There was not much apparent difference in the two varieties except in the stronger-growing vine of the Excelsior. The All Soluble fertilizer is very quick in its action upon crops, but appears deficient in carrying them out to the end of the season.

Experiment No. 2. — My second experiment in planting was with Sweet Corn. As this was on land alongside of that of the Pea experiment it was ploughed at the same time. On the 29th it was harrowed and furrowed in rows three and one-half feet apart. The fertilizer used was blood, bone, and potash, a handful being dropped in the drills three feet apart, and well mixed with the soil. The corn was dropped on April 30th and covered lightly with a hand hoe. The varieties planted were as follows: two rows each of Early Melrose, Early Champion, Early Crosby, Early Quincy Market, Low's Perfection, Bear's Foot. For so early a planting the seed came up well, and as there were no late frosts to injure it, grew without hindrance. The Quincy Market was a week the earliest, followed by Perfection and Early Melrose. There was no perceptible difference in appearance or earliness between the Early Melrose and Early Champion. Both varieties in color of stalk and manner of growth were so similar, I should decide they were the same variety. Early Crosby, although one of our best kinds, was not as early as I expected. Bear's Foot is a new variety of much promise, having a large stout ear with from sixteen to twenty rows on many ears and, the kernels being very sweet and tender, is well worthy of a trial.

Experiment No. 3. — My third experiment was on Potatoes.

As this crop is one of the most important which the farmer grows, I was desirous of embodying as many points in relation to its culture as possible, in the hope that by varying the usual routine of planting I might acquire some ideas which in the future would be of much benefit.

In the first week of April I selected the most uniform tubers I had of the following kinds: Early Fortune, Early Essex, Pearl of Savoy, Early Harvest, and Early White Ohio, and spreading them out on benches in the glass house left them to the full influence of the heat and sunshine until May, when I saw that the eyes had started nicely, and grown stout green sprouts from half an inch to an inch long.

In placing potatoes under glass always put them out singly, as they must have the full benefit of light as well as heat to start strong green sprouts, which is a very important point, as, if grown light colored, they will rub off very easily, and cannot be handled; while if grown under the full influence of the light the eyes start strong, and they can be handled without injury in putting them out.

As the land on which this experiment was tried was a part of the field of the previous experiments, it was ploughed at the same time. On the 3d of May it was well harrowed, and furrowed in rows three feet apart. Armour's blood, bone, and potash fertilizer was scattered in the rows at the rate of half a ton to the acre, and well mixed with the soil before setting out the potatoes. As this was a special experiment on starting potatoes well before planting out, I did not take the tubers from the glass house until May 4th, when the eyes had strong vigorous sprouts from half an inch to an inch long. The potatoes were carefully cut to two eyes to a piece, and placed in the bottom of the drill one foot apart, and all sprouts covered from two to three inches deep, with light soil.

As the weather was favorable, they soon made their appearance above ground and, not being troubled by late frosts, grew finely. As all the kinds planted were early, the vines seemed to be fully grown before the potato beetles made their appearance, and were not much troubled by them.

The piece was cultivated twice; at the last time the rows were ridged slightly, but no hand hoeing was given. The first potatoes were dug on June 22, and were of good size, smooth and handsome, and of fine quality. The potatoes were all dug by the 20th

of July, and averaged six bushels to a row two hundred feet long, of large, smooth, handsome potatoes, without any signs of scab upon them.

The above experiment was very satisfactory in showing the advantage of starting potatoes very early, as they make most of their growth before the potato beetle appears, and mature the tubers before the blight usually comes.

Of the varieties planted Early Fortune and White Ohio were new. The first named was one of the earliest, and first class in all respects. The Ohio I should not recommend from this trial, as the tubers were small and inferior in quality, while all the others were large and very handsome. The conditions of growth seemed perfectly suited to all the varieties except the Ohio.

Experiment No. 4. My next experiment was also on Potatoes, but was conducted on different lines: First, to determine if possible the difference, if any, in value of Seed Potatoes grown in different latitudes as well as the comparative value of the prominent varieties now in cultivation; Second, to determine the efficiency of various methods to prevent scab on the tubers and blight on the vines.

In accordance with the first part of the experiment I selected the following varieties of potatoes from different latitudes, two rows fifty feet long of each kind:

Early Harvest, from New York.
" " our own seed.
New Queen, from New York.
" " " Maine.
Rural New Yorker, No. 2, from New York.
" " " " " Maine.
Carman, No. 1, from New York.
" " our own seed.
" No. 3, from New York.
" " our own seed.
Rochester Rose, Gregory's seed.
Prolific Rose, " "
Honeoye Rose, from New York.
Enormous, from Vermont.
Uncle Sam, from Henderson, New York.

The potatoes were planted May 15, on commercial fertilizer, scattered in the rows at the rate of 800 lbs. to the acre, and well

mixed by horse and cultivator before dropping the potatoes. They were also covered by horse and cultivator, and all after-cultivation was performed in the same manner.

After the potatoes came up they grew well for a time, but as there was so much wet weather with but little sunshine the vines did not show such a stout, vigorous growth as when conditions are more favorable. Paris green was applied twice as a preventive of the potato beetle. The first week in July there appeared in spots on the vines of the earliest varieties a blight which soon spread over the kinds on which it was first seen. I immediately applied the Bordeaux mixture to the later kinds before the blight was to be seen on the vines, but rain followed in a few hours, washing the application off before it had time to be effective. I again applied the mixture at two different times, but each application was immediately followed by rain, and the effect was much impaired.

The varieties that withstood the blight the longest were Carman No. 1, Carman No. 3, Enormous, and Uncle Sam, all late potatoes.

Although the application of the Bordeaux mixture in this instance was not as effectual as I expected, still I believe that under favorable conditions it would well pay for thorough application early in the season by checking the blight on its first appearance and giving the vines a longer time to perfect their crop.

In preventing the scab on the potato, the remedy most highly recommended is soaking the seed potatoes in a solution of corrosive sublimate for an hour and a half, as per the formula of the Experiment Station at Amherst. Another method of prevention is to scatter flour of sulphur in the rows when the potatoes are planted.

I could not see any perceptible difference in the results of either method, as the potatoes in both cases were free from scab, while where neither was applied many of them were scabby.

The yield of the several varieties was as follows:

The 2 rows of Early Harvest,	N.Y. seed.	2	bushels.
" " " " " "	our own seed.	$2\frac{1}{4}$	"
" " " " New Queen,	N.Y. "	$2\frac{1}{2}$	"
" " " " " "	Me. "	3	"
" " " " R. N. Y. No. 2,	" "	$2\frac{1}{2}$	"
" " " " " " " " " "	N.Y. "	$2\frac{3}{4}$	"

The	2	rows	of	Carman	No.	1,	N.Y.	seed.	$2\frac{3}{4}$	bushels.
"	"	"	"	"	"	"	own	"	3	"
"	"	"	"	"	"	3,	"	"	$3\frac{1}{4}$	"
"	"	"	"	"	"	"	N.Y.	"	$2\frac{3}{4}$	"
"	"	"	"	Rochester Rose,			Gregory's	"	$3\frac{1}{2}$	"
"	"	"	"	Prolific Rose			"	"	3	"
"	"	"	"	Honeoye Rose			N.Y.	"	3	"
"	"	"	"	Enormous,			Vt.	"	4	"
"	"	"	"	Uncle Sam,			N.Y.	"	3	"

The variety giving the largest yield was Enormous, a late potato from Vermont. The next was Rochester Rose, from James J. H. Gregory. The third was Carman No. 3, our own seed.

Within a few years there has been much discussion at farmers' meetings as to the best method of restoring exhausted or worn-out lands to a productive fertility. Experiments have been conducted at Experiment Stations with various plants, to determine their relative value in restoring the needed elements of fertility to the soil. A number of plants have been imported from foreign countries, which were said to be particularly adapted for this purpose in the immense amount of green material they produce for ploughing under. The past two years I have tried a number of those recommended, and will briefly give the results.

Australian Salt Bush. — This is said to flourish and grow in the driest localities, where even grass and other forage plants will not live, and to produce heavy crops of nutritious food for stock. Perhaps from extreme moisture of the past season the result was not as good as I expected; evidently there was too little sunshine for its perfect development. It is of trailing habit, each plant covering the ground for several feet. It has small narrow leaves, thickly set on slender branches. Cattle, sheep, and hogs are very fond of it, and it is said to be exceedingly nutritious. I shall give it another trial, trusting that the season will be more favorable.

Dwarf Essex Rape. — This is a plant highly spoken of for green manuring, producing immense weight for that purpose; it is also said to be twice as nutritious for fattening stock as clover. It can be sown from May until July, is a rapid grower, and will furnish by the middle of September as large a crop as can well be ploughed under. I sowed between one and two acres in June, and when turned under in September it was from one to two feet high.

Rye was immediately sown upon the land, and next May I shall plough under the rye crop, planting the land at once to corn, thus testing the value of green manuring on light sandy soils.

Cow Peas have a very high reputation, especially in the southern part of our country, as a renovator of worn-out lands. They can be sown in May or June, from one to one and one-half bushels per acre, and should be ploughed under as soon as they have made their full growth. They are very prolific in seed, bearing from twenty to twenty-five bushels per acre. The vines are much relished by all farm stock.

Soja Bean. — This is the most highly recommended by the Experiment Stations for ploughing under as green manuring of all known plants. It is the greatest gatherer of nitrogen from the atmosphere during growth; when ploughed under it returns to the soil a large per cent of that element in its most available form. My experience with this the past season was very satisfactory. It grew strong and stocky, and when ready to plough under was two feet high. This seemed to be more hardy to withstand early frosts than the Cow Pea, as the first frost, last fall, killed the peas, but did not harm the beans growing alongside.

The Soja bean can be sown either broadcast or in drills two feet apart. I prefer the latter method, as the cultivator can then be run between the rows, thus keeping the land free from weeds. It is productive of seed, which, ground into meal, is said to be excellent for stock feeding.

Winter Rye. — For a number of years I have practised sowing winter rye on all lands available in the months of August and September, using from one and one-half to two bushels of seed. This will form a thick matted growth before winter sets in, and will be a good protection from the wash of heavy rains or from the soil being blown off by strong winds.

Winter rye, to the farmers of Massachusetts, is more available than any of the plants before noticed. Produced as it is in almost every town, it can be readily and cheaply procured at any time when needed for sowing.

I desire to emphasize the utility of ploughing under green crops, to every farmer who has light, sandy soil, as a restorer of a much needed element of fertility, which long cultivation has largely exhausted. There is no other means by which such lands can be as cheaply and rapidly brought back to productiveness. Another

important point in favor of ploughing under green crops is the marked resistance to drought which crops growing upon it always show. I have often noticed quite a difference in the same field where only a part of the crop was growing on green manuring.

In growing cabbages on land where rye was ploughed in, I have noticed their entire freedom from destructive insects, in marked contrast to lands adjoining on which cabbages were growing without the green manuring, the cultivation in all other respects being the same. On a piece of cabbages grown the past year, every plant set lived and formed a large solid head, which to me was conclusive evidence of its utility.

We often hear farmers and market gardeners say that they have more confidence in the applying of a heavy dressing of stable manure than any of the commercial fertilizers sold in the market. There is no doubt of the reliability of stable manure as applied to the market gardens in the vicinity of large cities. In many cases it costs only the hauling, and, when bought, is got at a very low rate. The farmers and gardeners living out in the country, from fifteen to twenty miles away from the city, cannot afford to buy stable manure at the price usually asked for it, as the cost of teaming and handling, when delivered on his farm, brings it at too high a figure to leave any profit on its use. In an experience of twenty years in using both stable manure and fertilizers on almost all kinds of garden vegetables, I have come to the conclusion that I can grow better crops on the same amount of money's worth of fertilizer than of stable manure.

The question is not as to the reliability of stable manure to produce good crops with the country farmer, but the amount which those crops cost him, and when the cost is more than the product returned he must endeavor to reduce its cost. I firmly believe that farmers, by using a high grade of fertilizers or chemicals, supplemented as it can readily be by ploughing under green crops, can produce most of their crops at a less cost than when using stable manure.

As the object of our Society's meetings is to call out from those present their individual practice and experience, I trust that the paper I have given you will call out a free interchange of your own ideas and experiences upon the subjects noted. I shall be pleased to answer such questions as may be asked in regard to any of the subjects mentioned.

Discussion.

At the close of the lecture the Chairman remarked that the audience had been very much pleased with the lecture.

Thomas Harrison inquired whether the lecturer had ever made use of the manure spreader, which cuts up the manure. He thought that manure spread in the usual way does not give its full effect the first year.

Mr. Low said that some years ago he used the manure spreader; it saved labor and spread the manure in better condition. The time for manuring in hills has passed by.

Varnum Frost inquired what the condition of the soil was.

Mr. Low replied that he came into possession of the land in 1892. From that time it has been cultivated; previously it had had little manure. In such cases the vegetable mould is pretty much exhausted, and green crops ploughed in are as good as manure. If he had a thousand cords of stable manure he would prefer to buy fertilizers to use in growing potatoes, as the tubers are smoother and of better quality.

Some one asked the lecturer whether he could raise poor potatoes on new sward land, and Mr. Low replied that on sward land potatoes are usually good.

George D. Moore asked about ploughing in stable manure lightly in the fall.

Mr. Low said that the gain of ploughing in manure in the fall is that the manure becomes more soluble. This is a great advantage over ploughing it in in the spring; it has become more soluble when it is time to plant.

Mr. Harrison thought that that might be wasteful in light soils, on account of the manure leaching through.

Mr. Low said that it would be safely imprisoned by frost. Nitrogen applied in the fall is thrown away. Nitrogen and potash on rhubarb in the spring will work wonders.

The Chairman asked whether the roots on the potatoes in the glass house struck into the ground where they lay on it.

Mr. Low said that he had had potato eyes sent by mail. He has handled the sprouts when six inches long, and would emphasize putting the tubers out singly in the glass house. He lays them on the earth without any covering, and waters them as you would otherwise. He said he knew a man who many years ago

multiplied the Early Rose to an extraordinary extent by sprouts and cuttings taken from them.

The Chairman said he should suppose that potatoes would make numerous roots where they lay on the ground. Many years ago he propagated the Early Rose potato, beginning with a little more than a peck. He cut the tubers and placed them on sand, from the sprouts he took cuttings, and planted in pots. The tendency of these cuttings was to make numerous roots and many small tubers.

Mr. Low said that the eye that lies on the ground would make many roots and the potato must be turned. Every eye will give a good sprout if rightly managed.

Mr. Low said in answer to an inquiry that it would be just as well to put the tubers on boards if you would water them two or three times a day. If they made many roots there might be danger of the shoots becoming drawn and weak.

Joshua C. Stone said that nobody would deny that it does land good to rest. But where land is so dear as it is in the vicinity of Boston this is impossible. He never lets the land lie idle.

Mr. Low said he had some rye sown in December ploughed under the last week in May when two feet high. He ploughed under a crop of soja bean, and has got four crops of green manure and has lost only one crop. Cow peas absorb nitrogen during growth, and when lying on the ground in winter protect it.

Mr. Stone said that land could be so heavily manured and cropped that it would become worn-out. He calculates to manure all his land twice a year, and applies twenty cords of stable manure to the acre. He would put half his farm down to grass three years and let it rest if he could afford it. It would be the better for the next five years. He said that he did not know about potash, but he puts on extra potash when he thinks the land needs it. He thought he should have less of blight and disease if he could use green fertilizers.

Mr. Frost said he should not think of planting potatoes on old garden soil.

Mr. Low said that he would plant anything that is green for green manuring. He planted two crops, and on one of them there was a crop of weeds which he turned under. The onions that were taken from this last lot were superior to those which were taken from the lot where weeds were not ploughed under. Another plant valuable for green manuring is the vetch.

Walter E. Coburn said that he cut potatoes lengthwise and put the cut side down.

Mr. Low said it would certainly be a good way to do if one had plenty of glass room. He cuts out sprouts with the point of a knife.

Mr. Harrison said that farmers in Canada on one acre of clover could raise 2,000 lbs. of pork. There was no resting of the land and no loss. Hogs will feed on clover.

Mr. Low said that if clover was sown very late in the fall it must be sown again in the spring. It must be well rooted to stand through the winter.

J. H. Woodford said that farmers who use twenty cords of manure per acre fill the ground with manure, and he thought that where that happened it would be better to omit manuring occasionally and dress with lime.

Mr. Low said that when land is surfeited with stable manure lime is beneficial. Manure causes an excess of acid which lime corrects.

Mr. Stone said that he bought a hundred barrels of lime which had been injured by fire. He said that using fertilizer on land was like making mince pies — you could not tell what conditions had led to the results. A farmer might plant a row without manure and you could not tell about the results. Lime is useful, especially on heavy land.

Mr. Harrison thought that lime was of great service in many cases.

Mr. Stone said that the lime which he bought was not hurt for agricultural purposes; it was all in lumps, and he let it slack with rain. Lime which has been slacked three or four months is of no value.

Mr. Low said that corn, crimson clover, Dwarf Essex Rape, or *Lathyrus sylvestris*, will fatten a drove of hogs quickly. By the third year roots will run down twenty-five or thirty feet on the most arid soils.

Mr. Harrison said that he sows rye, cuts it off in the spring, and follows with fodder corn. He had a remarkable crop also in another case.

Mr. Low said that the trouble with rye is that it hardens too quickly, so that the cattle will not eat it.

Mr. Woodford said that alfalfa was grown very largely in Cali-

fornia and the West, and spoke of a case where four acres of alfalfa kept fourteen head of cattle and horses. He asked his son, in Kansas, why he did not grow alfalfa. His son put in alfalfa, and two years afterwards he was pasturing his hogs on this field, and they had no other food. Some of the plants sent their roots down seven or eight feet. His son cut the alfalfa he keeps for haying three times a year. The speaker thought it could be grown here.

Mr. Low said alfalfa was not adapted to our Northern climate. Crimson clover will grow well in summer time, but does not succeed in winter.

Mr. Woodford said that the climate of Kansas was similar to this.

A. W. Cheever said he had tried it many years ago and had cultivated it carefully. It lived for some years, but never amounted to anything. It was not adapted to this climate. Not one in a hundred will succeed with it.

James Fisher said he had known of ten crops being cut in California.

A vote of thanks to Mr. Low was passed for his very practical essay and for the answers which he had so kindly given to the questions asked.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, January 28, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Peach Culture.

By J. H. Hale, South Glastonbury, Conn.

Probably no branch of commercial horticulture is receiving so much attention at the present time as peach orcharding; older residents of this Commonwealth remember the time when peaches for the family supply were an annual production on nearly every farm. To be sure, many of them were seedling varieties of not very high

quality, yet the most luscious of the then known varieties were freely grown by our best horticulturists.

Changed climatic conditions and the scourge of yellows practically wiped the peach trees off the face of the earth in New England thirty or more years ago, before the commercial importance of fruit growing in its present proportions had been foreseen.

For some years past we have been studying the peach and its needs for this latitude, and at the present time there is a genuine revival of peach culture, not only for the family supply, but as a commercial enterprise on many New England farms in this and other New England States.

The only reason that peaches are not grown in abundance in New England is the winter killing of the buds. In Maryland, Delaware, and other sections of the country where the trees do not suffer from winter freezing, the blossoms are sometimes forced out in the early spring and afterwards injured by frost.

A great deal depends on the intelligent selection of soils and varieties. In New England high lands are essential to peach culture. Seek a location giving as even a temperature as possible. Frost behaves much as water does, so that elevated land, dropping off suddenly, is most desirable. A well drained, naturally dry soil is best. Thorough drainage is necessary; peach trees will not grow with their feet wet. We have been growing peaches of the Persian family; also varieties from South China. Another type from North China, which we are just getting acquainted with, seems to be more hardy than the Persians. The most notable among the North China peaches is the Elberta. The Early Rivers is one of the hardiest peaches. Some think that Mr. Rivers really had a seedling of a North China peach without knowing it. The Crawford will thrive better on a clayey soil than on a sandy loam. The best soil, all things considered, is a light, sandy loam.

The peach industry tends to increase the value of land. Let ordinary farm land be developed into a peach orchard and all the land in that vicinity will immediately command $200 or $300 an acre.

The land about the average home is rich in nitrogenous matter, and peach trees planted in this soil will make rapid growth and produce splendidly for one or two crops. But such rapid growth makes soft wood, and the trees will soon die. If we want our trees

to live long and be happy we must not give them too much nitrogen. I would prefer poor soil to a very fertile one, and would feed it, but would avoid stable manure. Fertilizers rich in phosphoric acid and potash give ripe, hardy wood, and may be used freely. Potash adds to the color and quality of the peach.

For peaches prepare the soil as for any other crop with which you wish to succeed. The land cannot be ploughed too much. I recently visited the farm of General Bidwell, in Chico, Cal., a magnificent farm of forty thousand acres, cultivated with the steam plough, etc. An adjoining lot of land of five hundred acres, belonging to a lady, was ploughed with a good pair of horses and steel plough, and thoroughly harrowed, and on this land the amount of wheat raised was more than double that raised on the same area of the former farm. Plant in the spring. You cannot plant too early. Set the trees from sixteen to twenty feet apart each way. I set mine thirteen feet apart, which is too close, yet I make it pay. In one orchard I planted half the trees eighteen feet and the other half twelve feet each way, but by mistake got them only eleven and one-half feet apart. A careful account of the expense and yield has been kept. The close planted had to be fed more and pruned more, but at the end of twelve years were $7,000, net, ahead. At thirteen years the wide planted began to gain on them, reducing the balance to $5,000 or $6,000. Close planting means an everlasting pruning of trees. Medium-sized trees are the best to plant. Nurserymen charge more for large trees, but they are no better. Get trees a year old, from four to five feet high and three-fourths of an inch in diameter at the base. Don't worry if they come from the nursery without a great quantity of fibrous roots. I cut them all off smoothly from two to four inches long. Prune the top to a single stem about fifteen inches long. Don't put in any fertilizer around the tree when planting. Use nothing but fine earth; the fertilizer may be spread on top.

It is a mistake to attempt to grow crops between the trees. If you are a thorough cultivator, and crowded for room, you may plant low-growing crops. But this should be done when the orchard is young, before the trees come into bearing. I should have nothing but peaches in a peach orchard, except a horse, harrow, and plough. If your land is thin, and commercial fertilizers are insufficient, you may obtain nitrogenous matter by sowing

green crops. I sometimes use cow peas. Sow in midsummer, let them die, and plough in in the spring. Bank the trees to prevent them from swaying and to protect them from mice.

After the trees are planted rub off most of the sprouts, leaving three or four to grow at will. Prune after the weather becomes cold in the fall, and before spring growth begins. Shorten in and thin out the branches. The following spring cut out again, but don't cut off any of the little side spurs. Make a broad even tree and make it low. Continue the pruning until the tree begins to bear. With only one per cent of the buds left alive after a hard winter's freeze there is a chance for a crop. I have had a great crop with only four per cent.

Peach buds are badly killed in Massachusetts and Connecticut this winter. Out of two thousand buds I found only three alive, but by cutting from spurs I found a better proportion. If trees are badly injured by frost, wait till April, when the buds are swelling, before pruning. Leave the fruit buds wherever they are, one at the base of a branch, one at the top of another branch, etc. This makes a bad looking tree, but gives fruit, and the next year you can prune for form.

After the fruit is set in the spring, look the trees over and thin out the fruit where it is in clusters, leaving it from four to six inches apart. This means sometimes taking off nine-tenths of the fruit, but thinning is absolutely essential to the production of fine fruit. It will take only fifty or sixty of the largest-sized peaches to fill a half-bushel basket, which will sell for two dollars; of the next size, one hundred and twenty-five, selling for a dollar and a quarter; while of the small ones, two hundred will be needed, which will bring fifty cents a basket or a quarter of a cent apiece. Large peaches have more water, small ones more nutritive matter, yet the profit is all in the big ones.

When the fruit is well grown, leave it as long as possible upon the tree. If your market is reached by your own wagon, you can leave it until fully ripe before picking. It will take from seven to twelve days for all the fruit on a tree to come to maturity. Pick the fruit carefully and grade it. Never use a machine in grading. The only machine which can grade peaches well is a bright, intelligent woman. Men will lay aside extra fine specimens to put on top. Women sort them honestly; men either can't or won't. Pack honestly from top to bottom. In my Georgia orchard I have had two

hundred girls employed in sorting fruit. They work hard and get very tired before night, and as an experiment I tried putting a stringed band into the packing shed to play from two o'clock until dark, and found that it increased the work twenty-five per cent, and left the worker in a happy, contented condition.

Will peach growing be overdone? There is a chance that it might be, if all the trees planted came into bearing. But many who try peach growing do not succeed. The man who believes he can do it can. He must believe in himself. He must have a love and a taste for the business and an interest in it.

Massachusetts has some wonderful opportunities in this direction, for in central Hampshire, central and eastern Hampden, central and southern Worcester, Essex, Middlesex, and Norfolk counties, there are many tracts of lands perfectly suited to the peach, both as to soil conditions and elevation. Many of these tracts are within easy driving distance of your manufacturing towns and villages, and all of them are so situated that their choice products in a thoroughly ripe condition can be put down in any of the New England markets in from ten to twenty-four hours after being taken from the tree. It only needs men who have faith in the business and in themselves to develop these grand possibilities.

Discussion.

President Appleton asked if there was not something better than barrels for apples, to which Mr. Hale replied that he believed in boxes. In New York, a few weeks ago, he saw several car-loads of apples wrapped in paper and packed in bushel boxes.

In answer to an inquiry by William C. Strong about peach yellows, Mr. Hale said that quite a number of Massachusetts people do not recognize any such disease. It is a dangerous, deadly disease, for which there is no remedy, no cure. The infested trees should be pulled up immediately and burned. In young orchards it is well to remove the four nearest trees also, in order to prevent the spread of the disease. It is unknown in the South and in California.

Samuel H. Warren asked the lecturer if he knew of anything to protect the buds from winter killing.

Mr. Hale replied that the easiest way was to spray the trees

every very cold spell with water, which would form a coating of ice over the buds and protect them.

Mr. Warren knew of a man who had tried this and saved his orchard.

Jacob W. Manning asked whether Mr. Hale was troubled with peach rosette in Georgia. This, Mr. Hale said, seems to be dying out in the South.

Edmund Hersey knew of a variety which had never been troubled with the yellows. Trees of this variety had been growing on his farm for one hundred and fifty years. Southern trees in his neighbor's orchard had died of the yellows, yet these trees had never suffered. Three strong seedlings were budded with Crawford's Early. These grew and bore peaches for a number of years, but the Crawford part finally had the yellows and the trees were allowed to die. The branches which came from the strong roots were perfectly healthy. The peaches were not of good quality, but it never was a good variety.

George D. Moore asked for information in regard to borers.

Mr. Hale thought banking the trees early in the growing season with six or eight inches of earth the cheapest and easiest way to prevent them. But trees should be looked over once a year and the borers dug out.

In answer to an inquiry by Joshua C. Stone regarding the use of straw or burlaps as protection against freezing, Mr. Warren said that he had had experience in tying trees in burlaps and that it had done no good whatever. He had saved some trees by bending them down and covering them with snow.

Mr. Fisher asked the lecturer how high he allowed his trees to grow.

Mr. Hale replied that they should be headed so low that eighty per cent of the work of thinning, pruning, and gathering may be done on the ground. The average height of a full-grown tree should be about ten feet.

Thomas Harrison asked how to avoid splitting of the trees.

Mr. Hale said by avoiding crotches; cut off one branch. An amateur cultivator might trim trees in ideal form, but it can't be done in a commercial orchard.

Some of the indications of the yellows, Mr. Hale said in answer to an inquiry, are a premature ripening of the fruit, an unnatural size of the fruit early in the season, and a lack of natural flavor.

Also the so-called pennyroyal sprouts, with long, narrow leaves, which develop in the autumn after the leaves begin to fall. The yellows will often strike the most vigorous trees, the first symptom being a thicker clustering of the leaves. Sometimes these leaves, only half an inch apart, will be two inches wide and eight inches long, and on being held to the light will show a yellowish color not seen in the rest of the foliage.

A. M. Clement spoke of the Peach Yellows Law, which he said they have been trying for three years to secure in this State. He is anxious to see it tried as an experiment in the shore counties.

BUSINESS MEETING.

Saturday, February 4, 1899.

An adjourned meeting of the Society was holden at 11 o'clock today, the President in the chair.

In the absence of the Secretary, by reason of illness, the President appointed Miss C. M. Endicott Secretary *pro tem.*

Charles E. Richardson presented his Annual Report as Treasurer for the year 1898, approved by the Finance Committee. It was voted that the report be accepted without reading. On motion of William C. Strong it was voted that the Treasurer give a brief abstract of his report, showing the general condition of the financial affairs of the Society.

The Treasurer stated that the Assets were . .	$482,721 65
Liabilities . .	55,955 43
Surplus . .	$426,766 22

Since the beginning of the present year the liabilities have been decreased by the payment of the Stickney Fund of $12,000 to Harvard University, agreeably to the terms of the indenture by which it was held. The liabilities have also been decreased by the payment of $1,000 remaining on the mortgage on the building.

The Society has received during the present year the specific bequest of $10,000 by the late Francis B. Hayes, and also a large part of the amount coming to it as residuary legatee under the

same will. The Society has also received $1,000 from Mrs. Jerome Jones to constitute the Henry A. Gane Memorial Fund.

The Treasurer further stated that the present membership of the Society is 738, viz.: 535 Life Members and 203 Annual Members.

Joseph H. Woodford, Chairman of the Committee appointed to prepare a Memorial of the late Charles N. Brackett, presented the following:

By the death of Charles N. Brackett this Society has lost one of its most valued members. When he passed away on the fourth day of January he had attained the age of seventy-two years, and had been an active member of this Society for forty-eight years, and Chairman of the Vegetable Committee thirty-two years. The Society has lost a faithful and unpretending servant, and a man who will be missed by his associates. There are none who over so long a period of time have in quiet faithfulness performed their duties to the Society in a more conscientious or satisfactory manner. He was very punctual, careful, and just in all the work of his Committee; very quiet and unobtrusive in his demeanor, and beloved by all who knew him.

In the death of our fellow-worker and friend, this Committee, representing our Society, desires to express to his family its deep sympathy with them in their and our loss.

JOSEPH H. WOODFORD,
VARNUM FROST,
WARREN H. HEUSTIS,
} *Committee.*

The report was accepted, and it was voted that it be entered on the records, and that a copy be sent to the family of the deceased.

J. Woodward Manning moved that the Secretary prepare a card list of all awards of Medals, Certificates of Merit, Honorable Mention, and Complimentary Notices, for the last ten years, the same to be continued and kept on file, experience having proved that there is danger of making such awards a second time, which would be obviated by the existence of such a list.

This motion was carried.

Henry L. Clapp moved that the Society illustrate its TRANSACTIONS and place them on sale.

Edward O. Orpet offered as an amendment that illustrations of plants which had been thought worthy of the award of Medals or Certificates of Merit should be given.

William C. Strong thought that the Society did not want to vote that everything which received one of the above-mentioned awards should be illustrated. William H. Spooner suggested as an amendment that the illustrations should be subject to the approval of the Committee on Publication. The amendments were adopted, and Mr. Clapp's motion, as thus amended, was passed.

The following-named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Dr. Edwin A. Daniels, of Boston.
Warren D. Hinds, of Townsend.

On recommendation of the Executive Committee, it was voted to appropriate $80 for the use of the Garden Committee for 1898, additional to the appropriation for that year. As, according to the By-Laws, appropriations of money can be made only at Stated Meetings of the Society, this matter will come up for final action at the next Stated Meeting, the first Saturday in April.

Adjourned to Saturday, March 4.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 11, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Injurious Insects and their Transformations.

By Prof. Clarence M. Weed, New Hampshire College Agricultural Experiment Station, Durham, N.H.

None of the evil effects of the changes which modern civilization has made upon the earth is more evident to the American farmer than the increased difficulty of saving his crops from the ravages of noxious insects and parasitic fungi. Many of us

have heard from our fathers and grandfathers of the apples which once grew in abundance in yards and along highways, strangers alike to the codling moth, maggot, or scab; of the luscious peaches free from worms and rot; the plums unmarked by the curculio, and the pears that had yet to learn the secret of becoming dwarfed, gnarly, and cracked; of the grapes that knew not how to rot; and the potatoes which had neither been blighted nor bitten by the Colorado beetle. Now all is changed: every crop has foes that often gather the lion's share of the harvest. The enemies have come from the north and the south, the east and the west, from Europe and the islands of the sea, and in our own midst they have flocked from the forest to the field, deserting a wild plant for its cultivated congener, or changing their habits to conform to a new environment.

This increase of noxious insects, however, is the natural result of the changed conditions of things. Among the principal factors tending toward it may be mentioned: (1) the massing of crops in limited areas; (2) the facilities for transporting insects long distances by vessels and railways carrying agricultural products; (3) the abandoned farms and orchards that serve as breeding grounds; (4) the destruction of forests and the cultivation of prairies; and (5) the decrease in the numbers of insectivorous birds.

Considering each of these factors briefly, we find that the tendency of the first — that of the massing of crops in limited areas — toward increasing our insect pests rests upon the biological law that the increase of any animal is limited by its food-supply. Under the natural conditions existing on this continent before the advent of the white man, those insects which fed on wild plants had, as a rule, only a limited food-supply. The apple maggot, or railroad worm, for example, is supposed to have bred originally in the wild haws of the woods. The parent flies had then usually to find here and there an isolated tree bearing the fruit in which it deposited its eggs. Its chances of being caught by a bird or entrapped in a spider's web while on this search were very good, so that the scarcity of the food-supply not only directly limited the number of individuals that could be produced, but by being scattered it increased the chances of the adult insects falling a prey to enemies. But in a modern apple orchard all this is changed: the food-supply is almost unlimited, and is so massed together that the insect runs little risk in passing from fruit to fruit, or from

tree to tree. Hence it can multiply indefinitely, unless there is some means of checking it. The same line of reasoning applies to a large proportion of our injurious insects.

We are indebted to our commerce on sea and land for many of the most noxious insects. Brought to our shores from Europe, Asia, or Australia by ships, many of these pests have found a land which for them was flowing with milk and honey, and in which their hereditary enemies had not yet gained a foothold. Consequently they have multiplied without let or hindrance; and by natural and artificial means — notably the railroad trains — they have rapidly overrun the country of their adoption.

The abandoned or neglected fields and orchards all over the United States have proven a prolific breeding ground for many insect pests. Too often the efforts of painstaking farmers have been rendered unavailing by the proximity of such sources of infection. An orchard that has outlived its usefulness had better be converted into firewood than left to die uncared for.

The destruction of forests has compelled certain insects to resort to cultivated crops for subsistence; and in some cases a decided change in feeding habits has resulted. So, also, the bringing of the prairies into cultivation has caused many insects which originally fed upon wild grasses to resort to pastures and meadow lands.

The fact seems well established that birds, as a class, are now less numerous in the United States than they were a century or more ago. While some species have doubtless become more abundant under the changed conditions of modern civilization, others are very much rarer and a few appear to be approaching extinction. It of course was inevitable that the changes produced by man's interference with natural conditions should exert a tremendous influence upon the native fauna: some birds have found the new dispensation better suited to their wants than the old; others have changed their habits and made the best of it; while others have been so relentlessly persecuted that their only hope of survival lay in retreating to inaccessible swamps or cliffs. The wholesale destruction of primeval nesting sites has been a potent factor in the change produced, but fortunately many of the most useful birds have found substitutes that answer the purpose very well: the swallows have gone from hollow trees to the eaves and rafters of barns, and the swifts from trees to chimneys. The

great increase of meadow land has encouraged the development and distribution of birds like the meadow lark, originally confined to the prairies, while the decrease of forests has tended to the suppression of species like the passenger pigeon that lived largely on acorns, beech nuts, and other forest products.

Without stopping for further consideration of the causes of this decrease let us see what effect it seems to have had upon the hordes of noxious insects. It has been repeatedly shown that the birds are one of the most effective natural means of regulating the increase of insects. They have well been likened to a great standing army which of its own volition concentrates itself wherever an insect outbreak is threatened. We are not likely to overestimate the services of these feathered allies. Whenever an investigation of their relations to noxious insects is made we have new proof of their beneficence. Only recently in a study of the food of the chickadee in New Hampshire I was astonished to find that one of these birds frequently devours between four and five hundred plant-lice eggs in a single day, so that during the long winter months which these chickadees spend so cheerfully with us, millions of the eggs of these destructive pests must be devoured. The present crusade in favor of the birds is one in which the horticulturist is vitally interested.

The operation of these various causes, together with the enormous powers of multiplication possessed by the insects themselves, has led to a constantly increasing injury to cultivated crops, until today these tiny foes exact a tribute of ten per cent of the crop products of American agriculture. They form an omnipresent host of tax-gatherers, taking possession of the farmer's crops and enforcing their onerous demands without process of law, unless preventive measures are vigorously prosecuted. They are no respecters of persons; like the rain, they fall upon the fields of both the just and the unjust.

"The authorities best able to judge have estimated the annual loss in the United States due to these little pests at nearly half a billion dollars. Noxious insects, according to Dr. C. V. Riley, recently the distinguished entomologist of our National Department of Agriculture, occasion losses in the United States which are 'in the aggregate enormous, and have been variously estimated at from $300,000,000 to $400,000,000 annually.' In single States and single seasons the loss is often frightful in extent.

During some of the great chinch-bug epidemics the loss in Illinois occasioned by this one insect has amounted to over $73,000,000 a year; and in seasons not marked by an outbreak of such a great crop pest the injury is much more severe than is ordinarily supposed. The official entomologist of the State just named, Prof. S. A. Forbes, after years of careful field observation and statistical study, has recently expressed his belief that 'the insects of the State of Illinois derive as large a profit from the agriculture of this great agricultural State as do the farmers themselves.'"[1]

Fortunately, however, there is an extended silver lining to this dark cloud of insect injury. If these creatures have increased on every hand, our knowledge of methods of controlling them has also augmented with the passing years. Many of the remedies proposed ten or twenty years ago seem now foolish and impracticable. Within the last decade especially the progress has been phenomenal. It has been shown that many insects can be checkmated by a proper crop rotation; that the natural enemies of others can sometimes be used to destroy them; and that others are easily killed by improved insecticides. But the most important advance has been the introduction of the spraying machine, an apparatus by means of which insect-killing substances may be easily and rapidly distributed over the surfaces of trees, shrubs, vines, and herbaceous plants. As I have elsewhere said, its introduction into American horticulture marks an advance almost as important as was marked by the advent of the improved cultivators into our agriculture. Before the latter were introduced the weeds that infest the soil were fought by the hand hoe, but now a single team does the work of many men. In the same way until recently various laborious and partially effective methods were used in fighting noxious insects and destructive fungi; but now many foes of both these classes are fought on a large scale by the force-pump and spray nozzle, and every season adds others to the list of those against which this method may be successfully used. With a large class of farmers and fruit growers, spraying has become a recognized part of the season's operations, and therein lies the chief promise of the method. When the belief becomes general that it is as important to save a crop from destruction by its foes as it is to produce it; that fighting noxious worms must take its

[1] C. M. Weed, "Popular Science Monthly," March, 1893.

place as a farm process by the side of that of fighting noxious weeds; that the parasitic plants which absorb the vitality of leaf and fruit are as dangerous to the crop as the plants which dispute with it the possession of the soil; and when along with this recognition there is placed before the farming community a cheap and wholesale method of preventing the injuries of these organisms — then the vast annual loss now suffered because of insects and fungi will be very greatly lessened.

Transformations. — It is frequently supposed that almost any sort of bug, worm, or spider that flies or crawls about is an insect, but strictly speaking, a large proportion of these creatures are not insects at all. For example, a spider is not an insect; neither are the thousand-legged worms so often found under boards. In both these cases the creatures have too many legs to belong to the insect class. Spiders have eight legs and the thousand legs a great many more, while the true insects have but six. The body of an insect is also divided into three principal regions — head, thorax, and abdomen. A majority of them are also characterized by undergoing during their development a series of well-marked changes or transformations. Such insects exist in four distinct stages; namely, 1, the egg; 2, the larva or caterpillar; 3, the pupa or chrysalis; 4, the adult or imago. We may take, for example, the common cabbage worm: the white butterfly deposits, singly or in clusters of two or three each, small yellowish eggs upon the cabbage leaf. These soon hatch into little green larvæ that feed upon the substance of the foliage; in about two weeks they become full grown, when they generally leave the cabbage plant, and, finding some suitable shelter, — beneath a board or under the coping of a fence — change to chrysalids. They remain in this condition about ten days, when they emerge as butterflies.

An insect which goes through so distinct a series of changes as this is said to have complete transformations, to distinguish it from those having incomplete transformations. For example, our common grasshoppers hatch in spring from eggs deposited in the ground the previous season. The newly hatched grasshoppers resemble the adults in general appearance, but are smaller, and have no wings. They gradually increase in size, and moult, or shed their skins, at frequent intervals. They continue active until they become full grown, having no quiet pupa or chrysalis state. Such insects are said to undergo incomplete transformations.

While, in general, insect transformations may be grouped under these two headings, complete and incomplete, there are many modifications of each of the methods. One of the most interesting of these is illustrated by the aphides or plant lice — the green flies of the gardener and florist. The life-history of these little creatures may be summarized as follows: In the spring there hatches from an egg deposited the autumn previous a little aphid that sucks the sap of the food plant for a number of days — sometimes a fortnight — before it becomes full grown. During this period of growth it moults, or sheds its skin, a number of times to provide for its rapidly increasing size. This insect is sometimes called the stem-mother: she is always wingless. Soon after reaching maturity she commences to give birth to living young, continuing the process usually for several days. The young mature in the course of ten days or two weeks, when they begin to give birth to a third generation, and so the process is repeated again and again, the insects multiplying with marvellous rapidity. All of these aphides are the so-called agamic or viviparous females, giving birth to living young without the presence of any males. Throughout summer this is the only method of reproduction, but on the approach of cold weather a true sexual generation is produced. Eggs are laid by these, being deposited on the twigs of trees or the leaves of herbaceous plants, where they remain throughout the winter.

Insects take their food in two ways: some insects bite, others suck. The former, of which the Colorado Potato Beetle is an example, are provided with jaws by which they can gnaw the surface of the food-plant. The latter have, instead, a pointed, tube-like beak which they can insert into the tissues of their host-plant, and suck out the sap.

On account of this difference in feeding habits some insects can be destroyed by coating their food-plants with poison, the beetle just mentioned, for example, while others, like the plant lice or the Chinch Bug, must be treated with some insecticide that kills by contact.

Injurious insects have many natural enemies to contend with. Among the larger animals, they are preyed upon by the "fowl of the air and the fish of the sea;" frogs lick them up with their viscid tongues, and toads are continually sending them in search of the mystic jewel within their bodies; while snakes, lizards,

moles, skunks, and a host of other animals are their constant enemies. But more destructive than any or all of these are the foes of their own class — the predaceous and parasitic insects.

Predaceous insects are those which attack other insects from the outside, devouring them bodily or sucking out their lifeblood. The handsome little lady-bird beetles, the two-winged robber-flies, or the four-winged dragon-flies furnish good examples of this class. So, also, do the black ground beetles, found everywhere under sticks and stones. Some of the largest of these are called caterpillar hunters, because they feed upon canker-worms, army-worms, cut-worms, and various other insect pests. Other predaceous insects live in ponds, lakes, and rivers, devouring mosquitoes and related creatures, while still others burrow through the earth, and devour the insects found therein.

The common dragon-flies or devil's needles are good examples of predaceous insects. The adult dragon-flies lay eggs upon the stems of plants growing in ponds and streams. The eggs soon hatch into small larvæ that live in the water upon young mosquitoes and other aquatic insects. In about a year the larva becomes full grown; it then crawls up out through the water, the skin splits open along the back and the adult dragon-fly appears. It rests awhile to expand its wings and then flies rapidly through the air, in search of winged insects of almost any sort. In "The Two Voices" Tennyson has described the final development thus:

> "To-day I saw the dragon-fly
> Come from the wells where he did lie.
>
> "An inner impulse rent the veil
> Of his old husk: from head to tail
> Came out clear plates of sapphire mail.
>
> "He dried his wings: like gauze they grew:
> Thro' crofts and pastures wet with dew,
> A living flash of light he flew."

Parasitic insects differ from their predaceous cousins in that they develop within the bodies of their victims and thus destroy them. These, also, are exceedingly numerous, both in individuals and species. A good illustration of the habits of this class is found in the small, four-winged black fly that destroys the common Grape Caterpillar, an insect closely related to the

familiar Tomato Worm or Tobacco Worm. This fly deposits a number of eggs beneath the skin of the caterpillar, and these eggs soon hatch into minute worms or maggots that absorb the body juices of the worm and develop at his expense. After a few weeks these maggots become full grown, and burrow their way out through the skin of their hapless and helpless host. They then spin their white and silken cocoons upon his back. Within these cocoons they change to the pupa or chrysalis state. About two weeks later they again change, and the legless little maggots find themselves transformed into neat and pretty black flies, with four wings and six legs, like the one which a few weeks before deposited in the caterpillar the eggs from which they developed.

But these parasites are not always so successful as this, for they frequently furnish a striking illustration of Dean Swift's oft-quoted couplet:

> "So, Naturalists observe, a flea
> Has other fleas that on him prey;
> And these have smaller still to bite 'em;
> And so proceed ad infinitum."

These parasites are frequently subject to the attack of a still smaller parasite which destroys them as they destroyed their host. In such cases the first-mentioned species is called the primary parasite and the other a secondary parasite.

It is the presence of these secondary and other parasites that makes the subject of injurious insects and their enemies extremely complicated. For example, in New Hampshire we have been studying for several years the life-history and enemies of the common American tent caterpillar — the pest which for so many seasons has pitched its unsightly tents in the orchards and along the highways of New England. Doubtless to most of you the general life-history of this insect is well known. You know that in winter it exists in the egg state — the masses of a hundred or more being fastened around the twigs of apple and wild cherry trees. In the spring the little caterpillars emerge from the eggs and begin feeding upon the tender foliage of the buds about them. In a few days they begin to make a silken tent, utilizing generally, for this purpose, a fork of the branch. As time goes on the nest is enlarged. The caterpillars retire to the tent at night, and during cold and wet weather, and when not feeding. They have

regular times for meals, leaving and returning to the nest in processions. They become full grown in about six weeks, being extremely voracious during the latter part of their development. They are nearly two inches long, with a hairy body ornamented with a distinct white stripe along the middle of the back, on each side of which are numerous short, yellow, longitudinal lines, rather irregularly arranged.

Most of the caterpillars leave the tree where their nest is as fast as they are full grown, and crawl about in search of a suitable shelter to pupate in. Having found this, — beneath a board or in the cracks of a fence, — they spin an oval, silken cocoon, yellow when completed, within which they change to the pupa or chrysalis state. In two or three weeks another change takes place, and from the cocoons come forth reddish-brown moths. The female moths soon deposit the clusters of eggs on the twigs of trees, after doing which they die. Thus there is but one brood each season.

Now we have bred more than twenty species of parasites which prey directly or indirectly upon this tent caterpillar. One of these is so tiny that its development takes place within the egg, and so it is called an egg parasite. Most of the others prey upon the caterpillars themselves. Perhaps the commonest species is a four-winged fly belonging to the genus Pimpla that deposits its eggs in the caterpillars when they are nearly full grown. These eggs hatch into little grubs, each of which absorbs the juices of the host, developing at its expense, but not killing it until after it has spun its cocoon. Then the parasite matures rapidly, changes to a pupa, and soon after emerges as a four-winged fly.

This parasite, however, is commonly checked in its career by another. A four-winged fly of a different species from the one which laid the egg for the primary parasite lays an egg beside or upon the parasite grub. This egg hatches into a tiny larva that attaches itself to parasite No. 1, and begins slowly to absorb its lifeblood. Parasite No. 1 is unable to shake off parasite No. 2 and soon gives up his life to it. No. 2 feasts upon the carcass of its victim and rapidly becomes full grown, when it changes to a pupa, to change again soon after into a fly.

But a third fly, called Dibrachys, often comes upon the tragic scene. When the larva of parasite No. 2 is approaching full growth the Dibrachys fly deposits beside or upon it an egg. The

egg soon hatches into a minute larva that fastens itself to parasite No. 2, and soon kills it. Then this parasite No. 3 feeds upon the body of No. 2, as No. 2 had fed upon No. 1, and No. 1 had fed upon the tent caterpillar. In due time No. 3 becomes full grown, changes to a fly, and wanders off in search of other victims.

These shifting scenes of tragedy have all taken place within the small yellow cocoon of the caterpillar. The cocoon, perchance, is fastened to the tough bark of a tree or the boards of a fence. Along comes a bird, — a chickadee or a sparrow, — spies the yellow silk, and, knowing that there is a luscious insect morsel inside, pecks open the cocoon and devours the contents. Now from our human point of view, of which, of course, none of these creatures is conscious, does the bird do us a benefit or an injury? It may be that the bird simply eats a caterpillar that had no parasite, in which case we should conclude that it was befriending us; it may be that it ate instead parasite No. 1, cutting off the hope of progeny of a host of friendly insects, in which case we should be likely to conclude that it was doing us an injury; possibly the bird comes when parasite No. 2 is getting in its work, when again we should conclude that it was a friend; or finally should it reach the cocoon when parasite No. 3 was present the same reasoning would lead to the conclusion that again the act was unfriendly. But the arrangements by which the increase and decrease of injurious insects are brought about are so intricate that after fifteen years' consideration of the subject I am convinced that we cannot safely say that the bird which devours the secondary parasite of a noxious insect is doing an unfriendly act. What we call the "Balance of Nature" is so delicately adjusted that the only safe thing for man to do is to act cautiously and with the fullest possible knowledge.

Now this sketch of the parasites which beset the tent caterpillar is no fanciful one. And could we but study with equal thoroughness our other injurious insects I doubt not that similar conditions would be found. In fact, in several cases such studies have been made, and very similar results obtained.

Insect enemies and birds, however, are only a part of the agencies which work for the woe of the tent caterpillars. During the summer of 1897 in southern New Hampshire these various parasites were so abundant that a large percentage of the caterpillars were destroyed before maturing into moths, yet enough of the latter developed to provide eggs for a vast number of colonies for the

brood of 1898. But during 1898 in my region the pests were checked much more effectively, and by entirely different agencies. Just after the larvæ had hatched last April a heavy and long-continued rainfall caused the death of enormous numbers of them. An examination of the apple and wild cherry trees after the storm showed that in most cases the only larvæ present were those huddled together on the lower side of the egg mass, where they were protected from the washing effect of the rain. These survivors developed in sufficient numbers to be decidedly in evidence in May, but they had to succumb to a very great extent during the last weeks of their growth to a bacterial disease — a sort of insect cholera — that killed them in vast numbers. The effectiveness of this disease was doubtless increased by the wet weather prevailing at that time. Early in June nearly every nest was full of dead and dying caterpillars, many of those on the outside of the web gradually shrivelling up until only the dried skins remained. A series of observations made upon a large number of nests just before the time for pupation showed that more than ninety per cent had been killed by this disease. As a result there were few of the caterpillars crawling about the streets and highways in early June, although during previous years great numbers were to be seen at that time. There were also comparatively few moths later in the season, and the eggs now to be found are correspondingly reduced.

But what was the effect of this epidemic of disease upon the parasite? It was almost as destructive to them as to the caterpillars. While some of the parasitic flies probably found other species in which to deposit their eggs, it seems to have been inevitable that vast numbers of them must have perished with their hosts. In consequence it seems likely that in the region under my observation the outbreak of the American tent caterpillar which has extended over at least the last five years has been checked, and that the coming season the pests, having swung to a point in which their numbers are far below the average, will begin again the gradual increase that shall lead to another culmination some years hence. And it is worthy of note that they begin this increase at a time when their parasites are, comparatively speaking, very scarce, so that for several years the caterpillars will suffer little from their attacks.

I have dwelt thus upon the relation of the tent caterpillar to its parasites because there is an impression abroad that the modern

way of fighting noxious insects is by means of their insect enemies. The famous lady bird introduced into California a few years ago to destroy a scale insect is responsible for much of this opinion. But this remarkable case was the exception which proves the rule, that in general it is not practicable to fight injurious insects by means of enemies of their own class. In the California case the conditions were unique, and a great deal too much weight has been given to it.

It is fortunate that this American tent caterpillar is restricted in its food to comparatively a few kinds of trees. Were it a more general feeder these periodical outbreaks would be matters of much more serious concern than they now are. An illustration of this fact is seen in the history of the closely related Forest Tent Caterpillar (*Clisiocampa disstria*), which feeds upon a much greater variety of fruit and shade trees. In its life-history it is very similar to the common species; it is a native American insect and is beset by hosts of enemies, yet during the last century there have been frequent and destructive outbreaks of it in many parts of the United States. In Maine, New Hampshire, and Vermont during the last few years such an outbreak has been taking place. Last season immense damage was done over large areas of forest growth, the woods in July looking as bare of foliage as they do now. There are millions of eggs now upon the trees, with every prospect that the coming season the attack will reach a severity much greater than that of 1898. Before such hordes of caterpillars the efforts of individual men seem futile. It is possible to fight insects in orchard trees and on the home grounds, but when the wilderness is alive with crawling foes what can man do but hope for a speedy culmination of the outbreak? But we know from long experience, not only with this but with many other insects, that the outbreak will be ended by natural causes only after the passing of several seasons in which great damage has been done.

This Forest Tent Caterpillar perhaps better than any other illustrates what would happen if the people of Massachusetts should permit the Gypsy Moth to escape from its present boundaries and become a scourge to the agriculture of the United States. This forest caterpillar is a native insect; for untold ages other American insects have been learning to prey upon it, but notwithstanding this the caterpillar at frequent intervals becomes so abundant as to do immense damage over large areas. There is

every reason to believe that the gypsy caterpillar, even if we imported every species of parasite to be found upon it in Europe, would be vastly more destructive. Its range of food-plants is much greater, especially so in its habit of attacking coniferous trees; it is a hardier species; it is not so freely eaten by birds; and it has that peculiar but undoubted advantage which the alien insect, sparrow, or rabbit enjoys over the native inhabitant. The argument so often heard that the gypsy moth can safely be left to the mercy of its parasites is discredited by the experience of every economic entomologist in the land. Any one who believes the argument to be sound would do well to visit, next June, the regions infested by this forest caterpillar.

The methods of preventing insect injuries may be conveniently grouped together under four headings; namely, 1. Agricultural methods; 2. Mechanical methods; 3. Use of natural enemies; 4. Insecticidal methods.

The limitations of the use of natural enemies have already been discussed, and there is only time now for a brief mention of the more important measures under the first and second of these headings.

[The speaker here gave a short discussion of clean culture, crop rotation, fall ploughing, fallowing, fertilizing, modifying the time of planting, hand-picking, excluding by mechanical means, attracting to light, and various other measures.]

Lack of time forbids a discussion of the various insecticidal methods of destroying injurious insects. I have already said that the most important recent advance in these methods has been the introduction of the spraying machine, and I would now add that the most important advance in the use of spraying machinery has been made by the Gypsy Moth Commission here in Massachusetts, in perfecting both the material to apply and the machinery with which to apply it.

Spraying is simply an easy and practical method of distributing certain substances having a destructive effect upon insect and fungous life over the outer surfaces of trees, shrubs, vines, and herbaceous plants. These substances are usually applied in a finely powdered condition, and the tiny particles stand guard over the plants, killing with remorseless certainty any insect or fungous pest that attempts to pass through their lines to reach the plant. As a rule the particles themselves do not enter the plant, but re-

main on the outside until driven off by the combined action of wind, rain, dew, and sunshine. This is not true, however, of the contact-killing insecticides, which are applied directly to the offending insects, and do not remain on the plant in an effective condition.

In conclusion, let me say that in view of the progress made in the past twenty-five years in our knowledge of injurious insects and the methods of preventing their injuries, we may well be sanguine concerning the future. But the experience of the present decade has shown us as never before that these pests must be reckoned with in the plans of the individual, the State, and the Nation. There are hosts of foes that have not yet invaded our country which we are likely to be called upon to fight, unless rigid measures of exclusion are put in force. It behooves every man interested in horticulture to be on the lookout for insects new and strange, especially on plants from abroad, and to take no chance that can be avoided of introducing one of these insidious foes.

Discussion.

Benjamin P. Ware spoke of the lecture as intensely interesting and instructive, and said that we have learned many ways of protecting ourselves. He had on his land a waste place covered with choke-cherry trees, which had been infested with the tent caterpillar, and he had felt obliged to go over the trees and destroy them. This, he said, is a very simple matter. When they are first hatched go out in the morning when the sun is shining and you can see them all, and easily destroy them. Mr. Ware appealed to the ladies not to wear birds on their bonnets. Birds, he said, are growing scarcer and scarcer. A single dealer in one year imported forty thousand humming birds to decorate bonnets. He presented spraying as the great remedy for injurious insects. The idea of spraying, he said, originated in Essex County; it was first discussed at a Farmers' Institute in Topsfield, and afterwards at a meeting of this Society. Mr. Ware moved that a vote of thanks be presented to the lecturer.

Professor Weed knew of another way in which caterpillars had been exterminated. In a town in New Hampshire the Village Improvement Society offered the children ten cents a hundred for destroying the caterpillar egg-masses. Eight dollars and twenty-

five cents in all was spent, one boy receiving $2. Thousands and thousands were destroyed in this way, and the town was practically freed from them.

Varnum Frost asked the lecturer whether he thought there was any occasion for alarm at present concerning injurious insects. He thought the tent caterpillars need cause no anxiety, for they are so easy to destroy. A weak solution of Paris green — one pound to two hundred gallons of water — will clean them all off.

Professor Weed considered spraying the most effective way of killing them. Caterpillars do not commit suicide; they are sometimes destroyed by a bacterial disease, but usually not until after a great deal of damage has been done. The idea that their natural enemies will destroy them before much mischief is done is wrong. There is an outbreak of the army worm about every ten years. The chinch bug appears about every thirteen years, and is liable to disappear suddenly.

Mr. Frost had had experience with the tent caterpillar for sixty years, and had twice known it to become so numerous that farmers got discouraged and gave up trying to exterminate it. It had appeared in such vast numbers that all foliage was soon devoured, and, its food being gone, it actually starved. He believed that the canker worm would exterminate itself, and that the gypsy moth would do the same.

Hon. Aaron Low had also twice during his life noticed that the tent caterpillar will, when it becomes very numerous, actually starve. He had a field of oats attacked by army worms, which soon became so numerous that he could hear them eating in the night. Trenches were ploughed and ditches dug across the fields, and here he could have gathered bushels of the worms. He afterwards had a good crop of Hungarian grass where the army worm had been so destructive. At the first appearance of the worm the grass was mowed, but before he could get it into the barn it was eaten to shreds. He had supposed they would come again the next year, but had seen none since.

A gentleman who was a member of the Newton Improvement Society thought it was useless to have the school children destroy the caterpillar nests. After they had destroyed many thousands, enough were left to do damage. Then, when the caterpillar had disappeared, the credit was given to destroying the nests, but not one in ten was destroyed.

Thomas Harrison said that a year ago two of his neighbors had sowed barley for green crops. When two or three feet high it was attacked by the army worm. This year they changed the crop to corn and rye, and the army worm had not shown itself. Sometimes a change of crops brings the army worm with it.

In answer to an inquiry Professor Weed said that the worm could not possibly be in the seed. It will develop in grass land, and when grown will seek grain fields, even crossing a road to get food that it likes.

The vote of thanks to the lecturer was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, February 18, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Why Crops must have Nitrogen and How it can be Provided.

By Prof. G. C. Caldwell, Cornell University, Ithaca, N.Y.

That all vegetation must have available nitrogen food is an established fact. The plant cannot grow without nitrogen. Again and again has the experiment been tried of planting the seed in an artificially prepared soil, usually clean sand, to which all the necessary foods of the plant were added except the nitrogen; every one of these experiments has given the same result: the seedling has grown for a short time only, while making use of the small quantity of nitrogen in chemical combination in the seed, — such nitrogen compounds as are stored up in every seed for the nourishment of the young plantlet till its roots can take food from the soil.

It is not long before the little plant begins to show most plainly that there is something seriously wrong in the soil; the lower and older leaves take on a yellowish color; a few new leaves may appear higher up on the stalk, that draw a part of their food from the older leaves; but they are miserably poor leaves at the best,

and they soon stop growing. It is in this way that the plant informs us that it is suffering from nitrogen hunger. This result never fails to appear, sooner or later, no matter what kind of a plant is put to the test. Such is the simple proof that nitrogen in the form of some chemical compound is an absolutely necessary component of the food of plants.

As to the use that is made of this nitrogen. We know only that it is worked up somewhere in the cells of the plant into chemical compounds that are exceedingly complex in their composition, and which play a very important part in the production of the substance of the plant, and therefore in its growth. The white of the egg, so familiar to everybody, is just such a kind of a compound as are those that are made in the plant cells, and for the making of which the nitrogen, as well as other foods, is absolutely necessary. The white of the egg is called albumen; these other compounds of the same kind that are made by the plant are called albuminoids, because they are like the albumen.

According to the opinion of chemists, these albuminoids are very closely connected with the power of motion in living beings. Animals have the power of motion, while plants have such power only in comparatively few cases. The bodies of animals are made almost entirely of albuminoids; plants, on the other hand, contain very much less; hence it is inferred that a large proportion of albuminoids in the living being goes with the power of motion which that being possesses.

But even though a plant cannot as a general rule move any of its parts, yet there is a kind of motion that goes on *in* the plant which seems to support this idea that power of motion is dependent on the coöperation of albuminoids. This motion is seen in the contents of the cells of the young and active leaves. These cells contain, first of all, water; in this water is a yellowish, semi-fluid substance which has about the consistency of the mucilage that we use for sticking things together; this part of the cell-contents is called the protoplasm; it consists largely of albuminoids; in it the microscope reveals the presence of a multitude of minute grains. In young cells the protoplasm is in constant motion, and the exceedingly small grains are themselves moving in currents through the protoplasm. Here, then, we have motion; motion in a substance rich in albuminoids; and this motion is in some way closely associated with the life of these cells.

The crops must, therefore, have nitrogen food in order that albuminoids may be produced; they must have albuminoids in order that they may grow; and these albuminoids must be in the young, active cells in abundance, in order that the growth shall be vigorous and healthy, and that the crops shall be large and profitable. We must raise crops that have albuminoids in order that our cattle and we ourselves can live. The animal cannot make albuminoids; it must get its whole supply from the grass, hay, grain, etc., that it eats, or by chewing up some other animal which got its nitrogen from the plants that it ate. We human beings are just as dependent on plants for our albuminoids as is the lowest grade of an animal; we can make thousands of chemical compounds in our laboratories, but we cannot make the minutest particle of an albuminoid.

The leaves with their millions of microscopic cells are the laboratories in which the albuminoids are made, out of carbon from the carbonic acid that is in the air, with the hydrogen and oxygen from the water that the plant is always taking up from the soil, the sulphur, perhaps, from some plaster that may be in the soil, and, finally, the nitrogen which it usually finds in the fertilizers that we apply.

A part if not all of the process of making plant substance requires the coöperation of the sun's rays. With plenty of food and sunlight and water provided, business is brisk on every bright, warm day, in these myriads of laboratories; sugar, starch, and such like things are made first, and then the albuminoids. Very little do we realize the magnitude of the work that is being carried on all around us, as we follow our cultivators through our corn or garden truck, or as we look over our fields of grain and smile at the prospect of thirty bushels of wheat or fifty bushels of oats, or as we sniff the fragrance of eight hundred bushels of onions per acre. We may say to ourselves that it is all the result of *our* labor; but the sun, the air, the soil, and the leaves are doing the biggest part of the work by far.

The possible and available sources of nitrogen are, first and foremost, the soil; second, the manures and fertilizers upon which we place so much dependence; and third, the air. As to the first source, few persons know how much nitrogen in chemical combination is contained in every soil of fair quality; the stock is immense in some cases. Lawes and Gilbert, of England, found in

the arable soils of their own fields from 3,255 to 8,645 pounds of nitrogen per acre in the uppermost two or three feet, and therefore within reach of the plant; in various other soils of Great Britain from 3,500 to 7,700 pounds per acre of area; in the prairie soils of the United States from 6,650 to 21,700 pounds; in the soils of the Manitoba prairies 16,000 to 42,000 pounds within a depth of four feet; in the soil of an English pasture 10,000 to 11,000 pounds.

Let us compare these great stores of nitrogen, quantities so large that they can be measured by tons as well as by pounds, with the quantities that are carried from our soils in the crops. The figures are, for an acre of wheat 48 pounds; 121 pounds in a good crop of corn including the stalks; 47 pounds in a fair crop of potatoes; 130 pounds in a crop of beets; 49 pounds in a crop of hay. It would seem that we need not concern ourselves about the supply of nitrogen food for our crops, with so much already in the soil, and so little carried off each year. Yet we do know that we must concern ourselves about this matter; we do know that if we let the nitrogen in the manure piles go to waste, or if we leave out the nitrogen in the fertilizers that we buy, our farming operations will not be profitable.

If it be asked why all this nitrogen in the soil seems to be of so small account, the answer is that it is in compounds that are not easily dissolved by the water in the soil, and very slowly becomes available for plant food; only as the nitrogen passes into other combinations that are soluble in water, or in the sap in the roots of the plants, can the plants get any good out of it. If one can establish a good system of drainage of the soil, and can till it frequently during the growing season, thus conserving the moisture and keeping the ground porous, so that the air can have free admission, good crops can be obtained for a series of years without putting any nitrogen fertilizer on the soil. The effect of such treatment is at least in part to convert some of the unavailable because insoluble nitrogen compounds into available because soluble compounds.

It was by this kind of treatment, and this alone, no fertilizer being applied, that an English farmer some years ago cropped a piece of ground with wheat for twelve years, getting on plots of half an acre as much wheat as was harvested from a whole acre of good soil treated in the ordinary way by good farmers. It was by a similar course of treatment of the soil that Professor

Roberts at Cornell obtained two successive crops of potatoes, yielding in the first year 367 bushels and in the second year on another plat 343 bushels; the soil was only a fair one at the start, and it received no fertilizers at the beginning of the experiment.

Nitrogen in purchased fertilizers costs nearly three times as much as phosphoric acid, if it is bought in that compound which is in general the best nitrogen food, namely, nitrate of soda. For intensive agriculture or horticulture the home supply of nitrogen in the manure of the yard is usually insufficient, and the supply must be increased in some way. The frequent tillage of the soil many times during the growing season may not be practicable as a general thing, no matter how much may be gained by it.

Is there, then, any other way by which we can get a sufficient supply of nitrogen in an available condition at less cost than by buying nitrate of soda, or with less labor than is involved in the tillage method? That our leguminous crops, such as clover, peas, beans, vetch, lucerne, and lupine may be used to help us is undoubtedly known to many in my audience, if not to all. I trust, however, that I may be able, while calling to mind again much that you have already heard and read about this subject, to give you some new information, and by means of the illustrations that will be shown with the lantern to make a more lasting impression than I can by merely talking to you about it.

It was first observed as far back as 1615 that there are peculiar swellings on the roots of certain kinds of plants; little attention was paid to them; they were supposed by some to be simply parasites living on the juices of the plants on which they were growing; others supposed them to be the results of the attacks of some insects; and others still thought that they might be the beginning of new roots. Not till 1858 was any further attention paid to them; then a German botanist found that they contained bacteria or microbes — those smallest of living microscopic organisms; he suggested the possibility that these swellings, or tubercles as they are more commonly called, stand in such relations to the plant on whose roots they are established, and especially to leguminous plants, as to account for the common opinion of farmers that such plants can take up and assimilate the free, uncombined nitrogen of the air.

In 1887 two German agricultural chemists performed some very interesting experiments which showed most conclusively that these

tubercles really do in some way enable the plants bearing them to take nitrogen from the air and make use of it as they would nitrogen from any other source. In 178 pots they put soil consisting of pure sand with no nitrogen in it, but to which all other foods that the plant required were added; there were planted in these pots oats, buckwheat, rape, — a plant then much cultivated in Germany for its oil, — peas, seradella, — a forage crop, — and lupine; only one seed was planted in each pot. The seeds germinated in all the pots alike, and all the plants grew alike up to a certain point, or as far as they could grow with the aid of the nitrogen in the seed; then the growth stopped in all the pots, and soon the yellowish color indicating nitrogen hunger appeared. An extract of garden soil was then made by simply stirring it up with water, and letting the coarser particles settle to the bottom of the vessel; a very small quantity of this extract was then added to the soil of each of the pots.

The oats, buckwheat, and rape remained in the same state of nitrogen hunger, making no further growth. The peas, seradella, and lupine, after a little time, as if waiting to consider the matter, suddenly recovered their normal green color, and from that time on continued to grow luxuriantly till they were ripe. If some of the extract was first boiled before applying it to the soil, all the plants so treated remained in the condition of nitrogen hunger, whether they were leguminous plants or not. The boiling of the extract could produce no other important change in the liquid than to kill bacteria in it. It therefore appears to be proved, even by these first experiments, that living bacteria brought about this change in the condition of the leguminous plants, and at the same time that they were quite unable to help the other plants that were not legumes.

On pulling the plants out of the soil when their growth was ended, it was found that all the leguminous plants had tubercles on their roots, while there were none on the plants that were not leguminous. Thus it is shown that the tubercles, or the bacteria in them, produced the sudden change in all the plants of one kind, the legumes; and it is indicated that, while these plants were waiting during that brief time after the soil-extract was added before taking on the dark green color and beginning to grow again, they were simply waiting for the tubercles to be formed and ripened for their use.

One remarkable feature of this series of experiments was that all the plants of the same kind told the same story. Not a single oat, rape, or buckwheat plant revived and resumed its growth; on the other hand not a single pea, seradella, or lupine plant failed to respond to the inoculation, as it is called, of the soil with the bacteria; all that they needed was the help of these microscopic living things; then with the abundance of all other necessary foods that were mixed with the sand at the beginning of the experiment they were fully equipped for rapid and vigorous growth.

In another experiment some sand was first heated to redness in order to drive out all the nitrogen in it and to kill any bacteria that might be there; this sterilized sand was then mixed with the needful quantity of all the plant foods except the nitrogen, and some of the extract of garden soil was also added; one grain of buckwheat, one of oats, and one pea were planted in this sand all in one pot; water was added, and the pot under a glass shade was then put where the sun would shine on it during the day. The result was the same as before: neither the buckwheat nor the oat seedling recovered from the nitrogen hunger; but the pea grew luxuriantly and was happy as it towered above its starved companions; even though the roots of the pea were probably intertwined with those of the other plants, and the roots of the latter were perhaps in contact with some of the tubercles of the pea roots, still these plants could make no further growth.

Another experiment was tried with thirty pea plants, each one in a pot by itself; the soil was prepared in the same manner as in the other experiments except that the extract of soil was added to ten of the pots only. All the plants grew to the height of about four inches, and then the growth stopped in every pot; after a little time the plants that had been inoculated with the soil extract suddenly took on the usual color of healthy plants, and went on growing. All these plants had an abundance of tubercles on their roots; the other plants had no tubercles.

Of course this discovery excited a great deal of interest throughout the agricultural world. Other investigators repeated the experiments for themselves, and obtained the same results. Among these were Lawes and Gilbert, of England, who have been carrying experiments along agricultural lines for sixty years, and have done an immense amount of work for the advancement of agriculture;

they were fully convinced by the results of their own experiments that the discovery of the Germans was correct.

That the nitrogen is really taken from the free nitrogen of the air by the leguminous plants has been conclusively proved by another experiment. Legumes with tubercles on their roots have been grown in pots in a closed glass case, so tightly constructed that no air could pass in or out. The air in the case was analyzed before and after the experiment, and it was found that some of the nitrogen was missing; and this could be explained only by supposing that the plants growing in the case, or the bacteria in their roots, consumed it.

There are a great many kinds of bacteria in the world; and there seems to be a number of different kinds of bacteria that bring about this fixation, in the plant, of the nitrogen from the air, each kind doing its best work for that species of a legume from which it was taken, and in a few cases doing as good work for other species. In other cases certain kinds of legumes get very little help from bacteria taken from another kind. This means that if you want to raise a good crop of peas with the aid of tubercles on the roots you will be most successful if you inoculate with soil in which peas have been growing, and in which there are pea bacteria; and that if you inoculate with some soil where there has been a growth of locusts or lupine, and where the bacteria are what we might call the locust variety or the lupine variety, your peas will not turn out so well. The pea and the vetch are less particular than other plants about the source of the bacteria with which they are inoculated; lupine, on the contrary, is exceedingly particular in this respect, and will make hardly any growth at all if inoculated with bacteria from any other species of legumes; but give it bacteria from a soil in which lupine has grown, and also an abundance of potash and phosphoric acid and lime, and it will do wonders. The yellow lupine is considered in Europe as the best plant to be used for the improvement of poor, sandy soils; it will grow freely where other legumes will nearly starve for want of nitrogen even if properly inoculated.

The quantity of nitrogen that can be taken from the air by some of these plants under favorable conditions is sometimes enormous. In the case of the first series of experiments that I described, the amount of nitrogen that some of the plants contained and which

they had taken from the air was determined by analysis; one of them contained 20 grains of nitrogen. The quantity seems small, but when we consider how much would be gained by all the plants that could grow on an acre of soil the result is very large. Each of those 178 pots contained 9 pounds of soil; the weight of the soil of an acre of ground to the depth of 12 inches is about 3,500,000 pounds; 9 will go in 3,500,000 about 400,000 times; we might have then 400,000 pea plants on one acre; this number of plants would take from the air 115 pounds of nitrogen, provided that every plant grew as vigorously as those in the pots. If this number of pounds of nitrogen be multiplied by six the product will be very near the weight of nitrate of soda that one would have to buy in order to get 115 pounds of nitrogen, or nearly 700 pounds. No one who has used this fertilizer, and knows how to use it, would dare to put 700 pounds on an acre; he would know that such a dose would do serious damage to the crop; a third as much would be the most that he would care to apply. Some remarkable and almost incredible results were obtained by a French chemist of great renown. In six trials with vetch, growing eleven weeks, there was gained from the air a quantity of nitrogen equal to from 1,285 to 1,728 pounds of nitrate of soda calculated per acre. Clover growing ten to twelve weeks gained in six experiments nitrogen equivalent to from 412 to 1,150 pounds of nitrate of soda. With lucerne, vetch, and some other leguminous plants growing together the gain in nitrogen was equivalent to from 728 to 3,717 pounds of nitrate. With lucerne alone, growing from eighteen to twenty-one weeks, the gain of nitrogen was equivalent to from 2,471 to 3,885 pounds of nitrate. The meaning of these figures is that these several crops, supposing each one to be growing on an acre of soil for periods ranging from ten to twenty-one weeks, would gain from the air quantities of nitrogen which if bought in the form of nitrate of soda would require from 412 to 3,885 pounds of this fertilizer; the first figure was the lowest result, with clover; the second was the highest result, with lucerne.

The potted soils in which these plants grew were carefully seeded or inoculated with the tubercle bacteria by means of extracts of other soils in which the same kinds of plants had been grown; the soil itself was well fertilized with all the foods needed by the plants except the nitrogen; the plants were kept supplied with the right

amount of water, so there was never any suffering from drought. Of course in the open field, where the supply of water is variable, and occasional droughts are unavoidable, there would be less vigorous growth, and consequently less nitrogen would be drawn from the air. But nevertheless these figures given above do at least prove that there are great possibilities in this natural method of getting nitrogen in the combined state from the inexhaustible supply of free nitrogen in the air. This combined nitrogen can be made useful for other crops that *must* get their nitrogen from compounds of nitrogen in the soil, either by using the nitrogen-gathering crops for fodder and spreading the manure in the fields, or by ploughing the crop in; it has been shown by experiments that the nitrogen of a crop used for green manuring is quite as available as the nitrogen in stable manure, or even more so.

Since we now know that clover can gain nitrogen from the air, we can the more easily believe the assertion of a most successful New York farmer, now dead, that he bought no manures for many years, and although exporting a large quantity of nitrogen from his farm in the dairy products sold, he had kept it in a highly fertile condition by frequently growing clover in the rotation and using plaster freely. He did not know that the clover drew nitrogen from the air while he was thus using his clover crops to maintain fertility; but he was a thinking man, and he undoubtedly thought that that was just what the clover did.

Since this discovery was made of what the leguminous plants can do for the farmer and the horticulturist, it has been affirmed by some investigators that all kinds of plants, whether legumes or not, can get nitrogen from the air and work it up into chemical compounds; but so far as our ordinary crops are concerned it has been conclusively proved that if they are not legumes they can get their nitrogen from the soil only. Mustard has been more frequently mentioned in this connection than any other plant. The latest investigation of this question was made at the Department of Agriculture in Washington. The results thereof fully confirmed the results of all the careful experiments made before in Germany and elsewhere, to the effect that mustard, like wheat, oats, maize, and all the small and the large fruits, etc., can get its nitrogen only from the soil.

The question as to what causes the growth of the tubercles on the roots of leguminous plants has been much studied. These

studies have led to the conclusion that the bacteria are the first cause; that the tubercles are not something that the plant itself causes to grow, any more than the gallnuts on an oak tree are caused by the tree, or than the swelling after a mosquito bite is caused by the hand on which it appears. These bacteria can be cultivated as any plants can be cultivated; they are plants, not animals; they can be carried through many generations. Starting with some material taken from the tubercles on a pea root, it is planted in a suitable medium; from the crop thus obtained another planting can be made in a fresh quantity of the same medium, and so on indefinitely. This medium in which the bacteria can be made to grow and multiply, or this soil for bacteria, as it might be called, is a jelly-like substance of such a nature that the bacteria will live and thrive in it, as higher plants will live and thrive in a rich soil made up of sand, clay, and other things. From the last culture made of the pea bacteria a plant can be inoculated with all the usual results of such inoculation; the result may be just as satisfactory as if the inoculating material had been taken fresh from a pea root. In one case where a pea plant was inoculated in this way over 4,000 tubercles were counted on its roots. That which can be done with the bacteria of the pea can be done with those of any other leguminous plant.

Many experiments have been made in inoculating one species of a leguminous plant with bacteria from another species; such as the inoculation of a pea root with bacteria from a clover plant, or clover with lupine bacteria, and so on. These experiments have proved what has been stated before, that each species generally produces the most tubercles and gets the most nitrogen from the air with the help of its own kind of bacteria. The conclusion is also established that these bacteria are the only agency through which the leguminous plants can enrich themselves with nitrogen compounds made from free nitrogen and other substances drawn from the air.

It is a curious and very interesting operation by which free nitrogen is thus taken into the plant and converted into nitrogen compounds. It is really a partnership between the plant on the one hand and the bacteria on the other; the plant provides the bacteria with a suitable place for their underground home; the bacteria build their little houses there and then proceed in some mysterious way not yet understood to provide the plant with com-

bined nitrogen — thus, so to speak, paying rent for the root surface on which they have built their tubercles. The higher plant, the pea, bean, or clover, does not suffer any damage on account of these growths on its roots, constructed and occupied by the lower plants, the bacteria.

It seems probable that there are not so many species of bacteria as there are species of plants that can be helped by them. The pea is one leguminous species, the bean is another, lucerne another, and so on through the whole list. In no way whatever can we convert a pea plant into a bean or into clover. There are surely different kinds of bacteria, each one of which is best adapted to the work of getting nitrogen from the air for some particular species of legume; but these different kinds of bacteria are to one another somewhat as the different varieties of some one vegetable are to one another — such as the different kinds of squashes listed in the seed growers' catalogues, or of corn or cucumbers. It is now supposed that these kinds of tubercle bacteria are only varieties of one species; and that they are produced each one by growing on some one species of plant. Bacteria that have been growing and multiplying on pea roots for some years, season after season, are in some way different from those which have grown for a time on the bean; and those whose home has been the bean are not just the same as those that have grown on clover. If the pea variety of bacteria is used to inoculate a bean plant the result will not be so good as when the bean is inoculated with the bean variety; but if the descendants of these pea bacteria that were used to inoculate the bean go on living for a number of seasons on the bean plant they seem to become modified into the bean variety.

These bacteria thus seem to have a wonderful power of changing their character under changed conditions of their surroundings. They seem to be present in all arable soils, or at least in all soils in which leguminous plants have been grown at some previous time. When no leguminous crops have been grown for a considerable time in any field the bacteria seem to pass into a variety which will produce tubercles on any species of legumes, although not so abundantly as when the plant is inoculated with its own variety. This kind of bacterium, which can produce tubercles on any legume, has been named the *normal* tubercle bacterium. If a field has only normal bacteria in it, and if some one species of

legume is grown on that field for a series of years, the normal bacteria are supposed to be gradually changed into the variety that is best fitted for this species.

A very interesting illustration of this operation is described as follows: Twenty seedling acacias were set out in a plat where no legumes had been grown for a long time. The plat was surrounded by a narrow rim of land on which vetch had grown as a weed for many years. All the acacias that were in the more central parts of the plat grew well, and at the end of the season had tubercles on their roots, while those that were in the rim or near it made but a poor growth and had no tubercles. These results indicated quite plainly that the soil of the rim of the field was full of bacteria that had become so completely modified into the vetch variety during this long period of time that they were of no use to the acacias. It was also indicated that the bacteria in the central part of the field were the so-called normal bacteria, and were therefore capable of developing tubercles on the roots of any species of legume that was capable of having tubercles, and which might take possession of that part of the field.

Another interesting experiment illustrates this property of the tubercle bacteria. Twenty-two different species of legumes were inoculated or seeded with pure tubercle-bacteria from pea plants, and twenty-one of the same kinds of plants were inoculated with pure locust tubercle-bacteria. The first lot of bacteria could be considered as best fitted for getting nitrogen for the pea, and the other lot were best fitted for the locust. Sixteen of the whole number were not at all helped by the locust bacteria, and thirteen were not helped by the pea bacteria. Of those inoculated with the locust bacteria that did have some tubercles on their roots only one gained much benefit; that one was the locust plant itself. The pea inoculation was really successful only on the pea and the bean. Here again the bacteria modified by repeated culture into the pea variety were really useful only when applied to the pea plants, and the bacteria converted by repeated culture into the locust variety were useful only on the locust.

The distribution of these tubercle bacteria in the soil has not been much studied. The number of them would appear to be large enough, ranging as it does in some soils where legumes have been growing from 78,000 to 143,000 in one cubic inch of soil. They do not spread rapidly in the soil, and need the help of tillage

in order that they may be uniformly distributed. In one experiment six peas were planted in a pot of soil free from nitrogen; soon after the plants appeared above the soil one of them was inoculated by scratching the crown of its roots with the point of a needle that had been dipped in a tubercle of a pea plant from the garden. This inoculated plant grew to the height of forty-two inches; the other five made only half as much growth in height, and had each of them only half as many leaves as were on the other plant. At the end of the experiment tubercles were found only on the plant that had been inoculated; the bacteria seemed to remain right where they were put. Therefore if a soil is inoculated near the surface they will remain thereabout; if the inoculation is further down in the soil there the bacteria will be most abundant at the end of the season. In the first case the tubercles will be found mostly on the rootlets near the surface; if the inoculation is at the depth of eight or ten inches the tubercles will be found mostly on the rootlets at or about that depth. The importance of a thorough stirring of the soil for distributing the bacteria is thus clearly shown.

The tubercles are more abundant on plants growing in poor loams than in rich soils where the crops can find sufficient nitrogen without the help of tubercle bacteria; there being little or nothing for the bacteria to do, but few if any tubercles appear. The poorer the soil is in nitrogen, the more vigorous is their growth, for there is so much the more work for them.

These bacteria seem to possess a very great resistant power against decay and death. It has been observed that the same kind of bacteria may be found in the soil even if no legumes have been grown there for a long time. That they are there and ready for work is proved by the abundance of tubercles on the roots of legumes planted in that soil after such a long period. They probably live through the winter by producing germs or spores that can withstand low temperatures; these spores bear the same relation to the bacteria from which they were produced that the wheat or the barley seed bears to its parent plant. As illustrating the above statement, a test was made for the presence of bacteria in a soil in January; none were found then; in the following summer the soil swarmed with them.

Now let us consider the practical application of this copartnership between certain leguminous plants and the bacteria that build

their houses on the roots of these plants. The first tests with leguminous plants on a large scale for the improvement of soils poor in nitrogen were made in Germany. with peas, clover, seradella, and lupine, on reclaimed upland bogs and on sandy soils. The best results were obtained on the soils poorest in nitrogen, and especially on new soils. In many of the trials the crops failed entirely unless inoculation was applied. On very poor, sandy soils that were plentifully supplied with potash salts and the basic slag phosphate, a fertilizer much used in Germany to supply phosphoric acid for the crops, the results were wonderful. The same soils yielded very poor crops without inoculation.

The history of one of these trials is instructive. The plat was a small one; about twenty pounds of potash salts, nine pounds of slag phosphate, and twenty-four pounds of a soil in which lupine had been growing were scattered over the soil of the plat; the lupine seed was then sowed and the plat was harrowed to mix all these additions with it as thoroughly as possible. Other plats near by were left uninoculated, but were supplied with the same fertilizers as those that were put on the trial plat. There was no difference between the vegetation on the different plats as long as the plants could use the nitrogen of the seed. Eight days after the formation of the first leaf the plants on the inoculated plat had tubercles abundantly on their roots, while none were found on the roots of the other plants. Eight days later the darker green color of the inoculated plants was distinctly visible, and this difference became more and more marked as the season advanced. The crop harvested on the uninoculated plat was only 100 pounds; the yield of the inoculated plat was 475 pounds. In other tests of a similar character from two to sixteen times larger crops were obtained on the inoculated plats than on the uninoculated ones.

In the management of this kind of inoculation on a large scale the inoculating material must be taken from a field where the same kind of a crop has been growing that is to be grown in the field to be improved. Evidence enough has been given in what has gone before to show that a plant is almost sure to make a better growth and gain more nitrogen if inoculated with its own modified variety of the bacteria. The soil to be improved should be one that really needs nitrogen; time and labor will be wasted if this rule is not observed. The soil of this field should be well pulverized by tillage in order that the inoculating material can

be intimately mixed with it and uniformly distributed. The quantity of inoculating soil should be, according to one authority, from 1,700 to 3,500 pounds per acre of soil to be treated. The inoculating soil should be well pulverized; otherwise it cannot be uniformly mixed with the other soil. It is good practice to let this soil freeze and thaw two or three times after taking it from the field, for then it can be much more easily made into a fine powder. This inoculating soil should be scattered by hand and then mixed with the other soil by the harrow, but it must not be carried too far down; it is best to apply it when the seed is sown. If the soil is sour it should be sweetened by the addition of lime, with care not to add too much.

As has already been stated, lupine is the best crop to be used in case a very sandy soil is to be treated; vetch appears to be best suited for poor loams. Experiments have shown that the addition of a little nitrate of soda at the time that the seed is planted is useful; it serves to feed the plants in that short period during which they have to wait for the development of the tubercles on the roots — that little waiting time which begins when the nitrogen of the seed has been consumed; if the nitrate is added the plants will keep on growing while the tubercles are getting ready for them and no time will be lost.

In this connection an account of an experiment tried for the purpose of testing the comparative power of different legumes to gather nitrogen from the air will not be out of place. Thirty-one different species of plants were thus tested. Nine of them gained only 65 to 86 pounds of nitrogen, equivalent to from 390 to 510 pounds of nitrate of soda; seradella and two species of clover were in this group. Ten species gained from 88 to 143 pounds, equivalent to from 528 to 858 pounds of nitrate; in this group were two species of vetch, three of clover, and the kidney bean; the red clover made the largest gain, which is an important fact, as this crop is so widely grown in this country. From 175 to 220 pounds of nitrogen were gained by five species, one of which was a vetch, one a lentil, one the ordinary pea, and another the everlasting pea; these quantities of nitrogen are equivalent to from 1,050 to 1,320 pounds of nitrate. Three species of lupine, the blue, the yellow, and the white, gained respectively 275, 328, and 371 pounds of nitrogen, equivalent to 1,650, 1,968, and 2,226 pounds of nitrate. The great nitrogen-gathering power of the lupines is

very clearly shown by these figures. But whatever may be the capacity of one legume or another for gathering nitrogen, it will amount to nothing if there is not a good supply of available potash and phosphate in the soil.

The labor and expense involved in the inoculation of soils on a large scale in the manner above described are so great that an attempt has been made in Germany to prepare pure cultures on a large scale of the several kinds of bacteria which correspond to the different species of plants that may be used for gathering nitrogen, or that may be grown for sale or for fodder. If it is desired to inoculate the soil of a field where peas have never been grown so as to get a good crop of the same it is only necessary to buy a small bottle or a few small bottles of this material according to the size of the field to be planted, and with the contents to inoculate the soil, either by mixing the inoculating material with the seed to be planted or with a small quantity of fine dry earth and scattering this mixture over the soil to be treated. The labor and cost of this method of inoculation are much less than of the other method.

The substance used is called nitragin. Each bottle, costing in this country $1.25, contains material enough to inoculate somewhat more than half an acre. To inoculate the soil by the first method above mentioned the bottle is gently warmed to about the temperature of the body, its contents are added to a quart of clean, warm water and the mixture is thoroughly stirred; it is then poured on the seed to be planted and the whole is worked over with the hands till the bacteria are evenly distributed; some dry sand or soil is then mixed with the moist seed and it is ready for the planting.

In the other method of inoculation the water to which the contents of the bottle are added is carefully mixed with about fifty pounds of fine, dry earth; this mixture is then allowed to dry in the air, but not where the sun will shine on it, or it may be dried by mixing it with more of the dry earth; it is then uniformly scattered over the field to be inoculated, and harrowed in to the depth of about four inches.

This nitragin can now be purchased in this country through the agency of a German firm in New York. They do not keep it in stock, but order it from Germany as wanted. No less than nineteen different kinds of nitragin are listed in their little catalogue; two species of peas, three of vetch, one of beans, three of lupine, five of clover, and one of lucerne are included in the list.

In 1896 many successful results of the use of nitragin were reported in Germany; not only were larger crops obtained, but they were less injured by fungi than usual; for example, inoculated peas suffered much less from the blight than those that were not inoculated. In another case uninoculated vetch suffered much more from the attacks of an insect than did that which was inoculated. Some of the uninoculated plants died because so much weakened by the pests. It must be acknowledged, however, that the success of this method of inoculation is not yet fully assured. I have met with only a few accounts of its use within the last year, and I do not know how extensively it is applied at present. But the application is so inexpensive and so convenient, and so great are its possibilities as illustrated by some of the figures that I have given, that it certainly seems to me to be worth a trial wherever there are poor soils to be stocked with nitrogen. It should not be forgotten that one year's inoculation may answer, if successful, for three or four years thereafter. It should also not be disregarded that the amount of nitrogen gained by the inoculated vegetation is likely to be much larger than the quantity usually applied to the soil in such a fertilizer as nitrate of soda. Three hundred pounds of nitrate would be as much as any one would care to apply on a growing crop; this quantity of nitrate contains about one-sixth of its weight of nitrogen, or fifty pounds. A ton of nitrate costs now in Boston or New York about $40; at that rate three hundred pounds would cost about $6. Now, if you will read again the figures that I have given for the quantities of nitrogen that may be taken from the air by some of these inoculated legumes, and if it be allowed that even only half as much would be gained in the open field, where the plants cannot be so well cared for as in pots, and if it be considered that the crop can be used for fodder if so desired, and that nearly all the nitrogen in the crop will be returned to the soil in the manure, you will, I think, come to the conclusion that it is an economical way to increase the stock of nitrogen in your soils.

There is another way in which air nitrogen can be worked into a chemical compound; namely, by the action of the electric current on the components of the air; nitrate of soda can be made by this operation. It is stated in a recent scientific journal that where water-power is abundant for making the electric current,

nitrate of soda can be made at a cost of $25 per ton, while the nitrate from South America costs $37 at least.

Many of you may remember the flurry caused two or three months ago, when a most noted English chemist affirmed in a public address that the beds of nitrate of soda in South America would be exhausted early in the coming century; and since that fertilizer is our mainstay for the supply of nitrogen, the civilized world must fall into the condition of nitrogen hunger; or, as the lecturer expressed it, "England and all the civilized nations stand in deadly peril of not having enough to eat." It would not be surprising if many people should be really frightened by such a statement coming from such a source. Several competent writers have shown that there is at least no immediate danger of such a catastrophe. If we take into account the vast stores of nitrogen in our arable soils, the large quantity of nitrogen in the nitrate beds of South America, and above all the immense supply of free nitrogen in the atmosphere about us upon which we can draw *ad libitum* by means of our leguminous plants, and also by means of the electric current, there seems to be little danger that we shall "be in deadly peril of not having enough to eat," or even that our children's children will.

The atmospheric air presses on every square inch of surface of the earth with a weight of fifteen pounds. Four-fifths of this weight is due to the nitrogen in the air. In other words there are twelve pounds of nitrogen over every square inch of an acre of soil. Calculate the number of square inches in an acre of surface, multiply that by twelve, and you have the number of pounds of nitrogen over every acre of soil. The number is 75,271,680 pounds. A crop of wheat, straw and all, asks for only 48 pounds; further comment is unnecessary.

The lecture was illustrated with stereopticon pictures of the roots of nitrogen-gathering plants, which added much to its interest and instructiveness.

A vote of thanks to Professor Caldwell for his interesting and instructive lecture, in which he had brought before the meeting the latest discoveries of science on the subject, was unanimously passed.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, February 25, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, Vice-President BENJAMIN P. WARE presiding.

The following lecture was delivered:

THE AGRICULTURE OF ANCIENT TIMES COMPARED WITH MASSACHUSETTS AGRICULTURE.

By Hon. WILLIAM R. SESSIONS, Secretary of the Massachusetts State Board of Agriculture, Springfield.

Our knowledge of the agriculture of ancient times goes back only to the time since the flood. The history of agriculture among the nations of what may be called classic antiquity is involved in impenetrable obscurity, very few facts on the subject being recorded previously to the times of the Romans.

The Egyptians are supposed to have excelled in agriculture. Moses is the earliest writer, 1,600 years B.C. Agriculture does not appear to have materially changed in those countries even to the present day. Noah is styled a husbandman, and is said to have cultivated the vine and made wine. In little more than three centuries Abraham is stated to have had extensive flocks and herds and great wealth in gold, silver, etc. Isaac, his son, is said to have sown and reaped one hundred fold. Corn seems to have grown in abundance in Egypt, for Abraham, and afterwards Jacob, had recourse to that country in time of famine. Irrigation seems to have been practised in Egypt in Abraham's time, for it is said (Genesis 13, 10) that the plain of Jordan was watered everywhere "even as the garden of the Lord, like the land of Egypt." Later, in the days of Jacob and thence on to Moses, irrigation was common in Egypt.

The agriculture of Greece was learned from the Egyptians, and some ancient Grecian writers state that there were more than fifty ancient Grecian authors who wrote on agriculture. The works of only one of these appear to have been to any extent preserved. The necessary agricultural implements catalogued by this writer are a plough and a cart. The cart had two low wheels and was ten spans in width. The plough consisted of three parts, the shoe-beam, the draught-pole, and the plough-tail. The shoe-beam is to

be made of oak and the other parts of elm or bay. They are to be joined firmly with nails. Nothing is said of iron in its construction. The beasts of labor mentioned are oxen and mules. The oxen were most common, and four and a half years is given as the best age at which to purchase oxen. He also says that the most desirable age for a ploughman is forty ; he must be well fed, go naked in summer, rise and go to work early, and have a sort of annual feast, proper rest, and good food and clothing ; coats of kid-skins, worsted socks, and half boots of ox-hide in winter. The products of Grecian agriculture were sheep, goats, swine, cattle, mules, asses, and horses, the grains and legumes at present in cultivation, and the vine, fig, olive, apple, date, and other fruits. It does not appear that other than wild grasses or herbage plants were in use, no grass seed being sown. No doubt the other nations of that day had a similar agriculture, as they had the same opportunity to learn of the Egyptians.

The allusions in the Old Testament to the agriculture of the Jews are mostly incidental, but enough is said to prove that all the people, from the king to the poorest individual, were interested in agriculture, and that it was almost the only industry, ordinary manufactures being carried on in the family of the farmer rather than by people who devoted their whole time to such business. King David's farming was managed by seven officers. King Uzziah "built towns in the desert and digged many wells, for he had much cattle, husbandmen also and vine dressers, for he loved husbandry." Elisha was found ploughing with twelve yoke of oxen before him. Job had 500 yoke of oxen and 500 she-asses, 7,000 sheep, and 3,000 camels. Isaiah describes ploughing and sowing and threshing, and the threshing floor is often spoken of. Winnowing was done by the wind without the aid of machines or other contrivances except the common sieve.

The Phœnicians were agriculturists as well as traders, and no doubt they introduced their agriculture into their colonies at Carthage, Marseilles, and other places.

The Republic of Carthage included Spain, Sicily, and Sardinia, and flourished for seven centuries, and agriculture was doubtless early introduced there. When Carthage was destroyed by the Romans, 147 B.C., of all the contents of the libraries the Romans saved only the twenty-eight books on agriculture of the Carthaginian general Magon, and these were translated by order of the

government for use of the Romans, and from this grew up the celebrated Roman agriculture, described by Cato, Varro, Virgil, Pliny, and others. At that time the North of France, Great Britain, and the rest of Europe were in a wild state, inhabited by nomadic nations who lived largely by hunting, sometimes keeping flocks and herds, but seldom, if ever, cultivating the soil. When Britain and Northern Europe were overrun, the Roman soldiers, to all of whom the art of agriculture was familiar, carried on farming wherever they were permanently stationed. These soldiers also taught the art to the barbarian inhabitants of every country conquered by them. Thus was the improved agriculture of Egypt, Greece, and Rome made known and put in practice in the parts of Europe from which our ancestors came.

During the middle ages, after the fall of the Roman power in Europe, agriculture was extremely neglected and almost abandoned. Almost savage Saxons conquered Britain and systematically robbed the people of their crops and cattle. The result was a terrible decadence in agriculture. But when the Normans invaded England in the eleventh century they brought with them advanced ideas and practices in agriculture. Many thousands of husbandmen from the fertile and well cultivated plains of France, Flanders, and Normandy settled in the island and introduced the advanced methods of their own countries. Orchards were planted, lands were drained, rivers were diked. Norman priests and monks were good farmers, and the lands allotted to them by the conquerers were cultivated with great care, often by their own hands. They used ordinary manure or dung to increase crops, and also learned the value of marl as a fertilizer and used it quite extensively. The kings encouraged agriculture and sometimes issued edicts compelling owners to cultivate their land to a certain extent and in a certain way. The implements of this period were much like those of Ancient Greece, and they continued in use until about the time of our Revolutionary War.

About the year 1534 appeared the first English treatise on agriculture, entitled the "Book of Husbandry," containing directions for draining, clearing, and enclosing a farm and for enriching and reducing the soil to tillage. Lime, marl, and fallowing were strongly recommended.

Laws were made requiring the practice of improved agriculture and the raising of hops and flax; also requiring the castration or

destruction of horses that were not up to a certain size. The legal standard was fifteen hands in stallions and thirteen in mares, and unlikely specimens were by law consigned to death. Later sovereigns imported superior specimens of horses with which to improve the breed of English horses. Improved grasses for making hay were then unknown, and straw and hay of water grasses were the only dependence for winter fodder. Agriculture now began to improve. It is not singular that this beginning of improvement was contemporaneous with the invention of printing and the revival of literature which ensued as a consequence.

The "Book of Husbandry" before referred to was filled with wise advice and practical directions for the raising of crops and the breeding of cattle and horses, much of which was not improved until some centuries later, and some of which would be considered orthodox at this day. But some maxims and directions for farmers' wives would hardly be accepted by our wives and daughters today, especially by those who believe in woman's suffrage instead of woman's suffering. The author said, "It is a wives' occupation to winnowe all manner of cornes, to make malte, to washe and wringe, to make heye, sheve corne and in time of nede to helpe her husbande to fyll the mucke waggon or dounge cart, drive the ploughe, to load heye, corne and such other. And to go or ride to market, to sell butter, chese, mylke, egges, chickyns, capons, hennes, pygges, gese, and all manner of cornes."

Efforts for improvement continued and laws were from time to time made to quicken the pace. In Elizabeth's time (1563), as cattle were less plentiful than was desirable, a law was made forbidding the eating of flesh on Wednesdays and Fridays on forfeiture of three pounds. Great pains were taken to have it understood that it was a political and not a religious measure. It was not until 1645, twenty-five years after the landing of the Pilgrims, that clover and turnips were introduced into England. Potatoes were introduced into England in 1565, but did not attract much attention for nearly one hundred years. The advent of clover, turnips, and potatoes into Britain marks an epoch in the agriculture of our ancestors, for although the exciting and terrible times of Charles I., Cromwell, and Charles II. were depressing for agriculture as for every other industry, these important helps to stock raising and additions to human food began to have a marked influence throughout Great Britain and Ireland. Laws

providing for bounties on corn exported and duties on corn imported were also made and had a wonderful effect in stimulating British agriculture, but this was before the days of Cobden and free trade. Manufactures and commerce also increased wonderfully in England, beginning about 1760, and, with the consequent increase of wealth, gave a powerful stimulus to rural industry, and augmented agricultural capital, by creating a home demand for the products of the soil and the increase of the flocks and herds. Most of the inventions for economizing labor and increasing fertility have been introduced since the days of Cromwell. The wonderful improvements in the breeds of cattle, sheep, and swine have been made since the same date. Robert Bakewell began this great work about 1750 by improving his father's flock of sheep by selection and cross-breeding. Afterwards the same practice and principles were applied to cattle and swine and resulted in our improved breeds. The influence upon the cattle of England and America is almost beyond comprehension. The marked improvements in implements began about this time, for as before remarked, the farm tools of 1750 were hardly an improvement over those used in Egypt in the time of Joseph, or in Greece in Xenophon's time, or in Rome in the time of Pliny. This brings us down to the time of the beginning of farming in New England.

Allow me to go back a few years and note the changes in Massachusetts agriculture up to the present time.

Massachusetts agriculture began with the Indians. At the time of the landing of the Pilgrims in 1620 it was confined to the raising of Indian corn, beans, pumpkins, and tobacco. The methods of the Indians were of the crudest and simplest kind. They had no domestic animals for draft or burden, or for the supply of meat or milk. They had no knowledge of iron, and were dependent for tools upon what they could contrive out of the products of the chase and the forest, together with what assistance they could gain from the stones that could be selected from the surface of the earth. The land was all covered with forest and was cleared by burning down the trees and brush, and prepared for crops by digging with rude hoes made of clam shells, or the shoulder-blades of deer or moose, the handles being tied on with thongs of deer-hide or native hemp. The crops were cultivated with the same tools, and were even in that day fertilized by the application of fish, buried in the corn hills.

The first white settlers of Massachusetts knew nothing of these native productions of the country. They brought with them no teams or domestic animals, and only the rude hand tools of that early day. Their small stock of English seeds was mostly consumed to ward off starvation during the first terrible winter, and had it not been for the timely discovery of the Indians' store of corn, the whole party would probably have died of hunger. As it was, about one-half their number succumbed to disease, which was the result of privation and exposure, before the first crop was harvested. This crop was so slight that, without the aid of fish and game, they could not have lived through the second winter.

On the arrival of the second party of settlers in November, after the first harvest, their supply of corn was so small that the whole population was put upon half allowance until the next crop should be gathered. This next crop was but little larger than the first, and was all consumed before the third was harvested; and on the arrival of sixty emigrants, in July, 1623, they had only boiled lobster and fish, without bread or vegetables, to set before the newcomers. The third crop was more bountiful, but was raised without teams or ploughs. They had no mills to grind their corn, and it was boiled or roasted while soft, and parched, or pounded into meal when ripe. The following year, 1624, the first cattle were brought over. One bull and three heifers comprised the importation. They were small, and, measured by the standard of today, very inferior, but they were valued highly. The increase from these and other importations in the following years sold at very high prices. Twelve years later, in 1636, cows sold for from 25 to 30 pounds sterling, equal to from $125 to $150 of our currency, each. It must be remembered in considering these first cattle of Massachusetts that one hundred years later the weight of the beef cattle of England, in the Smithfield market, averaged only 370 lbs. per carcass.

All the agriculture of the colony for the first twelve years was carried on without a plough, by hand tools alone, and these made almost entirely of wood. In 1637, seven years after the settlement of Boston, and seventeen years after the landing at Plymouth, there were but thirty-seven ploughs in the whole colony, and these were made of wood with perhaps a rough iron point.

Potatoes were introduced in 1629, but were not much grown in the early years of the colony; in fact, for the first one hundred

and twenty-five years they were not considered an important crop. The first apples were gathered in 1639, nineteen years after the first settlement, and until after the Revolution this fruit was valued only for cider making, and the varieties grown were good for nothing else. The agriculture of the early settlers was only to raise something to sustain life, and their ideas of agriculture were as poor and crude as their cattle and tools. Their cattle were all wintered on wild marsh hay and summered by browsing in the woods. Grass seed was not sown except in experimental patches until the time of the Revolution, one hundred and fifty years after the first settlement and less than one hundred and twenty years ago.

The early settlers' hope of bettering their condition was not based on a better agriculture, for there was no home or foreign demand for agricultural products. The Spanish adventurers of that day were looking for mines of gold and silver; the English for opportunities for trade in furs and fish. New settlements in Massachusetts were made where the location promised good fishing, or trade with the Indians. During the first thirty years forty new towns were founded, among them Springfield, on the Connecticut river, a hundred miles straight into the wilderness. The condition of agriculture did not much improve until after the Revolution. The only demand to be supplied was for food and clothing for the farmer's family, and for the merchants, sailors, and fishermen of the colony. There was not a city in the State for the first two hundred years, or until 1822, within the memory of many now living. Until the War of 1812 the demand for farm products was too small to stimulate production. Since that time manufacturing, commerce, and trade have been increasing, cities and large towns have grown, population has rapidly increased, Europe has competed with our urban population for the products of the soil, and a market has thus been assured.

But as the demand increased our enterprising young men began to look for better land. The average soil of Massachusetts is hard and rough. Western New York and the Western Reserve afforded fertile soil at a low price, and almost an exodus commenced. From my own little town of less than eight hundred and fifty inhabitants, more than sixty young people in the heyday of manhood and womanhood left for the Western Reserve within ten years.

The increased demand for agricultural products also stimulated the enterprise of those who stayed at home. The attention of the foremost men of the State, wealthy merchants and professional men of Boston, and prominent farmers, had, soon after the close of the Revolutionary War, been attracted to the backward condition of agriculture, and they had been incorporated as the Massachusetts Society for Promoting Agriculture. Their efforts were zealous, but the people were not easily influenced to try new methods. This society raised money by subscription, published an agricultural paper, encouraged the formation of county societies, erected a hall for the exhibition of agricultural products, and paid large premiums for essays on agricultural subjects and for experiments in agriculture. It also imported specimens of the best breeds of cattle, sheep, horses, and swine, and placed them where the farmers could use them for breeding purposes at a nominal expense, and thus contributed largely to the improvement of the live stock of the State.

This society held a ploughing-match and cattle-show among the first in the country. At the first ploughing-match the old wooden moldboard plough was the only one in use. The first cast-iron plough made in sections was made in 1819. Previous to 1820 it had been almost impossible to create any enthusiasm for the improvement of methods among the farmers, but the growth of cities and large towns and the commencement of manufacturing had made a market, while the publications of the agricultural societies and the exhibition of the valuable imported animals now began to stimulate the farmers to effort for a better agriculture. The State Legislature was affected by the change of sentiment, and in 1819 provided that a bounty of $200 should be paid to county agricultural societies that should raise $1,000 for the promotion of agriculture, and in like proportion for any greater sum not exceeding $3,000, to enable them to offer premiums for the best domestic animals and agricultural productions. This law has been since modified so as to allow the payment of the same amount of bounty on the same conditions to all societies incorporated whose location is not within twelve miles of any other society receiving a bounty. With this encouragement the number of societies has increased, until we now have thirty-five agricultural societies, each drawing an annual bounty of $600 from the State treasury. The annual exhibitions of these societies, and the more

than one hundred farmers' institutes which they are required to hold each year, have done much to stimulate the enterprise of our farmers, and to introduce among them improved methods and implements.

In 1852 the Legislature established the Massachusetts State Board of Agriculture, composed of the Governor, Lieutenant-Governor, and Secretary of the Commonwealth as members *ex officiis*, three members at large appointed by the Governor, and one member chosen by each of the societies receiving a bounty. Since then the President of the Agricultural College, the State chemist, and the Secretary of the Board of Agriculture have been made members, *ex officiis*, and the Board now consists of forty-six members. The Legislature accepted the congressional grant of land for an agriculture college, and in 1863 incorporated an agricultural college which has been very successful and is a source of pride to the farmers and to the State at large. It is doing a good work for agriculture and for the liberal education of the industrial classes of the State. This college has received many liberal appropriations from the State treasury. The State Legislature in 1882 established on the grounds of the agricultural college the Massachusetts Agricultural Experiment Station, and supports it by liberal annual appropriations in addition to the fees received by the Director from licenses of dealers in and for analyses of commercial fertilizers. Laws for the regulation of the manufacture and sale of commercial fertilizers were early enacted and the Director of the Experiment Station is charged with the enforcement of these laws.

The great West has grown up, and with her gigantic agricultural resources has monopolized the production of the staple food products for the consumers of this country. It also exports hundreds of millions of dollars' worth of these products to Europe, but there is still abundant room for Massachusetts farmers. As these changes have driven them from the production of meat and grain for the markets of the world, the wonderful growth of Massachusetts cities and towns, the increase of her manufacturing and commercial classes, who are thrifty and prosperous and in receipt of good wages or liberal incomes, has created at the doors of Massachusetts farmers a demand for a class of agricultural products that Massachusetts farmers can produce at a profit.

A comparison of the total of Massachusetts agriculture with

that of other States by census statistics makes her agriculture appear of almost trivial importance, if we fail to take into account the relative area of the States and the proportion of agricultural population in the State. The productive area of Massachusetts is less than one-eighth that of New York, less than one-ninth that of Iowa, and less than one-twelfth that of Illinois. Illinois to be equal to Massachusetts in value of agricultural products according to area should produce such products to the value of not less than $636,000,000. The United States Census of 1895 gives Massachusetts a population of more than 2,500,000, or more than 320 people to each square mile of land area. This population is very largely urban, there being by the Census of 1895 thirty-nine cities and towns of over ten thousand inhabitants in this little State. There is no other State in the Union that has as many places of as large population. In addition to these there are forty-five towns that by the same census had between 5,000 and 10,000 inhabitants, making eighty-four municipalities of over 5,000 inhabitants in the State. There are also twenty-two towns having between 4,000 and 5,000 inhabitants in this State. These towns, 106 in number, would all be cities in many of the States, as several States incorporate cities when they have a population of 4,000.

We find also by the State Census of 1885 (I do not find this in the State Census of 1895) that of the whole number of males in the State only 8.28 per cent are engaged in agriculture. This includes farmers, farm laborers, gardeners, market gardeners, persons engaged in the care of animals and in the care of gentlemen's places. Of these, 36,221 are farmers, 35,531 are farm laborers, and 5,505 are other persons. There were by the same State Census 442,616 voters in the State, and supposing that all the farmers are voters, the farmers, including the market gardeners, are but one voter to twelve and one-half voters who are engaged in other occupations, and who represent the population that consumes agricultural products. I may interject here the proposition that this state of things should be taken note of when farmers are inclined to array themselves against the notions and prejudices of the consuming public of the State.

This condition of population shows us why a different kind of agriculture prevails in Massachusetts from that in the larger and less thickly populated States of the central, western, and southern

sections of the country. Our agriculture tends more and more toward the supplying of our urban population with fruit, vegetables, poultry, and dairy products.

By the last State Census (1895) the total value of agricultural products of the State was $52,693,633 — composed of dairy products, $16,301,549; hay, straw, and fodder, $12,491,090; vegetables, $6,389,533; fruit, nursery products, and nuts, including cider and wine, $3,207,806; poultry products, $3,871,318; meats and other animal products, $3,533,019; wood products, including wooden goods, $2,799,514; cereals, $1,104,578; greenhouse and hotbed products, $1,846,297; food products, including canned and dried fruits, vinegar and maple syrup, $516,787; other products, including about $400,000 worth of tobacco, $632,142. By the census of 1890, $594,053 worth of plants and $1,036,409 worth of cut flowers were sold in Massachusetts. Cereals, on which the great West so largely depends, cut but a small figure in the list. Dairy products, fruit, vegetables, meat, poultry, hay, greenhouse products, and a large proportion of all the others are sold in the near-by markets that our numerous cities and large towns afford. These are the lines in which future progress must be made.

Our consuming population is prosperous; many families everywhere among them have large incomes; most of our workingmen and salaried men are liberally paid. They want and can afford the luxuries of life. It is ours to provide them at their doors. If we provide what is wanted, when it is wanted, in honest and attractive shape, we can command remunerative prices. There is little to be hoped for from old-fashioned farming or from haphazard farming. The day is past when "any fool can be a farmer."

Discussion.

The Chairman remarked that after all the time agriculture has been pursued it seems strange how lately some valuable products have been introduced. He remembered when the first cast-iron plough was introduced; he rode a horse to scour the plough, which was done by ploughing in coarse gravel, the iron being very rough.

Varnum Frost asked what were the qualifications necessary for a farmer in order that he should succeed.

Mr. Sessions said that in his lecture he had in mind the condi-

tion of things a hundred years ago, when the brightest boy on the farm was picked out for a minister, a lawyer, or a doctor, while it was thought that the dullest boy on the farm would do for a farmer. The day for that has now passed. In reply to Mr. Frost's inquiry he said that the successful farmer was the brightest and most competent man, and he who loved his calling.

Mr. Frost said that he knew a man who was unable to read or write, who was as successful as any farmer he ever knew. In his opinion farming required good natural common sense, but a liberal education is not necessary. He thought he could tell any one, in five minutes, all there was to know about any branch of farming. Farming is a relief business for a decayed professional or business man.

A. W. Cheever moved that Mr. Frost have five minutes to tell the meeting all he knew about strawberry growing.

Mr. Sessions said that the farmer who was better educated through observation, and through comparison, would be most successful.

Mr. Frost said that a farmer to be successful in his vocation today must be a successful business man first.

BUSINESS MEETING.

Saturday, March 4, 1899.

A Special Meeting of the Massachusetts Horticultural Society was holden at 10 o'clock today in accordance with the following request:

Boston, February 25, 1899.

To Gen. Francis H. Appleton,

President Massachusetts Horticultural Society:

Dear Sir:

The undersigned, members of the Society, respectfully request that a Special Meeting of the Society be called, to be held at as early a date as is practicable, to hear and consider a Special Report to be made by the Executive and Finance Committees, by which these Committees unanimously recommend that the Society purchase a piece of land on the corner of Boylston and Exeter

streets in the city of Boston ; to determine what action the Society will take on that report ; to consider and determine generally what action the Society will take in the matter of acquiring land for a new building, on erecting a building on such land if acquired, of providing funds for such land and building, and of disposing of the land and building now owned by the Society ; and to transact such other business as may legally come before the meeting.

Francis H. Appleton,	J. Woodward Manning,
Benjamin C. Clark,	Geo. F. Pierce,
William C. Strong,	Robert D. Ireland,
Robert Manning,	Wm. Wallace Lunt,
Mary C. Hewett,	James F. M. Farquhar,
Charles E. Richardson,	John K. M. L. Farquhar,
J. H. Woodford,	Chas. H. Breck,

J. W. Howard.

In accordance with this request, agreeably to Section XII. of the Constitution and By-laws, the following notice was sent to every member of the Society :

Massachusetts Horticultural Society.

Boston, February 27, 1899.

Pursuant to the provisions of the Constitution and By-laws, at the request of twelve members of the Society, the President hereby calls a Special Meeting of the Society to be held at Horticultural Hall, 101 Tremont street, Boston, on Saturday, the fourth day of March, 1899, at 10 o'clock in the forenoon, to hear and consider a special report, to be made by the Executive and Finance Committees, by which those Committees unanimously recommend that the Society purchase a piece of land on the corner of Boylston and Exeter streets in the city of Boston ; to determine what action the Society will take on that report; to consider and determine generally what action the Society will take in the matters of acquiring land for a new building, of erecting a building on such land if acquired, of providing funds for such land and building, and of disposing of the land and building now owned by the Society; and to transact such other business as may legally come before the meeting.

Francis H. Appleton,
President Massachusetts Horticultural Society.

Robert Manning, *Secretary.*

At this meeting the President occupied the chair and read the call for the meeting.

The President reported from the Building Committee that that Committee had unanimously voted to recommend to the Society the purchase of the Boston & Albany Railroad land at the southwest corner of Boylston and Exeter streets 16,000 square feet of land — 100 feet on Boylston street and 160 feet on Exeter street, at fourteen (14) dollars per square foot, subject to confirmation by this Society at a meeting to be called together immediately for that purpose.

The above vote of the Building Committee was embodied in a letter from the President to Messrs. Meredith and Grew, the brokers for the B. & A. R.R. Co., who replied in a letter which was read by the President, offering to sell 18,600 feet of land at sixteen dollars per square foot for 10,000 feet, and twelve dollars per foot for the remaining 8,600 square feet, making the whole cost $39,200 more than the offer of the Society. The Building Committee thereupon this morning unanimously passed the following vote:

Voted, That in view of the refusal of the Boston & Albany Railroad Company to accept the terms proposed by this Committee for the purchase of land on Exeter street, and the offer of another site at a much lower price, this Committee withdraws its recommendation to purchase the Exeter-street lot, and would submit the whole matter of the selection of a site to this meeting of the Society.

Benjamin C. Clark, of the Building Committee, in behalf of that Committee, offered the following vote and spoke in advocacy of it:

Voted, That it is expedient for this Society to move from its present building to a new one to be built for its use, and that it is desirable to procure land on the corner of Boylston and Hereford streets in the city of Boston for such new building, provided it can be obtained at a satisfactory price.

Francis Campbell moved that the Society purchase land on the northeast corner of Boylston street, fronting on the Fenway, opposite the Massachusetts Historical Society's Building, if the land can be purchased at a reasonable price. This motion was unanimously rejected.

The debate on the motion offered by Mr. Clark was then continued by Benjamin P. Ware, William E. Endicott, Edward B.

Wilder, George E. Davenport, William C. Strong, O. B. Hadwen, Rev. Calvin Terry, and Joseph H. Woodford.

Mr. Woodford made a motion to adjourn *sine die*, which was carried by a vote of 49 to 32.

The meeting of the Society on the fourth day of February adjourned to today at eleven o'clock. The special meeting continued until after that time, but no subject except the purchase of land and the erection on it of a building was brought up.

Adjourned.

MEETING FOR LECTURE AND DISCUSSION.

At the close of the business meeting, a meeting for lecture and discussion was held, Vice-President Benjamin P. Ware in the chair.

The following lecture was delivered:

Questions Answered and Unanswered; the Season of 1898 along Horticultural Lines.

By Walter F. Taber, Poughkeepsie, N.Y.

In many respects the season of 1898 has been a peculiar one in its climatic conditions, and in the results, more or less, of those conditions, many of which have been so striking in their results that I have thought to bring them to your notice somewhat in the order in which they occurred.

You will remember that the weather during March was unusually mild. At my place the frost was all out of the ground and men were digging raspberry plants on the 10th. There was no freezing weather afterward; some days very warm. Got plants dug; vines trimmed and tied. Nearly one hundred days of labor were accomplished in March. With the advent of April a great change took place. For ten days the mercury ranged from 18 degrees to 30 degrees.

April 2d was a cold, bleak, winter day; ground frozen hard. Cold, driving snowstorm; snow fell twice afterward, but soon melted. The months of March and April seemed to have changed places, and the question comes in here: What will be the result?

This question, in so far as it applies to the Marlboro raspberries, admits of an answer. The canes of the Marlboros, which had attained a very fine growth in the previous season of 1897, were

alive to the tips when tied to the stakes about the middle of March, but before the end of April a large proportion of the canes were dead from one-third to one-half of their length. What killed them? Answer: The warm weather of March started the flow of sap in the canes. The cold of April froze the sap and burst the cells, thus stopping the circulation in the leaves.

The last half of April was showery but seasonable. May was ushered in with a shower in the night, and the record of the month gives: 14 days without rain, 17 days with rain, 4 of them very heavy rains.

The week ending May 21st was memorable for its three heavy rainstorms. At this time cherries, pears, and the late strawberries were in full bloom. Pear trees of all varieties were literally covered with blossoms. My Gandy strawberries gave promise of an enormous yield. The outlook for fruit of every kind except apples (this being the off year for apples) was very promising. What was the outcome? Cherries were a very light crop. Pears, excepting Seckels, set but little fruit. My Gandy strawberries, that gave such promise, were almost a total failure, — very little but knots and buttons. Question: What was the cause of failure? I recollect that when attending the Annual Meeting of the Western New York Horticultural Society at Rochester, the subject of the failure of the apple crop in Western New York was under discussion, and Mr. H. S. Hooker said that whenever they had heavy rains at the time of blooming there was always a failure of the crop. Mr. George T. Powell writes me that he has not had a barrel of apples or pears to sell from his orchards this year (1898), and that he attributes the failure to the washing off of the pollen by the heavy rains. Another cause of the lack of fertilization lies in the fact that the rains prevented the bees from doing their work upon the flowers.

Mr. Powell writes me also that the foliage of his currants was affected by fungus, and that he sprayed with Bordeaux when the fruit was one-half grown, but, fearing the results to the fruit, left part unsprayed, with the result that those unsprayed lost their foliage, while those sprayed did not, and he gathered a very fine crop of currants. Along in October a number of buds on the unsprayed bushes blossomed and set fruit, and these buds were on the young wood growth of the present year. Question: What was the cause? Answer: The falling of the leaves checked

their growth and ripened the buds, and the warm wet weather following caused them to blossom and set fruit.

The year 1896 was the off year for apples, especially Greenings, in my section. My trees of this variety are large, probably fifty years old. They were covered with a luxuriant foliage. About the time for the setting of fruit, or a little later (no fruit being on these trees), the leaves began to turn yellow, the green matter being seemingly absorbed, until fully one-quarter of the leaves were of a bright yellow (not tawny yellow), and in a few days they all fell to the ground, and the trees resumed their apparently normal condition. Other kinds were affected somewhat, but not to so great an extent, while trees that were bearing fruit were but slightly affected. Question: What was the cause of this loss of color and consequent fall of the leaf?

The season of 1898 along this line has been full of surprises. A friend of mine living in the great fruit section on the west bank of the Hudson writes me that his apple crop has been a failure, and I will give you what he says in his own words:

"The first appearance of the blight was just after the bloom had fallen. I sprayed thoroughly with Bordeaux and Paris green at this time, as the fruit had set quite heavy; also sprayed again in about ten days, but these sprayings did not seem to have any effect. The foliage at first seemed wilted, and looked as if the branches had been cut off from the tree. After a few days many leaves turned yellow, and fell off; only a very little new growth of wood or foliage afterward. All the fruit dropped within two or three weeks.

"The varieties most affected were Newtown Pippin (called Albemarle Pippin in Virginia) and Spitzenburgh; then Baldwins, Greenings, and Vandeveres. The Hubbardston put out perfect foliage and matured a very heavy crop of perfect fruit, although this kind was among the others most affected.

"The trees that blighted the most were those on which the bloom was heaviest, especially the Baldwins." What was the cause of this blight of leaf and fruit, and what is the remedy? Answer: Cause — excess of water in the soil, diluting the food elements below the amount required to sustain the tree in crop production. Remedy — plant trees on well-drained soil. My friend goes on to say that he sprayed grapes and strawberries with Bordeaux, but with no apparent result, and pear trees with

whale-oil soap solution, but with no apparent benefit, but the application of Bordeaux and Paris green to his currant bushes for the currant worm and leaf blight, part sprayed once, and part twice, entirely destroyed the currant worm, and the foliage remained on the bushes very late. This coincides with the statement of Mr. Powell, and answers the question as to how to destroy the currant worm and retain the foliage of the plant.

This season of 1898 has raised a doubt as to whether the scientists at our experiment stations and colleges understand fully the origin of fungous growths and their manner of dissemination, and how and when and under what conditions spraying can be made most effective. I will here give you one of my own observations. We sprayed our grape vines once with Bordeaux, and later with the ammoniacal solution. Just as the early varieties were beginning to color the Concords showed some signs of rot, and we went through the vineyard and removed all clusters much affected and the affected berries from clusters showing only a few.

I frequently observed affected berries in the centre of those clusters, while those most exposed were perfectly sound. The question as to how or why this fungus should pass by these exposed berries and attach itself to one almost concealed from sight, remains to be answered.

I believe that a healthy plant, like a healthy person, is better able to resist the attacks of disease than an unhealthy one. But what causes the disease, and whether it must come from germs in the soil, or whether the elements are in the air under certain climatic conditions which can produce these results at certain stages during the growth of the plants, are questions of moment.

It has been suggested that perhaps the dampness of the berries retained on the inside of the cluster presented more favorable conditions for the growth of the spores than those on the outside of the cluster where it was exposed and dry.

I had no rot in 1897 in my Concords, and therefore no fungous spores in the soil, but had downy mildew on the Niagaras. The latter were not affected the past season, though weather conditions were more favorable for it.

My experience in the application of Bordeaux to the fruiting beds of strawberries was that it arrested to some extent the spread of the leaf spot, and perhaps I may as well state here that we mowed off the foliage after fruiting, raked it up, and removed it

from the ground. The new growth came up healthy and clean, but later the Marshalls rusted out badly, while the Gandys in adjoining rows remained clean. More leaf spot has developed on strawberry foliage the past season than ever before.

I have another friend, a prominent grower of fruit in the Hudson Valley, who has had a singular and to him puzzling experience in the treatment of his vineyard. He sprayed it five times, and his work is always thoroughly and carefully done. He had a light crop of poor quality, — most of it sold for wine purposes, — and his question is: What is the good in Bordeaux? In contrast to this a neighbor of his, owning a very large vineyard, writes me that he sprayed several times with a mixture of twelve and thirteen pounds of copper and nine pounds of lime to fifty gallons of water (this is the old formula as first made and used, but it proved to be a waste of material), and had a full crop with little or no loss. While on the subject of spraying I will state the experience of Mr. George T. Powell the past season in spraying his cherry trees for fruit rot, which threatened to destroy *his* crop as it ultimately did the crops of his neighbors. He first used two ounces of sulphate of copper in forty-five gallons of water, then increased to four ounces and later to six ounces to the same quantity of water, spraying the fruit thoroughly (sometimes twice the same day) and carefully watching results.

Finding that the disease was arrested, and fearing the stronger solution might injure the fruit, the quantity of copper was reduced to three ounces in forty-five gallons. Soon the decaying fruit dropped to the ground and half a crop of clean, perfect fruit was gathered, fully proving the efficacy of the spray. As I understand it, this treatment was recommended for trial by an Amherst professor. The result was particularly gratifying to him.

From Orleans County, N.Y., we have reports that some orchards carefully sprayed yielded light crops, while others not sprayed produced very heavy crops. Considering these results, does it not appear that other causes beside the apple scab fungus and codling moth govern more or less the production of fruit, and that, while we are not to leave undone the spraying of our trees and vines, we must seek to determine the cause of failure where these remedies do not avail? That while the spraying is absolutely necessary to the production of perfect fruit, the location of the orchard to insure perfect drainage, not only of the soil,

but of the air as well, and its proper fertilization, are the essentials that underlie and determine the productiveness and value of the tree? I have a friend living near me who has eighty acres of orchard wherein the requirements and conditions spoken of are very fully met, with the result that he secures large crops of such superior fruit that he realizes at least fifty per cent more for it than most others.

For years past much damage and loss has been caused by the discoloration and decay of the bark on the bodies of apple trees near the ground, and the grub has been charged with the damage, but recent investigations prove that it is a specific disease, known as apple canker. Experiments seem to prove that it is the same fungus that produces the black rot of the apple, pear, and quince, as the same fungus has been found on the blighted twigs of all these different fruits.

That the disease is of a very destructive character is proven by the fact that in one orchard of forty-five acres in East Bloomfield, N.Y., but ten acres now remain. It is found to be doing serious damage in other large orchards, and much good must result from these investigations, because this disease destroys the trees at an age when they are of the most value, not attacking young thrifty trees before the bearing age is reached. Now what is the remedy? It is believed that the remedy that holds in check the black rot of the apple, pear, and quince will avail to check the disease on the tree, because it is found that orchards which have been regularly sprayed with the Bordeaux mixture are much freer from it than those not sprayed. It is found that the disease lives in the rough bark of mature trees, and by removing this bark or spraying the body and limbs thoroughly this favorite breeding place will be destroyed, and also all spores that may chance to fall upon the body and limbs. Canker spots once formed cannot be cured, but the limbs on which they are should be removed wherever practicable.

The market conditions of the season of 1898 have been of so unusual a character that we hope they may never be duplicated.

It is an old saying that in union there is strength. The massing together of bodies gives force and power. This is true in the social compact, as has been shown in the union and unity of the North and South in our late war with Spain. But when the elements so conspire as to bring the productions of such a vast

extent of country into our markets so nearly together, as was the case this past season, the result is disastrous to all concerned.

The Route Agent of the Adams Express Company informed me that on the same day that the first car of strawberries was shipped from Highland, Ulster County, they had a car from Delaware and one from Oswego, bringing the products of this vast extent of country into competition with each other, flooding the market beyond its capacity, the result being that the fruit was sold below the cost of production, and in some cases below the cost of transportation to market.

On my recent visit to Delaware in January last I was told that many berries were left on the vines and many picked that did not pay for picking. In the report of the Transportation Committee at the Delaware meeting the same problem was presented.

This problem confronts every organization and is of vital importance to every individual shipper, showing both the organization and the individual the necessity of organized effort to compel, by State law or otherwise, the transportation companies to fix a schedule of charges on the basis of actual weight and not on supposed value as at present imposed. I found the same trouble to exist in this section on my visit to Taunton last winter, and I find it everywhere when one company has the monopoly in transportation.

I will cite this instance: The Pennsylvania Railroad will carry berries from Norfolk to New York City for less money than they charge from Central Delaware to New York on the same train, because of competition at Norfolk. The charges in the Hudson Valley have been materially reduced since the building of the West Shore Railroad, which runs through the fruit section, but the same trouble, the unequal charges upon different products, still exists, a thirty-pound crate of grapes being charged more than a barrel of apples weighing one hundred and fifty pounds. An express car loaded at Highland with twenty-eight thousand pounds of grapes for Worcester and Boston paid the express company nearly $200, distance two hundred and twenty-seven miles.

The regulation of these charges is a matter which the Legislative Committee of the Eastern New York Horticultural Society is investigating, aiming to effect a reduction.

There remains one question which comes to the front every-

where, and is not yet satisfactorily answered. It is this: What system can be devised that will enable the producer to get his proper share of the market value of his fruit? As it is a well-known fact that much of the fruit sent to market is of inferior quality, does not the answer to this question rest first with the producer, requiring him to raise the standard of quality? This can be secured by more care in production and selection, which would insure higher prices, and more margin for profit, with increased demand for the product. This, with the regulation of transportation charges and commissions by organized effort and coöperation amongst those having like interests, the results of which are seen in other lines of industry, would go far toward answering the question how the producer can get his fair share of the market value of his fruit.

I want to call your attention to some of the insect enemies of our fruits as gathered from various sources:

In the season of 1897 the damage caused by the larvæ of the saw-fly in some vineyards was very serious, and the remedies used did not avail to destroy it without at the same time destroying the foliage, which led to serious apprehensions of the danger to the crop in 1898. One vineyard of Delaware grapes failed to ripen its fruit because of loss of foliage, and the vines were seriously injured. Delaware, Empire State, Ulster, Brighton, and many vines of Niagara and Worden were killed in my vineyard.

Being on our guard in 1898, we were ready for the first worms that hatched, and while they were very small sprayed them thoroughly with Bordeaux and Paris green.

The spray must be thrown on the under side of the leaf, as they are on that side. By careful attention and spraying we succeeded in preventing any damage being done by them.

The most destructive enemy of our grapes, in proportion to numbers, is the white-faced hornet, which has strong, bony jaws with which he tears open the grape, and passing from one berry to another soon ruins the cluster. Honey bees and wasps follow and complete the work by sucking the juices.

I want to call your attention to the leaf curl of the peach as embraced in notes from Professor Duggar's address at the Eastern New York Horticultural Society's meeting:

In the early spring the young shoots affected by the fungus will be noticed as being swollen toward the tips and being pale in color.

When the leaves are out from a quarter to half an inch, if they show a deeply colored reddish tinge it is an indication that the curl will be on hand the coming season. This fungus, in its vegetative state, grows entirely within the tissues of the leaf.

The preventive treatment: three sprayings, Bordeaux mixture being preferred even for the earliest treatment, on account of its sticking to the twigs and buds much better than the sulphate of copper solution. Two sprayings before the buds opened showed the best results.

Two cases were cited where a strip of trees through an orchard which had been sprayed in the winter with lime to retard buds showed no signs of curl, or, at most, very little as compared with the rest of the orchard.

During my recent visit to Delaware I learned that the most serious enemy to strawberry culture in that section was the strawberry root aphis.

I heard of one field of forty acres that it had ruined, and think it right to warn you against the danger of its introduction by getting plants from sections where it is known to exist. I place it in the same list as the Peach Yellows and San José Scale.

Discussion.

In the course of the lecture Mr. Taber remarked that the grape saw-fly is found on the under side of the leaf, and that the larvæ look like currant worms. He had had splendid clusters of the Empire State grape, which he had saved for exhibition, destroyed by white-faced hornets. They are not very abundant, but he wanted to relieve the bees from the charge of destroying grapes; bees do not and cannot cut through the skin of the grapes. They suck the juices after the grape has been cut open by the hornets or sparrows. The consensus of opinion in regard to spraying is that the early sprayings do most good.

In reply to an inquiry, the lecturer said that the strawberry root louse can only be destroyed by destroying the whole bed.

The Chairman spoke of a case where apple trees wilted, when the undoubted fact was that the ground was so water-soaked that the digestive organs of the trees were unable to assimilate enough of the diluted food to sustain it. Hubbardston apple trees on a ridge where there was drainage were not affected in that way.

We must have ground so situated as not only to afford drainage of water, but circulation of air.

Mr. Taber said that George T. Powell, on a ridge road, saw an orchard in the same wilted condition, though there seemed to be sufficient drainage. Inquiry proved that the roots were water-soaked all through the season, for there was no time when a post-hole could be dug without becoming half full of water. The food was so diluted with water as to afford no nourishment.

Thomas Harrison asked if there are not many wet hillsides.

The Chairman inquired whether there was a clay subsoil in the ground referred to by Mr. Taber.

Mr. Taber replied that the ground referred to was a limestone soil, which ought to afford good drainage. But however high on a hill an orchard may be, if there is still higher land above it the soil may be too wet. You do not have to dig a well so deep on a hillside as in the valley. He lives on a hill in Poughkeepsie which is full of water; a well on the hill sixty feet deep always has forty feet of water.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, March 11, 1899.

A meeting for Lecture and Discussion was holden at eleven o'clock today, the President, Francis H. Appleton, in the chair.

The following lecture was delivered:

Market Gardening.

By Herbert W. Collingwood, New York, N.Y.

I hardly feel that it is possible for me to give words of advice to the market gardeners of Massachusetts. The methods that we follow at home on our little place will hardly appeal to expert market gardeners, who conduct large operations with abundant credit or capital. I have only a small story of a very small enterprise, and I shall simply try to tell my story in a few words, and let others build theories on it, if they care to do so. I have observed a tendency among older farmers and market gardeners to find fault with young men today, because they complain that farming is not as profitable as it was thirty or forty years ago. Most

of our wealthy Eastern farmers either made their money while high prices were obtained for crops during the war, or else the bulk of their money was made at mechanical work of some character, performed during the winter, so as not to interfere with farm operations. All this has changed today. The younger man finds himself face to face with very different situations. His prices have been cut in two, while the facilities for flooding his markets with products from distant points have been more than doubled. The competition is greater both on the farm and in the market. The land is less productive; in fact, the situation today before the young market gardener is, at first sight, far more serious than the situation which his father was called upon to face. I want to speak to these younger men, and more particularly to the young men in town and city, with small capital, who feel today the pinch that is coming from the grasp which the great monopolies have secured on industry. These great corporations are crushing out competition, and that means the discharge of thousands who will find it difficult to make a respectable living in town. What are they to do? From my experience, I can fairly say that the best opening before such men lies in the country on cheap land, made cheap because those who destroyed its character did not understand its possibilities. I can tell you that it is a great thing to be able to say, "I have saved a farm; I have given character and value to a despised and rejected piece of ground." That is the story I come to tell this morning, and yet I cannot stand up here and take the whole credit, for my friends — chemicals, cow peas, and Crimson clover — have done most of the work.

We were driven out into the country on to the soil. We found the farm the only place where one of moderate means can take care of a large family profitably. It came about that our family was filled up with people willing to work, yet without capital either of money or skill that would enable them to work alone to advantage. After looking the matter over carefully, I became convinced that poor land, or what classes as poor with the average farmer, reasonably convenient of access to the town, is the best place for poor men. Out of the poverty of the man riches may come to the land. I observe that in New York City, business men are not running away from the Battery for new building places: they simply put up twenty stories on the site of the old five-story building. They do not run miles away after cheaper

land on which to place a building of average height: they increase the capacity of the old lot. I can remember the time when it was thought necessary for a New England man to run west of the Alleghanies after a farm. I believe that now this is wrong. The man hunting for a home may imitate the business men, by getting hold of cheap, poor land near a town, and by mechanical means increasing its capacity for crop production. I have become convinced from my own experience that while cow peas and clover seed can be bought at a reasonable figure the man with moderate capital makes a mistake in running away from New England after a farm home.

In our own case we started too late in the season to buy or rent a good farm. The desirable pieces of land are always taken up early. With us in New Jersey one great standard of value in a farm is the amount of sod which it contains. Both landlord and tenant recognize the value of grass. They understand that one can grow a fair crop of almost anything by merely plowing under a thick sod. Under ordinary conditions a farm thickly set with grass will rent for twice as much as a farm on which tenants have plowed under all the sod. My judgment is that a poor man will do best to buy land which contains no sod, because such land is usually considered by the owner as of little value; that is, because most owners think it takes three or four years to obtain a heavy sod. One of the items of knowledge that becomes power to the poor man is the fact that with clover and cow peas one can produce this sod in six months and, after the first year, without interfering with other crops. Our farm was most unpromising as a market garden. For twelve years tenant after tenant had lived on it, taking what character the soil possessed out of it, and losing their own character as good farmers. The soil was light and thin, containing little besides weed seed and a bad reputation. This reputation, however, cut the rent far below the earning possibilities of the soil. We made a resolution that we would buy no stable manure, but that the farm must feed itself, except for the chemical fertilizers which we proposed using. In other words, the problem was to restore that soil to fertility by using high-class chemicals and green crops as manure.

The first year's crop did not pay. The fact must be stated right here that it is never fair to take one single year of farmin or gardening as a standard of what the land will do. Farming is a

business of a series of years, and it would not be fair to take any single year as a basis for figuring. We got the land well on the road to recovery, and we got our small fruits started, but we tried to raise too many crops. What with potatoes, sweet corn, tomatoes, melons, cabbages, and squashes, and half a dozen other things we had but small lots of everything. We have since learned the practice of raising enough small fruits, and keeping enough hens to pay our running expenses. Then, aside from that, a large crop of potatoes or sweet corn will give us a chance to handle the market better and bunch our work into a wholesale crop.

To hear some of the fertilizer dealers talk one would think that the fertility question may be settled by simply using large quantities of chemical fertilizer. Our experience shows that there are two sides to this matter. On that soil, no matter how heavily the fertilizers were used, we did not obtain more than a fair crop. We became satisfied that that soil required both lime and humus or organic matter in order that the fertilizers could give a good account of themselves. On light, open soils I have noticed that the organic matter quickly disappears or burns out. It is necessary to keep such soil well filled with organic matter in order to produce full crops. Our neighbors told us that we could not farm without manure. In one sense they were right, and yet they were wrong. That soil needed organic matter, but it was not necessary to use the dung of animals in order to produce crops. Most of our market gardeners import large quantities of stable manure from New York. When you come to think of it, their farms are fed from the West. The hay eaten by the New York horses may come from Ohio; the grain with which they are fed may come from Illinois and Wisconsin, and the straw with which they are bedded frequently comes from Iowa; in other words, our market gardeners are importing plant food from the Mississippi Valley in the form of stable manure. Now, the way we produce crops is different. Instead of going to the West for organic matter, we produce it in the same field in which the crop is grown. A summer crop is grown between frost and frost. After that leaves the ground a manure crop occupies the soil until it is time to put in another summer crop.

After a good deal of experimenting we have found that in nine cases out of ten the Early Black cow pea and Crimson clover will

make more manure for us than any other plants. The cow pea is sown on the higher and poorer parts of the farm. In any farm rotation there is a time when the soil is poorer than in other years. In most rotations the fertilizer or the manure is crowded upon one crop, and this heavy feeding is expected to produce the crops that follow. Where a man can buy a large farm at a low price he may take the lower and richer part for his truck and small fruit. Back on the hills he may make a short rotation of cow peas and corn, or cow peas and potatoes. One year this back land may be given entirely to cow peas, which are very easily grown. The land may be plowed or worked up with a Cutaway harrow and the cow peas either drilled or broadcasted and covered with an Acme or spiketooth. Then a crop may be left alone until the time comes to plow it in the following spring. The vines may then be plowed under and potatoes grown, using a fair amount of fertilizer. The following year the land may come back into cow peas, and so on year after year. By using a potato planter, riding harrow, and cultivator, and a strong potato digger, a farmer with only a moderate supply of help can raise potatoes in this way at a light cost without interfering with his ordinary fruit and garden crops. My own opinion is that for the town man who expects to make a home in the country, these large farms with an acreage of idle land will prove in the end most profitable. These back hill lands may be plowed and set with winter apple trees, as a farmer's capital permits. A rotation of cow peas and potatoes may be followed among the trees, while they are growing to bearing size.

We started the use of cow peas in one corner of the farm on a poor, thin, sandy field. It was so notoriously poor that the neighbors selected it as a place for burying their dead horses. Our first work was to chop this field up with the Cutaway harrow; it was covered with briers and dried mullein stalks. We applied at the rate of three hundred pounds of kainit and five hundred pounds of basic slag per acre. The same quantity of dissolved phosphate rock would have answered as well, except that the slag contains a large amount of lime, which we find very useful on poor, thin soil that has been exhausted of organic matter. After Cutaweying this field, we broadcasted five pecks to the acre of Early Black cow peas, which were worked in with the Acme harrow; in August we cut a part of this growth and used the vines for mulching strawberries, but most of the growth was permitted to die down on the

ground. A small amount of nitrate of soda applied to the cow peas will quicken up and improve their growth, but too much nitrogen would be unprofitable. The cow pea is one of those plants that absorb nitrogen from the air. My conviction is that when you sow this crop on land that is very rich, or where you use a large amount of nitrogen in your fertilizer, the plant will, from choice, take the nitrogen out of the soil, and will not prove so valuable as a soil improver. We are now raising the second crop of sweet corn after that crop of cow peas, and there is no question in my mind that the growth of vines was fully equal to twenty loads of stable manure per acre. Where the vines were worked into the ground the corn has a better color and is far better able to withstand the drought. I have noticed both in corn and potatoes that where a thick mat of cow peas was turned into the ground the crop was far better able to withstand a drought. In this respect I think green manures are superior to stable manures, as the latter appear to dry out more quickly and are not so useful for holding moisture. The objection to the cow pea is that it requires practically the whole season to make its best growth. I have, however, sown the peas after a crop of early potatoes and secured a fair growth before frost. We have also sowed the cow peas among the currants, raspberries, and other bush fruits, with very fair results. The first sharp frost, however, kills the cow pea, and in order to make it most useful it is necessary to give it an entire summer for its growth, although it may be sown after such crops as early peas or lettuce. My advice, however, would be to use the cow pea on the poorer lands of the farm. Where one has considerable idle land, it would be safe to keep one-fifth of the farm constantly in cow peas, which would be a cheap and effective way of manuring. My advice would be to use at least seventy-five per cent of the potash and the phosphoric acid on the cow-pea crop, with perhaps a small amount of nitrogen. The balance of the fertilizer I would use on the crop following the cow pea, and in my experience potatoes or sweet corn have given the best results for this purpose.

With us Crimson clover has proved a very valuable soil improver. We usually sow it in the sweet corn at the last cultivation. Seed at the rate of twelve pounds per acre is broadcasted through the standing corn, then the cultivator is used with a wide block or board hanging behind so as to scrape or level down the

soil. If possible the clover should be sown just before or just after a shower. If the conditions are right, it will come up in thirty-six hours. Its first growth is feeble and you will be likely to lose confidence in it half a dozen times before the fall is over. The first time we used it we became thoroughly disgusted with the plant; in fact, we harrowed part of it up and sowed rye in its place. In September, however, when the cooler weather came, the plant suddenly began to jump, and before long covered the ground with a thick mat of green. With us the clover has lived through the winter five years in succession. It seems to keep on growing beneath the ground even during the coldest weather. In the spring, when the growth above ground seems puny and insignificant, you will find an immense root system fully developed and of great value as a fertilizer. I would sow the seed year after year, even if I knew it would not live through the winter, for the growth it makes during the late summer and fall is, in my opinion, of much greater value than any growth of rye or ordinary winter crops could be. With a poor farm, once every fifth year in cow peas, and Crimson clover always following the sweet corn, or other early crops, there will be no need of stable manure, beyond what can be made on the average-sized farm. With fair dressings of high-grade fertilizer, in connection with the clover and cow peas, I am satisfied that poor land can be slowly but surely brought back to a high state of fertility at a profit.

Having done this, the problem comes down to a question of selecting the most profitable crops for one's locality. This year we have about an acre of strawberries, about six hundred plants each of red raspberries, blackcaps, and blackberries, which with three hundred hens will pay our running expenses. By running expenses I mean the grocery and meat bills, the feed for the stock, and the incidentals or current expenses which occur on every farm. After a good deal of study and experiment we decided that for our locality a combination of potatoes, sweet corn, and cabbages would pay us better than anything else. We have this year about fifteen acres of potatoes, ten acres of sweet corn, and plan to turn out about twenty thousand head of cabbages. Two men with an occasional boy's help will do this work. Potatoes are our main crop, and we use a combination of potato-growing tools which give but little hand labor. We plant with a potato planter, and ride on the harrow, the cultivator, and the digger.

With this combination, and, in addition, a bicycle weeder and a sulky plow, two one-legged men could plant and care for thirty acres of potatoes, and produce a fair crop. The "man with the hoe" has, in my opinion, seen his best days in this class of farming. Today, in order to compete with the West, we must adopt many Western methods. I think the potato growing of the future will be largely on the back fields, with the short rotation of cow peas and potatoes which I have mentioned, and with a full set of potato-growing machinery. This is one reason why I think the young man from the town buying a poor farm will do better to go a little farther into the country and buy a large farm where there is a good deal of idle land. His profit will be made by harnessing those idle fields with the cow-pea vines, and putting them to work. The poultry, small fruits, and truck business can be crowded upon the lower and level part of the farm. We raise a large acreage of early potatoes, having found that, one year with another, the early varieties bring more money than the late ones. This is because there is less competition with the early crop. The only competition with earlies is from the territory that lies south of us. For late potatoes, the entire West and North become our competitors. Again, after growing a crop of very early potatoes, the ground may be worked up at once and drilled to cow peas. These cow peas should be cultivated the same as beans or corn, and at the last cultivation Crimson clover seed may be sown exactly as it would be in the corn crop. If the weather is wet enough the clover seed will sprout and grow after the cow peas are killed by the frost, thus giving us a humus crop for the next year, or by transplanting our late cabbage plants twice we may finally put them in the soil left by the early potatoes, and in this way produce two crops from the land. With us, the earliest sweet corn pays best, as we usually grow it on the lightest part of the farm, and thus push it along early. The bulk of our crop consists of Crosby and Perry's Hybrid, with a small proportion of Evergreen for the late market. We use horse tools as far as possible in caring for our crops, beginning with the weeder and following with a two-horse cultivator. The ground is kept thoroughly stirred and we do not find much occasion for using the hoe. Strawberries with us have not proved very profitable except for a small local trade. As I have said, the small fruit and the eggs keep us running, while potatoes, corn, and cabbages are

expected to do the heavy work. This system of farming or gardening may not appeal to the gardeners on rich land near the towns, who command a heavier capital and produce larger crops than we do. I have no thought of instructing them in their business; in fact, I am talking to an entirely different class of men — those who are called upon to face the situation as it exists to-day. Out on the farms and hillsides that are at present idle and almost valueless, I believe there are golden chances for young men who have that best of ambitions, the desire to establish comfortable homes of their own. It requires pluck and energy and self-denial to pull away from the early home places, and cross mountains and the great rivers to carve a new home in the far West. Happily, the day has gone by when such migration is necessary. Right here in New England there are opportunities for the best efforts of the strongest men. I should count it a great privilege to be able to say, after a struggle with one of these old New England farms: "I have done something for my country; I have saved a farm. I have given character and strength to an abandoned and neglected piece of ground. I have saved a farm from the wilderness. I have saved a farm for my family; saved it to stand as the best monument that I can possibly leave behind me. I did not take rich and fertile land which asked only to be tickled with the hoe in order to make it laugh with the harvest, but *I have saved a farm;* saved it for my country; saved it for New England. I have saved a farm. I have done my duty!"

Discussion.

The lecturer said, in reply to inquiries, that he was born and brought up among small independent farmers on Cape Cod. They were crowded out by farmers with large capital who pursued scientific methods, and began to feel that there was no place for them there. He thought so himself until lately, but now his views have changed, and he believes that these small farms are the only places where a large family can be brought up safely. He had a large accession to his family, and it became a question what to do with them. He went twenty-five miles into Bergen county, N.J., hunting for a farm, and found all the desirable ones taken, but he found one where five tenants had nearly starved.

Varnum Frost asked the lecturer whether he kept a debit and credit account with his farm.

Mr. Collingwood replied that in two years the farm doubled in value, and that he supported a family of ten from it during the same time. If he had had a capital of one thousand dollars, to put half into stable manure and half into fertilizers, he could have brought up his farm much more rapidly. His method would be of no value to a capitalist, or on rich ground. He got basic slag at a bargain; otherwise he would not have bought it. He would buy stable manure if he could get it at a very low price. His idea had been to carry on and improve his farm with very little capital. He would not say definitely that any man can do what he has done, but he means to stick to it. The boys who work on the farm are members of his own family; his brother-in-law does most of the work.

Benjamin P. Ware thought it due to the lecturer to say a few words in recognition of him. He had taken two positions: he had discarded the plow and stable manure, and the speaker thought it was not right to let such fallacies go abroad without any expression of dissent. But he has proved that a family can be supported on a poor farm. Now, however, he has come round and uses the plow and stable manure. Mr. Ware said that Crimson clover is not useful here; cow peas are. He cautioned against planting cabbages where pigs have fed off the Crimson clover; they will all be stump-footed. In answer to an inquiry by the lecturer, as to what he would plant in such a place, Mr. Ware replied that sweet corn or melons would grow there.

Mr. Collingwood said that in New Jersey, when the peach crop fails they put in melons, thinking that they will form a substitute.

Hon. Virgil C. Gilman expressed the hope that, now that we have got acquainted with Hope Farm, the notes on it in The Rural New Yorker would continue, and that they would be made fuller, and that a plan of the farm would be given. Such notes would be read with intense interest.

MEETING FOR LECTURE AND DISCUSSION.

SATURDAY, March 18, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President BENJAMIN P. WARE presiding.

Before introducing the lecturer, the Chairman remarked that

yesterday, the 17th, was the seventieth anniversary of the organization of the Society, and he then spoke as follows:

It seems fitting that the seventieth anniversary of this Society should not pass without noticing the grand results of its work since its organization. The Massachusetts Horticultural Society was formed by men who were deeply interested in promoting improvement in the beauty of flowers, in the quality of fruits and vegetables, and in beautifying our homes as well as public grounds and highways, thus becoming benefactors to mankind. How well they and those who followed them have succeeded in their efforts is shown by the wonderful improvement that has been effected in the products of our gardens and fields. Without giving details, I may say that there is scarcely a cultivated flower that has not been so changed and improved as to be hardly recognized as the same as those of seventy years ago. The same is true of the fruits and vegetables that supply our markets. While this is the earliest incorporated horticultural society in the country, it was not the first organized; there were several of earlier date that have since died of inertia. It may be too much to claim that all of the improvements above mentioned have been caused by this Society, yet through the liberal premiums paid for the best specimens exhibited at our annual and weekly shows, and the patient, persistent efforts of our members, much, very much, may be justly claimed as accomplished by this Society. Mount Auburn Cemetery took its origin from this Society, thus giving an object lesson that has manifestly shown its effects throughout the whole country, not only in beautifying cemeteries and public parks, but, by creating public sentiment, making these possible. By the foresight and good management of the fathers of this Society, the foundations were laid for the best horticultural library in this country, and for ample financial endowment sufficient, with equal good management in the future, to secure for all time the ability for continual advancement in the line of its past history. Following the example set by this Society, about two hundred similar organizations are in successful operation throughout the country. So it appears that the efforts of those few noble men, the fathers of this Society, have resulted in cumulative good to us that is measureless and priceless. They builded better than they knew. All honor to their memory.

The following lecture was delivered:

Horticulture in Japan.

By John K. M. L. Farquhar, Boston.

The thoughtful horticulturist cannot have failed to note how large a portion of our ornamental trees, shrubs, vines, and flowering plants have come to us from Japan.

Among the last autumn attractions of our gardens were the unrivalled *Hydrangea paniculata grandiflora*, and the fragrant and beautiful *Clematis paniculata*, while the walls of our dwellings were radiant with the crimson and yellow foliage of the Japanese woodbine (*Ampelopsis Veitchii*).

Not only are our greenhouses during winter adorned with her camellias, spiræas, and lilies, but while the snow covers the ground, our parks and fens are enlivened with the shining cardinal berries of her drooping barberry.

Early in summer, the scarlet quince (*Pyrus Japonica*), the yellow corchorus, purple akebia, and numerous white and pink spiræas come as forerunners of an almost innumerable host of shrubs, trees, and vines, which uninterruptedly represent Japan in our floral decoration. Nor can we forget such popular things as her wonderful maples, conifers, irises, lilies, and pæonies. It was the contemplation of these facts that prompted me to visit Japan last summer.

Nagasaki, the southermost port of Japan, is of interest to horticulturists because for over two centuries it was the gateway through which the floral treasures of the country found egress.

From 1637 to 1859 the Dutch were the only western people having intercourse with the Japanese, and to the scientists associated with their settlement at Deshima we are largely indebted for the introduction of Japanese plants. Many of their introductions have been named in their honor, and thus the memories of Kaempfer, Thunberg, Siebold, and others, will live so long as mankind is interested in horticulture.

The first requisite of the visitor to Japan is a passport from the Japanese Government, and to secure this it is necessary to visit the American consul. The consulate is situated well up the southerly hills which enclose the bay, and is surrounded by a beautiful garden; in fact, it is said to be the finest consular residence in Eastern Asia. We find here extensive banks of azaleas,

clumps of *Cycas revoluta*, *Eulalia zebrina*, *Aucuba japonica*, and pink and white oleanders.

There are wistaria arbors, bamboo hedges, and a fine selection of shade trees. In a secluded corner we find a Japanese garden and hanging about the verandas, fine balls and figures of the interesting Japanese fern, *Davallia bullata*. The climate is humid, and even the stone walls soon become covered with a natural growth of ferns; chiefly *Pteris Cretica*, *P. serrulata*, and *Polypodium hastatum*.

Receiving my passport, I was impressed with one of its five warnings — that the traveller must not cut or injure any tree. I found Consul Harris an enthusiastic agriculturist, and his suggestions as to my trip were helpful.

Proceeding through the city, we encounter plant pedlers and see the dwellings decorated with pot-grown morning-glories, or cut flowers, chiefly lilies, hollyhocks, œnotheras, and the wild *Patrinia scabiosæfolia*.

Half-an-hour's ride by jinrikisha through the city and along a canal or stream overhung by cherry trees and willows brought me to the O'Suwa Temple, famous for its camphor trees. When Robert Fortune visited this place fifty years ago, as the guest of Dr. Siebold, whose residence was near by, he described these trees as being much the largest specimens of camphor he had met with. But Dr. Kaempfer had written a description of these gigantic trees when he resided at Nagasaki two hundred years ago, and at that time they were six hundred years old.

From Nagasaki I proceeded over the hills, which are terraced for the cultivation of rice and overflowed by streams from the mountains. It is usual to plant the narrow embankment around each terrace with a row of soja beans.

Ascending the higher hills, I passed through several dense forests of Japanese bamboo, a very important plant to the Japanese, and descending towards Mogi numerous patches of *Caladium esculentum*, grown for its esculent root; also the white lotus, of which the starchy rhizomes and the capsules are eaten, the latter having the flavor of almonds. Mogi is a fishing village on the bay of Shimabara, with fine specimens of *Pinus Thunbergii* around the water's edge.

Crossing the bay in a small steamer to Obama, I proceeded up the mountains on horseback to Unzen, famous for its sulphur

springs. The road or trail is a rough one, but there is no part of it without interest; among the forest trees I saw many fine camellias, while under them was a tangle of shrubs among which were *Hydrangea paniculata*, azaleas, *Rosa Wichuraiana*, and *Lonicera Japonica*. I found, too, numerous ferns — large spreading fronds of *Woodwardia Japonica*, *Nephrodium sophoroides*, and such delicate sorts as *Davallia tenuifolia*, *D. Mariesii*, and *Adiantum monochlamys;* also the climbing *Lygodium Japonicum* and rampant *Gleichenia*.

Part of the journey is over hills devoid of trees, and here, while pausing for rest, I gathered blooms of *Astilbe Japonica*, *Lilium Maximowiczi*, *Lychnis Sieboldii*, a species of *Inula*, and several varieties of *Ipomœa*.

When I entered Unzen I found I had to keep to one side of the street, the greater part of it being taken up with mats on which plums were being dried in the sun. The traveller should avoid eating fruits dried in this manner, as well as pickles which are exposed in uncovered vessels on the sidewalks; both are liable to cause cholera.

There are forty-three hot springs about Unzen, discharging clouds of sulphurous vapor into the atmosphere. One inhales sulphur with every breath. It seems to have no deleterious effect on vegetation; on the contrary, nowhere in the south of Japan is there more healthy foliage than here. While I noted the boiling hot water conducted in bamboo pipes to the various bath-houses, I thought how acceptable to some of our Boston cultivators would be a current of this blight-destroying vapor, fresh from nature's laboratory, could it be turned into our greenhouses.

Passing through the Inland Sea, with its three thousand or more islands, one cannot fail to note how many of the little islands are terraced and cultivated, while boats, with their crews collecting seaweed for fertilizer, are frequently passed. Although I had sailed through the Inland Sea twice, I desired to learn more about its islands; therefore on arriving at Kobe I sailed back by a small steamer to the sacred island Awaji.

Near Sumoto, the largest town on Awaji, I saw many pine trees with singular roots. The sandy soil out of which they are growing is evidently being gradually washed away, leaving the larger roots high in the air, until they look like, and in fact become, props supporting the trunk and branches.

The Japanese are not only close observers of nature, but skilful

imitators, and they have learned to produce pine trees with aërial roots four or five feet above the soil, and they are offered for sale in Tokio. Riding about twenty miles along the coast, I found many of the ferns previously mentioned; also *Clematis*, *Ampelopsis Veitchii*, *Arundo donax*, *Rosa Wichuraiana*, and *Clerodendron trichotomum*, the last a shrub with clusters of white and cardinal colored flowers of exquisite beauty, which unfortunately is not hardy in New England.

The staple product of Japan is rice, and there are about fourteen varieties in cultivation; some maturing in September, others in November; some requiring inundation during the whole period of growth, others only while they ear out; and lately varieties have been found which yield a good crop on dry land.

The seed is sown in April or May, and transplanted in a month or six weeks later. Where possible, the fields or plots are kept overflowed by streams from the mountains; elsewhere wells are resorted to, and it is not uncommon to see scores of well-sweeps operated by women, with a bamboo screen protecting them from the sun.

The fields are enriched chiefly by liquid applications. At the corner of each plot there is a cement cistern in which the liquid is prepared, and from which it is bailed to the rice ground and distributed by the overflowing water. When the crop is harvested, the only preparation needed for market is husking, an operation performed by treadmills, and which may be seen daily in the villages.

In the southern part of Japan a kind of indigo is grown to considerable extent, the color being developed by allowing the sap of the green leaves when picked to ferment in the sun. The leaves are spread on mats on the public streets; first, several inches deep to promote fermentation, after which they are turned over and spread in thin layers to dry. The growing crop looks like beds of spearmint.

At Kobe there is a public square with fine cherry trees, *Cycas revoluta*, and magnificent pink and white oleanders.

The pomegranate and Lagerstrœmia are among the striking ornamental trees which attract the traveller.

Not till I had reached Nara did I see the noble, sombre Cryptomerias, but there in the sacred grounds of the temples, where no one dare injure them, I found giants which had been stately trees before the famous Cryptomerias of Nikko were planted.

At Kyoto I found more horticultural work carried on than elsewhere in the south. At the suburb Arashyama there is one of the finest groups of cherry trees in Japan. Then the gardens of the Ginkakuji and Kinkakuji have for centuries been the models for gardens throughout the country. The Kinkakuji garden represents the Inland Sea, with its curious islands, rocks, and pines. The Japanese landscape gardener follows nature closely; the garden must contain no plant, shrub, or tree foreign to the scene he reproduces.

In a court of the Kinkakuji there is the most remarkable trained tree in Japan. It is in the form of a sailing junk; the hull (which is now about forty feet long and fifteen feet wide) being formed by the lower limbs, while the trunk and upper branches represent the mast and sails. This tree has been in training about three hundred and fifty years.

At Karasaki on the borders of Lake Biwa there is another remarkable pine, which is over a thousand years old. Its trunk is thirty-eight feet in diameter, and it has three hundred and eighty great horizontal branches extending from north to south nearly three hundred feet, and from east to west about two hundred and fifty feet.

Ten miles south of Kyoto are the famous tea gardens of Uji. They produce the finest teas in Japan, which often command from five to seven dollars a pound. Tea was introduced into Japan from China in A.D. 805, and the gardens of Uji have existed for about eight centuries. Two kinds are grown: a small-leaved variety which yields two pickings a year, — the first about the second week in May and the second about the end of June. The other sort, which has larger leaves, yields one crop about the middle of June. The small-leaved sort is the most esteemed, and the first picking is considered the best in flavor.

It is now well known that the color of tea depends entirely on the treatment of the leaves after being picked. If green tea is desired, they are fired immediately; while for black, they are spread out on mats or trays, the sap being allowed to ferment in the same manner as we observed practised with indigo, and then fired. The curl or twist is imparted to the leaves by turning and shaking them while in the firing pans.

Proceeding north, I stopped at Gotemba, where I saw growing wild many varieties of lilies, particularly *Lilium longiflorum* and

L. auratum. Exporters rely largely on collected bulbs of *L. auratum* for their stock. The other sorts are chiefly cultivated.

I was surprised to find that the bulbs of wild lilies were usually from a foot to two feet below the surface of the ground. They succeed admirably in the decomposed lava which forms the soil of Gotemba, as they have abundance of rain and ample drainage. Here, and also at Ofuna, there are extensive fields of *Lilium longiflorum*, *speciosum* sorts, and *auratum*. The fields are arranged so that they may be flooded or dried at will. The increase in lily-growing in Japan has been very great of late years, owing to failure by disease in both Holland and Bermuda. About two and a half millions of *Lilium longiflorum* bulbs were sent from Japan to the United States in 1898.

The greatest horticultural centre of the country is Tokyo. Mr. Veitch, of London, in his notes on Japan, has stated that the nurseries about Tokyo exceed those of Boskoop, Ghent, the bulb grounds of Holland, and the seed grounds of Erfurt and Quedlinburg combined. This is a bold statement; yet, having visited all these places, I am of opinion that it is no exaggeration. Some of the nurserymen carry miscellaneous stocks, while others are specialists.

Some nurseries are devoted to *Cycas revoluta*, which are grown as large specimens, or dwarfed by twisting and tying down the leaves. Many of the plants have small crowns grafted into the lower part of their stems, giving them curious forms; some of them are worth two hundred yen.

The morning-glory nurseries are particularly interesting. The plants are grown in pots, wall pots, or hanging baskets, and the variety of colors and forms is endless. Flowers five inches across are frequent; there are also many double-flowered sorts. The finer sorts are grown only as pot plants; they are not sown in the open ground, as with us.

Some nurseries are devoted to ornamental-leaved maples. In one I found over eighty distinct sorts.

Many travellers are most taken with the tree nurseries, where such conifers as *Pinus parvifolia*, *Pinus Thunbergii*, *Thuja obtusa nana*, and *Retinospora filifera* are dwarfed and stunted in small pots. Many of the trees seen are said to be three or four hundred years old. Ivies, several varieties of Podocarpus, and maples are also employed for dwarf cultivation. These trees, I think, will

never become popular here; the labor of caring for them is too great, and a few weeks of neglect will ruin the work of generations.

The nurseries of Tokyo are enclosed with hedges of Cryptomeria, Camellia, or Bamboo.

Between Tokyo and Yokohama the traveller is struck with the beautiful groups of pink lotus, which occur among the rice fields. At Kamakura there is quite a large pond filled with this lotus; there are also extensive beds of *Iris Kœmpferi* grown for export. Here, too, there are groups of *Chamœrops excelsa* planted in clumps like forest trees.

In this region we pass through extensive orchards, the trees — apples, pears, plums, and peaches — being trained on horizontal trellises, resembling our grape-vine arbors, seven or eight feet above the ground. In consequence of this method, the fruit hangs under the foliage shaded from the sun and is always devoid of flavor and sweetness. The Japanese, too, gather their fruit before it ripens, the result being that it is impossible to obtain ripe, sweet, well-flavored fruit in the country, and the traveller, having the sour stuff daily thrust before him, ultimately acquires, as did the late Robert Fortune, a taste for it. Even muskmelons are gathered and eaten long before coming to maturity; if the people would boil them, as they do cucumbers, they doubtless would be less harmful.

The most impressive forestry in Japan is found at Nikko, the splendid Cryptomerias surrounding the temples and tombs of Nikko and lining the road to Tokyo as far down as Utsonomiya, a distance of twenty-five miles. These trees were planted in the seventeenth century, when the body of Ieyasu, the founder of the Shogun dynasty, was removed to Nikko. The daimyos were called upon to furnish a stone lantern each to light the grounds about the great ruler's tomb, and one too poor to comply offered to plant trees by the roadside to protect visitors from the sun; he accordingly planted these Cryptomerias, whose solemn grandeur, together with the fine mountain scenery and wonderful cascades, have called for the proverb, "Let no one use the word 'magnificent' till he has seen Nikko." The grandeur of the beautifully lacquered and gilded temples does not eclipse that of nature here. The mountains, the streams, and the waterfalls are indeed magnificent. At the time of my visit I found many of these mountain-

sides densely covered with the dark green foliage and bright blue blossoms of *Hydrangea vestita*, particularly the rocky sides of the canyons, where they were watered by the spray of the waterfalls.

Of the many shrubs found in these mountains, *Hydrangea paniculata* was at the time of my visit the most conspicuous, because it was in full bloom. I picked flowers of *Hydrangea vestita*, *Lycoris squamigera*, *Anemopsis macrophylla*, *Epilobium spicatum*, *Clematis apiifolia*, *Campanula punctata*, *Adenophora latifolia*, *Scabiosa Japonica*, *Lespedeza bicolor*, *Patrinia hispida*, *P. scabiosæfolia*, *P. officinalis*, *Salvia Japonica*, *Primula Japonica*, *Aster scaber*, *Veronica longifolia*, and *Commelina nudiflora*.

As I have said, Japan has given us many beautiful plants particularly adapted to our climate, that of Japan being not unlike that of New England. It is somewhat hotter in summer and not as cold in winter, with much more rainfall and considerable snow.

In the practice of horticulture generally, the people are far behind us, and the results in several branches in which they excel, as in dwarfing plants, curious grafting, and fantastic training, are unworthy of the labor bestowed.

Japan will be helpful to us in supplying lilies, irises, and pæonies, which on account of climate and cheap labor she can produce advantageously, but I do not believe she will become a serious rival to American or European nurserymen, as has been feared.

The lecture was illustrated with numerous beautiful stereopticon views, which added greatly to its interest. At the close, on motion of Joseph H. Woodford, it was voted that the thanks of the Society be presented to Mr. Farquhar for his very interesting exhibition and lecture.

MEETING FOR LECTURE AND DISCUSSION.

Saturday, March 25, 1899.

A meeting for Lecture and Discussion was holden today at eleven o'clock, Vice-President Benjamin P. Ware presiding.

The following lecture was delivered:

Roadside Treatment: Actual and Possible.

By Mrs. F. H. Tucker, Newton.

As it was by your Forestry Committee that I was asked to speak to you today I should have preferred to speak upon some phase of forestry proper, and should have done so had I not been sure that I could bring you no phase of the subject with which you were not quite as familiar as I. Besides, I happened just at that time to be especially interested in what seemed to me some almost unconsidered features of roadside treatment, and as it is out of the abundance of the heart that the mouth is apt to speak to the best purpose, I venture to bring you this subject today. I do not come, however, mainly for the purpose of giving you information or facts which you doubtless already possess, but rather to bring you the problems and suggestions which the facts have brought to me, hoping for your aid in a practical solution. I have, in short, an axe to grind, but as it is your axe as much as mine, I trust you will pardon me for bringing it to your grindstone.

Scientific roadside treatment is closely related on the one hand to the science of forestry, and on the other to the science of good roads, but belongs to a more advanced stage of civilization than either. For as long as tree growth is regarded solely as an encumbrance to the ground, to be got rid of as fast as possible, or of value only as measured in terms of cord wood or board feet, and while roads are allowed to remain nearly or quite impassable during large portions of the year, the chief problem being how to pass through them at all, — while these conditions represent the normal standard of a community, one is plainly too far in advance of his times who calls public attention to the beauty or even tries to discuss the utility of any roadside growth. But we in Massachusetts, as well as in many other parts of the country, have passed that primitive stage where we can look with equanimity on indiscriminate destruction of trees and forests, or submit tamely to the inconveniences of bad travelling, or of no traveling at all. arising from bad roads. Many of us are also passing, or have passed, that sentimental stage where one cannot see a tree cut or cut down without a shriek of horror, and the ultra-economic stage when one cannot conscientiously enjoy a good dirt or grass-grown road because of a conviction that every road should be macadamized. No one, indeed, who has not given the subject some atten-

tion can realize the rapid strides which intelligence and common sense have made the past few years among the people at large in altering their views and their standards in respect to trees and roads. Now, with our forest and park reservations, our schools and chairs of arboriculture, and the greater or less influence of Arbor Day, our forestry associations, and the literature and general influence and information disseminated by all these forces; with our Highway Commission and the more than two hundred miles of State roads and the many more miles of first-class town and country roads due to this State object lesson and to the earnest efforts and coöperation of the League of American Wheelmen, — with all this pioneer work we are surely ready to begin what has never yet been attempted, a general systematic and artistic treatment of the roadsides, the connecting link between road-making and forestry.

There is at present apparently no science or art or system of roadside treatment. There are a few traditional notions on the subject and a body of more or less thoughtful and intelligent but haphazard opinion and practice; but this opinion and practice are so varied that it is doubtful whether any two persons who had given thought to the matter would agree on any five of the dozen or so principal points of variance.

In this discussion we shall confine ourselves almost entirely to country roadsides, noticing suburban roads and parkways only incidentally, and shall try to answer three questions:

I. What is the actual condition and treatment of our New England roadsides, and what principles, if any, underlie this treatment?

II. What constitutes — or would constitute if we had it — a treatment at once artistic and practical; in other words, in the broadest sense scientific; that is, founded on knowledge of conditions and of ends to be served and the best means of attaining those ends?

III. How may such scientific treatment be attained?

First, as to actual conditions and treatment and the principles thereof.

Without doubt the rural New England population, both as towns and as individuals, generally answer the question, "Shall we allow or encourage anything except grass to grow beside the road?" by an emphatic, "We will not." I have tried to find out the reasons

for this almost universal opposition to roadside growth, and will give you the results of my investigation:

1. *Conservatism.* — Many farmers keep the roadsides close cut for no tangible reason whatever, except that they and their neighbors and their ancestors have always regarded it as the proper thing to do. The most casual observer driving through country roads can hardly fail to be struck with what seem to be two opposite tendencies in the treatment of the roadside. One is to make a clean sweep of everything that grows. So far from planting trees or anything else, there seems to be a special spite against every scrap of vegetation, and all growth, whether a blade of grass, a daisy, a fern, raspberry, alder, or seedling oak or maple, — everything is periodically clipped as close as scythe can cut it. The other is the let-alone tendency. On roads where this prevails there is no more attempt at tree-planting than in the other case, but neither is there care or effort of any kind, and all sorts of growth flourish wildly luxuriant, — so luxuriant, indeed, as often to interfere rather seriously with the traveller's hat or carriage-top. In many parts of New England the latter tendency seems to be rapidly gaining ground in spite of the forces of conservatism. I account for this by the decay of agriculture and abandonment of many farms and consequent partial disuse of some of the roads in almost every town, and also by the fact that many farms are taken by foreigners without New England traditions in the matter.

2. *Untidiness.* — The New England love of order and tidiness led the old-time farmer to look upon roadside "bushes and weeds" as untidy, and to "clean up" the sides of the road just as his wife swept her floors and arranged the chairs in straight rows against the walls, and the conservatism just mentioned has kept him and his descendants doing the same thing ever since. A farmer who did not keep his roadsides "clean" was looked at askance as "shiftless" and more or less unthrifty, whatever redeeming traits he might display.

3. *Tramps.* — I have been told that the greatest objection to roadside shrubbery is that it harbors and encourages tramps. This cannot, however, be taken too seriously. The same objection might be made to building barns.

4. *Shade.* — Roadside trees beside cultivated fields are opposed on the ground that they shade the crops, and also because of the nourishment which they withdraw from the soil at the expense of the crops.

5. *Seeds.* — Another objection urged against roadside growth is that harmful seeds are thereby propagated which are scattered over neighboring fields, thus producing weeds which are a pest to the farmer.

6. *Insects.* — Roadside growth is opposed also as the breeding place of many insect pests injurious to crops.

7. *Grass.* — Some farmers wish to utilize their roadsides for grass, which they cut as an addition to their hay crop, and so oppose any growth which interferes with this end.

8. *Dust.* — It is objected from an æsthetic point of view that dust from the highway settles so heavily upon wayside shrubs and plants as to make them unsightly and disagreeable, whatever beauty they might otherwise possess.

9. *Cutting off View and Breeze.* — For æsthetic reasons, also, tall bushes are opposed as cutting off the view both near and distant, as well as shutting out the breeze, thus making the road hot and uncomfortable.

10. *Dampness.* — Trees and tall shrubs are discouraged by some on the ground that by their shade they prevent mud from drying, and in some localities keep the road generally damp.

11. *Drifting of Snow.* — This is by far the most serious objection raised to roadside trees and shrubs, but there is the greatest possible difference of opinion even among the most strenuous objectors as to what constitutes right or permissible conditions in the matter. The most radical declare that all trees, bushes, and plants of every kind on every road should be cut off regardless of location ; others assert that only certain kinds of trees cause drifting ; some that trees trimmed high do not affect drifting conditions ; others that they should be trimmed low ; many say that trees do no harm, but all other growth should be cut off. Some insist that any growth on the north or east side of the road is protective ; others say that both sides should be kept cut or both shaded. These are but a few of the many points of dispute connected with this branch of the subject.

II. In view of all these arguments against roadside adornment our second question : What would constitute a treatment both practical and artistic? may seem rather difficult to answer. But let us first ask just what we should like to have if we could get it regardless of objections, and then see if meeting those objections might not be the very method, or one method, of obtaining our object.

And, first, the negative side, What must we *not* have? We must not have rubbish or gravel heaps beside the road. Even remote country roadsides should never be used, as is often the case, for a dumping-ground, and gravel or stone left from road-mending should be disposed of otherwise than in unsightly heaps by the roadside.

Banks from which sand, gravel, or dirt is dug for repairing the road should not, if possible to avoid it, be left in such condition as to disfigure the roadside.

Telephone poles should wherever possible be set at a sufficient distance from the road to be invisible to passers-by. This is already done to a small extent in some towns.

Fences and walls should be made as unobtrusive or otherwise as artistic as can be. Board fences are a disfigurement to the highway, besides being objectionable under certain conditions as causing snowdrifts. Many object to walls on the same account. Wire fences, — not barbed wire, — where something better can be substituted for the ugly posts, are as harmless as anything. In some places efforts are made to do away with fences altogether, leaving field and wood wholly open to the road. Artistically, this is perhaps the most desirable plan of all, though low walls, or ruined walls, often have a beauty peculiarly their own.

Poison Ivy is a pest which should nowhere be tolerated, and the carelessness which allows it to flourish in profusion on so many of our Massachusetts roadsides is a disgrace to the boasted civilization of this State. There are evils enough that no legislation can cure or even mitigate, but on this matter State laws could surely be made and enforced which should within two or three years at longest rid the country of this wholly unnecessary plague. I have never until lately heard of any reason or excuse, except apathy or inertia, for the perpetuation of such a nuisance, but it has just been suggested to me that some land owners allow it to overrun their walls and fences in order to keep trespassers off their ground. Whatever the cause, stringent measures should be taken for its extermination.

But now for the positive side, What should we like to have, if we could get just what we wanted?

First, let us have *only* our own native vegetation, including those few species, like Lombardy poplars, so closely associated with New England life and history as to seem at least adopted children of

the soil. I have seen the suggestion that our country roadsides should be planted with foreign shrubs and plants, especially some Japanese varieties. Lovely as these are, however, I should be extremely sorry to see this done. The whole world is growing too nearly alike, anyway. Let us keep what distinctive features we can and preserve at least that individuality of nature which is so dear to the heart of every true New Englander and which is nowhere else more characteristic than in the foliage and blossoms of our roadsides. But I would suggest the free use of as many beautiful foreign plants as possible along some of our suburban roads, replacing them by the native growth as suburb merges into country. This treatment if not overdone would appeal to me as especially beautiful and fitting and therefore artistic, with the foreign, artificially cultivated plants accompanying the more artificial human life and gradually giving place to the native growth along with changing environment.

And next let us have within these limits all possible variety. Our roadsides are now too often either monotonously bare or monotonously overgrown. And we should not choose, even if we could, to line every highway with endless rows of trees, or endless anything else, however beautiful in itself. Almost all our trees, shrubs, and plants are beautiful and suitable when fittingly placed, and an intelligent, artistic study of conditions would suggest that infinite variety of treatment through which our roadsides might yield perpetual because ever-varying charm. How to apply such treatment can perhaps best be suggested by considering those objections, many of them very real, which are raised against roadside growth. Just a word upon each.

Conservatism and a false standard of tidiness can, of course, best be met by showing with object lessons a more excellent way. The tramp question can be better discussed from a sociological than an arboricultural point of view.

The injury done by trees and bushes in shading crops or in robbing the soil of nourishment is often a question of location or of species. On the south side of a road, for instance, trees or bushes will not cast enough shade to be harmful upon fields on either side, and the amount of nourishment taken from crops depends largely upon the kind of trees or bushes in question. It must also be remembered that much nourishment is returned to the ground by fallen leaves. And again, when harm is actually

done in these ways it is often very small indeed or is more than made even by compensating advantages. So I should say, plant or encourage such trees and shrubs as are otherwise desirable where they will not shade crops, and such species as will not rob the soil, or choose locations where on the whole they will be more useful and beautiful than mischievous.

The number of roadside plants that really do much harm by scattering noxious seeds is comparatively small. Seeds are much more apt to be propagated in large numbers from field to roadside, but beautiful plants which really do this injury should be allowed only in places where they will do no harm, or the flowers should be cut before the seeds mature.

Insect pests ought, of course, to be everywhere and always as far as possible exterminated, even, as a last resort, by destroying the trees or shrubs on which they flourish. But as in the case of injurious seeds, the damage of this sort arising from roadside growth is small, compared with what is allowed to go on often wholly unchecked on land adjoining the highway.

Some farmers wish to cut grass from their roadsides, and in the main there is no good reason why they should not do so. For, while we should not wish to see all roadsides cut close, it is in the interest of the very variety that we are seeking, to allow some of them to be kept simply grass-grown. The chief objection against permitting them to be mowed is the unsightliness of the stubble, but as this is quickly covered by the second growth, and as in our present stage of progress insistence on more refined treatment is not yet feasible, we may well wink at these slight blemishes, especially as the farmers who care to harvest their roadsides are comparatively few.

For the disfiguring dust on roadside plants there seems to be no adequate remedy in sight. On all roads, whether dirt or macadam, paved or concreted, on the Back Bay or the Berkshire Hills, the dust fiend reigns at times almost supreme. But let us not destroy our plants or our houses because dust covers them as with a mantle, but rather let us seek the remedy, for one must somewhere sometime be found.

Tall, thick bushes and low-trimmed trees do shut out in some localities both breeze and landscape, but trees may be trimmed high, and bushes thinned or allowed to grow only in clumps wherever an unobstructed view or breeze is desirable and possible.

Luxuriant hedges of alder or willow, with or without the adornment of clematis or other vines, are often very effective for short distances, and places for them can be found where they will not interfere with the comfort or pleasure of the traveller. A chronically damp or muddy road needs more radical treatment than cutting down the trees and bushes on its sides, though too much shade is, of course, undesirable. Dampness and mud show a "springy" soil or defective drainage, and such roads should be replaced by different or better ones.

The alleged influence of trees and bushes in causing snowdrifts is, as has been said, the most serious objection to be met — almost equally serious, indeed, for the time, whether it exists in fact or chiefly in the mind of the objector. Only long and patient study of local conditions — conditions varying with every locality and often with every half-dozen rods on the same road — such study and investigation only can solve the problem. Meanwhile, there are many roads or stretches of road in every town where the snow never drifts to any extent and where roadsides can be beautified without considering this troublesome factor.

By this time it can readily be seen from even these brief observations that one seeking to foster roadside growth must necessarily employ some variety of treatment to meet varying conditions. But the roadside artist will not confine himself to the narrow suggestions of necessity. For instance, when local conditions forbid shrubbery, grass or barrenness are not the only alternatives. The roadside may be seeded for a distance in white clover with delightful effect. Farther on let the grass be filled with violets and perhaps next adorned with the delicate beauty of innocence or bluets, a much neglected flower. Blueberry bushes and sweet fern, hardhack and queen of the meadow, asters and golden-rod, buttercups and daisies, brakes and ferns, make only a beginning of the possibilities of beauty, employed separately or in such combinations as taste or the season may permit. And again; at present, when bushes are to be cut everything else goes with them, whether seedling trees or flowering plants. That is easier than to use care and selection. Now, I have seen it estimated that the cost of planting roadside trees, including care as long as needful, averages about six hundred dollars per mile. But why not sometimes utilize the spontaneous growth? Why should roadside trees *always* stand in rows rather than in groups or irregularly as they

chance to take root. By fostering the natural seedling growth with taste and discretion, might not expense sometimes be lessened and more artistic effects be produced?

It would also seem that a greater variety of trees might be used to advantage for roadside planting. The effect of different outlines and foliage, with a turn in the road or break in the landscape, is very pleasing. The objections commonly made to nut and fruit trees and to pines and other evergreens along highways are not insurmountable and might be more than counterbalanced by their advantages. In short, I believe that no one has ever yet imagined half the possibilities of beauty and variety in our native trees and shrubs and humble wayside plants — a beauty and variety to be obtained not so much by cultivation or artificial treatment of any sort as by skilful and sympathetic direction of Nature's own profusion and combinations. As in forestry, not planting but judicious cutting and pruning is the keynote of success. Let Nature produce and man direct the production. Thus, when consistent with local conditions, let some of the "cleaned up" roadsides grow in as Nature wills, and then thin out and supplement and direct according to taste. Most wayside bushes attain their growth in five or six years, and can thus be experimented on at a much less cost of time and care than trees.

All these are merely suggestions, and but a tithe of those possible to be made, the value of which only investigation and experiment can prove. And this brings us to our last question:

III. How may systematic and artistic roadside treatment be attained? When and how shall we begin to educate, and who will undertake the work of experiment and investigation? First, something may be done directly with and by the farmers. They have much more interest in the subject than might be supposed, and some are doing aggressive and even original work in this line. But most would not know what to do or how to set about it if they wished. Nearly all talk on the matter with much intelligence and respond to questions with valuable opinions and information. As a result of consultations with a number of farmers in different parts of New England I have almost wholly revised the opinions with which I began this study of conditions and methods of treatment. When farmers, as well as other people, find their own opinions sought for and prized they are much more ready to listen to those of others and to act upon them than when approached

dogmatically. For example, the beauty of roadside "brush" is almost wholly unappreciated in the country. Most farmers do not greatly object to trees that cost them no care or trouble, especially if trimmed high, and roadside plants are thought merely untidy. But bushes are regarded as wholly a nuisance. City boarders, however, have done something toward teaching the beauty of hedges or clumps of barberry, thickets of raspberry and blackberry, and rows or groupings of sumac, alder, willow, cherry, mulberry, elderberry, and many other shrubs. When it is found that such things pay they are looked at in a new light; first, perhaps, with curiosity and then with real appreciation. Many instances might be given of genuinely beautiful and educative work done by or through the influence of these boarders or summer residents, such as buying or saving strips of roadside woodland, planting or preserving trees, shrubs, and vines, and in other ways. But such results are almost infinitely small compared with what remains to learn and to do. One valuable principle is, however, illustrated; namely, that all reforms, even reform of the country itself, must proceed from the city and work outward. Moreover, trained and organized effort is necessary to produce the desired result — a treatment, that is, at once general, systematic, scientific, and beautiful. To what organization can we look? It seems to me that in this State the Massachusetts Highway Commission is the best equipped for study and investigation along these lines. They have already many miles of State road under their supervision to which they are adding other miles every year. This Commission has already nearly or quite all the authority and discretion necessary for such an undertaking in the statutes requiring it to "keep all State roads reasonably clear of brush," and to "cause suitable shade trees to be set out along said highways when feasible," and to "renew the same when necessary," besides "cutting the weeds along the roadway." The Massachusetts Forestry Association also and the Horticultural Society could find many ways to assist and advise in making our country roads beautiful without being unpractical. Village improvement societies, road commissioners, and every other agency should as far as may be act in harmony with and under the advice of the State Highway Commission, which has from its scope and equipment the best possible opportunity of making its roads object lessons for the study of conditions and for every variety of treat-

ment. No one official is of more importance in such a movement than the tree warden, especially when every town shall have that officer, and occasional conferences of all the tree wardens of the State, perhaps including the firewards, would be most valuable for comparing notes and discussing facts and methods.

But all effort, great or small, whether undertaken by individual or town or by organizations, either State or voluntary, should have for its motto, Scientific and Artistic Treatment in Accordance with Local Conditions.

Discussion.

The Chairman said that the lecturer had opened a wide field for discussion. She had answered many of the difficulties brought up when roadside improvement is urged. Farmers who have a mile of road by their land find it difficult to make both ends meet, and especially to pay their taxes. Towns would be unwilling to make appropriations for roadside improvement, because they have not been educated to it; but Mrs. Tucker would make a good missionary to educate them. In gathering autumn leaves the poison ivy should be avoided, and it ought to be eradicated. We want to create a popular sentiment in favor of roadside improvement, and there are ladies and gentlemen at this meeting who could carry home a powerful influence for its advancement.

Mrs. Tucker said that the expense of roadside improvement had been spoken of, but this would not be great. In one location that she knew of, very pleasant results were produced by planning the work systematically, and using our own native shrubs. It is not rare foreign plants that are needed, or large sums of money, so much as good taste and a desire to improve the appearance of the roadside.

O. B. Hadwen said that he had a fondness for roadside improvement, but he had changed his opinion somewhat, and now thinks that no trees should be set where there is much traffic; horses, electric-light men, and highway surveyors have no fondness for trees. He would plant his trees inside the fence, so as to retain control over them. A great variety of trees can be grown on a country road where the objections mentioned do not exist. In some country towns, from the sidewalk to the roadway there is a wide strip of grass for miles, which is cut with a lawn-mower, and one feels in passing through such a street that he is in a section of great refinement.

In Worcester, where the speaker resides, the Parks Commission have control of all street trees, and plant eight hundred a year; but they begin after a few years to show indications of neglect. They are planted seven feet from the fence. Trees weighted with ice bend over into the street and have to be cut off. People advise land owners to let the forest grow, but the speaker is coming to the conclusion that the only way is for the Commonwealth or towns to undertake it.

Mrs. Tucker wanted to say a word in favor of white pines. She knew a row of these trees, about thirty feet high, on the north side of a road, opposite the residence of the owner, and though they injure the grass somewhat, they shelter the house, and every tree has saved him a cord of wood. A wealthy man bought a strip of woodland three rods wide on each side of a road to save the trees, but was not very successful; as soon as the trees lost the support of the others the largest blew down, but the experiment may yet be successful. In a place sheltered by hills another attempt succeeded. If the expense of setting out trees is six hundred dollars per mile, it does not cost so much to preserve trees already there. Professor Fernow says that the planting tools are not so much needed.

Mr. Hadwen said that he planted a row of white pines in 1846, which are now seventy or eighty feet high, and afford good sawlogs. The ice we have had for some time past in winter has broken them badly; they are the worst of all evergreens to withstand breaking by ice, and the Norway spruce is one of the best.

James H. Bowditch was surprised that Mr. Hadwen should advocate the Norway spruce in preference to the white pine. Street trees must be trimmed up, and the beauty of the Norway spruce is destroyed the moment you trim it up. Mr. Hadwen's white pines, planted more than fifty years ago, have got through a good deal, and the speaker thought that Mr. Hadwen's objections to the white pine were answered by his own trees. Mr. Vanderbilt, at Biltmore, offers seedling white pines, four feet high and transplanted, for $10.50 per thousand.

The Chairman said that there are many country roads where it would involve great expense to do anything effectual; there are instances in his vicinity. Clematis vines growing over barberry bushes by the side of the road cover up the coarseness of the land, and become things of beauty. There are many places where the

let-alone system would be best and most beautiful, and many places where the trees and shrubs might be trimmed and improved; but who is to do it? It will require a good deal of preaching to bring about public sentiment to the improvements suggested by the lecturer.

—— Nowell agreed with Mr. Hadwen that much injury is done to trees by electric-light men, boys, etc., and said that a bill was then before the Legislature providing for the appointment of tree wardens, who should have sole charge of all trees in streets. He suggested that the audience should exercise their influence in favor of the preservation of street trees from injury.

J. W. Manning spoke of a row of white pine trees in Manchester, N.H., on the river road, about two miles below the city, in that part which was formerly Bedford. They are trimmed up, but they look well. He had something to do with planting them; he dug up small trees where a wood lot had been cut off. They were planted four or five feet inside of the owner's land for a distance of seventy-five rods. Many of them lived, and are now from twenty to forty feet high.

CONTENTS.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to make complete its sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station). — Bulletins 4–6 (1884), 7–10 and 1–4 (1885), and 5–9 (1886). 7th Annual Report, for 1894, and 9th, for 1896.

Alabama (Canebrake Station). — All Bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas. — Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, and 50, New Series.

Colorado. — Bulletin 3.

Connecticut (New Haven Station). — Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive, except that for 1878.

Florida. — Annual Reports for 1891 and 1892.

Indiana (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1–14, inclusive.

Kentucky. — Bulletin 10.

Michigan. — Special Bulletins 1, 3, and 5. 6th Annual Report, for 1892–93. (Contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, 26, and 33 of Old Series. All Annual Reports since the 1st, for 1888, except those for 1896 and 1897.

New Jersey. — Bulletins 1, 4, 5, 15, 27 and 28.

New York (Cornell). — Annual Report, 1882–83 (Report of Agricultural Department of Cornell University).

North Carolina. — Bulletins 1 to 56, inclusive. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*). Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota. — 4th Annual Report, for 1893.

Ohio. — All Bulletins of First Series, except 16, 17, 18, and 19.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina. — All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, 6th, for 1893, and 9th, for 1896.

Texas. — College Bulletins 1–5, 1883–1887.

Washington. — 6th, 7th, and 8th Annual Reports, for 1895–96, 1896–97, and 1897–98 All Bulletins later than 27

West Virginia. — Special Bulletin — Potash and Paying Crops, 1890.

Wyoming. — Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto. — Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1899.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1900.

☞SEE LAST PAGE OF COVER.

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OF THE

Massachusetts Horticultural Society,

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1900.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

BUSINESS MEETING.

Saturday, April 1, 1899.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The recommendation of the Executive Committee that the Society appropriate $80 for the use of the Garden Committee for the year 1898, additional to the appropriation for that year, reported to the Society at the meeting on the 4th of February, and then accepted, came up for final action and was unanimously voted.

The Executive Committee reported a recommendation that the Society appropriate $150 for the use of the Committee on Forestry and Roadside Improvement for the year 1899. The report was accepted and the appropriation was unanimously voted.

The Executive Committee recommended the election of William Salway, Superintendent of Spring Grove Cemetery, Cincinnati, Ohio, as a Corresponding Member, and he was unanimously elected.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

Mrs. Isabella Stewart Gardner, of Boston.
George P. Hayward, of Roxbury.
H. R. Kinney, of Worcester.
Dr. Ben H. Metcalf, of Winthrop.
Horace H. Moses, of Roxbury.
Michael Sullivan, of Revere.

Joseph H. Woodford, at the request of the Committee on Plants, announced the decease of Azell C. Bowditch, Chairman of that Committee, and moved the election of William Wallace Lunt as Chairman, and Mr. Lunt was unanimously elected.

Mr. Woodford further moved that the Committee on Plants be empowered to select a member to fill the vacancy in the Committee and report the same to the Society, and this vote also was passed.

Mr. Woodford brought up the subject of the selection of a site for a new building for the Society, and advocated the purchase of a lot on the corner of Huntington Avenue and Oxford Terrace, explaining his views by the aid of a plan of the locality. The subject was discussed by Benjamin P. Ware, William E. Endicott, and Rev. Calvin Terry, and President Appleton made a statement explanatory of the subject.

Mr. Woodford moved that the selection of a site be left to the Executive Committee.

George D. Moore moved as an amendment that the Committee on Building take into consideration rebuilding on the present site and the purchase of land in the rear.

Pending the discussion of these motions, the Society, on motion of Benjamin C. Clark,

Adjourned to Saturday, May 6.

BUSINESS MEETING.

Saturday, April 22, 1899.

A special meeting of the Massachusetts Horticultural Society was holden at ten o'clock today, in accordance with the following request:

Boston, April 12, 1899.

Francis H. Appleton, Esq.,
President of the Massachusetts
Horticultural Society, Boston, Mass.

Dear Sir: The undersigned, members of the Society, respectfully petition that a meeting be called at as early a date as is practicable, to listen to a report of the Finance and Executive

Committees, and to see whether the Society will authorize and direct the Finance Committee to purchase the lot of land on the corner of Huntington and Massachusetts Avenues, and extending to Falmouth Street, opposite the new Music Hall, and to authorize the President to appoint a committee of five with power to erect a new horticultural building thereon; also to authorize the Finance Committee to mortgage any of the Society's property in order to complete the purchase of said new lot of land, and the erection of said new horticultural building; and to authorize the Finance Committee to sell or improve the Society's real estate on Tremont Street as the said Finance Committee shall deem best; and to take any further action that may be necessary.

Walter Hunnewell,	Francis H. Appleton,
Charles W. Parker,	H. H. Hunnewell,
Charles S. Sargent,	William C. Strong,
Henry P. Walcott,	William H. Spooner,
Solomon Lincoln,	Nathaniel T. Kidder,
C. E. Richardson,	Benjamin C. Clark,
Benjamin M. Watson,	Charles F. Curtis,

Augustus Hemenway.

In compliance with this request, agreeably to Section XII of the Constitution and By-Laws, the following notice was sent to every member of the Society:

Massachusetts Horticultural Society,

Boston, April 12, 1899.

Pursuant to the provisions of the Constitution and By-Laws, at the request of twelve members of the Society, the President hereby calls a special meeting of the Society, to be held at Horticultural Hall, 101 Tremont Street, Boston, on Saturday, the twenty-second day of April, 1899, at ten o'clock in the morning, to listen to a report of the Finance and Executive Committees, and to see whether the Society will authorize and direct the Finance Committee to purchase the lot of land on the corner of Huntington and Massachusetts Avenues and extending to Falmouth Street, opposite the new Music Hall, and to authorize the President to appoint a committee of five with power to erect a new horticultural building thereon; also to authorize the Finance Committee to mortgage any of the Society's property in order to

complete the purchase of said new lot of land and the erection of said new horticultural building; and to authorize the Finance Committee to sell or improve the Society's real estate on Tremont Street, as the said Finance Committee shall deem best; and to take any further action that may be necessary.

FRANCIS H. APPLETON,
President Massachusetts Horticultural Society.

ROBERT MANNING,
Secretary.

At this meeting the President was in the Chair. The call for the meeting was read by the Secretary.

Benjamin C. Clark introduced the subject by speaking in favor of the purchase of land on the corner of Huntington and Massachusetts Avenues as recommended by the Finance and Executive Committees.

Col. Solomon Lincoln moved the adoption of the following votes, and spoke in support of his motion:

Voted, That the Finance Committee be authorized to purchase, at such price as may seem to them suitable, the lot of land at the corner of Massachusetts and Huntington Avenues, in this city, comprising about twenty-two thousand five hundred square feet, for the use of the Society.

Voted, That the Finance Committee be authorized to sell or improve the Society's real estate on Tremont Street as the said Finance Committee shall deem for the best interests of the Society, and to mortgage any of the Society's property for such purposes, or in order to carry out the vote of the Society to purchase a piece of land at the corner of Massachusetts and Huntington Avenues.

Voted, That the President shall appoint a committee of five members, of which he shall be the chairman, with full powers to erect a building at the corner of Massachusetts and Huntington Avenues for the use of the Society at a cost not exceeding two hundred and twenty-five thousand dollars.

On motion of J. D. W. French it was voted that the speakers be limited to five minutes except with the consent of the meeting.

It was voted that the polls be kept open from eleven o'clock to one, provided that a vote is not previously reached.

The following Committee was appointed to receive, sort, and count the votes:

BENJAMIN M. WATSON, *Chairman.*

J. ALLEN CROSBY,	MISS MARY C. HEWETT,
CHARLES W. JENKS,	HENRY S. ADAMS.

The polls were opened at eleven o'clock, and remained open until one o'clock. The Committee to receive, sort, and count the votes, at the close of the ballot, reported that on each vote two hundred and fifty-seven members voted in the affirmative, and seventy-seven in the negative.

The President then declared that all the votes were passed, and that the second vote was passed by an affirmative vote of more than two-thirds of the members of the Society present and voting at this meeting.

The President said that he would announce the names of the Committee provided for in the third vote through the press.

Adjourned.

BUSINESS MEETING.

SATURDAY, May 6, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, FRANCIS H. APPLETON, in the chair.

The President announced the following as the Building Committee appointed by him agreeably to the vote passed at the Special Meeting of the Society on the twenty-second day of April:

President FRANCIS H. APPLETON, *Chairman* (as provided in the above mentioned vote).

CHARLES F. CURTIS,	CHARLES S. SARGENT,
GEORGE A. NICKERSON,	WILLIAM J. STEWART.

and that the Committee had chosen William J. Stewart, Secretary, and Edmund M. Wheelwright, Architect.

William Wallace Lunt, Chairman of the Committee on Plants, reported that that Committee had selected to fill the vacancy thereon, agreeably to the vote of the Society, Robert Cameron.

The President spoke of the decease of Waldo O. Ross, formerly Chairman of the Library Committee, and Azell C. Bowditch, Chairman of the Committee on Plants, and it was voted that Committees be appointed by the Chair to prepare memorials of these members. The Chair appointed to prepare a memorial of Mr. Ross, William E. Endicott, George E. Davenport, and George W. Humphrey.

And to prepare a memorial of Mr. Bowditch, William Wallace Lunt, C. H. B. Breck, and Arthur H. Fewkes.

The Secretary announced the decease on the 19th of March, in his eighty-fourth year, of Charles Naudin, Director of the Experimental Garden at the Villa Thuret, Antibes, France, one of the most distinguished gardener-botanists of our times, of whom the "Gardeners' Chronicle" said that "though to the rank and file of gardeners his name might not be familiar, those concerned with the problems of systematic botany, hybridization, experimental cultivation, and the acclimatization and distribution of economic plants, would recognize that a mighty leader had fallen." He was elected a Corresponding Member of this Society in 1887, and several of his works are in the Library. The Secretary did not propose any action in regard to the death of M. Naudin, but thought it due to the Society that the departure of so eminent a member should not pass unnoticed.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Marshall K. Abbott, of Hamilton.
Miss Mary S. Ames, of North Easton.
Oliver Ames, of North Easton.
Rebecca C. Ames, of North Easton.
Charles W. Amory, of Boston.
George H. Ball, of Boston.
Walter C. Baylies, of Taunton.
Albert S. Bigelow, of Cohasset.
Joseph S. Bigelow, of Cohasset.
Dr. William Sturgis Bigelow, of Boston.
T. Dennie Boardman, of Boston.
Lawrence Brooks, of Groton.
Peter C. Brooks, of Boston and Medford.

Shepherd Brooks, of Medford.
John A. Burnham, of Manchester.
Eliot C. Clarke, of Boston.
Hon. George G. Crocker, of Boston.
Charles P. Curtis, of Swampscott.
Edward L. Davis, of Boston and Worcester.
George Dexter, of Beverly.
James L. Duncan, of Chelsea.
William A. Gaston, of Boston.
Edward S. Grew, of Boston.
William Hooper, of Boston.
Horatio A. Lamb, of Milton.
George C. Lee, of Newton (Chestnut Hill).
Abbott Lawrence Lowell, of Boston.
Charles Merriam, of Boston.
John T. Morse, Jr., of Boston.
Henry Parkman, of Boston.
S. Endicott Peabody, of Salem.
Elisha N. Pierce, of Waltham.
Alexander S. Porter, of Boston.
Richard M. Saltonstall, of Newton.
Miss Emily E. Sears, of Boston.
Dr. Henry F. Sears, of Boston.
Francis Shaw, of Wayland.
John Eliot Thayer, of South Lancaster.
William Warren Vaughan, of Boston.
Samuel D. Warren, of Dedham.
Edmund M. Wheelwright, of Boston.

Adjourned to Saturday, June 3.

BUSINESS MEETING.

Saturday, June 3, 1899.

An adjourned meeting of the Society was holden at eleven o'clock today, the President, Francis H. Appleton, in the chair.

William Wallace Lunt, Chairman of the Committee appointed at

the last meeting to prepare a memorial of Azell C. Bowditch, reported the following;

Whereas, God, who doeth all things well, has called from among us our late associate, Azell Carter Bowditch, and

Whereas, In the death of Mr. Bowditch we have lost an able counsellor, an upright judge, and one who has endeared himself to all who have had occasion to make exhibits before the several committees of which he was a valued member.

Resolved, That we hereby express our deep sense of the loss of one of the oldest members of the Society, who inherited from his father, also a member of the Society, a love of horticulture, and who for half a century has labored earnestly for its welfare.

Resolved, That we tender our sincere sympathy to his family in their bereavement.

Resolved, That these resolutions be spread upon the records of the Society, and that a copy of them be sent to the family of the deceased.

WM. WALLACE LUNT,
C. H. B. BRECK,
A. H. FEWKES,
} *Committee.*

The memorial was unanimously adopted.

George E. Davenport, from the Committee appointed at the last meeting to prepare a memorial of Waldo O. Ross, presented the following:

It is with feelings of the deepest regret that we find ourselves called upon to record the death of so valuable a member of this Society as Mr. Waldo O. Ross, who passed away on the 27th of December, 1898, after a brief illness which cut him off from a career of usefulness in the very prime of a splendid manhood. As a member of the Library Committee during the years 1875 to 1878, inclusive, in the last two of which he was chairman, Mr. Ross served this Society well, and his gift to the Library of a fine set of "Nature" attests the character and value of his membership.

Always in touch with the best interests of this Society, and ever ready to serve it to the best of his ability, his loss is greatly to be deplored, while the superb character of his personality and the unaffected simplicity of his manners, which endeared him to all who came in contact with him, make his loss all the greater.

Wherefore, in testimony of the esteem in which he was held by this Society, we place these resolutions on record, and tender a copy of the same to the family of our late brother member.

GEORGE E. DAVENPORT,
For the Committee.

This memorial also was unanimously adopted.

The Secretary announced the decease, on the 11th of May, of Malcolm Dunn, head gardener to the Duke of Buccleuch, at Dalkeith, Scotland, who took this position in 1871, after serving in some of the most noted gardens in England, Scotland, and Ireland, and who, succeeding to such great gardeners as Charles McIntosh and William Thomson, sustained the high level of their reputation at Dalkeith, and the fame of the garden. As a landscape gardener he possessed a good taste and he had also a knowledge of plants and their adaptation to given localities; as a pomologist he had an extensive knowledge of varieties, and his labors in the Caledonian Horticultural Society, the Scottish Horticultural Association, and the Scottish Arboricultural Society, were of the highest importance. He was elected a Corresponding Member of this Society in 1891.

The President announced that John G. Jack had resigned his membership of the Committee on Forestry and Roadside Improvement, and James Sturgis Pray was elected to fill the vacancy.

George E. Davenport, of the Committee on School Gardens, Children's Herbariums, etc., asked for an additional appropriation of $50 for gratuities for native plants. This appropriation was, agreeably to the Constitution and By-Laws, referred to the Executive Committee.

The following named persons, having been recommended by the Executive Committee as Life Members of the Society, were upon ballot duly elected:

SAMUEL N. BROWN, of Boston.
T. JEFFERSON COOLIDGE, JR., of Boston and Manchester.
L. SHANNON DAVIS, of Brookline.
WILLIAM AMORY GARDNER, of Groton.
SAMUEL HENSHAW, of Cambridge.
WILLIAM A. JEFFRIES, of Boston.
DAVID P. KIMBALL, of Boston.

Rt. Rev. William Lawrence, of Boston.
Arthur Lord, of Plymouth.
Charles S. Minot, of Boston.
Col. Charles Pfaff, of South Framingham.
Gen. Stephen M. Weld, of Dedham.

The meeting was then dissolved.

BUSINESS MEETING.

Saturday, July 1, 1899.

A duly notified stated meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

Leverett M. Chase moved that the subject of placing mural tablets on the walls of the building to be erected for the Society, to be inscribed with the names of eminent horticulturists, be referred to the Building Committee. The motion was carried.

Adjourned to Saturday, August 5.

BUSINESS MEETING.

Saturday, August 5, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

Agreeably to the Constitution and By-Laws, the President appointed the following named members a Committee to nominate candidates for Officers and Standing Committees for the year 1900:

Henry Parkman, *Chairman*.

Patrick Norton.	Herbert Merriam.
Charles W. Jenks.	John Lawrence.
George A. Nickerson.	Warren H. Heustis.

Ex-President William C. Strong spoke of the meeting of the American Pomological Society, at Philadelphia, on the 7th and 8th of September, at which the Semi-Centennial Anniversary will be

celebrated, and moved that a delegation be appointed to represent the Society at that meeting. The following named members were accordingly appointed:

The President, Francis H. Appleton, *Chairman*.

William C. Strong,	Thomas C. Thurlow,
William H. Spooner,	Edward B. Wilder,
Benjamin G. Smith,	Hon. Aaron Low,
Robert Manning,	Charles B. Travis,
Samuel B. Parsons,	E. W. Wood,
Benjamin P. Ware,	Charles F. Curtis,
Leverett M. Chase,	O. B. Hadwen,
James H. Clapp,	Warren Fenno,
Jacob W. Manning,	J. Willard Hill,
C. C. Shaw,	Sumner Coolidge,
William M. Munson,	Samuel Hartwell.

It was voted that the delegation have power to add to their number, and that persons desiring to attend the meeting be requested to hand in their names to the Secretary.

Adjourned to Saturday, September 2.

BUSINESS MEETING.

Saturday, September 2, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President, Francis H. Appleton, in the chair.

The Committee to nominate candidates for Officers and Standing Committees for the next year reported a printed list, which was accepted, and the Committee was continued and requested to nominate candidates in place of any who might decline before the election.

A communication from the Forestry Division of the United States Department of Agriculture, asking information as to what has been done here in the interests of Forestry, was referred to the Committee on Forestry and Roadside Improvement. Communications from the same source, relating to the exhibition of fruit

and other articles at the Paris Exposition of 1900, were referred to the Executive Committee.

A communication from the American Rose Society was laid on the table for the information of members.

William C. Strong announced the arrangements for delegates to the twenty-sixth session of the American Pomological Society at Philadelphia on the 7th and 8th instant.

The President announced the decease of Benjamin G. Smith, and it was voted that a committee of three be appointed by the Chair to prepare a memorial. The Chair appointed as that Committee, Benjamin C. Clark, Theodore H. Tyndale, and Benjamin P. Ware.

The Secretary announced the decease of Henri Leveque de Vilmorin, of Paris, a Corresponding Member of the Society, and the head of the great seed house of Vilmorin, Andrieux, et Cie., founded more than a hundred and fifty years ago. M. Vilmorin's great-grandfather became the head of the firm in 1781. M. Henri Vilmorin was the founder of the Society of French Agriculturists; in 1889 he was elected President of the Botanical Society of France, and at the time of his death was the premier Vice-President of the National Horticultural Society of France. He was the best known figure among the horticulturists of France, and the recognized chief authority on horticulture in that country. He made two visits to this country, when we have had the pleasure of welcoming him to these rooms. He was elected a Corresponding Member of this Society in 1887.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

Mrs. Charles Francis Adams, of South Lincoln.
F. L. Ames, of North Easton.
John Ames, of North Easton.
Francis Bartlett, of Boston and Beverly.
William Carver Bates, of Newton.
Miss Anne Blake, of Brookline.
Mrs. Arthur W. Blake, of Brookline.
John M. Brown, of Belmont.
Arthur T. Cabot, M. D., of Boston.

Zenas Crane, of Dalton.
Charles H. Dalton, of Boston and Beverly.
George A. Draper, of Hopedale.
William C. Endicott, Jr., of Danvers.
H. H. Fay, of Wood's Holl.
Joseph S. Fay, Jr., of Wood's Holl.
L. Carteret Fenno, of Boston.
Daniel S. Ford, of Weston.
Charles H. W. Foster, of Brookline and Marblehead.
John L. Gardner, of Boston.
Jackson E. Hall, of Roxbury.
Edwin B. Haskell, of Auburndale.
Mrs. Augustus Hemenway, of Canton.
Col. Charles A. Hopkins, of Brookline.
George Abbot James, of Nahant.
D. Webster King, of Boston.
John Mason Little, of Boston and Swampscott.
Augustus P. Loring, of Boston and Pride's Crossing.
Mrs. William Caleb Loring, of Pride's Crossing.
William Morrison, of Cohasset.
Mrs. David Nevins, of Methuen.
Mrs. George A. Nickerson, of Dedham.
G. A. Peabody, of Danvers.
Miss Marion W. Peirce, of Topsfield.
Col. Albert A. Pope, of Boston and Cohasset.
James M. Prendergast, of Boston.
George Putnam, of Manchester.
Henry R. Reed, of Jamaica Plain.
Elizabeth P. Rogers, of Peabody.
Jacob C. Rogers, of Peabody.
Mrs. Charles S. Sargent, of Brookline.
William H. Sherman, of Brookline.
Charles D. Sias, of Wenham.
Francis Skinner, Jr., of Boston.
Samuel T. Snow, of Boston and Cohasset.
Col. William D. Sohier, of Beverly.
Hon. Moses T. Stevens, of Andover.
Mrs. Nathaniel Thayer, of Lancaster.
Hermann Thiemann, of Manchester.
George R. White, of Boston.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 7, 1899.

A Stated Meeting of the Massachusetts Horticultural Society was holden today at eleven o'clock, being the Annual Meeting for the choice of Officers and Standing Committees, Vice-President Benjamin P. Ware presiding.

The Secretary stated that the meeting had been duly notified to the members of the Society, agreeably to the Constitution and By-Laws.

The following Memorial of Benjamin G. Smith, prepared by a Committee appointed for that purpose at the last meeting of the Society, was read by Benjamin C. Clark, Chairman, and unanimously adopted by a rising vote:

MEMORIAL OF BENJAMIN GREEN SMITH.

Benjamin Green Smith was born in Boston, October 1, 1816, graduated from the Boston English High School in the class of 1830, and died in Cambridge, August 23, 1899, leaving a widow, the daughter of Moses Warren, and one daughter, to mourn an exceptionally devoted and affectionate husband and father.

Mr. Smith retired from business many years ago, his health at that time being in a precarious condition, and he had the rare privilege of realizing fully the dream of his early life, which was the opportunity to engage in scientific and practical horticulture.

His ambition was to grow every variety of fruits and flowers. He had one hundred varieties of Hybrid Perpetual roses. Nothing was too difficult for him to attempt. It was deemed impossible to cultivate the high-bush blueberry, yet Mr. Smith studied the natural conditions of the fruit and energetically undertook what proved to be a great success.

Among his specialties were hardy grapes, of which he had more than sixty varieties. He also raised English gooseberries, currants of all kinds, pears, apples, raspberries, strawberries, and quinces in great variety. His conservatory, forcing house, and cold grapery were models.

Although to his last days interested in all the various activities of the Massachusetts Horticultural Society, of which he was Vice-

President from 1880 to 1891, inclusive, giving his time and influence freely to promote its usefulness, Mr. Smith was also greatly devoted to other associations. For many years he was Treasurer of the American Pomological Society, President of the Massachusetts Agricultural Club, Life Member of the Middlesex Agricultural Society, of the American Forestry Association, Bay State Agricultural Society, and New England Historic Genealogical Society, of the American Association for the Advancement of Science, and Local Secretary of the Audubon Society.

We make as part of this memorial the following obituary of Mr. Smith, written by one of the Committee and taken from the "Boston Transcript," of August 28:

Benjamin G. Smith.

The last summons came quietly and without pain as befitted his peaceful and serene old age. Bright and active to the last, in the full use of all his faculties, with but slight evidence of the marks of advancing years, his departure has left us bereft indeed, consoled only by the remembrance of the character of one whom it was a rare privilege to know.

Many years ago Mr. Smith left the cares and anxieties of active business life and thenceforth devoted himself to the cultivation and enjoyment of his beautiful estate in Cambridge. In this pursuit he was most successful, and it is safe to say that no man was ever more thorough in the work which he so much loved, and it is equally true that no one ever enjoyed more fully the exhibition and distribution of the products of his garden. When fruits and flowers came from his lavish hand there was always something more than their usual taste and perfume; there was the sense of a fine sentiment coming from a sympathetic and noble nature.

Mr. Smith was strongly averse to all display and ostentation. Although during his life he held many positions of honor and responsibility, he was not ambitious except in the highest and noblest sense, and he refused more offices than he ever accepted. He was a man of whom all who knew him intimately will say that if there was a kind, thoughtful, considerate act to be performed he would improve the opportunity with a rare discernment. The

most loving memory of a pure, kindly, loyal, unselfish nature is left to those who knew him best and longest.

"On earth we hear a knell —
Elsewhere there peals a bell
In welcome for a guest,
New to the wondrous quest
Whereof no man on earth
May ever know the birth."

August 26. B. C. C.

In placing upon the record of this Society its appreciation of the life, character, and services of Mr. Smith, the Secretary is requested to send a copy of this memorial to his family as an expression of our heartfelt sympathy in their bereavement.

Benjamin C. Clark,
Theodore H. Tyndale,
Benjamin P. Ware,
} *Committee.*

The following memorial of David Nevins, prepared by a Committee appointed for that purpose, was read by the Secretary:

Memorial of David Nevins.

In the death of David Nevins this Society and the community in which he lived have lost an enthusiastic lover of nature in whichever department he chose to take up. In the latter years of his life he devoted his leisure time to adorning his beautiful place at South Framingham with trees, shrubs, and flowers; and at frequent times entered the list of exhibitors at some of our most prominent exhibitions with very great success. Besides these successes, however, were those superior personal characteristics which every one coming in contact with him appreciated, and which will always attach to his memory the lasting sentiments of respect and esteem.

Every one receiving his hospitalities and enjoying his beautiful place will long remember the magnetic presence of a man who found his keenest enjoyment in life in sharing his own pleasures with his friends and neighbors.

Herewith we desire to place on the records of our Society our deep sense of the loss which we have sustained by his death.

N. I. Bowditch,
J. H. Woodford,
J. Woodward Manning,
} *Committee.*

After appropriate remarks by Ex-President William C. Strong, this memorial also was unanimously adopted by a rising vote.

The Chairman read a letter from President Appleton proposing that Section V of the Constitution and By-Laws be amended so as to permit voting by proxy. The proposed amendment was read twice and was discussed by Hon. Virgil C. Gilman, William C. Strong, Benjamin C. Clark, Patrick Norton, and Nathaniel T. Kidder. A motion to lay on the table was negatived.

The question was then put "Shall the proposed amendment be entered on the records for final action at the stated meeting in January next," and on this question the vote was unanimously in the negative.

Agreeably to the Constitution and By-Laws, the Chair appointed Hon. Aaron Low, John K. M. L. Farquhar, and Miss Mary C. Hewett a Committee to receive, assort, and count the votes given for Officers and Standing Committees, and report the number. The polls were opened at forty minutes after eleven and closed at forty minutes past one o'clock, and the Committee reported that the persons named on the ticket presented by the Nominating Committee had a plurality of votes, and were elected.

The report was accepted and the persons named on the above-mentioned ticket were, agreeably to the Constitution and By-Laws, declared by the presiding officer to have a plurality of votes, and to be elected Officers and Standing Committees of the Society for the year 1900.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were upon ballot duly elected:

James B. Ayer, M. D., of Boston.
George N. Black, of Manchester.
Mrs. John L. Bremer, of Manchester.
William B. de las Casas, of Malden.
H. E. Converse, of Malden.
J. Randolph Coolidge, of Chestnut Hill.
Mrs. J. Randolph Coolidge, of Chestnut Hill.
Charles P. Curtis, Jr., of Boston.
George B. Fessenden, of Allston.
Mrs. John C. Gray, of Boston.

Arthur E. Hartshorn, of Worcester.
Mrs. Henry S. Hunnewell, of Wellesley.
Eben D. Jordan, of Boston.
Otis H. Luke, of Brookline.
Mrs. Theodore Lyman, of Brookline.
Mrs. John C. Phillips, of North Beverly.
William Phillips, of North Beverly.
Mrs. Francis W. Sargent, of Wellesley.
Mrs. J. Montgomery Sears, of Southborough.
Mrs. Robert G. Shaw, of Wellesley.
Miss Mabel Simpkins, of Yarmouth.
Charles H. Taylor, of Boston.
Mrs. Alice R. Thayer, of Boston.
Eugene V. R. Thayer, of Lancaster.
Mrs. Eugene V. R. Thayer, of Lancaster.
Mrs. John E. Thayer, of Lancaster.
Nathaniel Thayer, of Boston.
Stephen V. R. Thayer, of Boston.
Henry M. Whitney, of Cohasset.
John Davis Williams, of Boston.
Roger Wolcott, of Milton.

Col. Henry W. Wilson presented a bean plant, grown in pure silex with the addition of soda, but without potash, and moved that the subject be referred to the Committee on Gardens, to make such experiments as they see fit, without expense to the Society. The motion was carried and the subject was so referred.

Adjourned to Saturday, November 4.

BUSINESS MEETING.

Saturday, November 4, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The amendment to the Constitution and By-Laws, to permit voting by proxy, proposed at the meeting on the first Saturday in October, and then defeated, was brought up again on a motion made by the President to reconsider it. The legality of any action

on this subject at this time was questioned and the Chair decided that it was legal. This decision was appealed from, and on putting the question to vote the Chair was sustained.

The question on reconsidering the vote whereby the proposed amendment was refused entry on the records was then put, and was carried by a vote of Yes, 75; No. 58. A motion to postpone indefinitely was defeated.

A vote on the main question was then taken and the proposed amendment was defeated by a vote of Yes, 46; No, 50.

The President, as Chairman of the Executive Committee, reported from that Committee a recommendation that the Society appropriate the same amounts for Prizes and Gratuities for the year 1900 as for the present year, but that the sum of $136.50 be transferred from the appropriation for Prizes and Gratuities for Flowers to that to be awarded by the Committee on School Gardens and Children's Herbariums for Prizes and Gratuities for Native Plants.

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over for final action on the first Saturday in January next.

The amounts recommended are as follows:

For Prizes and Gratuities for Plants . . .	$2,000 00
" " " " " Flowers . . .	2,531 50
" " " " " Native Plants . .	186 50
" " " " " Fruits . . .	1,732 00
" " " " " Vegetables . . .	1,200 00
" " " " " Gardens . . .	500 00
Total for Prizes and Gratuities for the year 1900 .	$8,150 00

Joseph H. Woodford offered the following vote:

Voted, That the three statues on the building, the two tablets on the walls of the staircase hall, and the two boxes in the corner-stone, be reserved and re-incorporated in the new Horticultural Building about to be erected by the Society.

The vote was referred to the Building Committee.

The following named persons, having been recommended by the

Executive Committee for membership in the Society, were on ballot duly elected:

Larz Anderson, of Brookline.
William H. Derby, of Revere.
Miss Caroline Louisa Williams French, of Boston.
Z. T. Hollingsworth, of Boston and Cohasset.
Charles Lanier, of Lenox.
William E. McClintock, of Chelsea.
John E. Parsons, of Lenox.
Preston Pond, of Winchester.
Barthold Schlesinger, of Brookline.
Henry Davis Sleeper, of Boston and Marblehead Neck.
David T. Strange, of Stoneham.
W. B. Thomas, of Manchester.
Miss Ellen May Tower, of Lexington.
William Benjamin Whittier, of South Framingham.
George Wigglesworth, of Milton.
Miss Adelia Coffin Williams, of Roxbury.
Windsor H. Wyman, of North Abington.

Adjourned to Saturday, December 2.

BUSINESS MEETING.

Saturday, December 2, 1899.

An adjourned meeting of the Society was holden today at eleven o'clock, the President in the chair.

The Schedule of Prizes for the year 1900 was reported by William J. Stewart, Chairman of the Committee for Establishing Prizes, accepted, and ordered to be printed.

J. Woodward Manning, Chairman of the Committee on Flowers, presented the Annual Report of that Committee.

Warren Howard Heustis, Chairman of the Committee on Vegetables, presented the Annual Report of that Committee.

Robert Manning presented his Annual Report as Secretary and Librarian.

These reports were severally accepted and referred to the Committee on Publication.

The Chairman of the Library Committee asked further time to prepare his report, which was granted.

It was voted that when the meeting adjourns it be for two weeks, and that the Secretary notify the Chairmen of Committees who have not presented their reports, and all others from whom reports are due, of this action.

The President, as Chairman of the Building Committee, reported that the Committee had given a great deal of time to the plans for a new building, until now they meet the unanimous approval of the Committee. Two estimates of cost have been made; the first, based on the cost of materials at the time the building was authorized, showing that it could then have been built for the amount appropriated by the Society; the second estimate, made lately, is much higher, so that the Committee have decided to postpone further consideration of the subject until March.

The Secretary announced that a statement of the changes made in the Schedule of Prizes for 1900 from that of 1899 had been printed, and that copies were on the table for distribution.

The following named persons, having been recommended by the Executive Committee for membership in the Society, were on ballot duly elected:

William Tracy Eustis, of Brookline.
Henry G. Jordan, of Hingham.
Isaac H. Locke, of Belmont.
Miss Ellen F. Mason, of Boston.

Adjourned to Saturday, December 16.

BUSINESS MEETING.

Saturday, December 16, 1899.

An adjourned meeting of the Society was holden on Saturday at eleven o'clock, the President, Francis H. Appleton, in the chair.

William Wallace Lunt, Chairman of the Committee on Plants, presented the Annual Report of that Committee.

Joseph H. Woodford, Chairman of the Committee of Arrangements, presented the Annual Report of that Committee.

Mr. Woodford also presented the Annual Report of the Committee on Gardens.

William E. Endicott, Chairman of the Library Committee, presented the Annual Report of that Committee.

Hon. Aaron Low, Chairman of the Committee on Lectures and Publication, presented the Annual Report of that Committee.

The Secretary of the Society, in behalf of the Committee on Forestry and Roadside Improvement, presented the Annual Report of that Committee.

Henry L. Clapp, Chairman of the Committee on School Gardens and Children's Herbariums, presented the Annual Report of that Committee.

The above-mentioned reports were accepted and referred to the Committee on Publication.

Further time was granted to the Fruit Committee and the Delegate to the State Board of Agriculture to prepare their reports.

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS,

FOR THE YEAR 1899.

By WILLIAM WALLACE LUNT, Chairman.

Your Committee present the following report with mingled feelings of pride and gratification at the excellence of the exhibitions made during the year now drawing to a close. Pride, at the number of "new and rare" plants shown before the Society for the first time, and gratification at the renewal of interest of many of the older exhibitors, who, with those of more recent date, are materially aiding your Committee in presenting a very creditable display nearly every Saturday as well as at the regular exhibitions.

At a meeting of the Committee on Establishing Prizes, held a year ago, ways and means were discussed to bring out a more extended exhibition of plants new to cultivation, such as recently discovered species, hybrids between existing kinds, etc., and a revival of the Orchid exhibits of ten or fifteen years ago, there having been a lamentable falling off in these particular classes, as well as in the class for "Groups of Docorative Plants."

Radical changes were proposed, but their advocates found themselves in a hopeless minority, and the matter was allowed to remain dormant until after the death of the late Chairman of this Committee, Azell C. Bowditch, whose long and varied experience and conservative conduct of affairs had done much to establish that prestige for which your Committee on Plants has long been noted.

Notwithstanding this, criticism, in some cases just, had been frequent, and it was to answer this criticism that the radical change, before mentioned, was, in a measure, inaugurated when your Committee, as now constituted, commenced their duties some nine months ago, the results certainly being beyond anything anticipated; there having been not less than three new Palms, fifty-five new Orchids, and seventeen new varieties of Dipladenias exhibited for the first time: this Society having the honor of recording many of them in this country and abroad.

Your Committee may, therefore, assume that their departure from some of the old-time customs, and their endeavors to keep abreast of the times in matters horticultural, have, in a measure, been successful, and that a continuance of this discriminating and liberal, *though not extravagant*, policy in the future, may bring forth equal if not better results the coming year.

It gives your Committee much pleasure to acknowledge the courtesy of Oakes Ames, in placing at their disposal for consultation and reference his unequalled records and herbarium, which have been of inestimable value in determining not a few of the varieties placed on exhibition under other than their correct names.

While there is still hope for improvement in the grouping and arrangement of exhibits, it is certain that more attention than formerly, is paid to artistic details, and this was apparent at the Spring, Rose and Strawberry, and Chrysanthemum Exhibitions.

In conclusion, your Committee would offer the following suggestions: —

1. That in future, exhibitors of groups of plants, pay more attention to correctly marking the name of each variety upon plants exhibited, for the benefit of the public.

2. That they pay more attention to properly finishing off the border of their exhibits, screening from view the lower row of pots and boxes used as plant stands, labelled with remedies for every ill that "flesh is heir to," suggesting to the disappointed exhibitor a possible balm for his wounded feelings.

3. That the proper authorities make some provision for the recognition of the untiring efforts of the gardeners who have exerted their skill and knowledge to perfect for their employers the magnificent specimen plants that are shown throughout the year at our exhibitions.

CATTLEYA x HARDYANA, Young's Var.

It may not be out of place at this time to make some mention of the weekly exhibits of James E. Rothwell (John Mutch, gardener), and H. A. Wheeler, who have done much toward making our Saturday displays interesting and successful.

And last, but not least, your Chairman would here acknowledge his personal obligations to the members of his Committee, who, though making horticulture a profession, have accorded him that generous treatment, which, as an amateur, he hardly expected, but which, on better acquaintance, he finds they willingly give to those who labor for the Goddess Flora.

Among the exhibits of rare botanical interest may be mentioned the following: —

August 5.— Display of Botanical Orchids by Oakes Ames (R. M. Grey, gardener) which were awarded Honorable Mention.

August 19.— *Cattleya Hardyana* by Oakes Ames, a most interesting variety, it having the influence of the *Dowiana* parent entirely obliterated. The Committee asked that it be shown again. It received the award of Honorable Mention.

September 9.— *Cypripedium Kimballianum*, by Oakes Ames, a supposed natural hybrid between *C. Rothschildianum* and *C. Dayanum*, awarded a First Class Certificate of Merit.

November 4.— Display of six new varieties of Anœctochilus, by William Duckham, of Madison, N. J., awarded a Silver Medal.

Among the general exhibits were the following:—

February 11.— Six varieties of *Cymbidium eburneo-Lowianum*, raised and exhibited by George McWilliam, they being of exceptional merit as an *American* production. They were awarded the Society's Gold Medal.

April 8.— *Deutzia* (hybrid) *Lemoineii*, introduced by James Comley, a pleasing improvement which was awarded a gratuity.

April 22.— *Dendrobium densiflorum*, a magnificent specimen, bearing sixteen racemes of beautiful flowers, and a remarkable example of the superior cultivation bestowed upon it by its grower, Edward Butler, who was awarded a Silver Medal.

May 6.— *Areca Ilsemanni* and *Licuala Jeanenceya*, exhibited for the first time in this country by Jason S. Bailey (William Donald, gardener) awarded a Silver Medal and First Class Certificate of Merit, respectively.

RHODODENDRON SHOW.

June 7 and 8.

Miltonia Bleuana var. *nobilor*, by H. H. Hunnewell (Frederick L. Harris, gardener) exhibited here for the first time and awarded a Silver Medal.

July 1.— *Dipladenia Boliviensis*, grown as a dwarf bedding and decorative plant, by George McWilliam, deemed worthy of a Silver Medal.

July 15.— *Linospadix Petrickiana*, by Jason S. Bailey (William Donald, gardener), first time exhibited,— a Silver Medal.

August 12.— Three specimen plants, distinct varieties of the rare *Cattleya Hardyana*, the varieties being Trenton var., Young's var., and var. Roeblingiana, exhibited by C. G. Roebling (H. T. Clinkaberry, gardener), Trenton, N. J. They were awarded the Appleton Gold, and Society's Silver and Bronze Medals, respectively. Also *Cattleya chrysotoxa*, a fine specimen of superior cultivation, by Bayard Thayer (James Brydon, gardener), a Silver Medal. Seldom have four finer varieties of Orchids been displayed at one time in the halls of this Society, and it gave an impetus to the orchid culture which has been very appreciably felt by growers in the increased demand for finer varieties.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 30 and 31.

Display of hybrid Dipladenias raised by George McWilliam, who began in 1883 to experiment with these plants, and for the past sixteen years has labored incessantly to bring to perfection the remarkable specimens exhibited, which for size and gorgeousness of color are surpassed by but few plants. They were awarded the Society's Gold Medal. There was also exhibited by E. O. Orpet, an American raised seedling *Laelia nigrescens*, a hybrid between *L. pumila* and *L. tenebrosa*, partaking strongly of the latter parent, though lighter in color. It was awarded a First Class Certificate of Merit.

September 23.— *Laelio-Cattleya* Catherine L. Whitin (*C. Harrisoniæ*×*L. purpurata*), an American seedling raised and exhibited by George McWilliam and believed to be the first plant of this cross. It was awarded a Silver Medal.

DIPLADENIA BOLIVIENSIS.

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

September 28 and 29.

Cattleya Portia (*C. Bowringiana*×*C. labiata*,) by E. O. Orpet, a pretty hybrid partaking in a marked degree of the characteristics of *C. Bowringiana*, though the flowers are larger and more intense in coloring: your Committee considered it an improvement and it was awarded a First Class Certificate of Merit.

October 21.— *Cattleya Mantinii* var. *nobilor* (*C. Bowringiana*, var. *floribunda colorata*×*C. Dowiana* var. *aurea*) by Oakes Ames —a fine richly colored hybrid showing just enough of its *Dowiana* parentage in the labellum to make it a much desired acquisition. Awarded a Silver Medal.

CHRYSANTHEMUM SHOW.

November 7, 8, 9 and 10.

It is no easy task for your Committee to describe properly displays made by the several exhibitors, for where such skill is shown by all it would be manifestly unfair to give one more credit than another. The Chrysanthemum plants shown were of such excellence that the award for First Prize for twelve named plants, judged by points, was a matter of much consideration, Mrs. B. P. Cheney (John Barr, gardener), finally carrying off the prize with the following varieties:

Arethusa.	Mrs. F. A. Constable.
Charity.	Mrs. Weeks.
Iora.	Mutual Friend.
Miss G. Bramhall.	Red Warrior.
Miss Georgianna Pitcher.	Silver Cloud.
Mrs. E. B. Freeman.	The Bard.

Jason S. Bailey was a close second with:

Arethusa.	Ivory.
Black Hawk.	John Shrimpton.
Garza.	Major Bonaffon.
Golden Gate.	Miss Agnes Dalscon.
Golden Trophy.	Mutual Friend.
Iora	The Bard.

Walter Hunnewell and E. S. Converse took third and fourth prizes respectively. Mrs. B. P. Cheney also took Firsts in the following classes:

Three Japanese Incurved, Three Reflexed, Specimen Incurved, Specimen Reflexed, and Specimen Pompon.

The Botanic Garden of Harvard University made a pleasing exhibit of Begonia Gloire de Lorraine (some sixty plants being in the display) and nineteen plants of Chrysanthemums upon the stage in the Upper Hall, both adding very materially to the color effect and success of the exhibition, though not entered in competition.

Much interest was created by some pretty little Chrysanthemum plants grown to bush form by T. D. Hatfield, gardener to Walter Hunnewell, they being all that could be desired as plants for house decoration.

November 25.—*Cymbidium Winnianum* and *Cattleya Chocoensis*, var. *virginalis*, were shown for the first time here by Oakes Ames (R. M. Grey, gardener.) Each was awarded a Silver Medal.

December 25.—*Cypripedium insigne* var. *citrinum*, and *Cypripedium Deedmanianum*, (*C. Spicerianum* × *C. Chamberlainianum*) were shown by Oakes Ames, each receiving a First Class Certificate of Merit. There were also exhibits of Orchids by James E. Rothwell (J. Mutch, gardener), Mrs. J. L. Gardner (William Thatcher, gardener) and H. A. Wheeler. This exhibition being something of a twentieth century innovation, upon its success or failure depended its retention upon the Schedule in future, but for obvious reasons the Committee would recommend it be made a month later, in January.

The amount appropriated for Prizes and Gratuities during the year was	$2,000 00
Prizes and Gratuities have been awarded amounting to	1,815 00
Leaving a balance of	$185 00

out of which Medals, etc., are to be paid for.

Respectfully submitted,

WILLIAM WALLACE LUNT,
JAMES WHEELER,
WM. J. MARTIN,
ARTHUR H. FEWKES,
ROBERT CAMERON,
Committee on Plants.

LAELIA X NIGRESCENS.

PRIZES AND GRATUITIES AWARDED FOR PLANTS.

1899.

January 7.

Primula Sinensis.— Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney 4 00
Second, Mrs. B. P. Cheney 3 00
Third, Mrs. John L. Gardner 2 00

Primula stellata.— Six plants in not less than six-inch pots:

First, Mrs. B. P. Cheney 3 00
Second, Mrs. John L. Gardner 2 00

Primula obconica Hybrids.— Six plants in not less than six-inch pots:

Second, Mrs. John L. Gardner 3 00

Gratuities: —

Mrs. John L. Gardner, Begonia Gloire de Lorraine 1 00
" " " " Primulas 2 00
Mrs. B. P. Cheney, " 2 00
Edward J. Mitton, *Cattleya speciosissima* 1 00

January 21.

Gratuities: —

Walter E. Coburn, Fifteen plants Primula Sinensis . . . 3 00
James E. Rothwell, *Cypripedium signatum Calypso* . . . 1 00
" " " " *Lucienianum superbum* . . 1 00

February 4.

Freesias.— Six pots or pans:

First, Charles H. Souther 5 00

Gratuities: —

Charles H. Souther, *Begonia incarnata* (improved) . . 2 00
Harvard Botanic Garden, Collection of Orchids and Freesias . . 10 00
Mrs. John L. Gardner, Display of *Primula Sinensis* and *Erica melanthera* 4 00
George McWilliam, Display of Seedling Cypripediums . . . 2 00
H. A. Wheeler, " " Orchids 1 00

February 11.

Gratuity: —

Mrs. J. C. Whitin (William McAllister, gardener), Specimen *Dendrobium nobile* 3 00

February 18.

Gratuities: —

Edward J. Mitton, Two plants of *Cattleya Trianæ* . . . 5 00
James E. Rothwell, *Cypripedium Leeanum*, var. *Masareelianum* . 2 00

March 4.

Gratuities:—

Mrs. John L. Gardner, Display of Cyclamen and Violets . . 5 00
James E. Rothwell, *Oncidium tigrinum* 1 00
Harvard Botanic Garden, Display of Orchids 10 00

March 18.

Gratuity:

James E. Rothwell, *Sophronitis grandiflora* 1 00

SPRING EXHIBITION.

March 21, 22, 23 and 24.

Theodore Lyman Fund.

Indian Azaleas.—Specimen Plant, named:
First, Dr. C. G. Weld 10 00
Second, Dr. C. G. Weld 8 00
Third, H. A. Wheeler 5 00
Ericas.— Six, not less than three species:
Second, Bussey Institution 4 00

Society's Prizes.

Orchid.— Single plant:
First, James E. Rothwell 12 00
Second, Edward Butler 10 00
Third, Mrs. J. C. Whitin 6 00
Fourth, J. S. Bailey 4 00
Stove or Greenhouse Plant.— Specimen in bloom other than Azalea or Orchid, named:
First, Dr. C. G. Weld 8 00
Hardwooded Greenhouse Plants.— Four, in bloom:
First, Dr. C. G. Weld 10 00
Second, Dr. C. G. Weld 8 00
Climbing Rose.— Specimen plant in bloom:
First, C. H. Souther 8 00
Hardy Flowering Deciduous Shrubs, Forced.— Four, of four distinct species, named:
First, Bussey Institution 6 00
Hardy Flowering Evergreen Shrubs, Forced.— Four, of four distinct species, named:
First, Bussey Institution 6 00
Cannas.— Display, not less than ten plants, in pots:
First, James L. Little 10 00
Second, James L. Little 8 00

HARDY PRIMROSES.— Twelve plants of distinct varieties:

First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00

HARDY POLYANTHUSES.— Twelve plants of distinct varieties:

First, Mrs. John L. Gardner	6 00
Second, Bussey Institution	4 00

CYCLAMENS.— Ten plants:

First, Mrs. B. P. Cheney	15 00
Second, Mrs. B. P. Cheney	12 00
Third, Dr. C. G. Weld	10 00

Ten plants in not over seven-inch pots:

First, Dr. C. G. Weld	8 00
Second, Mrs. B. P. Cheney	6 00
Third, Mrs. B. P. Cheney	4 00

Single plant:

Second, Mrs. B. P. Cheney	4 00
Third, Mrs. B. P. Cheney	3 00

CINERARIAS.— Six varieties:

First, James Garthley	10 00
Second, Charles H. Souther	8 00
Third, J. S. Bailey	6 00
Fourth, Mrs. John L. Gardner	5 00

Three varieties:

First, James Garthley	6 00
Second, Mrs. John L. Gardner	5 00
Third, J. S. Bailey	4 00

Single plant:

First, James Garthley	4 00
Second, Mrs. John L. Gardner	3 00
Third, J. S. Bailey	2 00

HYACINTHS.— Twelve named varieties in pots, one in each pot:

First, Mrs. John L. Gardner	6 00
Second, Bussey Institution	4 00

Six named varieties in pots, one in each pot:

First, Bussey Institution	5 00
Second, Mrs. John L. Gardner	4 00
Third, E. S. Converse	3 00

Single named bulb, in pot:

First, Mrs. John L. Gardner	2 00
Second, Bussey Institution	1 00

Three pans, not to exceed twelve inches, ten bulbs of one variety in each pan:

First, Dr. C. G. Weld	6 00
Second, Mrs. John L. Gardner	4 00
Third, Mrs. John L. Gardner	3 00

Two pans, not to exceed twelve inches, ten bulbs of one variety in each pan:

First, Mrs. John L. Gardner 4 00
Second, Dr. C. G. Weld 3 00

Single pan, not to exceed twelve inches, with ten bulbs of one variety:

First, Mrs. John L. Gardner 3 00
Second, Bussey Institution 2 00
Third, Bussey Institution 1 00

Tulips.— Six eight-inch pans, nine bulbs of one variety in each:

First, William S. Ewell & Son 4 00
Second, E. S. Converse 3 00
Third, Bussey Institution 2 00

Three eight-inch pans, nine bulbs of one variety in each:

First, William S. Ewell & Son 3 00
Second, E. S. Converse 2 00
Third, Bussey Institution 1 00

Three ten-inch pans, twelve bulbs of one variety in each:

First, William S. Ewell & Son 5 00
Second, E. S. Converse 4 00
Third, Bussey Institution 3 00
Fourth, Bussey Institution 2 00

Polyanthus Narcissus.— Four seven-inch pots, four bulbs in each, distinct varieties:

First, Mrs. John L. Gardner 4 00
Second, Bussey Institution 3 00

Jonquils.— Six pots or pans, not exceeding eight inches, the number of bulbs in each to be at the discretion of the grower:

First, William S. Ewell & Son 4 00
Second, Bussey Institution 3 00
Third, Dr. C. G. Weld 2 00

Narcissuses.—Six eight-inch pans, distinct varieties, single or double:

First, Dr. C. G. Weld 4 00
Second, William S. Ewell & Son 3 00

Three eight-inch pans:

First, Dr. C. G. Weld 3 00
Second, William S. Ewell & Son 2 00

Lily of the Valley.— Six pots or pans, not exceeding eight inches:

Second, Bussey Institution 3 00

Crocuses.— Three boxes, each eight by twenty inches, three distinct varieties:

First, William S. Ewell & Son 3 00
Second, Bussey Institution 2 00

Freesias.— Six pots or pans:

First, Dr. C. G. Weld 3 00

Roman Hyacinths.— Six eight-inch pans, ten bulbs in a pan:

First, Bussey Institution 3 00
Second, Dr. C. G. Weld 2 00
Third, William S. Ewell & Son 1 00

GENERAL DISPLAY OF SPRING BULBS.— All Classes:

First, William S. Ewell & Son	15 00
Second, Bussey Institution	12 00

Gratuities:—

E. S. Converse, Display of Cinerarias	3 00
C. H. Souther, Display of *Cineraria stellata*	3 00
Mrs. B. P. Cheney, Hybrid Roses and Cinerarias	12 00
James Garthley, Display of Cyclamens	3 00
Bussey Institution, Forced Hardy Plants and Shrubs	5 00
Edward Butler, Display of Orchids	5 00
Yamanaka & Co., Display of Japanese Plants	15 00
Mrs. John L. Gardner, Display of Hyacinths	4 00
Dr. C. G. Weld, Display of Hyacinths	2 00

APRIL 1.

Gratuities:—

Warren Heustis & Son, *Rubus rosaefolius*	2 00
Edward Butler, *Dendrobium nobile*	4 00
H. A. Wheeler, *Dendrobium Wardianum*	1 00

APRIL 8.

Gratuities:—

James Comley, *Deutzia hybrida Lemoinei*	5 00
James E. Rothwell, *Cypripedium Robelenii*	3 00

MAY 6.

PELARGONIUMS.— Six named Show or Fancy varieties, in not less than eight-inch pots:

First, C. H. Souther	10 00

INDIAN AZALEAS.— Six plants in pots, named:

First, Dr. C. G. Weld	8 00

Single specimen:

First, Dr. C. G. Weld	3 00
Second, Dr. C. G. Weld	2 00

CALCEOLARIAS.— Six varieties in pots:

First, Mrs. B. P. Cheney	10 00
Second, Mrs. B. P. Cheney	8 00

Single plant:

First, Mrs. B. P. Cheney	3 00
Second, Mrs. B. P. Cheney	2 00
Third, Mrs. B. P. Cheney	1 00

ORCHIDS.— Display, named:

First, James E. Rothwell	12 00

AMARYLLISES.— Six pots, distinct varieties:

First, Dr. C. G. Weld	8 00

Gratuities:—

Jason S. Bailey, *Cattleya Mendelli* 1 00
Mrs. B. P. Cheney, Calceolarias 2 00
Dr. C. G. Weld, Display of Azalea and *Boronia elatior* . . 5 00
Dr. C. G. Weld, Display 4 00
Charles H. Souther, Ivy-leaved Pelargoniums 2 00

May 20.

Gratuity:—

Rea Brothers, Display of *Primula Sieboldi* 2 00

May 27.

Gratuity:—

James E. Rothwell, *Uropedium Lindeni* 1 00

RHODODENDRON EXHIBITION.

June 7 and 8 (*postponed from* June 1 and 2).

Orchids.— Display, arranged for effect, with foliage plants, in a space eight feet by five feet:

First, H. H. Hunnewell 30 00
Second, J. S. Bailey 25 00
Third, J. E. Rothwell 20 00

Gratuities:—

Mrs. Walter E. Searles, Boston Fern 3 00
Robert Laurie, Newport, R. I., *Araucaria Bidwillii* . . . 3 00
Edward Butler, *Cattleya Gaskelliana* 5 00
Edward J. Mitton, Pelargoniums 8 00
Dr. C. G. Weld, Display of Pelargoniums and Orchids . . . 8 00

June 10.

Gratuity:—

Dr. C. G. Weld, Display of Orchids and Pelargoniums . . 10 00

ROSE AND STRAWBERRY EXHIBITION.

June 22 and 23.

Decorative Plants.— Group, arranged for effect, covering seventy-five square feet:

First, J. S. Bailey 30 00
Second, E. S. Converse 25 00

Orchids.— Six plants, of six named varieties, in bloom:

First, James E. Rothwell 15 00

Second, W. P. Winsor 10 00
Three plants, of three named varieties, in bloom:
First, W. P. Winsor 10 00
Single specimen, named:
First, W. P. Winsor 5 00
Second, W. P. Winsor 3 00

Gratuity:—
J. S. Bailey, *Acalypha hispida* 4 00

JULY 1.

Gratuity:—
Edward J. Mitton, *Cattleya Gigas* 2 00

JULY 8.

Gratuity:—
Edward J. Mitton, *Cattleya Gaskelliana* 1 00

JULY 15.

HYDRANGEAS.— Pair, in tubs:
First, H. Dumaresq 15 00
Second, H. Dumaresq 10 00
Single plant, in tub or pot:
First, H. Dumaresq 5 00
ACHIMENES.— Six, of six varieties, in not over ten-inch pans or pots:
First, H. Dumaresq 5 00

Gratuity:—
Mrs. John L. Gardner, Display 2 00

EXHIBITION OF AQUATIC PLANTS AND FLOWERS, ASTERS, ETC.

AUGUST 19.

OUVIRANDRA FENESTRALIS:
First, E. S. Converse 6 00
Second, Mrs. John L. Gardner 4 00
CANNAS.— Collection of not less than six named varieties, grown in pots:
Third, Mrs. John Jeffries 6 00

Gratuity:—
H. A. Wheeler, *Epidendrum venosum* 1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 30 and 31.

H. H. Hunnewell Fund.

Hardy Coniferous Trees.— Display in pots and tubs, named:
First, Francis Blake 25 00

Society's Prizes.

Palms.— Pair, in pots or tubs not more than twenty-four inches in diameter:
First, J. S. Bailey 12 00
Pair, in pots not more than fourteen inches in diameter:
First, Mrs. John L. Gardner 8 00
Second, Dr. C. G. Weld 6 00
Greenhouse Plants.— Collection containing foliage plants of all descriptions, not to exceed forty plants, in pots or tubs:
First, J. S. Bailey 40 00
Second, Mrs. John L. Gardner 30 00
Six Greenhouse and Stove plants, of different named varieties, two Crotons admissible:
First, J. S. Bailey 25 00
Second, Mrs. John L. Gardner 20 00
Third, Dr. C. G. Weld 15 00
Table Decoration. — For fifteen covers, living plants, in one receptacle, only one entry admissible:
First, James E. Rothwell 10 00
Second, W. H. Lincoln 8 00
Third, E. J. Mitton 6 00
Fourth, H. A. Wheeler 4 00
Specimen Flowering Greenhouse Plant.— Single named variety:
First, James Garthley 8 00
Second, James E. Rothwell 6 00
Fuchsias.— Six plants:
Second, Charles H. Souther 10 00
Caladiums.— Six named varieties:
First, Charles H. Souther 8 00
Ferns.— Specimen, other than Tree Fern:
First, J. S. Bailey 4 00
Second, Dr. C. G. Weld 3 00
Adiantums.— Four named varieties:
First, Dr. C. G. Weld 8 00
Lycopods.— Four named varieties:
First, Dr. C. G. Weld 5 00

DRACÆNAS.— Six named varieties:
First, J. S. Bailey 8 00
Second, Dr. C. G. Weld 6 00
CROTONS.— Twenty-five plants, not less than eighteen named varieties in not less than six-inch pots:
First, James E. Rothwell 12 00
Second, J. S. Bailey 10 00
Third, Edward J. Mitton 8 00
Six named varieties, in not less than eight-inch pots:
First, Dr. C. G. Weld 10 00
Second, W. H. Lincoln 8 00
CYCAD.— Single plant, named:
First, Mrs. John L. Gardner 10 00
NEPENTHES.— Three plants, named:
Second, Edward J. Mitton 8 00
BEGONIA REX.— Six pots of six varieties:
First, E. S. Converse 8 00
BEGONIA REX HYBRIDS.— Collection, named:
First, E. S. Converse 8 00

Gratuities:—
Oakes Ames, Caladiums 3 00
J. M. Southwick, Seedling Begonia, Woodstock 1 00
James Comley, *Fourcroya Lindeni* 5 00
E. S. Converse, Display of Greenhouse and Stove plants . . 15 00
Harvard Botanic Garden, Display of Orchids 8 00
John Shepard, *Oncidium Carthaginense* 1 00

SEPTEMBER 8.

Gratuity:—
Edward J. Mitton, *Cattleya labiata* 2 00

SEPTEMBER 16.

Gratuities:—
James E. Rothwell, *Cypripedium Isabellæ* and *C. Josephianum* . 2 00
H. A. Wheeler, *Cattleya chrysotoxa* 1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

DECORATIVE PLANTS.— Display, not less than forty, not to exceed three feet in height, to be arranged by the Committee:
First, J. S. Bailey 25 00
Second, E. S. Converse 20 00

OCTOBER 28.

Gratuities:—
Edward J. Mitton, *Oncidium varicosum* 1 00
H. A. Wheeler, *Cattleya labiata* 2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9, AND 10.

CHRYSANTHEMUMS.— Display of twelve named plants, any or all classes, distinct varieties:

First, Mrs. B. P. Cheney	50 00
Second, J. S. Bailey	40 00
Third, Walter Hunnewell	30 00
Fourth, E. S. Converse	20 00

Three Japanese Incurved:

First, Mrs. B. P. Cheney	10 00

Three Reflexed, distinct named varieties:

First, Mrs. B. P. Cheney	10 00

Specimen Incurved, named variety:

First, Mrs. B. P. Cheney	6 00
Second, James Garthley	5 00
Third, Mrs. B. P. Cheney	4 00

Specimen Reflexed, named variety:

First, Mrs. B. P. Cheney	6 00
Second, Mrs. B. P. Cheney	5 00
Third, Mrs. B. P. Cheney	4 00

Specimen Anemone Flowered, named variety:

First, Walter Hunnewell	6 00
Second, James Garthley	5 00

Specimen Pompon, named variety:

First, Mrs. B. P. Cheney	4 00
Second, Walter Hunnewell	3 00

Twelve plants, of twelve different varieties, grown to one stem and bloom, in not over six-inch pots, preference being given to plants not more than three feet in height:

First, C. H. Souther	8 00
Second, Dr. C. G. Weld	6 00
Third, E. S. Converse	4 00
Fourth, H. Dumaresq	2 00

Six plants grown as above but all one color, Red:

First, Dr. C. G. Weld	4 00
Second, H. Dumaresq	3 00
Third, E. S. Converse	2 00

White:

First, Dr. C. G. Weld	4 00
Second, E. S. Converse	3 00
Third, C. H. Souther	2 00

Pink:

First, C. H. Souther	4 00
Second, Dr. C. G. Weld	3 00
Third, Dr. C. G. Weld	2 00

Yellow:
- First, James Nicol 4 00
- Second, James Nicol 3 00
- Third, E. S. Converse 2 00

Any other color:
- First, Dr. C. G. Weld 4 00
- Second, C. H. Souther 3 00
- Third, E. S. Converse 2 00

Six plants grown to bush form, in not over eight-inch pots, without stakes:
- First, Walter Hunnewell 8 00
- Second, Walter Hunnewell 6 00

Group of Chrysanthemums, arranged for effect, with palms and decorative foliage plants, limited to one hundred square feet:
- First, Mrs. John L. Gardner 25 00
- Second, Mrs. John L. Gardner 20 00
- Third, E. S. Converse 15 00

Gratuities:—

Harvard Botanic Garden, Display (nineteen plants) of Chrysanthemums 15 00

James Garthley, Specimen Chrysanthemum plant 2 00

Dr. C. G. Weld, Display of Begonia Gloire de Lorraine . . . 3 00

Harvard Botanic Garden, Display (sixty plants) of Begonia Gloire de Lorraine 12 00

William W. Edgar, Display of Begonia Gloire de Lorraine, Ferns, and Dracænas 8 00

Lager & Hurrell, Summit, N. J., Display of Orchids . . . 15 00

NOVEMBER 18.

Gratuity:—

H. A. Wheeler, *Odontoglossum crispum* 1 00

NOVEMBER 25.

Gratuity:—

J. E. Rothwell, Cypripedium Charles Canham 1 00

DECEMBER 2.

Gratuities:—

J. E. Rothwell, *Cypripedium Leeanum* 1 00

J. E. Rothwell, *Odontoglossum crispum* 1 00

DECEMBER 9.

ORCHIDS.—Six plants, named varieties, in bloom:
- First, J. E. Rothwell 15 00
- Second, J. E. Rothwell 10 00

Three plants, named varieties, in bloom:
First, J. E. Rothwell 10 00
Second, Mrs. John L. Gardner 8 00
Single plant, named, in bloom:
First, Mrs. John L. Gardner 5 00
Second, J. E. Rothwell 4 00

Gratuity:
Mrs. John L. Gardner, Display of Primulas 3 00

SOCIETY'S GOLD MEDALS.

February 11. George McWilliam for Seedling *Cymbidium eburneo-Lowianum.*
August 30. George McWilliam for Seedling Dipladenias.

APPLETON GOLD MEDAL.

August 12. C. G. Roebling, Trenton, N. J., for *Cattleya* × *Hardyana*, Trenton var.

SILVER GILT MEDALS.

January 28. J. E. Rothwell, for *Cypripedium* × *Chapmanii* var. *rubellum.*
May 27. J. E. Rothwell, for *Cypripedium* × *Aylingii.*

SOCIETY'S SILVER MEDALS.

January 7. J. E. Rothwell, for *Cypripedium Exul.*
February 4. George McWilliam, for *Cypripedium* × *Hobsonii.*
" 25. C. G. Roebling, for *Cypripedium* × *Roeblingianum.*
March 4. Mrs. John L. Gardner, for Superior Cultivation of *Erica melanthera.*
April 15. George McWilliam, for Cypripedium × Mrs. George Marston Whitin.
April 22. Edward Butler, for Superior Cultivation of *Dendrobium densiflorum.*
May 6. J. S. Bailey, for *Areca Ilsemanni* (new palm).
" 20. J. E. Rothwell, for *Cypripedium leuchochilum* var. *Rothwellianum.*
Rhododendron Exhibition, June 7 and 8. H. H. Hunnewell, for *Miltonia Bleuana* var. *nobilior.*
July 1. George McWilliam, for *Dipladenia Boliviensis*, grown as a dwarf decorative plant.
" 15. J. S. Bailey, for *Sinospadie Petrickiana* (new palm).
August 12. C. G. Roebling, for *Cattleya* × *Hardyana*, Young's var.
" " Bayard Thayer, for Superior Cultivation of *Cattleya chrysotoxa.*
September 23. George McWilliam, for Laelio-Cattleya Catherine L. Whitin

October 21. Oakes Ames, for *Cattleya×Mantini*, var. *nobilior*.
November 4. William Duckham, for Display of six new varieties of Anoectochilus.
November 25. Oakes Ames, for *Cymbidium× Winnianum*.
" " Oakes Ames, for Specimen plant of *Cattleya chocoensis* var *virginalis*.
December 23. W. A. Manda, Orange, N. J., for *Cypripedium insigne* var. Mrs. George B. Wilson.

SOCIETY'S BRONZE MEDALS.

May 13. J. E. Rothwell, for Display of *Cypripedium niveum*.
August 12. C. G. Roebling, for *Cattleya×Hardyana* var. *Roeblingiana*.
November 4. Oakes Ames, for *Cypripedium insigne* var. *Ballae*.
" 18. J. E. Rothwell, for *Cypripedium*×Fairy Queen.

FIRST CLASS CERTIFICATES OF MERIT.

January 7. Oakes Ames, for Cypripedium×Madame Georges Truffaut.
" 14. J. E. Rothwell, for *Dendrobium Phalaenopsis* var. *albens*.
March 4. Rea Brothers, for *Deutzia discolor purpurescens*.
" " W. P. Winsor, *Dendrobium nobile*, var. *virginalis*.
Spring Exhibition, March 21–24. Dr. C. G. Weld, for Superior Cultivation of *Primula obconica*.
" " W. A. Manda, South Orange, N. J., for *Oncidium Saintlegerianum*.
April 1. J. E. Rothwell, for *Cypripedium×Lebaudianum*.
" 15. J. E. Rothwell, for *Cypripedium Rothschildianum*.
May 6. J. S. Bailey, for *Licuala Jeanenceyi*.
" 13. James Garthley, for Superior Cultivation of Zonale Pelargoniums.
June 3. H. H. Hunnewell, for Superior Cultivation of *Miltonia vexillaria*.
August 5. H. A. Wheeler, for Superior Cultivation of *Oncidium sarcodes*.
" 12. J. E. Rothwell, for *Laelia (Brassavola) Digbyana*.
Exhibition of Aquatic Plants and Flowers, Asters, etc., August 19. Mrs. John Jeffries, for *Nephrolepis exaltata* (sport).
Annual Exhibition of Plants and Flowers, August 30 and 31. E. O. Orpet, for *Laelia nigrescens*.
September 9. Oakes Ames, for *Cypripedium Kimballianum*.
" 16. J. E. Rothwell, for *Cypripedium× Thayerianum*.
" 23. J. E. Rothwell, for Cypripedium×H. Ballantine.
" " J.E. Rothwell, *Cypripedium× Uihleinianum (Allanianum)*.
Annual Exhibition of Fruits and Vegetables, September 28 and 29. E. O. Orpet, for *Cattleya Portia (C. Bowringiana ♀ × C. labiata ♂)*.
October 21. Oakes Ames, for *Cypripedium Smithii×Lucie (C. Lawrenceanum×C. ciliolare)*.

November 4. Oakes Ames, for *Batemannia Burtii.*
" " J. E. Rothwell, for *Cypripedium* × *Hurrellianum (C. Curtisii* × *C. Argus).*
" " J. E. Rothwell, for *Cypripedium regale* var. *purpuratum (C. insigne Maulii* × *purpuratum).*
November 25. J. E. Rothwell, for *Cypripedium Maynardii (C. Spiceria-num* × *C. purpuratum).*
December 2. J. E. Rothwell, for *Cypripedium Alcides (C. insigne* × *C. hirsutissimum.)*
December 9. Oakes Ames, for *Cypripedium insigne* var. *citrinum.*
" " Oakes Ames, for *Cypripedium Deedmannianum.*
December 16. George McWilliam, for *Luculia gratissima.*

HONORABLE MENTION.

January 14. R. and J. Farquhar, *Begonia nana compacta* Gloire de Lorraine.
February 18. F. Prideux, *Cineraria Stellata*, hybrid.
March 11. R. and J. Farquhar, Cyclamen Bush Hill Pioneer.
Spring Exhibition, March 21–24. W. A. Manda, Begonia Vernon, double.
April 1. C. G. Roebling, *Cattleya Trianæ*, var. *Roeblingiana.*
Rhododendron Show, June 7 and 8. Dr. C. G. Weld, Seedling Zonale Pelargonium.
August 5. Oakes Ames, Collection of Botanical Orchids.
August 19. Oakes Ames, *Cattleya Gigas* × (*Hardyana*?).
October 28. John Mutch, *Cypripedium* × *Bingleyense* var. *Longwoodense.*

William Wallace Lunt,
James Wheeler,
William J. Martin,
Arthur H. Fewkes,
Robert Cameron,
} *Committee on Plants.*

REPORT

OF THE

COMMITTEE ON FLOWERS.

FOR THE YEAR 1899.

By J. WOODWARD MANNING, Chairman.

The exhibitions for the year 1899, although in many instances of sterling merit, have not, on the whole, been up to the standard of past years. The peculiar weather conditions through which we have passed seriously interfered with the best efforts of our exhibitors at the time of the principal shows, and this effect continued more or less throughout the season. Taking the exhibitions in their chronological order, our report would be as follows:

During January the usual classes of exhibits were brought in and the more noteworthy were those of Oakes Ames, on the 7th, of a spike of *Cattleya chocoensis alba* which was particularly beautiful in its purity of color, and of which your Committee made Honorable Mention.

On January 21, J. E. Rothwell made an exhibit of *Laelia anceps* var. *Ballentinianum*.

During the Carnation and Orchid Show of February 4, the new Carnation Olympia, from John N. May, of Summit, N. J., received a First Class Certificate and the new Carnation Melba was given Honorable Mention. The balance of the month was taken up with the usual variety of exhibits and the more noteworthy awards were those of a gratuity to James E. Rothwell, for a fine spike of *Cattleya Trianae* var. *Backhousiana* and to the Harvard Botanic Garden for a fine display of *Toxicophlaea spectabilis*.

SPRING EXHIBITION.

March 21, 22, 23, and 24.

There was less competition at this show than in past years, and Hybrid Perpetual Roses were shown by few exhibitors only. The Carnation exhibit was closely contested and Violets were shown to the best possible effect. The new white Carnation Marquis, shown by Mr. E. L. Marquisee, was very noteworthy and was awarded the Society's Silver Medal. At the same exhibition Kenneth Finlayson displayed the new crested form of *Cyclamen Persicum*, for which a First Class Certificate of Merit was given.

April 1, Hon. C. G. Roebling, of Trenton, N. J., exhibited *Cypripedium villosum giganteum*, of which Honorable Mention was made by the Committee.

May 6, James E. Rothwell was awarded a First Class Certificate of Merit for superior culture of *Phalaenopsis grandiflora.*

RHODODENDRON SHOW.

June 7 and 8.

Rhododendrons, in the June exhibits, had suffered very severely from drought and while the exhibits were, in the main, very commendable, yet as compared with previous years they could hardly be considered superior. At the exhibition of June 7 and 8, Herbert Dumaresq was awarded a First Class Certificate of Merit for a particularly noteworthy display of *Bougainvillea spectabilis.*

PÆONY SHOW.

June 10.

This was very effective and gave added evidence of the increase in popularity and value of this thoroughly hardy class of flowers. The display of blooms arranged for effect in the Society's vases called forth great admiration, and in many ways was considered fully as satisfactory as similar exhibits that are made later in the season with Chrysanthemums.

ROSE EXHIBITION.

June 22 and 23.

Unfortunately the drought had so severely interfered with the growth of Roses that the Rose Exhibition was in many respects a failure. Had it not been for the remarkable display made by the Heirs of Hon. Joseph S. Fay, the exhibition would hardly have warranted opening the doors. Under the circumstances, the above-named exhibitors practically swept the prizes throughout almost every class scheduled. At this exhibition Jackson T. Dawson displayed vases of Hybrid Roses, crosses between *Rosa Wichuraiana* and older garden forms. Among these crosses, one between *Rosa Wichuraiana* and *Rosa Indica carnea* was particularly noteworthy and was granted a Silver Medal by your Committee. Another similar cross, exhibited by Mr. Dawson under the name of William Eagan was granted a First Class Certificate of Merit.

July 1, among the many displays of Roses shown by the Heirs of Hon. Joseph S. Fay, was a new seedling Rose, a cross between *Rosa Wichuraiana* and Baroness Rothschild, which was given a Silver Medal by your Committee.

The Exhibition of Hollyhocks on the 8th of July was not up to the standard, owing to the severe killing that had been suffered by the plants during the previous winter.

July 29, Hicks Arnold made a display of *Cattleya Hardyana*, a choice species of extremely high merit for ornament, for which a Silver Medal was awarded by the Society. At this same exhibition, a very remarkable display of seedling Dipladenias was made by George McWilliam of Whitinsville, Mass. Among the differing varieties shown, a Silver Gilt Medal was awarded the variety George M. Whitin, a Silver Medal to the variety Mrs. George McWilliam, and a Bronze Medal to the variety Miss Lois H. Whitin. Perennial Phloxes were first exhibited July 29 and continued to be a very prominent feature of the exhibits throughout the remainder of the summer and autumn.

August 5, Dr. C. G. Weld was awarded a Silver Medal for *Watsonia Adernei*, and James F. Harlow was given a First Class Certificate of Merit for each of the new Gladiolii, Mme. Desbordes

Valmore and Baron Jos. Hulot. James E. Rothwell was given a First Class Certificate of Merit for superior culture of Cypripedium Frau Ida Brandt and *C. Edwardii* var. *superbum superbiens* and *C. Fairieanum*.

EXHIBITION OF AQUATIC PLANTS AND FLOWERS.

August 19.

The exhibition of Aquatics was not as satisfactory this season as in past years. This was accounted for in some instances by the severe drought influencing the level of the ponds to such an extent as seriously to interfere with the satisfactory blooming of aquatics. Bayard Thayer was granted a Silver Medal for *Nymphaea Brydonacea elegans* and the Henry A. Dreer Corporation of Philadelphia, was awarded a First Class Certificate of Merit for *Nymphaea fulva* and *N. rubra punctata*. At the same time E. G. Shaylor was granted a Silver Medal for Hybrid Gladioli, which were particularly rich in their varied color, and J. W. Howard received a First Class Certificate of Merit for a vase of Giant Comet China Asters, a pure white form of extraordinary size and strong growth; also for China Aster Daybreak, a variety of a most charming rich shade of pink and of first-class quality and size.

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

August 30 and 31.

From the middle of August until hard frosts Dahlias were the showiest features of the exhibitions, and the display of Dahlias at the Annual Exhibition was in many respects a revelation of the worth of this flower. There was a marked increase in the size and quality of the blooms and also a greater range of color as compared with previous years. The Dahlia Show was most admirably staged by the competitors and the competition was extremely close. Altogether, it was probably the most successful of any class of flowers during the past season. In connection with the Dahlia Show, a most admirable exhibition of Perennial Phloxes was made by Rea Brothers, showing the great improvement in the size of

the flowers and their range of color. Cornelius Vanderbilt, of Newport, R, I., made a very effective display of named Montbretias, Besseras, and Acidantheras, and at this exhibition Oakes Ames gave us one of the most satisfactory displays of aquatics made during the season. James Brydon was awarded Honorable Mention for his new variety of Nymphæa called Arethusa.

During September, Dahlias continued to be shown in great profusion and the desirability of extending the scheduled awards of this class of plants was evident.

September 16, Frederick S. Davis made a display of *Incarvillea variabilis*, of which Honorable Mention was made by your Committee.

On the 4th of November H. A. Wheeler was granted a First Class Certificate of Merit for *Zygopetalum Mackayi* var. *cæruleum*, showing great improvement in depth of color and markings over the old type.

CHRYSANTHEMUM SHOW.

November 7, 8, 9, and 10.

Competition was not as close at this exhibition as in past years. The exhibits made by the Waban Conservatories were fully up to the standard of previous seasons as was also the case with most of the other exhibits, but owing to the lack of competition as compared with other years the hall was not as well filled with flowers as in other seasons, thus making a less effective display. Competition for the best arrangement of Chrysanthemums in the Society's vases was close, and the awards, from the reading of the Schedule, necessarily varied from day to day according to the satisfactory condition in which the vases were maintained by the exhibitors. A change in the Schedule whereby the award on each particular day was to be final has been suggested, and probably would be much more satisfactory to exhibitors than the past method. The number of competitors was less than was hoped, but there probably will be a great increase under the new arrangement. There were no entries of any Seedling Chrysanthemums, which would indicate less interest in their production than in past seasons. Dr. F. I. Williams received Honorable Mention for Chrysanthemum Bessie Jones.

Charles S. Cooper was awarded Honorable Mention for a new Carnation exhibited under the name of Crawford. Other Honorable Mentions were granted Mr. E. F. Wilson for Cosmos Klondike and John Cook for the Hybrid Tea Rose Baltimore.

The exhibition of Hardy Perennials throughout the season has been very satisfactory and promises to be one of the most important features in coming years. While severe weather conditions, it is true, seriously interfered with the most satisfactory results, as in the past two years, still an impetus for increased competition will probably be given with the advent of better weather conditions in future years. We presume that our restricted facilities have been something of a discouragement to some exhibitors and feel confident that the enlarged accommodations in our new hall will bring forth far greater competition than ever in the past.

Herewith we append the list of prizes and other awards granted by your Committee during this season. The amount of our appropriation for the year 1899 was $2,668; the amount of awards and gratuities was $2,076, leaving a balance of $592, from which the cost of Medals and First Class Certificates of Merit and awards of the Native Plant Committee are to be deducted.

Respectfully submitted,

J. WOODWARD MANNING,

Chairman Flower Committee.

PRIZES AND GRATUITIES AWARDED FOR FLOWERS.

1899.

January 7.

Primula Sinensis.— Display of fifty or more individual blooms:

First, Walter E. Coburn	$2 00
Second, Mrs. John L. Gardner	1 00

Freesias.— Vase of fifty spikes:

First, Mrs. E. M. Gill	2 00
Second, W. N. Craig	1 00

Gratuities: —

W. N. Craig, Vase of *Cypripedium insigne*	3 00
James E. Rothwell, Seedling Varieties of *Cypripedium insigne*	2 00

January 28.

Gratuities: —

James Comley, Display	3 00
Mrs. E. M. Gill, "	2 00

February 4.

Orchids.— Display of named species and varieties, filling not less than twenty bottles:

First, Mrs. John L. Gardner	15 00
Second, J. E. Rothwell	10 00

Violets.— Best collection of varieties, fifty blooms of each in a bunch:

First, Norris F. Comley	4 00

Carnations.— Display of cut blooms with foliage, not less than six varieties, in vases:

First, William Nicholson	8 00
Second, M. A. Patten	6 00
Third, S. J. Goddard	4 00

Camellias.—Display of named varieties, cut flowers with foliage, not less than twelve blooms, in not less than six varieties:

First, James Comley	4 00
Second, James Comley	3 00

Gratuities: —

Walter E. Coburn, Chinese Primroses	1 00
James Comley, Display	2 00
Mrs. E. M. Gill, "	1 00
George McWilliam, Display	1 00

February 11.

Gratuities: —

Mrs. J. C. Whitin, Display of *Phaius grandifolius* . . . 1 00
J. E. Rothwell, Display of *Cypripedium Harrisii* var. *superbum* . 1 00
Jason S. Bailey, Vase of Carnations 2 00

February 18.

Gratuities: —

Harvard Botanic Garden, *Toxicophlaea spectabilis* 2 00
James E. Rothwell, *Cattleya Trianaei* var. *Backhousiana* . . 1 00
Mrs. E. M. Gill, Display 2 00
James Comley, " 2 00

February 25.

Gratuities: —

James Comley, Display 3 00
Mrs. E. M. Gill, " 2 00

March 4.

Gratuity: —

James Comley, Display 3 00

March 11.

Gratuity: —

Mrs. E. M. Gill, Display 2 00

March 18.

Gratuity: —

R. McMillan, Vase of Mignonette 1 00

SPRING EXHIBITION.

March 21, 22, 23, and 24.

Hybrid Perpetual Roses. — Twelve blooms, in not less than four named varieties:

First, Charles H. Souther 12 00

Six blooms, not less than three named varieties:

First, Charles H. Souther 6 00

Twelve blooms of Ulrich Brunner:

First, John McFarland 10 00

Tender Roses in Vases. — Twenty-five blooms of Bridesmaid:

First, William H. Elliott 12 00

Twenty-five blooms of The Bride:

First, William H. Elliott 12 00
Second, Mrs. B. P. Cheney 10 00

CARNATIONS.— Vase of one hundred cut blooms with foliage, not less than six varieties :

First, M. A. Patten	8 00
Second, William Nicholson	6 00
Third, Mrs. E. M. Gill	4 00
Twenty-five blooms of any named Crimson variety :	
First, M. A. Patten, for Ferdinand Mangold	2 00
Twenty-five blooms of any named Dark Pink variety :	
First, William Nicholson, for Mrs. F. Joost	3 00
Second, M. A. Patten, for Mrs. F. Joost	2 00
Twenty-five blooms of any named Light Pink variety :	
First, William Nicholson, for Daybreak	3 00
Second, Mrs. E. M. Gill, for Daybreak	2 00
Twenty-five blooms of any named Scarlet variety :	
First, M. A. Patten, for Bon Ton	3 00
Twenty-five blooms of any named White variety :	
First, William Nicholson, for White Cloud	3 00
Second, William Nicholson, for Eureka	2 00
Twenty-five blooms of any named Yellow variety :	
First, William Nicholson, for Eldorado	3 00
Twenty-five blooms of any named White variegated variety :	
First, William Nicholson, for Mrs. G. M. Bradt	4 00
Second, M. A. Patten, for Mrs. G. M. Bradt	3 00

PANSIES.— Forty-eight cut blooms, not less than twenty-four varieties, in flat dishes :

First, Charles H. Souther	3 00

VIOLETS.— Bunch of one hundred blooms of Lady Hume Campbell :

First, H. Dumaresq	3 00
Bunch of one hundred blooms of Marie Louise :	
Second, A. A. Thorndike	2 00
Bunch of one hundred blooms of any other double variety :	
First, W. L. Minor, for The Imperial	3 00
Bunch of one hundred blooms of any other single variety :	
First, Harry S. Rand, for Princess of Wales	3 00
Second, Mrs. John L. Gardner, for La France	2 00

ANTIRRHINUMS.— Display of not less than three varieties :

First, Charles H. Souther	3 00
Second, Mrs. John Jeffries	2 00

Gratuities : —

James Garthley, Cinerarias	2 00
Peter Fisher, Display of Carnations	3 00
Alex. McKay, Display of Roses	2 00
Mrs. E. M. Gill, Basket of Flowers	2 00
James Comley, Display	3 00
Mrs. E. M. Gill, "	1 00

April 1.

Gratuity: —

Edward J. Mitton, Display of Gloxinias 3 00

April 8.

Gratuities: —

E. A. & W. K. Wood, Display of Violets 3 00
James Comley, Display 2 00
Mrs. E. M. Gill, " 1 00

April 15.

Gratuities: —

James Comley, Display 3 00
Mrs. E. M. Gill, " 1 00
Mrs. John Jeffries, Display 1 00

April 22.

Gratuities: —

George Hollis, Display of Geraniums 2 00
James Comley, Display 1 00

April 29.

Gratuities: —

Mrs. John Jeffries, Display of Antirrhinums 1 00
James Comley, Display 3 00
Mrs. E. M. Gill, " 1 00

May 6.

Tulips. — Forty-eight blooms, not less than twelve named varieties:
First, W. N. Craig 4 00

Hardy Narcissuses. — Collection of fifty vases of not less than ten named varieties:
First, W. N. Craig 8 00

Pansies. — Forty-eight blooms, not less than twenty-four varieties, in flat dishes:
First, Mrs. E. M. Gill. 4 00

Gratuities: —

Dr. C. G. Weld, Display of Hardy Narcissuses 4 00
Harvard Botanic Garden, Hardy Herbaceous Plants . . . 4 00
W. S. Eager, Vase of Carnations 1 00
James Comley, Display 5 00
Mrs. E. M. Gill, " 1 00

May 13.

Gratuities: —

James Garthley, Display of Geraniums 2 00
James Comley, Display 4 00
Mrs. E. M. Gill, " 1 00

MAY 20.

Gratuities : —

Mrs. H. S. Stanley, Display of Cacti and Roses 1 00
Mrs. E. M. Gill, Display 2 00

MAY 27.

Gratuity : —

Mrs. E. M. Gill, Display 2 00

JUNE 3.

Gratuities : —

H. H. Hunnewell, Display of Rhododendrons 20 00
Mrs. E. M. Gill, Display 1 00

RHODODENDRON EXHIBITION.

JUNE 7 AND 8 (POSTPONED FROM JUNE 1 AND 2).

H. H. Hunnewell Fund.

RHODODENDRONS. — Twelve distinct varieties of unquestioned hardiness, named :

First, James Comley 20 00
Second, Mrs. John L. Gardner 15 00

Six distinct varieties of unquestioned hardiness, named :

First, James Comley 10 00

Six tender varieties, named :

First, Mrs. John L. Gardner 5 00
Second, Mrs. John L. Gardner 4 00

HARDY AZALEAS, FROM ANY OR ALL CLASSES — Fifteen varieties, one vase of each :

First, T. C. Thurlow 8 00

Twelve varieties, one vase of each :

First, T. C. Thurlow 4 00

Cluster of trusses, one variety :

First, T. C. Thurlow 2 00

Society's Prizes.

TREE PÆONIES. — Collection of single and double varieties, named :

First, Mrs. John Jeffries 6 00

GERMAN IRISES. — Thirty-six vases of three trusses each, of not less than twelve varieties :

First, Mrs. John L. Gardner 4 00

HARDY PYRETHRUMS. — Display of thirty bottles, Single and Anemone-flowered :

Second, Rea Brothers 2 00

ORIENTAL POPPIES.—Display:
Second, Mrs. E. M. Gill 2 00
AQUILEGIAS.— Collection, twenty-five vases:
Second, Mrs. John Jeffries 2 00
Third, W. C. Winter 1 00
HARDY ORNAMENTAL TREES AND SHRUBS.— Display of not less than thirty species and varieties, named, cut blooms or foliage:
First, T. C. Thurlow 8 00
Second, Miss Alice L. Grinnell 6 00
VASE OF FLOWERS:
First, Miss Hattie B. Winter 4 00
Second, Mrs. E. M. Gill 3 00

Gratuities: —
H. H. Hunnewell, Rhododendrons 20 00
H. H. Hunnewell, Display of Rhododendrons 10 00
James Comley, Rhododendrons 30 00
Mrs. B. P. Cheney, Rhododendrons 15 00
Mrs. John L. Gardner, Rhododendrons 10 00
F. W. Vanderbilt, Newport, R. I., Rhododendrons 3 00
T. C. Thurlow, Display of Pæonies 8 00
Mrs. John L. Gardner, Display of Pæonies 5 00
George Hollis, Display of Pæonies 2 00
Rea Brothers, Display of Pæonia festiva maxima 1 00
F. S. Davis, Two vases of Pæonies 2 00
Mrs. John Jeffries, German Irises 1 00
Dr. C. G. Weld, Pyrethrums and Aquilegias 8 00
Rea Brothers, Display of Herbaceous Perennials 2 00
Mrs. E. M. Gill, Display 2 00

PÆONY EXHIBITION.

JUNE 10.

HERBACEOUS PÆONIES. — Collection of named varieties, double:
First, Kenneth Finlayson 12 00
Second, T. C. Thurlow 10 00
Collection of named varieties, single:
First, T. C. Thurlow 6 00
Specimen bloom:
First, T. C. Thurlow 2 00
Second, Kenneth Finlayson 1 00
Vase of blooms on long stems, arranged for effect in the Society's large China vases:
First, Mount Vernon Nursery 10 00
Second, Kenneth Finlayson 8 00

Third, T. C. Thurlow	6 00
Fourth, Miss Hattie B. Winter	4 00
Gratuity : —	
Mrs. E. M. Gill, Display	3 00

ROSE AND STRAWBERRY EXHIBITION.

June 22 and 23.

Special Prizes, Theodore Lyman Fund.

Hardy Roses: — Twenty-four distinct named varieties, three of each variety :	
First, Heirs of Hon. Joseph S. Fay	25 00
Second, Heirs of Hon. Joseph S. Fay	20 00
Third, Heirs of Hon. Joseph S. Fay	15 00

Society's Prizes.

Sixteen named varieties, three of each variety :	
First, Heirs of Hon. Joseph S. Fay	15 00
Twelve named varieties, three of each :	
First, Heirs of Hon. Joseph S. Fay	10 00
Three named varieties, three of each :	
Third, Heirs of Hon. Joseph S. Fay	1 00
Twenty-four blooms of Mme. Gabriel Luizet :	
First, Heirs of Hon. Joseph S. Fay	8 00
Six blooms of Alfred Colomb :	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Baroness Rothschild :	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of John Hopper :	
First, Heirs of Hon. Joseph S. Fay	3 00
Six blooms of Jubilee :	
First, Heirs of Hon. Joseph S. Fay	3 00
Six blooms of Marshall P. Wilder :	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Merveille de Lyon :	
Second, Heirs of Hon. Joseph S. Fay	2 00
Six blooms of Mme. Victor Verdier :	
Second, Heirs of Hon. Joseph S. Fay	2 00
Twelve blooms of any other variety :	
First, Heirs of Hon. Joseph S. Fay	4 00
Second, Heirs of Hon. Joseph S. Fay	3 00
Third, Heirs of Hon. Joseph S. Fay	2 00
Best single bloom of any variety :	
First, Heirs of Hon. Joseph S. Fay	2 00

General Display.— One hundred bottles of Hardy Roses, buds admissible, each exhibitor limited to one entry:

First, Heirs of Hon. Joseph S. Fay	10 00

Basket of Roses.— Arranged for effect, to be shown the second day:

First, Mrs. E. M. Gill	5 00

Sweet Williams.— Thirty spikes, not less than six varieties:

First, William C. Winter	4 00
Second, W. N. Craig	3 00
Third, Mrs. John L. Gardner	2 00

Display, eighteen vases of three trusses each:

First, Mrs. John L. Gardner	4 00
Second, W. N. Craig	3 00

Vase of Flowers.— Best arranged:

First, Mrs. E. M. Gill	5 00
Second, William C. Winter	4 00

Gratuities: —

Heirs of Hon. Joseph S. Fay, Display of Roses	30 00
Heirs of Hon. Joseph S. Fay, Display of Roses, Bank	20 00
Heirs of Hon. Joseph S. Fay, Bank of Roses	10 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Heirs of Hon. Joseph S. Fay, " " "	5 00
Rea Brothers, Display of Perennials	2 00
Mrs. John Jeffries, Foxgloves and Irises	1 00
Kenneth Finlayson, Gloxinias	4 00
James Comley, Display	10 00
Mrs. E. M. Gill, "	8 00
T. C. Thurlow, "	6 00
W. E. Coburn, "	1 00

July 1.

Hardy Roses.— Collection, named, not less than twenty-five varieties filling fifty vases, one rose in each vase:

First, Heirs of Hon. Joseph S. Fay	15 00

Iris Kæmpferi.— Six varieties, three of each, in vases:

First, Dr. C. G. Weld	4 00
Second, Mrs. John L. Gardner	3 00

Lilium candidum.— Twelve spikes:

Second, Sumner Coolidge	2 00

Campanula Medium.— Collection, not less than fifteen bottles:

Second, Mrs. John L. Gardner	4 00

Sweet Williams.— Auricula-flowered, thirty spikes of not less than six distinct varieties:

Second, William C. Winter	2 00

DELPHINIUMS.— Collection of twenty spikes, not less than five varieties:

First, Mrs. John L. Gardner	5 00

Display, thirty vases of three spikes each:

First, Mrs. John L. Gardner	6 00

HARDY HERBACEOUS PLANTS.— Thirty bottles:

First, Rea Brothers	8 00
Second, W. N. Craig	6 00

VASE OF FLOWERS:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

Norris F. Comley, Display of Iris Kæmpferi	2 00
E. S. Converse, Display of Tuberous Begonias	2 00
E. C. Lewis, Display of Hollyhocks	1 00
Heirs of Hon. Joseph S. Fay, Display of Crimson Rambler Roses	3 00
Heirs of Hon. Joseph S. Fay, Display	6 00
W. N. Craig, "	3 00
Rea Brothers, "	2 00

JULY 8.

HOLLYHOCKS.— Double, twelve blooms, of twelve colors, in flat dishes:

Second, Heirs of Hon. Joseph S. Fay	4 00

Double, six blooms, of six colors, in flat dishes:

First, W. N. Craig	3 00
Second, Heirs of Hon. Joseph S. Fay	2 00

Double, twelve spikes:

First, Heirs of Hon. Joseph S. Fay	5 00

PERENNIAL PHLOXES.— Suffruticosa or early-blooming section, collection of named varieties:

First, Rea Brothers	3 00

VASE OF FLOWERS.— Best arranged:

First, Mrs. E. M. Gill	4 00
Second, Miss Hattie B. Winter	3 00

Gratuities: —

L. F. Kinney, *Rhododendron maximum*	1 00
James Comley, " "	1 00
James Comley, *Combretum purpureum*	1 00
Norris F. Comley, *Iris Kæmpferi*	2 00
Heirs of Hon. Joseph S. Fay, Display of Roses	5 00
Rea Brothers, Rose Display	3 00
Heirs of Hon. Joseph S. Fay, Display of Hollyhocks	4 00
Mrs. John L. Gardner, " " "	1 00

W. N. Craig, Display 5 00
Mrs. E. M. Gill, " 1 00
E. C. Lewis, " 1 00

JULY 15.

TUBEROUS BEGONIAS.— Collection, arranged with their own foliage, in flat dishes:
First, H. Dumaresq 4 00
Second, E. S. Converse 3 00
HARDY AQUATIC FLOWERS.— Collection, named:
First, Mrs. John L. Gardner 8 00

Gratuities: —
George F. Sylvester, Hollyhocks 1 00
George Hollis, Ipomœa and Geraniums 1 00
Mrs. John L. Gardner, Drummond Phlox 2 00
Rea Brothers, Hardy Perennials 2 00
Heirs of Hon. Joseph S. Fay, Display 5 00
Mrs. E. M. Gill, " 2 00
W. N. Craig, " 2 00
E. C. Lewis, " 1 00

JULY 22.

HARDY HERBACEOUS PLANTS.— Thirty bottles:
First, W. N. Craig 8 00
Second, Rea Brothers 6 00
Third, Julius Heurlin 4 00
VASE OF FLOWERS.— For table decoration:
First, Miss Hattie B. Winter 4 00

Gratuities: —
W. N. Craig, Display of Sweet Peas and Phlox 3 00
Mrs. E. M. Gill, Display 3 00
George Hollis, " 2 00

JULY 29.

PERENNIAL PHLOXES. — Twelve named varieties, one truss of each:
First, W. N. Craig 3 00
Second, George Hollis 2 00
ANTIRRHINUMS. — Display of thirty vases, three spikes in each, not less than ten varieties:
Second, Edward J. Mitton 3 00
Third, Mrs. John Jeffries 2 00

Gratuities: —
Mrs. John L. Gardner, Phlox 2 00

Rea Brothers, Perennials	2 00
E. C. Lewis, Sweet Peas	1 00
W. N. Craig, Display	3 00
Mrs. E. M. Gill, "	2 00

AUGUST 5.

ANNUALS.— General display, named, filling not less than one hundred and fifty bottles:

First, Mrs. John L. Gardner	10 00
Second, Mrs. E. M. Gill.	8 00
Third, Charles H. Souther	6 00

Gratuities: —

H. H. Hunnewell, Ixora and Rhododendrons	2 00
H. H. Hunnewell, Display of Orchids	5 00
J. Warren Clark, Gladioli	4 00
Rea Brothers, Hardy Phlox in fifty-six varieties	3 00
Mrs. John L. Gardner, Hardy Phlox	2 00
George Hollis, Display of Phlox	1 00
James Comley, " " "	1 00
I. E. Coburn, Display of Pansies	3 00
Hon. C. W. Hoitt, Nashua, N.H., *Lilium auratum* and *L. Batemanniæ*	2 00
Norris F. Comley, Asters	2 00
William C. Winter, Dahlias	3 00
Charles H. Souther, Antirrhinums	1 00
Julius Heurlin, Display	1 00

AUGUST 12.

MONTBRETIA.— Display in vases:

First, Mrs. John L. Gardner	3 00
Second, W. N. Craig	2 00

PERENNIAL PHLOXES.— Eighteen vases of eighteen named varieties, not exceeding three trusses in each vase:

First, Rea Brothers,	5 00
Second, George Hollis	4 00
Third, William C. Winter	3 00

Gratuities: —

William C. Winter, Dahlias	3 00
J. Heurlin, Hardy Herbaceous Perennials	3 00
Rea Brothers, Rudbeckia Golden Glow	2 00
J. Warren Clark, Named Gladioli	2 00
J. Warren Clark, Seedling Gladioli	2 00
Mrs. John L. Gardner, *Lilium tigrinum*	1 00
R. P. Struthers, Display	2 00
Mrs. E. M. Gill, "	2 00
Hon. C. W. Hoitt, "	2 00
James Comley, "	2 00

August 19.

Theodore Lyman Fund.

Aquatics.—General Display of Nymphæas, Nelumbiums, Sedges, Papyrus, and other aquatic plants, arranged for effect, to include not less than twenty-five blooms of Nymphæas:

First, Henry A. Dreer Corporation, Philadelphia . . . 25 00

Gladioli.—Twenty named varieties in spikes:

First, J. Warren Clark, ... 4 00

Ten named varieties in spikes:

First, J. Warren Clark 3 00

Six named varieties, in spikes:

First, J. Warren Clark 2 00

Display of named and unnamed varieties, filling one hundred vases, arranged for effect, with any foliage:

First, J. Warren Clark 8 00

Asters.— Large Flowered, of all classes, fifty vases, not less than twelve varieties, three flowers in each vase:

First, Charles H. Souther 6 00

Second, J. W. Howard 5 00

Third, Norris F. Comley 4 00

Truffaut's Pæony Flowered, thirty blooms, not less than twelve varieties:

Second, Charles H. Souther 3 00

Third, E. S. Converse 2 00

Victoria Flowered, thirty blooms not less than twelve varieties:

First, Charles H. Souther 4 00

Hardy Herbaceous Plants.— Thirty bottles:

Third, Julius Heurlin 4 00

Gratuities:—

J. Warren Clark, Collection of Gladioli 3 00

J. Warren Clark, Gladioli Seedlings 2 00

William C. Winter, Dahlias 3 00

Lothrop & Higgins, " 3 00

Mrs. J. B. Lawrence, " 2 00

George Hollis, Perennial Phlox 2 00

Mrs. John Jeffries, Lilies and Montbretias 1 00

Hon. C. W. Hoitt, Sweet Peas 1 00

Henry A. Dreer Corporation, New Cannas 2 00

Henry A. Dreer Corporation, Fringed Petunias 1 00

James Comley, Lilies and Tuberoses 1 00

Mrs. J. B. Lawrence, Tropæolums 1 00

Mrs. J. B. Lawrence, Sweet Peas and Pinks 1 00

Norris F. Comley, Collection 2 00

Mrs. John Jeffries, Display 2 00

R. P. Struthers, " 1 00

W. N. Craig, Display 2 00
Mrs. E. M. Gill, " 1 00

AUGUST 26.

Gratuities: —

Lothrop & Higgins, Display of Dahlias 6 00
Mrs. J. B. Lawrence, Gaillardias, Dahlias, and Gladioli . . . 2 00
J. Warren Clark, Seedling Gladioli 2 00
Mrs. E. M. Gill, Display 1 00
I. E. Coburn, " 1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

DAHLIAS. — Show, eighteen blooms, named varieties:
First, Lothrop & Higgins 4 00
Second, William C. Winter 3 00
Fancy, eighteen blooms, named varieties:
First, H. F. Burt 4 00
Second, H. F. Burt 3 00
Cactus, twelve blooms, named varieties:
First, H. F. Burt 4 00
Second, Lothrop & Higgins 3 00
Third, H. F. Burt 2 00
Decorative, twelve blooms, named varieties:
First, Lothrop & Higgins 4 00
Second, H. F. Burt 3 00
Third, H. F. Burt 2 00
Show, Six blooms, named varieties:
First, Lothrop & Higgins 2 00
Second H. F. Burt 1 00
Fancy, Six blooms:
First, Lothrop & Higgins 2 00
Second, H. F. Burt 1 00
Best single bloom, of any class, introduction of 1897 or later:
First, Lothrop & Higgins 1 00
Pompon, twelve vases, of three blooms each, named varieties:
First, William C. Winter 3 00
Second, Lothrop & Higgins 2 00
Third, Lothrop & Higgins 1 00
Single, twelve vases of three blooms each, named varieties:
First, William C. Winter 2 00
Second, William E. Endicott 1 00
General Display, all classes admissible, one hundred or more bottles:
First, H. F. Burt 12 00

Second, William C. Winter 10 00
Third, Lothrop & Higgins 8 00
Fourth, Mount Vernon Nursery 6 00
Fifth, William H. Symonds 4 00

Hardy Lilies.— Collection of not less than four named species:
Second, Sumner Coolidge 4 00

Tropaeolums.— Display with their own foliage, filling twenty-five vases, not over twelve blooms of one variety in each:
First, Mrs. J. W. Cain 3 00
Second, Mrs. E. M Gill 2 00

Marigolds.— Display of French and African, filling twenty-five vases:
First, Mrs. John L. Gardner 3 00
Second, E. C. Lewis 2 00

Zinnias.— Fifty double, not less than twelve varieties:
First, E. C. Lewis 3 00
Second, E. C. Lewis 2 00

Fifty single, not less than twelve varieties:
First, A. B. Howard 3 00

Vase of Flowers.— For table decoration, on the last day of the exhibition:
First, Miss Hattie B. Winter 4 00
Second, Mrs. E. M. Gill 3 00

Gratuities: —
Oakes Ames, Aquatics 15 00
Mrs. W. C. Loring, *Lilium auratum* 1 00
Rea Brothers, Perennial Phlox 4 00
Julius Heurlin, Hardy Perennials 3 00
C. Vanderbilt, Newport, R.I., Montbretias, Besseras, and Acidantheras 3 00
Norris F. Comley, China Asters 2 00
James Garthley, Cockscombs 2 00
Schlegel & Fottler, Cannas 2 00
J. Warren Clark, Gladioli 2 00
Rea Brothers, New Perennials 2 00
Mrs. E. M. Gill, Vase of Allamandas 1 00
E. S. Converse, Tuberous Begonias 1 00
James Comley, Display 5 00
Mrs. E. M. Gill, " 1 00

September 2.

Gratuities: —
Lothrop & Higgins, Display of Dahlias 5 00
Mrs. J. B. Lawrence, Display 2 00

September 9.

Dahlias.— Cactus, twelve blooms, named varieties:
First, H. F. Burt 3 00

Second, H. F. Burt	2 00
Third, Lothrop & Higgins	1 00
HERBACEOUS PERENNIALS.—Thirty bottles:	
First, W. N. Craig	8 00
Second, Julius Heurlin	6 00
Third, Rea Brothers	4 00
Gratuities: —	
H. F. Burt, Dahlias	1 00
William C. Winter, Dahlias	1 00
Lothrop & Higgins, "	1 00
Mrs. George Duncan, Cockscombs	2 00
E. L. Dorr, "	2 00
Rea Brothers, Phlox and Sunflowers	2 00
J. E. Clapp, Chrysanthemum-flowered Sunflower	1 00
E. C. Lewis, Marigolds	1 00
Mrs. E. M. Gill, Display	3 00

SEPTEMBER 16.

PERENNIAL ASTERS.— Collection of Native or Introduced species and varieties:	
First, Mrs. E. M. Gill	5 00
Second, Misses Eleanor and Mollie Doran	4 00
Third, George Hollis	3 00
ORNAMENTAL FRUITED HARDY TREES AND SHRUBS:—	
First, Miss Alice L. Grinnell	8 00
Gratuities: —	
Julius Heurlin, Hardy Perennials	2 00
Mrs. J. B. Lawrence, Dahlias	2 00
F. A. Blake, Begonias	1 00
Henry A. Purdie, Solidagos	1 00
Robert Manning, Display	1 00

SEPTEMBER 23.

Gratuity: —	
Mrs. George Duncan, Display	1 00

SEPTEMBER 28.

Gratuities: —	
H. F. Burt, Display of Dahlias	5 00
Julius Heurlin, Display of Herbaceous Plants	2 00

SEPTEMBER 30.

Gratuities: —	
Lothrop & Higgins, Cactus and Decorative Dahlias	2 00
Mrs. J. B. Lawrence, Dahlias	1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9, AND 10.

Josiah Bradlee Fund.

CHRYSANTHEMUMS.— Twenty-five blooms of twenty-five distinct varieties, named:

First, Mrs. B. P. Cheney	20 00
Second, Arthur F. Whitin	15 00
Third, Col. Charles Pfaff	10 00

Six vases of six named varieties, ten blooms each:

First, Waban Conservatories	30 00
Second, Norris F. Comley	25 00

Henry A. Gane Memorial Fund.

For the best twelve specimen blooms of any of the Seedling Chrysanthemums originated by the late Henry A. Gane:

First, Waban Conservatories	20 00
Second, Norris Comley	10 00

Society's Prizes.

Twelve cut blooms, Incurved, named, in vases:

First, C. H. Souther	8 00
Second, E. S. Converse	6 00

Twelve cut blooms, Japanese Incurved, named, in vases:

First, Mrs. B. P. Cheney	10 00
Second, Col. Charles Pfaff	6 00
Third, E. S. Converse	4 00

Twelve cut blooms, Anemone, named, in vases:

First, C. H. Souther	8 00
Second, Dr. C. G. Weld	6 00
Third, E. S. Converse	4 00

Six cut blooms, Incurved, named, in vases:

First, Dr. C. G. Weld	5 00
Second, E. S. Converse	4 00
Third, C. H. Souther	2 00

Six cut blooms, Japanese, named, in vases:

First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, Edward Whitin	2 00

Six cut blooms, Japanese Incurved, named, in vases:

First, C. H. Souther	6 00
Second, Edward Whitin	4 00
Third, Edward Whitin	2 00

Six cut blooms, Reflexed, named, in vases:	
First, C. H. Souther	6 00
Second, Mrs. B. P. Cheney	4 00
Third, E. S. Converse	2 00
Six cut blooms, Anemone, named, in vases:	
First, E. S. Converse	5 00
Second, John Thomas	4 00
Third, C. H. Souther	2 00
Twelve sprays, Japanese, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
Second, Norris F. Comley	3 00
Twelve sprays, Pompons, naturally grown, stems twenty-four inches or over, not less than six named varieties:	
First, J. W. Howard	4 00
Twelve best varieties, named, introductions of the current year:	
First, C. H. Souther	8 00
Second, J. W. Howard	6 00
Vase of ten blooms, on long stems, Pink, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Mrs. B. P. Cheney	6 00
Vase of ten blooms, on long stems, Red, named:	
First, Mrs. B. P. Cheney	10 00
Second, H. Dumaresq	8 00
Third, E. S. Converse	6 00
Vase of ten blooms, on long stems, White, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, E. S. Converse	6 00
Vase of ten blooms on long stems, Yellow, named:	
First, Waban Conservatories	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Mrs. B. P. Cheney	6 00
Vase of ten blooms, on long stems, any other color, named:	
First, Mrs. B. P. Cheney	10 00
Second, Mrs. B. P. Cheney	8 00
Third, Col. Charles Pfaff	6 00
Vase of blooms, on long stems, arranged in the Society's large China vases, to be kept in good condition during the exhibition:	
First, Norris F. Comley	20 00
Second, Col. Charles Pfaff	18 00
Third, Mrs. E. M. Gill	16 00
Fourth, Charles H. Souther	14 00
Fifth, J. W. Howard	12 00

Gratuities: —

J. W. Howard, Chrysanthemum Glory	3 00
J. W. Howard, Vase of Pompon Chrysanthemums	2 00
I. E. Coburn, Pansies	4 00
Sewell Fisher, Carnation Saxon	1 00
William Nicholson, Carnations	3 00
M. A. Patten, "	3 00
D. Carmichael, "	2 00
John Pritchard, "	2 00
Mrs. B. P. Cheney, Display	10 00
Mrs. E. M. Gill, "	5 00
James Comley, "	4 00
John Thomas, "	3 00
Alexander McKay, "	3 00
Norris Comley, "	2 00
J. W. Howard, "	1 00
Dr. F. S. Williams, "	1 00

NOVEMBER 25.

Gratuities: —

Oakes Ames, Cattleya chocoensis	2 00
Mrs. E. M. Gill, Display	1 00
James Comley, "	1 00

SOCIETY'S SILVER MEDALS.

February 11. James Comley, for *Prunus Pseudo-cerasus*.

Spring Exhibition, March 21. E. L. Marquisee, for Carnation The Marquis.

Rose Exhibition, June 22. Jackson T. Dawson, for *Rosa Wichuraiana* × *R. Indica*.

July 1. M. H. Walsh, for *Rosa Wichuraiana* × Baroness Rothschild.

" 29. Hicks Arnold, for *Cattleya Hardyana*.

" " George McWilliam, for Dipladenia Mrs. George McWilliam.

August 5. Dr. C. G. Weld, for *Watsonia Adernei*.

" 12. Bayard Thayer, for *Nymphaea Brydonacea elegans*.

" 19. E. J. Shaylor, for Gladioli hybrids.

SOCIETY'S SILVER GILT MEDAL.

July 29. George McWilliam, for Dipladenia George M. Whitin.

SOCIETY'S BRONZE MEDAL.

July 29. George McWilliam, for Dipladenia Miss Lois H. Whitin.

KELWAY SILVER GILT MEDAL.

June 10. Kenneth Finlayson, for eighteen named varieties of *Pæonia albiflora*.

KELWAY BRONZE MEDAL.

June 10. Thomas C. Thurlow, for eighteen named varieties of *Pæonia albiflora* (second prize).

FIRST CLASS CERTIFICATES OF MERIT.

January 21. James E. Rothwell, for *Laelia anceps* var. *Ballentinianum.*
February 4. John N. May, of Summit, N. J., for Carnation Olympia.
Spring Exhibition, March 21. Charles H. Souther, for Rose Carmine Pillar.
March 21. Kenneth Finlayson, for Crested *Cyclamen persicum.*
May 6. J. E. Rothwell, for Superior Culture of *Phalaenopsis grandiflora.*
Rhododendron Show, June 7. H. Dumaresq, for *Bougainvillea spectabilis.*
Rose Exhibition, June 22. Jackson T. Dawson, for Rose William Egan.
July 8. M. H. Walsh, for *Rosa Wichuraiana* × Bridesmaid.
August 5. James F. Harlow, for Gladiolus Mme. Desbordes-Valmore.
" " James F. Harlow, for Gladiolus Baron Joseph Hulot.
" " J. E. Rothwell, for superior culture of Cypripedium Frau Ida Brandt.
" " J. E. Rothwell, for *Cypripedium* × *Edwardii* var. *superbum superbiens.*
Exhibition of Aquatic Plants, etc., August 19. J. W. Howard, for Giant White Comet Aster.
August 19. J. W. Howard, for Aster Daybreak.
" " Henry A. Dreer Corporation, for *Nymphæa fulva.*
" " Henry A. Dreer Corporation, for *Nymphæa rubra punctata.*
October 28. J. E. Rothwell, for *Cypripedium* × *Brysa Sedenii candidulum* × *Boissierianum.*
November 4. H. A. Wheeler, for *Zygopetalum Mackaii caeruleum.*

HONORABLE MENTION.

January 7. Oakes Ames, for *Cattleya chocoensis alba.*
February 4. John N. May, for Carnation Melba.
April 1. Hon. C. G. Roebling, of Trenton, N. J., for *Cypripedium villosum* var. *giganteum.*
Annual Exhibition of Plants and Flowers, August 30. A. B. Howard, for Verbenas.
August 30. A. B. Howard, for Petunias.
" " James Brydon, for Nymphæa Arethusa.
September 16. F. S. Davis, for *Incarvillea variabilis.*
Chrysanthemum Show, November 7. Dr. F. S. Williams, for Chrysanthemum Bessie Jones.
November 7. Charles S. Cooper, for Carnation Crawford.
" " E. F. Wilson, for Cosmos Klondike.
" " John Cook, for Rose Baltimore.

J. Woodward Manning,
Michael H. Norton,
Kenneth Finlayson,
Frederick S. Davis,
James Comley,
} *Committee on Flowers.*

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1899.

By E. W. WOOD, Chairman.

Owing to the partial failure of the apple crop in 1898, it was hoped by the growers that the trees which had failed to produce the usual crop on the even or bearing year would produce a largely increased quantity of fruit on the present odd calendar year. These hopes have been partially realized, as there have not been for many years so many apples shown at the exhibitions on the off year as during the past season. It would be to the advantage of both grower and consumer if a more even production of this most important fruit could be secured in successive years.

Owing to dry weather or other climatic conditions, fruits, especially late fall and winter varieties, matured earlier than usual, and it has been impossible to keep them under ordinary conditions as in former years.

Pears have been shown in about the usual quantity, but the crop has been below the average. The market has not at any time been oversupplied with good fruit of the desirable varieties.

The exhibitions during the year have been fully up to the average of former years and have been well attended. The Strawberry Exhibition proved one of the most interesting of the year; more new and promising varieties were shown than in any other class of fruits. It is impossible to recommend varieties for general cultivation as they vary so much when grown in different

soils and locations. The safest guide for the grower would seem to be to test the most promising varieties in his own field or garden.

With the exception of Strawberries few new fruits have been shown deserving special mention. J. S. Chase and E. J. Recanco showed several varieties of seedling grapes, some of good quality — but the size and appearance of the bunches did not compare favorably with varieties in general cultivation.

The dry season was unfavorable for fungous growth and there was little injury to pears from cracking; several dishes of the Flemish Beauty were shown possessing all their former merit in size and appearance.

There has been awarded during the year in prizes and gratuities sixteen hundred and sixteen dollars, leaving an unexpended balance of one hundred and sixteen dollars.

E. W. WOOD, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

1899.

SPRING EXHIBITION.

MARCH 21, 22, 23, AND 24.

WINTER APPLES.— Baldwin:	
First, C. F. Boyden	$3 00
Second, E. M. Bruce	2 00
Third, H. R. Kinney	1 00
Northern Spy:	
First, George V. Fletcher	3 00
Second, William O'Connell	2 00
Third, E. M. Bruce	1 00
Roxbury Russet:	
First, H. R. Kinney	3 00
Second, George V. Fletcher	2 00
Third, Joshua C. Stone	1 00
Tompkins King:	
First, George C. Rice	3 00
Second, F. J. Kinney	2 00
Third, C. L. Hartshorn	1 00
Any other variety:	
First, H. R. Kinney, Peck's Pleasant	3 00
Second, George C. Rice, Sutton Beauty	2 00
Third, George V. Fletcher, Fletcher Russet	1 00
WINTER PEARS.— Any variety:	
First, Warren Fenno, Duchess of Bordeaux	3 00
Second, A. T. Brown, Easter Beurré	2 00
STRAWBERRIES.— One pint:	
First, Francis Blake	3 00

APRIL 1.

Gratuity: —

Francis Blake, Strawberries	1 00

JUNE 7.

Gratuities: —

Warren Heustis & Son, Strawberries	1 00
William C. Winter, Peaches	1 00
H. R. Kinney, Apples	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 22 AND 23.

Special Prizes from the Theodore Lyman Fund.

STRAWBERRIES.— Four quarts of any variety:

First, Warren Heustis & Son, Marshall	20 00
Second, Benjamin M. Smith, Nick Ohmer	16 00
Third, Sumner Coolidge, Marshall	12 00
Fourth, George V. Fletcher, "	10 00
Fifth, Warren Heustis & Son, Belmont	8 00

Special Prizes offered by the Society.

Two quarts of any variety best adapted for garden cultivation for home use, to be judged by points:

First, Warren Heustis & Son, Marshall	6 00
Second, George V. Fletcher, "	5 00
Third, William C. Winter, Gen. Appleton	4 00
Fourth, I. E. Coburn, Belmont	3 00

Regular Prizes.

For the largest and best collection, not less than fifteen baskets of two quarts each, and not less than five varieties:

First, George F. Wheeler	20 00

Ten baskets, two quarts each, not less than three varieties:

First, Warren Heustis & Son	15 00
Second, George V. Fletcher	12 00
Third, George F. Wheeler	10 00
Fourth, I. E. Coburn	8 00

Two quarts of Belmont:

First, I. E. Coburn	4 00
Second, George V. Fletcher	3 00
Third, Warren Heustis & Son	2 00

Bubach:

First, George V. Fletcher	4 00
Second, I. E. Coburn	3 00
Third, Warren Heustis & Son	2 00

Clyde:

First, Levi Doran & Son	4 00
Second, Warren Heustis & Son	3 00
Third, George V. Fletcher	2 00

Crescent:

Second, I. E. Coburn	3 00
Third, William C. Winter	2 00

Enormous:
First, George F. Wheeler 4 00
Second, George V. Fletcher 3 00
Haverland:
First, I. E. Coburn 4 00
Second, George F. Wheeler 3 00
Hersey:
First, George F. Wheeler 4 00
Second, Sumner Coolidge 3 00
Jessie:
First, William C. Winter 4 00
Second, I. E. Coburn 3 00
Third, George V. Fletcher 2 00
Margaret:
First, Benjamin M. Smith 4 00
Second, George F. Wheeler 3 00
Marshall:
First, Sumner Coolidge 4 00
Second, Warren Heustis & Son 3 00
Third, George V. Fletcher 2 00
Miner's Prolific:
First, George F. Wheeler 4 00
Parker Earle:
First, I. E. Coburn 4 00
Second, George F. Wheeler 3 00
Sharpless:
Third, George F. Wheeler 2 00
Any other variety:
First, Samuel H. Warren, Seedling 4 00
Second, George V. Fletcher, Glen Mary 3 00
Third, Sumner Coolidge, Brandywine 2 00
Collection of not less than six varieties, one quart each:
First, George F. Wheeler 8 00
Second, George V. Fletcher 6 00
One quart of any new variety not previously exhibited:
First, Samuel H. Warren, Seedling 5 00
Second, John C. Haskell, " 4 00

CHERRIES.— Two quarts of any variety:
First, Miss Ellen W. Rumrill 4 00
Second, George V. Fletcher 3 00
Third, O. R. Robbins 2 00

FOREIGN GRAPES.— Two bunches of any variety:
First, E. S. Converse 6 00
Second, E. S. Converse 4 00

FORCED PEACHES.— Six specimens:
First, William C. Winter, Hale's Early 3 00
Second, William C. Winter, Waterloo 2 00

July 1.

Strawberries.— Any variety:

First, Sumner Coolidge, Marshall	4 00
Second, Warren Heustis & Son, Marshall	3 00
Third, Samuel H. Warren, Seedling	2 00

Cherries.— Black Eagle:

First, Charles B. Travis	3 00
Second, E. S. Converse	2 00
Third, F. W. Damon	1 00

Black Tartarian:

First, George V. Fletcher	3 00
Second, O. R. Robbins	2 00
Third, James L. Duncan	1 00

Coe's Transparent:

First, Charles S. Smith	3 00
Second, John L. Bird	2 00

Downer:

First, Charles S. Smith	3 00
Second, M. W. Chadbourne	2 00
Third, A. T. Brown	1 00

Any other variety:

First, Charles S. Smith, Hyde's Seedling	3 00
Second, Miss Vera Chapelle, Napoleon	2 00
Third, J. H. Fletcher, Royal Ann	1 00

July 8.

Raspberries.— Two quarts of any variety:

First, E. C. Lewis	3 00

Currants.— Two quarts of any Red variety:

First, W. N. Craig, Versaillaise	4 00
Second, Mrs. E. M. Gill, Versaillaise	3 00
Third, W. N. Craig, Fay's	2 00
Fourth, William O'Connell, Versaillaise	1 00

Two quarts of any White variety:

First, H. R. Kinney	3 00
Second, W. N. Craig	2 00
Third, Mrs. John Jeffries	1 00

Gooseberries.— Two quarts of any American variety:

First, W. N. Craig, Columbus	4 00
Second, W. G. Kendall, Bates	3 00
Third, W. N. Craig, Triumph	2 00
Fourth, Joseph S. Chase, Triumph	1 00

Gratuity: —

Charles S. Smith, Hyde's Seedling Cherries	1 00

JULY 15.

RASPBERRIES.— Two quarts of any variety:

First, Mrs. E. J. Cutter, Cuthbert	3 00
Second, Sumner Coolidge	2 00
Third, E. C. Lewis	1 00

CURRANTS.— One quart of any Red variety:

First, W. N. Craig, Versaillaise	3 00
Second, W. N. Craig, Fay's	2 00
Third, Mrs. E. M. Gill, Versaillaise	1 00

One quart of any White variety:

First, W. N. Craig, White Grape	2 00
Second, E. N. Horne, Dana's Transparent	1 00

GOOSEBERRIES.— Two quarts of any Foreign variety:

First, W. G. Kendall, Industry	4 00
Second, W. N. Craig, "	3 00
Third, George L. Brown, White Smith	2 00

JULY 22.

BLACKBERRIES.— Two quarts of any variety:

First, Sumner Coolidge	3 00
Second, M. W. Chadbourne	2 00
Third, Rev. Calvin Terry	1 00

APPLES.— Tetofsky:

First, Samuel Hartwell	3 00
Second, Joseph S. Chase	2 00

PEARS.— Summer Doyenne:

First, E. S. Converse	3 00
Second, David L. Fiske	2 00
Third, Sumner Coolidge	1 00

PEACHES.— Six of any variety:

First, William C. Winter	3 00

Gratuities: —

Mrs. John L. Gardner, Nectarines	1 00
W. N. Craig, Currants and Gooseberries	2 00

JULY 29.

APPLES.— Red Astrachan:

First, F. W. Damon	3 00
Second, Samuel Hartwell	2 00
Third, S. F. & F. L. Weston	1 00

Sweet Bough:

First, Sumner Coolidge	3 00
Second, George V. Fletcher	2 00
Third, Charles B. Travis	1 00

Any other variety:
First, Sumner Coolidge, Williams 3 00
Second, Joshua C. Stone, " 2 00
Third, Hittinger Brothers, " 1 00
PEARS.— Giffard:
First, A. T. Brown 3 00
Second, John L. Bird 2 00
Third, F. W. Damon 1 00
Any other variety:
First, A. T. Brown, Clapp's Favorite 3 00
Second, Sumner Coolidge, Clapp's Favorite 2 00
Third, Hittinger Brothers, Wilder 1 00
BLACKBERRIES.— Two quarts of any variety:
First, Sumner Coolidge 3 00
Second, M. W. Chadbourne 2 00
Third, Rev. Calvin Terry 1 00
PEACHES. — Open culture:
First, Sumner Coolidge, Hale's Early 3 00
Second, George H. Sherwin, Hale's Early 2 00
Third, Mrs. N. D. Harrington, Alexander 1 00

Gratuity: —
William H. Monroe, Gooseberries 1 00

AUGUST 5.

APPLES — Oldenburg:
First, Sumner Coolidge 3 00
Second, John L. Bird 2 00
Third, J. V. Fletcher 1 00
Any other variety:
First, Sumner Coolidge, Williams 3 00
Second, Hittinger Brothers, " 2 00
Third, Joshua C. Stone, " 1 00
PEARS.— Clapp's Favorite:
First, A. T. Brown 3 00
Second, Sumner Coolidge 2 00
Third, M. W. Chadbourne 1 00
Any other variety:
First, A. T. Brown, Giffard 2 00
Second, Warren Fenno, " 1 00
PEACHES.— Twelve specimens of outdoor culture, any variety:
First, Sumner Coolidge, Rivers 3 00
Second, George H. Sherwin, Hale's Early 2 00
Third, Mrs. N. D. Harrington 1 00
Six specimens of cold house culture:
First, William C. Winter, Crawford's Early 3 00
Second, William C. Winter, Crawford's Late 2 00

BLACKBERRIES.— Two quarts of any variety:

First, Sumner Coolidge,	Dorchester	3 00
Second, M. W. Chadbourne,	"	2 00
Third, Rev. Calvin Terry,	"	1 00

PLUMS.— Japanese, any variety:

First, Hittinger Brothers,	Abundance	3 00
Second, Sumner Coolidge,	"	2 00
Third, Hon. Aaron Low,	"	1 00

FOREIGN GRAPES.— Two bunches of any variety:

First, E. S. Converse,	Black Hamburg	5 00
Second, William C. Winter,	Black Hamburg	4 00

Gratuity: —

Jackson T. Dawson,	Nebraska Sand Cherry	1 00

AUGUST 12.

APPLES.— Chenango:

First, Sumner Coolidge		3 00
Second, Charles F. Curtis		2 00

Summer Pippin:

First, Warren Fenno		3 00
Second, Samuel Hartwell		2 00

Williams:

First, Hittinger Brothers		3 00
Second, Sumner Coolidge		2 00
Third, Joshua C. Stone		1 00

Any other variety:

First, Mrs. O. Underwood		3 00
Second, Hittinger Brothers		2 00
Third, Joshua C. Stone		1 00

PEARS.— Rostiezer:

First, Sumner Coolidge		3 00
Second, M. W. Chadbourne		2 00
Third, A. T. Brown		1 00

Tyson:

First, John L. Bird		3 00
Second, Warren Fenno		2 00

Any other variety:

First, Sumner Coolidge		3 00
Second, A. T. Brown		2 00
Third, J. Cunning		1 00

PEACHES.— Any variety:

First, Sumner Coolidge		3 00
Second, W. N. Craig		2 00
Third, George H. Sherwin		1 00

PLUMS, JAPANESE.— Abundance:

First, E. C. Lewis	3 00
Second, Butler & Jewell, Cromwell, Conn.	2 00
Third, Hittinger Brothers	1 00
Burbank:	
First, Butler & Jewell	3 00
Second, Hittinger Brothers	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, George V. Fletcher	3 00
Second, Butler & Jewell, Berckmans	2 00
Third, Butler & Jewell, Satsuma	1 00
Gratuity: —	
William C. Winter, Peaches	1 00

AUGUST 19.

APPLES.— Gravenstein:

First, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, Hittinger Brothers	1 00
Maiden's Blush:	
First, Joshua C. Stone	3 00
Second, Mrs. O. Underwood	2 00
Porter:	
First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Charles S. Smith	1 00
Any other variety:	
First, Hittinger Brothers, Williams	3 00
Second, Joshua C. Stone "	2 00
Third, Sumner Coolidge, Bietigheimer	1 00

PEARS.— Andrews:

First, E. S. Converse	3 00
Second, Joshua C. Stone	2 00
Bartlett:	
First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, Sumner Coolidge	1 00
Any other variety:	
First, A. T. Brown, Clapp's Favorite	3 00
Second, Sumner Coolidge, Clapp's Favorite	2 00
Third, J. B. Beley, " "	1 00

PEACHES.— Single dish of any variety:

First, Sumner Coolidge	3 00
Third, George L. Brown	1 00

PLUMS. — Bradshaw:

First, George V. Fletcher	3 00
Second, H. R. Kinney	2 00
Third, M. W. Chadbourne	1 00

Any other variety:

First, Butler & Jewell, Cromwell, Conn., Abundance	3 00
Second, E. C. Lewis. Abundance	2 00
Third, Butler & Jewell, Burbank	1 00

NATIVE GRAPES. — Six bunches of Winchell or Green Mountain:

First, H. R. Kinney	3 00
Second, Joseph S. Chase	2 00

Gratuities: —

Miss Ellen W. Rumrill, Crab Apples	1 00
William C. Winter, Peaches	1 00

AUGUST 26.

Gratuity: —

Joseph S. Chase, Native Grapes	1 00

ANNUAL EXHIBITION OF PLANTS AND FLOWERS.

AUGUST 30 AND 31.

Special Prizes from the Theodore Lyman Fund.

FOREIGN GRAPES. — For the heaviest and best ripened bunch of any Foreign Black Grape:

First, George McWilliam	15 00
Second, Miss E. J. Clark	10 00

For the heaviest and best ripened bunch of any Foreign White Grape, Syrian excluded:

First, Mrs. R. M. Clark	15 00

Society's Prizes.

FOREIGN GRAPES. — Black Alicante:

First, Miss E. J. Clark	5 00
Second, J. C. Whitin	4 00

Black Hamburg:

First, Miss E. J. Clark	5 00
Second, Daniel Brown	4 00
Third, William C. Winter	3 00

Lady Downes:

First, Mrs. J. C. Whitin	5 00

Muscat of Alexandria:

First, George McWilliam	5 00
Second, E. J. Bernard	4 00
Third, Miss E. J. Clark	3 00

Any other variety:
First, Mrs. R. M. Clark, Bowood Muscat 5 00
Second, Mrs. J. C. Whitin, Madresfield Court 4 00
Third, Mrs. J. C. Whitin, Golden Queen 3 00

Gratuities: —
F. W. Damon, Moore's Early Grapes 1 00
William C. Winter, Peaches 2 00

SEPTEMBER 9.

APPLES.— Gravenstein:
First, Charles S. Smith 3 00
Second, William Christie 2 00
Third, Sumner Coolidge 1 00
Maiden's Blush:
Second, H. R. Kinney 2 00
Porter:
First, M. W. Chadbourne 3 00
Second, Sumner Coolidge 2 00
Third, Joshua C. Stone 1 00
Washington Strawberry:
First, Sumner Coolidge 3 00
Second, Joshua C. Stone 2 00
Third, Hittinger Brothers 1 00
Any other variety:
First, C. L. Hartshorn, Sterling 3 00
Second, L. P. Rollins, New York Pippin 2 00
Third, Joshua C. Stone, " " 1 00
CRAB APPLES.— Transcendent:
First, L. J. Fosdick 2 00
Second, Mrs. O. Underwood 1 00
Any other variety:
First, M. W. Chadbourne, Hyslop 2 00
Second, C. L. Hartshorn, " 1 00
PEARS.— Bartlett:
First, William Milman 3 00
Second, A. T. Brown 2 00
Third, J. Cunning 1 00
Belle Lucrative:
First, E. S. Converse 3 00
Second, A. T. Brown 2 00
Third, F. J. Kinney 1 00
Boussock:
First, Sumner Coolidge 3 00
Second, Charles F. Curtis 2 00
Third, M. W. Chadbourne 1 00

Hardy:
Second, Warren Fenno 2 00
Paradise of Autumn:
First, Warren Fenno 3 00
Souvenir du Congrès:
First, A. T. Brown 3 00
Second, Warren Fenno 2 00
Third, Sumner Coolidge 1 00
Any other variety:
First, A. T. Brown, Louise Bonne of Jersey 3 00
Second, A. T. Brown, De Tongres 2 00
Third, C. E. Richardson, Flemish Beauty 1 00

PEACHES.— Coolidge's Favorite:
First, Sumner Coolidge 3 00
Crawford's Early:
First, A. A. Bradshaw 3 00
Second, W. N. Craig 2 00
Third, Sumner Coolidge 1 00
Crosby:
Second, John Parker 2 00
Third, Sumner Coolidge 1 00
Foster:
First, Charles F. Curtis 3 00
Second, Sumner Coolidge 2 00
Oldmixon Freestone:
First, Sumner Coolidge 3 00
Second, Charles F. Curtis 2 00
Third, C. E. Swain 1 00
Stump the World:
First, L. M. Chase 3 00
Second, Sumner Coolidge 2 00

PEACHES, ORCHARD HOUSE CULTURE.— Any variety:
First, William C. Winter 4 00

PLUMS.— Imperial Gage:
First, George V. Fletcher 3 00
Lombard:
First, H. R. Kinney 3 00
Second, E. C. Lewis 2 00
Third, W. Warburton 1 00
Any other variety:
First, Sumner Coolidge, Yellow Egg 3 00
Second, H. R. Kinney, Bradshaw 2 00
Third, John Parker, Golden Egg 1 00
Japanese, any variety:
First, E. C. Lewis 3 00

NATIVE GRAPES.— Eumelan:	
First, Joseph S. Chase	3 00
Massasoit:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, Joseph S. Chase	1 00
Moore's Early:	
First, H. R. Kinney	3 00
Second, F. W. Damon	2 00
Third, William Christie	1 00
Any other variety:	
First, H. R. Kinney, Worden	3 00
Second, H. R. Kinney, Moore's Diamond	2 00
Third, F. J. Kinney, Worden	1 00
Any variety from girdled vines:	
First, F. J. Kinney, Brighton	3 00
Second, H. R. Kinney, Worden	2 00
Third, H. R. Kinney, Delaware	1 00
Gratuity: —	
Herbert Dumaresq, Foreign Grapes	3 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

Special Prizes.

Samuel Appleton Fund.

APPLES.— Baldwin, Joshua C. Stone	5 00
Hubbardston, Joshua C. Stone	5 00
PEARS.— Bosc, A. T. Brown	5 00
Sheldon, A. T. Brown	5 00

Benjamin V. French Fund.

APPLES.— Gravenstein, C. F. Boyden	5 00
Rhode Island Greening, Joshua C. Stone	5 00

Marshall P. Wilder Fund.

PEARS.— Anjou:	
First, George V. Fletcher	4 00
Second, William Milman	3 00
Third, A. T. Brown	2 00
Fourth, F. W. Damon	1 00
Bartlett:	
First, George V. Fletcher	4 00
Second, Varnum Frost	3 00

Third, A. T. Brown	2 00
Fourth, M. W. Chadbourne	1 00
NATIVE GRAPES.— Twelve bunches of Concord:	
First, C. T. Hayward	4 00
Second, E. A. Adams	3 00
Third, H. R. Kinney	2 00
Fourth, W. D. Hinds	1 00
Twelve bunches of Worden:	
First, E. A. Adams	4 00
Second, F. J. Kinney	3 00
Third, H. R. Kinney	2 00
Fourth, Joseph S. Chase	1 00

Theodore Lyman Fund.

APPLES.— Baldwin:	
First, Joshua C. Stone	4 00
Second, C. F. Boyden	3 00
Third, F. W. Damon	2 00
Fall Orange:	
First, Charles S. Smith	3 00
Second, Charles T. Foster	2 00
Fameuse:	
First, H. Whittaker	3 00
Second, William Milman	2 00
Fletcher Russet:	
First, Charles F. Curtis	3 00
Gravenstein:	
First, C. F. Boyden	4 00
Second, Mrs. A. S. Underwood	3 00
Third, Charles S. Smith	2 00
Hubbardston:	
First, C. F. Boyden	4 00
Second, H. E. Rich	3 00
Third, Joshua C. Stone	2 00
Hunt Russet:	
First, C. F. Boyden	3 00
Third, W. H. Teele	1 00
Mackintosh:	
First, Edwin C. Stone	4 00
Second, Charles F. Curtis	3 00
Third, C. M. Handley	2 00
Maiden's Blush:	
Second, Warren Fenno	2 00
Mother:	
First, O. B. Hadwen	3 00
Third, George C. Rice	1 00

Northern Spy:
- First, C. H. Thomas 3 00
- Second, William O'Connell 2 00
- Third, Warren Fenno 1 00

Porter:
- First, Mrs. A. S. Underwood 3 00
- Second, Edwin C. Stone 2 00
- Third, Charles S. Smith 1 00

Pound Sweet:
- First, George V. Fletcher 3 00

Rhode Island Greening:
- First, Pliny Moore 4 00
- Second, Joshua C. Stone 3 00
- Third, C. L. Hartshorn 2 00

Roxbury Russet:
- First, Joshua C. Stone 4 00
- Second, C. L. Hartshorn 3 00
- Third, Warren Fenno 2 00

Sutton:
- First, C. L. Hartshorn 3 00
- Third, Charles T. Foster 1 00

Tolman's Sweet:
- First, Mrs. A. S. Underwood 3 00
- Second, W. F. Davidson 2 00

Tompkins King:
- First, C. F. Boyden 3 00
- Second, George C. Rice 2 00
- Third, Elliott Moore 1 00

Palmer:
- First, E. M. Bruce 3 00
- Second, C. F. Boyden 2 00
- Third, O. B. Hadwen 1 00

Any other variety:
- First, John Parker, Yellow Bellflower 3 00
- Second, A. T. Brown, New York Pippin 2 00
- Third, C. H. Thomas, Fallawater 1 00

Crab Apples.— Hyslop:
- First, W. E. Allen 2 00
- Second, J. L. Richardson 1 00

Any other variety:
- First, Samuel H. Warren, Whitney 2 00

Special Prizes offered by the Society.

Pears.— Anjou, A. T. Brown 5 00
Seckel, A. T. Brown 5 00
Peaches.— Any variety, W. D. Hinds 5 00
Native Grapes.— Twelve bunches of any variety, H. R. Kinney . 5 00

Regular Prizes.

PEARS.— Angouleme:

First, A. T. Brown	4 00
Second, William O'Connell	3 00
Third, Warren Fenno	2 00

Bosc:

First, E. S. Converse	4 00
Second, A. T. Brown	3 00
Third, S. F. & F. L. Weston	2 00
Fourth, Charles F. Curtis	1 00

Clairgeau:

First, E. J. Recanco	3 00
Second, F. W. Damon	2 00
Third, Charles F. Curtis	1 00

Comice:

First, A. T. Brown	3 00
Second, J. Cunning	2 00
Third, Leverett M. Chase	1 00

Dana's Hovey:

First, A. T. Brown	4 00
Second, F. W. Damon	3 00
Third, J. Cunning	2 00
Fourth, C. E. Swain	1 00

Diel:

First, A. T. Brown	3 00
Second, C. E. Swain	2 00
Third, J. Cunning	1 00

Fulton:

First, E. S. Converse	3 00
Second, S. F. & F. L. Weston	2 00
Third, Warren Fenno	1 00

Hardy:

First, Samuel Hartwell	3 00
Second, Charles F. Curtis	2 00
Third, Leverett M. Chase	1 00

Howell:

First, E. W. Wood	3 00
Second, J. E. Fuller	2 00
Third, John J. Merrill	1 00

Josephine of Malines:

First, Warren Fenno	3 00
Second, John L. Bird	2 00

Lawrence:

First, A. T. Brown	3 00
Second, Warren Frost	2 00
Third, William S. Janvrin	1 00

Louise Bonne of Jersey:
- First, Mrs. James McCormick 3 00
- Second, C. E. Richardson 2 00
- Third, Mrs. N. D. Harrington 1 00

Marie Louise:
- First, C. E. Swain 3 00
- Second, E. A. Hall 2 00
- Third, Warren Fenno 1 00

Merriam:
- First, F. W. Damon 3 00
- Second, Charles F. Curtis 2 00
- Third, C. H. Plimpton 1 00

Onondaga:
- First, Charles B. Travis 3 00
- Second, Warren Fenno 2 00
- Third, John L. Bird 1 00

Seckel:
- First, A. T. Brown 4 00
- Second, J. Cunning 3 00
- Third, S. S. Hovey 2 00
- Fourth, Mrs. N. D. Harrington 1 00

Sheldon:
- First, Mrs. Arthur C. Wiggin 4 00
- Second, A. T. Brown 3 00
- Third, G. E. Freeman 2 00
- Fourth, George V. Fletcher 1 00

St. Michael Archangel:
- First, Benjamin P. Ware 3 00
- Second, Warren Fenno 2 00
- Third, Warren Heustis & Son 1 00

Superfin:
- First, Herbert Coolidge 3 00
- Second, F. W. Damon 2 00
- Third, Leverett M. Chase 1 00

Urbaniste:
- First, E. S. Converse 3 00
- Second, A. T. Brown 2 00
- Third, John L. Bird 1 00

Vicar:
- First, E. S. Converse 3 00
- Second, A. T. Brown 2 00
- Third, E. A. Hall 1 00

Winter Nelis:
- First, A. T. Brown 3 00
- Second, J. Cunning 2 00
- Third, E. A. Hall 1 00

Any other variety:	
First, Mrs. James McCormick, Flemish Beauty	3 00
Second, E. J. Recanco, President	2 00
Third, A. T. Brown, De Tongres	1 00
QUINCES.— Champion:	
First, Charles S. Smith	3 00
Second, E. M. Bruce	2 00
Third, George V. Fletcher	1 00
Orange:	
First, Arthur F. Coolidge	3 00
Second, J. S. Richardson	2 00
Third, George V. Fletcher	1 00
Pear:	
First, George V. Fletcher	3 00
Second, George L. Brown	2 00
Rea:	
First, Warren Fenno	3 00
Any other variety:	
First, H. O. Bates, Meech	3 00
Second, Joseph S. Chase, Meech	2 00
PEACHES.— Crawford's Late:	
First, W. N. Craig	3 00
Second, H. R. Kinney	2 00
Third, E. M. Bruce	1 00
Any other variety:	
First, W. D. Hinds, Crosby	3 00
Second, Benjamin M. Smith, Elberta	2 00
Third, W. N. Craig, Stump the World	1 00
Orchard house culture, any variety:	
First, William C. Winter	4 00
PLUMS.— Yellow Egg:	
First, George V. Fletcher	2 00
Any other variety:	
First, H. R. Kinney, Lombard	2 00
NATIVE GRAPES.— Brighton:	
First, E. A. Adams	3 00
Second, Joseph S. Chase	2 00
Third, Charles W. Libby	1 00
Delaware:	
First, H. R. Kinney	3 00
Second, Joseph S. Chase	2 00
Third, Warren Fenno	1 00
Herbert:	
First, Charles W. Libby	3 00
Second, Joseph S. Chase	2 00
Third, E. A. Adams	1 00

Iona:
First, Joseph S. Chase 3 00
Second, F. W. Damon 2 00
Lindley:
First, H. R. Kinney 3 00
Niagara:
First, E. A. Adams 3 00
Second, C. F. Hayward 2 00
Third, Joseph S. Chase 1 00
Pocklington:
First, Joseph S. Chase 4 00
Second, Charles W. Libby 3 00
Third, F. W. Damon 2 00
Fourth, H. R. Kinney 1 00
Prentiss:
First, J. Cunning 3 00
Second, A. T. Brown 2 00
Third, Estate of Benjamin G. Smith 1 00
Wilder:
First, E. A. Adams 3 00
Second, F. J. Kinney 2 00
Any other variety:
First, E. A. Adams, Campbell's Early 3 00
Second, Charles W. Libby, Moore's Diamond 2 00
Third, H. R. Kinney, " " 1 00
Any variety from girdled vines:
First, H. R. Kinney, Concord 3 00
Second, F. J. Kinney, Pocklington 2 00
Foreign Grapes.— Two bunches of any variety, cold house culture:
First, Daniel Brown, Bowood Muscat 5 00
Second, Daniel Brown, Alicante 4 00
Cranberries.— Half-peck:
First, L. J. Fosdick 3 00
Second, L. J. Fosdick 2 00
Third, L. J. Fosdick 1 00

Gratuities:—
Sumner Coolidge, Display 15 00
E. M. Bruce, Edible Nuts 1 00
W. D. Hinds, " " 1 00
C. L. Hartshorn, " " 1 00

October 21.

Gratuity:—
Joseph S. Chase, Quinces 2 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 18.

Benjamin V. French Fund.

APPLES.—Baldwin, C. F. Boyden	5 00
Rhode Island Greening, Mrs. A. S. Underwood	5 00

Society's Prizes.

APPLES.—Baldwin:	
First, J. W. Clark	3 00
Second, M. W. Chadbourne	2 00
Third, George C. Rice	1 00
Fletcher Russet:	
Second, Charles F. Curtis	2 00
Hubbardston:	
First, J. W. Clark	3 00
Second, C. F. Boyden	2 00
Third, John Parker	1 00
Hunt Russet:	
First, C. F. Boyden	3 00
Third, Rev. Calvin Terry	1 00
Northern Spy:	
First, E. C. Stone	3 00
Second, Warren Fenno	2 00
Third, George V. Fletcher	1 00
Rhode Island Greening:	
First, George V. Fletcher	3 00
Second, Mrs. E. M. Gill	2 00
Third, C. L. Hartshorn	1 00
Roxbury Russet:	
First, C. F. Boyden	3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
Tolman's Sweet:	
First, Mrs. A. S. Underwood	3 00
Tompkins King:	
First, George C. Rice	3 00
Any other variety:	
First, Mrs. A. S. Underwood, Yellow Bellflower	3 00
Second, John Parker, Yellow Bellflower	2 00
Third, C. F. Boyden	1 00
PEARS.—Angouleme:	
First, F. W. Damon	4 00
Second, Warren Fenno	3 00

Anjou:
- First, William Milman 4 00
- Second, A. T. Brown 3 00
- Third, A. K. Gould 2 00
- Fourth, J. Cunning 1 00

Clairgeau:
- First, F. W. Damon 3 00
- Second, Warren Fenno 2 00
- Third, Charles F. Curtis 1 00

Comice:
- First, A. T. Brown 4 00
- Second, J. Cunning 3 00
- Third, Warren Fenno 2 00
- Fourth, M. W. Chadbourne 1 00

Dana's Hovey:
- First, F. W. Damon 4 00
- Second, A. T. Brown 3 00
- Third, J. Cunning 2 00
- Fourth, George V. Fletcher 1 00

Diel:
- First, M. W. Chadbourne 3 00
- Second, C. E. Swain 2 00

Glout Morceau:
- First, E. A. Hall 3 00
- Second, Mrs. A. A. Johnson 2 00
- Third, Warren Fenno 1 00

Josephine of Malines:
- First, Warren Fenno 3 00
- Second, John L. Bird 2 00

Langelier:
- First, Warren Fenno 3 00
- Second, M. W. Chadbourne 2 00

Lawrence:
- First, F. W. Damon 3 00
- Second, A. T. Brown 2 00
- Third, M. W. Chadbourne 1 00

Vicar:
- First, E. S. Converse 3 00
- Second, J. M. Swett 2 00
- Third, A. T. Brown 1 00

Winter Nelis:
- First, A. T. Brown 3 00
- Second, J. Cunning 2 00
- Third, E. A. Hall 1 00

Any other variety:
- First, George V. Fletcher, Bosc 3 00

Second, Warren Fenno, Duchess of Bordeaux	2 00
Third, C. D. Frisbee, Sheldon	1 00
FOREIGN GRAPES.— Any variety:	
First, Mrs. J. C. Whitin, Alicante	5 00
Second, H. Dumaresq	4 00
Third, Daniel Brown	3 00

Gratuities: —

J. G. Masters, Collection of Apples	5 00
L. J. Fosdick, Cranberries	2 00
Rev. Calvin Terry, "	1 00

George McWilliam, New Foreign Grape, Appley Towers, First Class Certificate of Merit.

E. W. WOOD,
CHARLES F. CURTIS,
O. B. HADWEN,
WARREN FENNO,
SAMUEL HARTWELL,
J. WILLARD HILL,
SUMNER COOLIDGE,
} *Committee on Fruits.*

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1899.

By WARREN HOWARD HEUSTIS, Chairman.

Notwithstanding an extremely dry season the quality and quantity of the Vegetable exhibits have been fully up to the usual high standard, which proves in a great measure that the intensive gardeners of today are not as great sufferers from the elements as formerly, many of them having very complete water systems. But even with irrigation, the results are not as satisfactory as when crops are watered from the heavens. There have been some new exhibitors and most of the old ones still keep the interest from flagging. At the Saturday exhibitions during the winter the vegetables have been quite plenty and varied; the principal prize winners have been George D. Moore, C. L. Hartshorn, Joshua C. Stone, Hon. Aaron Low, Arthur F. Coolidge, James Comley, and Warren Heustis & Son. The competition has been quite close in most cases.

March 11, A. W. Crockford brought some mushrooms which were considered by many to be the finest specimens ever shown here. At the Spring Exhibition there was a large showing of all kinds, the Lettuce from Wyman Brothers, Mushrooms from A. W. Crockford, Rhubarb from George D. Moore, and Tomatoes from S. J. Goddard, deserving special mention as also the fine collection of fifty-two varieties of Potatoes from Hon. Aaron Low. The first Asparagus was shown by C. L. Hartshorn the 6th of May, and on

the 7th of June, F. Leith, gardener for Francis Blake had the first Peas. The vegetables at the Rose and Strawberry Show were very fine; the principal exhibitors were A. F. Coolidge, C. L. Hartshorn, George D. Moore, and Warren Heustis & Son.

The weekly shows during the year have been very well sustained. The native Mushrooms have been rather meagre, presumably on account of the dry weather.

At the Annual Exhibition the Lower Hall was completely filled with vegetables, which for quality were above the average. The specimens of Potatoes shown were very smooth, and we think the quality has been very good all through the season. The Silver Medal for New Seedling Potatoes was awarded this year for the first time in several years, Hon. Aaron Low being the recipient. The Culinary Herbs made a very interesting and instructive feature of this show. On October 2, A. W. Crockford had a new Cucumber which he has called Crockford's Columbia. It is a cross between Zion House and White Spine. It resembles the White Spine on the outside, but is very solid and has few seeds, and the keeping qualities are very good indeed. The Committee thought very favorably of it and awarded it a First Class Certificate of Merit.

There have been but few changes in the Schedule for the coming year.

The amount appropriated for prizes and gratuities for 1899 was	$1,200
Amount awarded	1,180
Leaving a balance of	$20

out of which a Medal and two Certificates of Merit are to be paid for.

For the Committee,

WARREN H. HEUSTIS,
Chairman.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

1899.

January 7.

Radishes.— Four bunches of any variety:	
First, Arthur F. Coolidge	$3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00
Cauliflowers.— Four heads:	
First, Joshua C. Stone	3 00
Celery.— Four roots:	
First, A. F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Warren Heustis & Son	1 00
Lettuce.— Four heads:	
First, A. F. Coolidge	3 00
Second, George D. Moore	2 00
Parsley.— Two quarts:	
First, W. N. Craig	2 00
Second, W. N. Craig	1 00
Mushrooms.— Twenty-four specimens:	
First, E. S. Converse	3 00
Tomatoes.— Twelve specimens:	
First, C. A. Learned	3 00
Second, Francis Blake	2 00
Third, William C. Winter	1 00
Gratuities: —	
James Comley, Rhubarb	1 00
W. Heustis & Son, Celery	1 00
C. L. Hartshorn, Collection	3 00
Arthur F. Coolidge, "	1 00

January 14.

Gratuity: —	
A. F. Coolidge, Collection	2 00

January 21.

Gratuity: —	
A. F. Coolidge, Collection	1 00

January 28.

Gratuities: —	
George D. Moore, Lettuce	1 00

A. F. Coolidge, Collection 1 00
Warren Heustis & Son, Collection 1 00

FEBRUARY 4.

RADISHES.— Four bunches:
First, A. F. Coolidge 2 00
Second, C. L. Hartshorn 1 00
SALSIFY.— Twelve specimens:
Second, W. Heustis & Son 2 00
Third, C. L. Hartshorn 1 00
CELERY.— Four roots:
First, C. L. Hartshorn 3 00
Second, W. Heustis & Son 2 00
Third, A. F. Coolidge 1 00
LETTUCE.— Four heads:
First, C. L. Hartshorn 3 00
Second, George D. Moore 2 00
Third, A. F. Coolidge 1 00
MUSHROOMS.— Twenty-four specimens:
First, E. O. Orpet 3 00
Second, James Comley 2 00
RHUBARB.— Twelve stalks:
First, James Comley 3 00
Second, E. O. Orpet 2 00
TOMATOES.— Twelve specimens:
First, W. C. Winter, Stone 3 00
Second, W. C. Winter, Chemin 2 00
Third, W. C. Winter, May's Favorite 1 00

Gratuities: —
C. A. Learned, Beets 1 00
W. Heustis & Son, Collection 1 00

FEBRUARY 18.

Gratuities: —
James Comley, Rhubarb 1 00
Norris F. Comley, Radishes 1 00

FEBRUARY 25.

Gratuities: —
A. F. Coolidge, Collection 1 00
N. F. Comley, " 1 00

MARCH 11.

Gratuity: —
A. W. Crockford, Mushrooms 1 00

SPRING EXHIBITION.

MARCH 21, 22, 23 and 24.

William J. Walker Fund.

RADISHES.— Turnip Rooted, four bunches:
- First, A. F. Coolidge 2 00
- Second, C. L. Hartshorn 1 00

Long Scarlet:
- First, H. R. Kinney 2 00

CUCUMBERS.— White Spine, pair:
- First, E. M. Bruce 3 00

SPINACH.—Half-peck:
- First, Hon. Aaron Low 2 00

DANDELIONS.— Peck:
- First, C L. Hartshorn 3 00

LETTUCE.— Four heads:
- First, Wyman Brothers 3 00
- Second, D. L. Tappan 2 00
- Third, C. L. Hartshorn 1 00

WATER CRESS.— Two quarts:
- First, C. L. Hartshorn 2 00
- Second, A. F. Coolidge 1 00

PARSLEY.— Two quarts:
- First, W. N. Craig 2 00
- Second, W. N. Craig 1 00

MUSHROOMS.— Twenty-four specimens:
- First, A. W. Crockford 3 00
- Second, Mrs. B. P. Cheney 2 00
- Third, E. S. Converse 1 00

RHUBARB.— Twelve stalks:
- First, George D. Moore 3 00
- Second, Wyman Brothers 2 00
- Third, George Sanderson 1 00

TOMATOES.— Twelve specimens:
- First, S. J. Goddard 3 00
- Second, Francis Blake 2 00
- Third, William C. Winter 1 00

Gratuities:—

Wyman Brothers, Mushrooms 1 00

Aaron Low, Collection of fifty-two varieties of Potatoes, First Class Certificate of Merit and $5.

C. L. Hartshorn, Collection 2 00

A. F. Coolidge, " 1 00

W. Heustis & Son " 1 00

April 1.

Cucumbers.— White Spine, pair:
First, E. M. Bruce 3 00

Gratuities: —
Hon. Aaron Low, Spinach 1 00
A. F. Coolidge, Collection 1 00

April 8.

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
Hon. Aaron Low, Collection 1 00
George D. Moore " 1 00

April 15.

Gratuities: —
Warren Heustis & Son, Lettuce 1 00
Estate of John Jeffries, Parsley 1 00
George D. Moore, Collection 1 00

April 22.

Gratuities: —
Hon. Aaron Low, Spinach 1 00
Mrs. E. M. Gill, Tomatoes 1 00
Mrs. B. P. Cheney, Mushrooms 1 00
George D. Moore, Collection 1 00

April 29.

Gratuities: —
Mrs. E. M. Gill, Tomatoes 1 00
George D. Moore, Collection 1 00
Warren Heustis & Son, Collection 1 00

May 6.

William J. Walker, Fund.

Asparagus.— Four bunches:
First, C. L. Hartshorn 3 00
Cucumbers.— White Spine, pair:
First, Arthur F. Coolidge 3 00
Second, E. M. Bruce 2 00
Third, Wyman Brothers 1 00
Spinach.— Peck:
First, Hon. Aaron Low 3 00
Second, C. L. Hartshorn 2 00
Third, Hon. Aaron Low 1 00

DANDELIONS.— Peck:	
First, W. Heustis & Son	2 00
Second, A. F. Coolidge	1 00
LETTUCE.— Four heads:	
First, C. L. Hartshorn	3 00
Second, George D. Moore	2 00
Third, A. F. Coolidge	1 00
RHUBARB.— Twelve stalks:	
First, Warren Heustis & Son	2 00
Second, A. F. Coolidge	1 00
TOMATOES.— Twelve specimens:	
First, Francis Blake, Best of All	3 00
Second, Francis Blake, Essex	2 00
Third, E. M. Bruce, "	1 00
Gratuities: —	
George D. Moore, Collection	1 00
A. F. Coolidge, "	1 00
W. Heustis & Son, "	1 00
Hon. Aaron Low, "	1 00
W. N. Craig, "	1 00

MAY 13.

Gratuities: —	
Norris F. Comley, Asparagus	1 00
George D. Moore, Collection	2 00
C. L. Hartshorn, "	2 00
W. Heustis & Son, "	2 00

MAY 20.

Gratuities: —	
George D. Moore, Collection	1 00
Mrs. E. M. Gill, "	1 00
W. Heustis & Son, "	1 00
C. L. Hartshorn, "	1 00
Norris F. Comley, "	1 00

MAY 27.

Gratuities: —	
William H. Hunt, Asparagus	1 00
Mrs. E. M. Gill, Tomatoes	1 00
Hon. Aaron Low, Collection	1 00
George D. Moore, "	1 00
W. Heustis & Son, "	1 00

RHODODENDRON SHOW.

JUNE 7 AND 8.

Theodore Lyman Fund.

BEETS.— Twelve specimens, any variety:

First, H. R. Kinney	3 00
Second, C. L. Hartshorn	2 00
Third, George D. Moore	1 00

CARROTS.— Short Scarlet, twelve specimens:

First, H. R. Kinney,	3 00
Second, C. L. Hartshorn	2 00

RADISHES.— Turnip rooted, four bunches:

First, C. L. Hartshorn	2 00
Second, George D. Moore	1 00

Long Scarlet, four bunches:

First, George D. Moore	2 00
Second, Wyman Brothers	1 00

ASPARAGUS.— Four bunches:

First, William H. Hunt	3 00
Second, Norris F. Comley	2 00
Third, C. L. Hartshorn	1 00

CUCUMBERS.— Pair:

First, George D. Moore	3 00
Second, Wyman Brothers	2 00
Third, H. R. Kinney	1 00

LETTUCE.— Four heads:

First, Estate of Hon. Joseph S. Fay	3 00
Second, Warren Heustis & Son	2 00
Third, George D. Moore	1 00

RHUBARB.— Twelve stalks:

First, Warren Heustis & Son	3 00
Second, Hon. Aaron Low	2 00
Third, Joshua C. Stone	1 00

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
W. C. Winter, "	1 00
Wyman Brothers, Collection	2 00
George D. Moore, "	2 00
C. L. Hartshorn, "	2 00
Francis Blake, "	1 00
W. Heustis & Son, "	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 22 AND 23.

BEETS.— Summer Turnip Rooted, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Joshua C. Stone	1 00

ONIONS.— Twelve specimens:

First, W. N. Craig	3 00
Second, Wyman Brothers	2 00
Third, George D. Moore	1 00

CUCUMBERS.— White Spine, pair:

First, Arthur F. Coolidge	3 00
Second, George D. Moore	2 00
Third, Warren Heustis & Son	1 00

Any other variety:

First, George D. Moore, Eureka	3 00
Second, George D. Moore, Emerald	2 00

CABBAGES.— Three of any variety, trimmed:

First, Warren Heustis & Son, All Seasons	3 00
Second, Warren Heustis & Son, Early Summer	2 00
Third, George D. Moore, Early Summer	1 00

LETTUCE.— Tennisball, four heads:

First, George D. Moore	3 00
Second, Warren Heustis & Son	2 00
Third, C. L. Hartshorn	1 00

Any other variety:

First, E. C. Lewis, Deacon	3 00
Second, Estate of John Jeffries, Deacon	2 00
Third, George D. Moore, Sensation	1 00

PEAS.— Any variety, half-peck:

First, H. R. Kinney	3 00
Second, George D. Moore	2 00
Third, C. L. Hartshorn	1 00

Gratuities: —

E. C. Lewis, Collection	1 00
Hon. Aaron Low, "	1 00
Estate of John Jeffries, Collection	1 00
Warren Heustis & Son, "	1 00
William C. Winter, "	1 00
George D. Moore, "	1 00
Sumner Coolidge, "	1 00
C. L. Hartshorn, "	1 00

JULY 1.

POTATOES.— Twelve specimens:

First, George D. Moore, Early Bovee	3 00
Second, E. C. Lewis, Bliss's Triumph	2 00
Third, C. L. Hartshorn, Early Fortune	1 00

ONIONS.— Twelve specimens:

First, Wyman Brothers	2 00
Second, George D. Moore	1 00

SQUASHES.— Long Warted, four:

First, Joshua C. Stone	3 00
Second, Sumner Coolidge	2 00
Third, C. L. Hartshorn	1 00

Scalloped:

First, Joshua C. Stone	2 00
Second, Sumner Coolidge	1 00

CABBAGES.— Three of any variety, trimmed:

First, Warren Heustis & Son, Succession	3 00
Second, George D. Moore, "	2 00
Third, Warren Heustis & Son, No. 2	1 00

BEANS.— Half-peck of Golden Wax:

First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, I. E. Coburn	1 00

Half-peck of any other variety:

First, George D. Moore, Davis	3 00
Second, I. E. Coburn, Cranberry	2 00
Third, Arthur F. Coolidge, Mohawk	1 00

PEAS.— American Wonder, half-peck:

First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00

Advancer:

First, C. L. Hartshorn	3 00
Second, George B. Gill	2 00

Any other variety:

First, C. L. Hartshorn, Telephone	3 00
Second, E. C. Lewis, Prosperity	2 00
Third, W. Warburton, Carter's Daisy	1 00

Gratuity: —

W. Warburton, Collection	1 00

JULY 8.

CABBAGES.— Three Drumhead, trimmed:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00

BEANS.— Half-peck of Cranberry:

First, I. E. Coburn	3 00
Second, Joshua C. Stone	2 00

SWEET CORN.— Twelve ears:

First, Sumner Coolidge, Cory	3 00
Second, Joshua C. Stone, "	2 00

TOMATOES.— Open culture:

First, Sumner Coolidge, Atlantic	3 00
Second, Arthur F. Coolidge, "	2 00
Third, W. N. Craig, Essex	1 00

Gratuities: —

Estate of Hon. Joseph S. Fay, Potatoes	1 00
George D. Moore, Collection	1 00
W. Heustis & Son, "	1 00
W. Warburton, "	1 00
E. C. Lewis, "	1 00
Arthur F. Coolidge "	1 00
C. L. Hartshorn, "	1 00

JULY 15.

POTATOES.— Twelve specimens of any variety:

First, J. Burns, Early Northern	3 00
Second, Hon. Aaron Low, Early Fortune	2 00
Third, Estate of Hon. J. S. Fay, Hebron	1 00

LETTUCE.— Tennisball, four heads:

First, Sumner Coolidge	2 00
Second, C. L. Hartshorn	1 00

Any other variety:

First, C. L. Hartshorn	2 00
Second, Warren Heustis & Son	1 00

PEAS.— Stratagem, half-peck:

First, C. L. Hartshorn	3 00
Second, Hon. Aaron Low	2 00

Any other variety:

First, C. L. Hartshorn, Telephone	3 00
Second, Hon. Aaron Low "	2 00

SWEET CORN.— Twelve ears of any variety:

First, Sumner Coolidge, Crosby	3 00
Second, Sumner Coolidge, Hybrid	2 00
Third, Joshua C. Stone, Cory	1 00

TOMATOES.— Twelve specimens:

First, Sumner Coolidge	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

July 22.

Potatoes.— Any variety, twelve specimens:

First, J. W. Burns	3 00
Second, F. J. Kinney	2 00
Third, Hon. Aaron Low	1 00

Squashes.— Three Marrow:

First, Warren Heustis & Son	3 00

Sweet Corn.— Twelve ears, Crosby:

First, Hittinger Brothers	3 00
Second, Sumner Coolidge	2 00

Any other variety:

First, Joshua C. Stone, Quincy Market	3 00

Tomatoes.— Twelve specimens:

First, Hittinger Brothers, Stone	3 00
Second, Sumner Coolidge, "	2 00
Third, Joshua C. Stone, "	1 00

Mushrooms.— Not less than five edible varieties:

Second, Miss Alice L. Grinnell	3 00

Gratuities: —

C. A. Berg, Kohl Rabi	1 00
W. N. Craig, Cucumbers	1 00

July 29.

Beans.— Goddard, two quarts:

First, Warren Heustis & Son	3 00
Second, I. E. Coburn	2 00
Third, David L. Fiske	1 00

Horticultural:

First, David L. Fiske	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00

Tomatoes.— Comrade, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, I. E. Coburn	2 00
Third, Hon. Aaron Low	1 00

Stone:

First, Francis Blake	3 00
Second, Hittinger Brothers	2 00
Third, E. N. Pierce	1 00

Any other variety:

First, Hittinger Brothers, Hybrid	3 00
Second, Warren Heustis & Son, Hybrid	2 00
Third, Sumner Coolidge, Atlantic	1 00

Egg Plants.— Round Purple, four:

First, Arthur F. Coolidge	3 00

Second, Joshua C. Stone 2 00
Third, Sumner Coolidge 1 00

Gratuities : —

Hon. Aaron Low, Potatoes 1 00
J. W. Burns, " 1 00
Joshua C. Stone, Melons 1 00
Warren Heustis & Son, Collection 1 00
E. C. Lewis, " 1 00

AUGUST. 5.

GREEN FLESH MELONS.— Four specimens :
First, Arthur F. Coolidge 3 00
Second, C. L. Hartshorn 2 00
Third, Joshua C. Stone 1 00
SALMON FLESH MELONS.— Four specimens :
First, C. L. Hartshorn 3 00
Third, Joshua C. Stone 1 00
SWEET CORN.— Twelve ears :
First, I. E. Coburn, Potter's Excelsior 3 00
Second, Oliver R. Robbins, Kendall's Giant . . . 2 00
Third, Sumner Coolidge, Potter's Excelsior . . . 1 00
EGG PLANTS.— Round Purple, four :
First, Arthur F. Coolidge 3 00
Second, Sumner Coolidge 2 00
Third, Norris F. Comley 1 00

Gratuities : —

George F. Stone, Collection 1 00
Hon. Aaron Low, " 1 00

AUGUST 12.

POTATOES.— Twelve specimens of any variety:
First, E. C. Lewis, Thoroughbred 3 00
Second, J. W. Burns, Early Northern 2 00
Third, Hon. Aaron Low, Early Fortune . . . 1 00
ONIONS.— Twelve specimens :
First, E. C. Lewis, Prize Taker 3 00
Second, Sumner Coolidge, Danvers 2 00
Third, W. N. Craig, Danvers 1 00
GREEN FLESH MELONS.— Four specimens :
First, Arthur F. Coolidge 3 00
Second, C. L. Hartshorn 2 00
Third, Joshua C. Stone 1 00

SALMON FLESH MELONS.— Any variety, four specimens:

First, Varnum Frost	3 00
Second, George D. Moore	2 00
Third, Joshua C. Stone	1 00

CELERY.— Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, W. N. Craig	2 00
Third, Warren Heustis & Son	1 00

BEANS.— Small Lima, two quarts:

First, Sumner Coolidge	3 00

Goddard:

First, Warren Heustis & Son	3 00
Second, C. L. Hartshorn,	2 00
Third, Hon. Aaron Low	1 00

SWEET CORN.— Potter's Excelsior, twelve ears:

First, I. E. Coburn	3 00
Second, E. C. Lewis	2 00
Third, Oliver R. Robbins	1 00

Any other variety:

First, E. C. Lewis, Crosby	3 00
Second, Joshua C. Stone, Bear's Foot	2 00
Third, Joshua C. Stone, Crosby	1 00

PEPPERS.— Squash, twelve specimens:

First, Arthur F. Coolidge	3 00
Second, George Lincoln	2 00
Third, Hon. Aaron Low	1 00

Any other variety:

First, E. C. Lewis, Ruby King	3 00
Second, Joseph Thorp, "	2 00
Third, C. L. Hartshorn, "	1 00

Gratuities: —

Mrs. E. M. Gill, Tomatoes	1 00
E. C. Lewis, Collection	2 00
W. H. Burlen, "	1 00
C. A. Berg, "	1 00
W. Heustis & Son, "	1 00

AUGUST 19.

GREEN FLESH MELONS.— Four specimens:

First, C. L. Hartshorn	3 00
Second, Joshua C. Stone	2 00
Third, Arthur F. Coolidge	1 00

SALMON FLESH MELONS.— Four specimens:

First, George D. Moore	3 00
Second, Varnum Frost	2 00

WATERMELONS.— Pair:

First, C. L. Hartshorn	3 00

CABBAGES.— Three of any variety, trimmed:
First, C. L. Hartshorn 3 00
CAULIFLOWERS.— Four specimens:
First, W. S. Luscomb 3 00
Second, B. J. De Souza 2 00
CELERY.— Four roots:
First, Arthur F. Coolidge 3 00
Second, W. N. Craig 2 00
Third, Warren Heustis & Son, ... 1 00
BEANS.— Large Lima, two quarts
First, C. L. Hartshorn 3 00
Second, Sumner Coolidge 2 00
Small Lima:
First, Oliver R. Robbins 3 00
Second, C. L. Hartshorn 2 00
MARTYNIAS.— Twelve specimens:
First, E. S. Converse 2 00
Second, E. C. Lewis 1 00

Gratuities: —
E. C. Lewis, Collection 2 00
W. N. Craig, " 2 00
W. Heustis & Son, " 1 00
Hon. Aaron Low, " 1 00

AUGUST 30.

Gratuity: —
James Comley, Collection of Celery 2 00
James Comley, New London Celery, First Class Certificate of Merit

SEPTEMBER 2.

Gratuity: —
Warren Heustis & Son, Celery 1 00

SEPTEMBER 9.

TURNIPS.— Flat, twelve:
First, E. C. Lewis 3 00
Second, C. L. Hartshorn 2 00
GREEN FLESH MELONS.— Four specimens:
First, C. L. Hartshorn 3 00
Second, Joshua C. Stone 2 00
Third, I. E. Coburn 1 00
SALMON FLESH MELONS.— Four specimens:
First, George D. Moore 3 00
Second, Joshua C. Stone 2 00

WATERMELONS.— Two specimens:

First E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Rev. C. Terry	1 00

CAULIFLOWERS.— Four specimens:

First, B. J. De Souza	3 00
Second, William H. Teele	2 00
Third, C. M. Handley	1 00

LETTUCE. — Four heads of any variety:

First, George D. Moore, Deacon	3 00
Second, Sumner Coolidge, Tennisball	2 00
Third, George F. Stone, "	1 00

CELERY. — Four roots of any variety:

First, Arthur F. Coolidge	3 00
Second, Warren Heustis & Son	2 00
Third, C. L. Hartshorn	1 00

PARSLEY. — Two quarts:

First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00

BEANS. — Large Lima, two quarts:

First, Mrs. E. M. Gill	3 00
Second, C. M. Handley	2 00
Third, Sumner Coolidge	1 00

Small Lima:

First, E. C. Lewis	3 00
Second, Sumner Coolidge	2 00
Third, C. L. Hartshorn	1 00

CORN. — Potter's Excelsior, twelve ears:

First, I. E. Coburn	3 00
Second, E. C. Lewis	2 00
Third, Arthur F. Coolidge	1 00

Any other sweet variety:

First, E. C. Lewis	3 00
Second, C. L. Hartshorn	2 00
Third, Hon. Aaron Low	1 00

EGG PLANTS.— Round Purple, four:

First, Arthur F. Coolidge	3 00
Second, Sumner Coolidge	2 00
Third, Norris F. Comley	1 00

TOMATOES.— Three varieties, twelve specimens each:

First, Hon. Aaron Low	5 00
Second, Varnum Frost	4 00
Third, Arthur F. Coolidge	3 00

Aristocrat, twelve:

First, Joseph Thorp	3 00
Second, Hon. Aaron Low	2 00
Third, Varnum Frost	1 00

Comrade:
First, Hon. Aaron Low 3 00
Second, Arthur F. Coolidge 2 00
Third, Joshua C. Stone 1 00
May's Favorite:
First, Hon. Aaron Low 3 00
Second, Varnum Frost 2 00
Third, W. N. Craig 1 00
Any other variety:
First, Joseph Thorp, Stone 3 00
Second, Hittinger Brothers, Stone 2 00
Third, Varnum Frost, " 1 00

MARTYNIAS.— Twelve specimens:
First, Sumner Coolidge, ... 2 00
Second, E. C. Lewis 1 00

OKRA.— Twelve specimens:
First, E. C. Lewis 2 00
Second, E. C. Lewis 1 00

PEPPERS.— Squash, twelve specimens:
First, George Lincoln 2 00
Second, E. C. Lewis 1 00
Any other variety:
First, C. L. Hartshorn, Ruby King 2 00
Second, E. C. Lewis, " " 1 00

Gratuities: —
Warren Heustis & Son, Collection 2 00
E. C. Lewis, " 2 00
Hon. Aaron Low, " 2 00
W. N. Craig, " 1 00

SEPTEMBER 16.

Gratuities: —
Mrs. G. Duncan, Collection 1 00
Warren Heustis & Son, " 1 00

ANNUAL EXHIBITION OF FRUITS AND VEGETABLES.

SEPTEMBER 28 AND 29.

Special Prizes.

POTATOES.— New Seedlings, best collection:
Hon. Aaron Low, Silver Medal.

Regular Prizes.

BEETS.— Turnip Rooted, twelve:
First, E. C. Lewis 3 00

Second, Joshua C. Stone	2 00
Third, W. Warburton	1 00
CARROTS.— Long Orange, twelve:	
First, E. C. Lewis	3 00
Second, W. Warburton	2 00
Third, C. L. Hartshorn	1 00
Intermediate, twelve:	
First, W. Warburton	3 00
Second, E. C. Lewis	2 00
Third, W. A. Donnell	1 00
PARSNIPS.— Long, twelve:	
First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, E. C. Lewis	1 00
POTATOES.— Four varieties, twelve specimens each:	
First, C. H. Thomas	5 00
Second, F. J. Kinney	4 00
Third, H. R. Kinney	3 00
Carman No. 1:	
First, C. H. Thomas	3 00
Second, Hon. Aaron Low	2 00
Clark:	
First, C. H. Thomas	3 00
Second, Hon. Aaron Low	2 00
Third, F. J. Kinney	1 00
Hebron:	
First, H. R. Kinney	3 00
Second, F. J. Kinney	2 00
Third, C. H. Thomas	1 00
Rose:	
First, C. H. Thomas	3 00
Second, F. J. Kinney	2 00
Third, H. E. Rich	1 00
Any other variety:	
First, F. J. Kinney, Early Bovee	3 00
Second, E. C. Lewis, Somerset	2 00
Third, C. H. Thomas, Sir Walter Raleigh	1 00
SALSIFY.—Twelve specimens:	
First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, W. Warburton	1 00
TURNIPS.— Flat, twelve:	
First, Wilfred Wheeler	3 00
Second, George F. Wheeler	2 00
Third, F. J. Kinney	1 00

Swedish:
First, E. C. Lewis 3 00
Second, E. C. Lewis 2 00
Third, C. L. Hartshorn 1 00

Onions.— Danvers, twelve:
First, B. P. Winch 3 00
Second, W. N. Craig 2 00
Third, C. L. Hartshorn 1 00

Red:
First, W. N. Craig 3 00
Second, C. L. Hartshorn 2 00
Third, E. C. Lewis 1 00

White:
First, C. L. Hartshorn 2 00
Second, Sumner Coolidge 1 00

Any other variety:
First, E. C. Lewis, Prize Taker 3 00
Second, W. N. Craig, " 2 00
Third, C. L. Hartshorn " 1 00

Squashes.— Bay State, three:
First, Joshua C. Stone 3 00
Second, C. L. Hartshorn 2 00
Third, E. C. Lewis 1 00

Hubbard:
First, C. L. Hartshorn 3 00
Second, Joshua C. Stone 2 00
Third, Arthur F. Coolidge 1 00

Hybrid Turban:
First, E. C. Lewis 3 00
Second, C. L. Hartshorn 2 00
Third, George N. Lincoln 1 00

Marblehead:
First, E. C. Lewis 3 00
Second, C. L. Hartshorn 2 00

Marrow:
First, E. C. Lewis 3 00
Second, Arthur F. Coolidge 2 00
Third, Hon. Aaron Low 1 00

Any other variety:
First, C. L. Hartshorn 3 00
Second, Hon. Aaron Low 2 00
Third, Warren Heustis & Son 1 00

Cucumbers.— White Spine, pair:
First, W. N. Craig 3 00
Second, Joshua C. Stone 2 00

Any other variety:
First, W. N. Craig 3 00
Second, Hon. Aaron Low 2 00

GREEN FLESH OR SALMON FLESH MELONS.— Four specimens:
First, C. L. Hartshorn 3 00
Second, George D. Moore 2 00
Third, C. L. Hartshorn 1 00

WATERMELONS.— Two specimens:
First, E. C. Lewis 3 00
Second, Hon. Aaron Low 2 00
Third, C. L. Hartshorn 1 00

BRUSSELS SPROUTS.— Half-peck:
First, C. L. Hartshorn 3 00
Second, E. C. Lewis 2 00
Third, E. S. Converse 1 00

CABBAGES.— Drumhead, three, trimmed:
First, Samuel Hartwell 3 00
Second, E. C. Lewis 2 00
Third, C. L. Hartshorn 1 00

Red:
First, Samuel Hartwell 3 00
Second, E. C. Lewis 2 00
Third, B. P. Winch 1 00

Savoy:
First, B. P. Winch 3 00
Second, E. C. Lewis 2 00
Third, C. L. Hartshorn 1 00

CAULIFLOWERS.— Four specimens:
First, C. M Handley 5 00
Second, De Souza Brothers 4 00
Third, William H. Teele 3 00

CELERY.— Paris Golden, four roots, best kept during the exhibition:
First, Arthur F. Coolidge 5 00
Second, Warren Heustis & Son 4 00
Third, C. L. Hartshorn 3 00

Any other variety:
First, Warren Heustis & Son, Pascal 5 00
Second, A. Nixon, White Plume 4 00
Third, W. N. Craig, " 3 00

ENDIVE.— Four specimens:
First, C. L. Hartshorn 3 00
Second, E. C. Lewis 2 00
Third, E. C. Lewis 1 00

LETTUCE.— Four heads:
First, George D. Moore 3 00
Second, Warren Heustis & Son 2 00

Third, C. L. Hartshorn	1 00
PARSLEY.— Two quarts:	
First, W. N. Craig	2 00
Second, C. L. Hartshorn	1 00
HORSERADISH.— Six roots, present year's growth:	
First, H. R. Kinney	2 00
Second, W. Warburton	1 00
CORN.— Yellow or Field, twenty-five ears, traced:	
First, Elliott Moore	3 00
Second, H. E. Rich	2 00
Third, H. E. Rich	1 00
Sweet, twelve ears:	
First, C. L. Hartshorn	3 00
Second, E. C. Lewis	2 00
Third, E. C. Lewis	1 00
EGG PLANTS.— Round Purple, four:	
First, Arthur F. Coolidge	3 00
Second, C. L. Hartshorn	2 00
Third, Sumner Coolidge	1 00
TOMATOES.— Three varieties, twelve specimens each:	
First, Varnum Frost	4 00
Second, Arthur F. Coolidge	3 00
Third, W N. Craig	2 00
Aristocrat:	
First, Joseph Thorp	3 00
Second, E. M. Bruce	2 00
Third, Varnum Frost	1 00
May's Favorite:	
First, Warren Heustis & Son	3 00
Second, B. P. Winch	2 00
Third, W. N. Craig	1 00
Stone:	
First, Hon. Aaron Low	3 00
Second, Varnum Frost	2 00
Third, B. P. Winch	1 00
Any other variety:	
First, Joseph Thorp, Combination	3 00
Second, W. Warburton, Matchless	2 00
Third, Arthur F. Coolidge, Perfection	1 00
PEPPERS.— Squash, twelve specimens:	
First, George W. Jameson	3 00
Second, Hon. Aaron Low	2 00
Any other variety:	
First, C. L. Hartshorn	3 00
Second, Joseph Thorp	2 00
Third, A. Nixon	1 00

CULINARY HERBS, GREEN.— Collection, named:

First, W. N. Craig	5 00
Second, C. L. Hartshorn	4 00
Third, W. Warburton	3 00

Gratuities: —

C. L. Hartshorn, Collection	5 00
W. N. Craig, "	5 00
W. Heustis & Son, "	5 00
E. C. Lewis, "	3 00
George D. Moore, "	2 00
W. Warburton, "	2 00
Hon. Aaron Low, "	2 00
George F. Stone, "	1 00
B. P. Winch, "	1 00

OCTOBER 21.

Gratuities: —

Warren Heustis & Son, Celery	1 00
Hon. Aaron Low, Turnips	1 00

A. W. Crawford, New Cucumber, Crockford's Columbia, First Class Certificate of Merit.

OCTOBER 28.

Gratuity: —

Warren Heustis & Son, Salsify	1 00

NOVEMBER 4.

Gratuities: —

George D. Moore, Lettuce	1 00
Warren Heustis & Son, Celery	1 00

EXHIBITION OF WINTER FRUITS AND VEGETABLES.

NOVEMBER 18.

PARSNIPS.— Twelve specimens:

First, Warren Heustis & Son	3 00
Second, George D. Moore	2 00
Third, D. L. Tappan	1 00

CUCUMBERS. — Pair:

First, Joshua C. Stone	3 00
Second, C. A. Learned	2 00
Third, Mrs. John L. Gardner	1 00

CABBAGES.— Red, three:

First, C. L. Hartshorn	3 00

Savoy:

First, Joshua C. Stone	3 00
Second, C. L. Hartshorn	2 00

Brussels Sprouts. — Half peck:

First, H. Dumaresq	3 00
Second, Mrs. John L. Gardner	2 00
Third, C. L. Hartshorn	1 00

Cauliflowers. — Four specimens:

First, C. M. Handley	3 00

Celery. — Four roots:

First, Warren Heustis & Son	3 00
Second, D. L. Tappan	2 00
Third, C. L. Hartshorn	1 00

Lettuce. — Four heads:

First, George D. Moore	3 00

Tomatoes. — Twelve specimens, grown under glass:

First, William C. Winter	3 00
Second, Francis Blake	2 00
Third, C. A. Learned	1 00

Gratuities: —

C. M. Handley, Cauliflowers	1 00
D. L. Tappan, Salsify	1 00
Hon. James J. H. Gregory, No. 7 Squash	1 00
C. L. Hartshorn, Collection	4 00
W. Heustis & Son, "	4 00
George D. Moore, "	2 00
Hon. Aaron Low, "	1 00

November 25.

Gratuities: —

Joshua C. Stone, Cucumbers	1 00
Warren Heustis & Son, Collection	2 00

December 2.

Gratuity: —

Warren Heustis & Son, Collection	1 00

December 16.

Gratuity: —

Charles A. Learned, Tomatoes, First Class Certificate of Merit and $1.

Warren Howard Heustis,
Cephas H. Brackett,
Varnum Frost,
Walter Russell,
Aaron Low,
George D. Moore,
Joshua C. Stone,
} *Committee on Vegetables.*

REPORT

OF THE

COMMITTEE ON GARDENS,

FOR THE YEAR 1899.

By PATRICK NORTON, Chairman.

The season which is about closing has been one of great activity with your Committee. We have been called upon to visit seventeen places, all of which have been examined with pleasure both to the Committee and to the proprietors. In nearly every instance the weather has been favorable, and the excursions, thus made pleasant, have been very enjoyable. We will take the notices in their order and describe each place in as brief a manner as possible, and at the end of this report will be found a list of the prizes and gratuities awarded by your Committee.

F. A. Blake's Carnation House, Rochdale.

The first visit was on the 18th of April, to the estate of F. A. Blake, at Rochdale, to view a house of carnations which was filled with plants of a seedling, of a rich scarlet color, originated by Mr. Blake and named Bon Ton. The house was in fine condition, and the plants were robust and healthy and profusely flowered. The flower stems were fully eighteen inches long, upright in habit, and of strong growth. The flowers are of medium size, and command a ready sale in the market.

William Nicholson's Tomato House, Framingham.

The second visit was on May 11th to William Nicholson, Framingham, to inspect a house of tomatoes, principally grown on benches. The house, one hundred feet long by fifteen feet wide,

contained two hundred and fifty plants on the main bench, planted in four rows the length of the house, and about two feet apart in the rows, all planted January 1st. A careful estimate by the Committee was made, and it was agreed that the house then contained fully two tons of fruit. Everything about the houses was clean, neat, and thrifty, the whole plant presenting a prosperous appearance.

E. M. Bruce's Cucumber House, Leominster.

The third visit was to the farm of E. M. Bruce, Leominster, on May 17th, to inspect a house of cucumbers. The house was one hundred and fifty feet long by twenty feet wide, and was planted in four rows lengthwise and two feet apart in the rows. The vines were in full bearing when we saw them, and presented a very healthy and vigorous appearance although Mr. Bruce reported to us that he had already cut ten thousand cucumbers up to that time, in four months.

Mrs. David Nevins's Estate, Methuen.

The fourth visit occurred on June 9th, by the kind invitation of Mrs. David Nevins, of Methuen (formerly of South Framingham). This estate has been in the family a great many years and consists of from forty to fifty acres of land planted with a large variety of trees and shrubs, some of which are fine specimens of arboreal growth. The buildings correspond with the surroundings and are of that old-fashioned and comfortable style, which appeals to one's sense of comfort and hospitality, always to be found in those peaceful homes occupied by the descendants of old-fashioned people. Our visit to Mrs. Nevins was one of the most delightful in our recollection.

In this vicinity is Memorial Hall, which was presented to the town by the late David Nevins, and is a magnificent monument of his generosity. It contains a fine large library, a reading room and a beautiful memorial window which must have cost a great sum of money. Contiguous to the hall has been erected an appropriate monument over the grave of the late Mr. Nevins. It is a splendid work of art and will perpetuate the memory of a good man after this generation shall have passed away.

C. H. Tenney's Estate, Methuen.

While at Methuen we were invited to visit Greycourt, the magnificent estate of C. H. Tenney. This place is modern in all its appointments, and is replete with all the comforts and conveniences which can be incorporated in a wealthy man's house. The house is a magnificent stone palace, and the grounds are laid out in the most artistic manner. It is a great pleasure to see so much good taste displayed, and on such a broad scale, as is manifest on this estate.

William C. Winter's House of Foreign Grapes and House of Tomatoes, Mansfield.

The fifth visit occurred on June 15th at William C. Winter's, Mansfield, to inspect a house of foreign grapes and a house of tomatoes. The grape vines were heavily fruited but mildew had made its appearance to a considerable extent, which must be detrimental to the ripening of the fruit. The plants in the tomato house were all in pots and about six feet high, fairly well fruited, but badly infested with red spider,— so much so that the vines would not grow much more, and probably would not mature all the fruit set.

Warren H. Heustis's Strawberry Garden, Belmont.

The sixth visit was on the 16th of June, to W. H. Heustis's fruit and vegetable farm at Belmont, to inspect a strawberry garden. The plants were set in rows three feet apart, and about one foot apart in the rows. The variety was the Marshall. The plants were heavily fruited with berries of the first quality and of enormous size. The field was mulched with salt meadow hay and kept sufficiently watered to perfect the fruitage. The result was a very large yield of first-class berries, which were further appreciated by the Fruit Committee at the Annual Strawberry Show, where Mr. Heustis was awarded the first prize over all competitors.

George D. Moore's Vegetable Garden, Arlington.

June 21 we visited the estate of George D. Moore to inspect a house of cucumbers and a vegetable garden. The house of cucumbers was, in the judgment of your Committee, the best they

Residence of Arthur F. Estabrook, Beach Bluff.

ever saw; and this decision was confirmed by several of the best farmers of Arlington, who had been invited to go with the Committee. The vegetable garden showed good cultivation and a thrifty appearance, notwithstanding a very dry springtime. There was not a very great variety of vegetables, but the tomatoes, beans, and peas were remarkably fine.

Sumner and Frank E. Coolidge's Vegetable Farm, Mount Auburn.

The eighth visit occurred on July 6th, and was to the vegetable farm of Sumner and Frank E. Coolidge, at Mount Auburn. This farm has the advantage of an abundant water supply, which is so well distributed all over the farm that the growing crops never get thirsty from the want of water. The past summer was a very trying one to farmers who had no adequate supply of water, but on this farm the vegetables looked as thrifty as though it rained every other day. The weather of late years is so variable that it would seem to be economy for all our early and late vegetable farmers to put in adequate irrigating plants to protect their farms from such a drought as we have had during the past summer.

Arthur F. Estabrook's Grounds, Beach Bluff.

The next visit was to the summer estate of Arthur F. Estabrook, at Beach Bluff. The estate is entered for the Hunnewell Triennial Premium, and this is the third year of inspection. The whole of the place was in splendid condition notwithstanding it was a very dry summer and trying to lawns, shrubs, and flower gardens, the flower beds, the lawn, and the shrubs and trees showed that none of them had suffered by the effects of drought. The whole place showed increased care by Mr. Barker, the gardener, and a greater degree of taste in the arrangement of flower-bed effects than formerly. The estate is beautifully situated and enjoys a splendid outlook over the ocean, making it a delightful summer home for the owner. The Committee has awarded the estate the first of the Hunnewell Triennial Premiums.

The Oliver Ames Estate, North Easton.

On August 29th we visited the Oliver Ames estate at North Easton, occupied by Oakes Ames. This estate is entered in competition for the Hunnewell Triennial Premium and this is the first

year of entry. The place is furnished with very fine stone buildings, which were erected by his father, the late governor of this state, and has the advantage of a beautiful pond which borders it on the south, with other ponds, devoted to the culture of all kinds of aquatics, in the grounds. The surface of the place is nicely undulating and is covered with various superb forest trees, all of which were planted by the late governor as to his good judgment seemed best. The trees are so far apart that each has had room enough to develop and become a fine specimen of its kind. Mr. Ames is devoting a portion of his valuable time to the improvement of our native wild flowers by hybridizing and careful cultivation. His stove and greenhouses are remarkable, for they contain a very large collection of orchids and other plants from all over the world. The whole estate was in good condition, except that the drought had partially spoiled the grass among the forest trees.

George Abbot James's Estate, Nahant.

The eleventh visit was made on September 11th, to the estate of George Abbot James, at Nahant. This was our first visit to this estate, which is entered for the Hunnewell Triennial Premium. It consists of twenty-five acres of land and rocks, and is situated at the extreme south end of this rock-bound promontory. About thirty years ago this place was a wind-swept sand dune, but now it presents to the eye a very different appearance. A walk has been constructed on the cliffs, which affords some of the grandest views to be found on this rugged coast, and when the sea is angry the water roars over the immense boulders which line the shore, in a terrific manner. The sand has been hidden by a thick coating of loam; trees, shrubs, and flower-beds have been planted and the whole place has been made to "blossom like the rose." The place has an advantage over inland estates inasmuch as the huge rocks and the never quiet sea are ever present, making this promontory a most delightful summer home.

Col. Frederick Mason's Vegetable Garden, Taunton.

We visited the estate of Col. Frederick Mason, at Taunton, on the 14th of September, to inspect his vegetable garden, which consists of about five acres and was planted with almost every

vegetable we read about in the lists yearly issued by our best seedsmen. Mr. E. C. Lewis is the gardener, and the grand appearance of the crop would indicate that good care is constantly applied, leading to successful results. Mr. Lewis is to be congratulated, as also is Colonel Mason, for it is seldom one sees a vegetable garden with such a variety of good food for the table.

Col. Charles Pfaff's Estate, South Framingham.

The fourteenth visit was to the beautiful estate of Col. Charles Pfaff, at South Framingham, to view a house of chrysanthemums planted on benches. We saw over six hundred plants flowered to one stem. There were over thirty varieties. The flowers were very large and well finished; the foliage was excellent. Some few flowers showed the effect of a week's warm weather, but otherwise the growth and flowering reflected great credit on the gardener, George Melvin.

Mrs. B. P. Cheney's Chrysanthemum Houses, Wellesley.

The next visit was on the 3rd of November to Mrs. B. P. Cheney, at Wellesley, to inspect chrysanthemums in pots and on benches. The house of chrysanthemums in pots, arranged for effect with foliage plants interspersed, gave the house a sumptuous appearance, and was by far the best house of this gorgeous flower we have ever seen. The fine hand of John Barr was shown in the arrangement, and he deserves great credit for growing such grand plants for exhibition. We append the names of all the plants in this house, and will say that each one was very symmetrical in form, magnificently flowered, and would average over six feet in diameter:

Arethusa,
Autumn Glory,
Charity,
Charles Molin,
C. H. Curtis,
Defender,
Frank Hardy,
Georgiana Pitcher,
Georgienne Bramhall,
Golden Gate,
Golden Trophy,
Iora,
Ivory,
John Shrimpton,
Lady Hanham,
Louis Boehmer,
Marion Henderson,
Mrs. E. B. Freeman,

Mrs. F. A. Constable,	Phenomenon,
Mrs. J. G. Breer,	Pink Ivory,
Mrs. H. Weeks,	Red Warrior,
Mutual Friend,	Savannah,
Onyx,	Silver Cloud,
Peter Kay,	The Bard.

The plants on benches were grown to one bloom each. They were fine stalwart plants and in the very best condition.

Edward Hatch's Estate, Wenham.

The sixteenth visit was to "The Windmill" on Lake Wenham. This estate, which has but lately come into the possession of Edward Hatch, is situated on the shore of Lake Wenham on an elevation which commands a superb outlook "over the lake and far away." It is an ideal summer home, and one which is being improved by the planting of trees and shrubs. It will be the study of the proprietor, assisted by his numerous friends, to produce an artistic and beautiful place where restful pleasure may reign supreme, and the joys of living may be appreciated by his own good self and his hosts of friends.

Edmund M. Wood & Co.'s Waban Conservatories, Natick.

The last visit of the season was made on the 13th of December to the Waban Conservatories of Edmund M. Wood & Co., at Natick. These greenhouses are of very great extent, covering several acres of ground, and were at the time of our visit filled with roses in their different stages of development. Tea and tender roses predominated and they presented a most wonderfully healthy and vigorous appearance. Some of the houses were planted out in July last, and others contained plants which had been planted from one to three years. The houses face the south, are span roofed, and range from one hundred feet by twenty up to three hundred and fifty-five by twenty-four feet. Most all the tender roses were Brides and Bridesmaids, and they were coming into bloom very profusely.

The particular object of our visit was to examine a new house, three hundred feet long by twenty-four feet wide, planted in July last, with three thousand plants of the celebrated American Beauty

rose. This rose was discovered in General Bancroft's grounds at Washington some years ago, and it has proved of such superior excellence in size, color, and fragrance that it is grown by all our rosarians in the varied forms of perfection, as their knowledge of its wants extends. It would seem that Mr. Wood's head gardener, Alexander Montgomery, had conquered every obstacle in growing this rose to the limit of perfection, for this house presented the highest type of luxurious beauty ever seen by your Committee. The plants had each sent up on an average five stalks of flowers which would measure from four to six feet high, and with luxuriant foliage and not a speck of mildew in any of the houses. The knowledge of growing roses finely is not all confined to this estate, for nearly all the gardeners who have graduated from Mr. Montgomery's tuition have gone forth and put into practice the knowledge they have acquired while working in this magnificent establishment. Yet, when they attempt this task, they do not seem to have the knack that Mr. Montgomery possesses of putting on that fine finish and lusty appearance which culminates under his personal supervision.

This whole plant is run by four boilers, embodying four hundred and fifty horse power, with a further reserve of two other boilers in case of need. The annual amount of coal consumed is one thousand two hundred tons. Not content with this enormous plant as it now stands, and now turning out thousands of roses every day, Mr. Wood is about erecting two other greenhouses, each seven hundred feet in length, so as to enable him to produce a few more roses. We award the Waban Conservatories the first prize for a rose house.

The prizes awarded this year are as follows:

H. H. Hunnewell Triennial Premiums:

For an estate of not less than three acres, which shall be laid out with the most taste, planted most judiciously, and kept in the best order for three consecutive years:

First, A. F. Estabrook $160 00

Special Prize from the John A. Lowell Fund.

For the best house of Chrysanthemums arranged for effect, with other plants, in pots:

First, Mrs. B. P. Cheney 40 00

For the best house of Chrysanthemums grown on benches:	
First, Col. Charles Pfaff	30 00

Society's Prizes.

For the best house of Foreign Grapes:	
Second, William C. Winter	20 00
For the best house of Carnations:	
First, F. A. Blake	30 00
For the best house of Roses:	
First, Edmund M. Wood & Co.	40 00
For the best Vegetable Garden:	
First, Col. Frederick Mason	30 00
Second, S. & F. E. Coolidge	20 00
For the best house of Cucumbers:	
First, George D. Moore	30 00
Second, E. M. Bruce	20 00
For the best house of Tomatoes:	
First, William Nicholson	30 00
Second, William C. Winter	20 00

Gratuities.

Mrs. David Nevins's estate	25 00
Warren H. Heustis, Strawberry Garden	30 00

Respectfully submitted,

PATRICK NORTON,
JOSEPH H. WOODFORD,
WM. WALLACE LUNT,
J. WOODWARD MANNING,
E. W. WOOD,
WARREN H. HEUSTIS,
HENRY W. WILSON,
JACKSON DAWSON,

Committee on Gardens.

REPORT

OF THE

Committee on School Gardens and Children's Herbariums

FOR THE YEAR 1899.

By HENRY LINCOLN CLAPP, Chairman.

One of the instructions concerning prizes for school gardens in the prize list of this Committee is this: "In determining the prizes reliance must be placed upon the descriptions of the principals in charge." Since the principal of the George Putnam School left the school for Europe two months before it closed and did not return till after November 1, he knew comparatively little about the management, condition, or use of the garden, and, accordingly, could not give a proper account of it. However, an adequate account written by Miss Katharine W. Huston, the principal's assistant, is herewith presented.

It is interesting to read that the old Quaker, George Fox, in 1691 willed a tract of land near Philadelphia "for a playground for the children of the town to play on and for a garden to plant with physical [medicinal] plants, for lads and lassies to know simples, and learn how to make oils and ointments."

It may also interest some persons to learn that on the 200th anniversary of that event (1891) the first school garden in Massachusetts was established on the grounds of the George Putnam School, Roxbury.

WILD GERANIUM

GEORGE PUTNAM SCHOOL GARDEN, ROXBURY.

The George Putnam School Garden was begun in the spring of 1891, in a small way, and for eight consecutive years has steadily increased in the number of its plants and in its usefulness to the school.

It now contains more than one hundred and fifty species of native flowering plants and ferns, some of which have propagated themselves to a somewhat remarkable extent.

Aster Novæ-Angliæ and *Viola cucullata* may always be depended upon to produce colonies in profusion. Besides these, *Viola Canadensis*, originally a handful, has given us in 1899 a mass measuring three feet by two, and has also migrated to the neighboring bed on the other side of the fence. *Viola striata* has grown from one small plant to a fine clump. *Polygonatum biflorum*

SENSITIVE FERN.

has sheltered under its scores of blossoming stems hundreds of its own seedlings in all stages of growth. *Oakesia sessilifolia* has not only spread itself profusely, but bore in 1899 flowers of phenomenal size. *Solidago lanceolata*, whose existence for the first few years seemed rather precarious, formed a bed this year measuring five feet by three feet and ten inches, its increase being due wholly to its own vigor. It was already budding when school closed, June 23d.

The other golden-rods have made great gains also, notably *S. juncea* and *S. latifolia*. *S. sempervirens*, although a seaside species, now forms a clump between five and six feet high, develops an abundance of very large flowers, and is a paradise for wasps, bees, and flies. Like Longfellow's chestnut tree, it "murmurs like a hive" through the month of September.

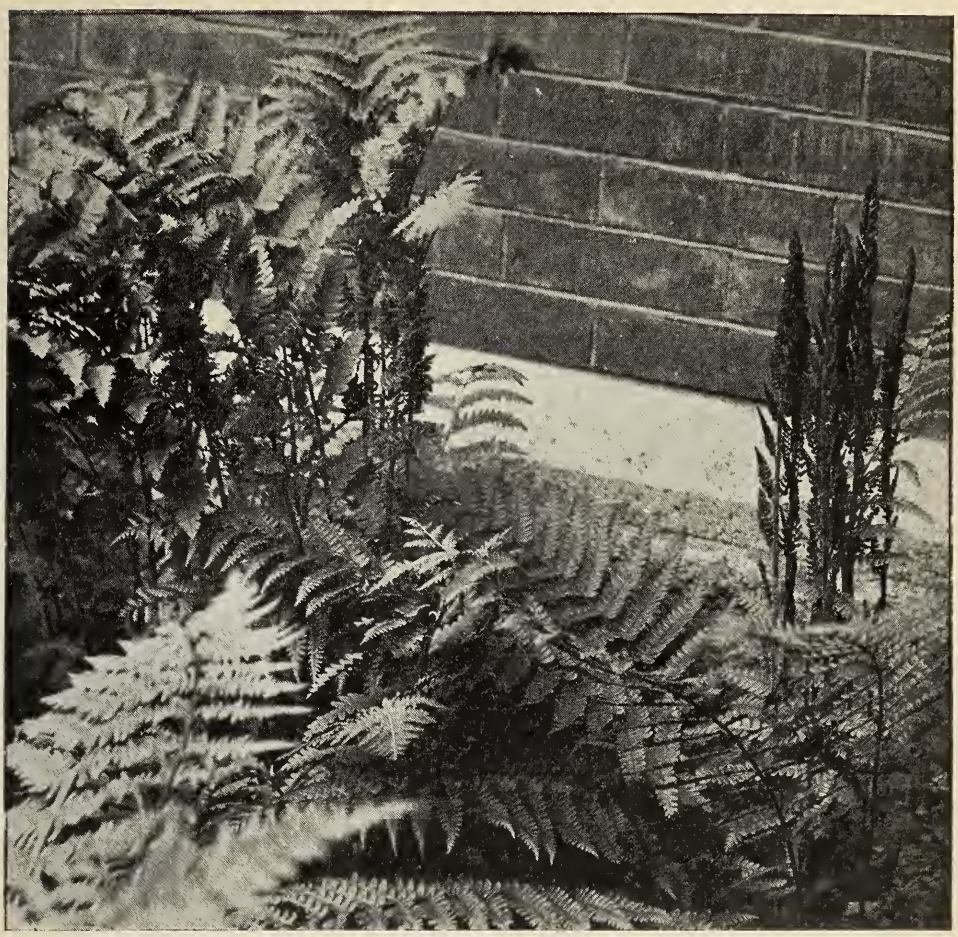
OSTRICH FERN.

The little Herb Robert has made its lodgment under the edges of stones and the rocky foundation of the fence, and has increased and multiplied as if it were a native of this garden. The Hog Peanut is very prolific and furnishes interesting material for decorative design

Iris versicolor and *Iris Pseudacorus* blossomed profusely this season, the latter bearing five or six flowers on every stalk. Two of the flowers were abnormal, one having four falls and three standards, the other five falls and two standards. In 1898 some of the flowers showed four fully developed falls and standards.

Aspidium acrostichoides, var. *incisum*, was set out in 1894 and has continued for five years to produce beautifully incised fronds, although this variation is said not to be constant.

In his report of the garden for 1896, Mr. Clapp called attention to the fact that many vigorous seedlings had sprung from the



CLAYTON'S FERN AND CINNAMON FERN.

different species of asters originally planted. In the three years since then their number has largely increased, and some interesting variations in color have been noticed. *A. Novæ-Angliæ* and its variety *roseus* have given us a long range of hues from rose to purple. *A. corymbosus* has produced a plant with pink blossoms. *A. acuminatus* has appeared with blue ray flowers.

Many other plants might be mentioned whose naturalization and increase make the garden a veritable bit of the country. In considering our garden we may say it consists not simply of the plants set out eight years ago and in the following years, but of those which have established themselves and which have led us to expect them, season after season, as surely as in their own homes.

Nothing has been said of the beauty and lavish flowering of the roses, cultivated irises, and hardy chrysanthemums, as the School

Garden proper is devoted to the native flora; but the cultivated plants just mentioned were a source of great pleasure while they lasted.

The unusually dry season of 1899 would have affected the garden very unfavorably, had it not been for the efforts of the janitor. By means of a lawn sprinkler he succeeded in keeping the conditions almost normal, and the garden was a most beautiful sight through May and June, while in September and October the asters and golden-rods were in their prime.

We make no provision for flowers which blossom only in July and August as they would be useless to the children, but rely upon those belonging to the spring and fall. We have found by experience that it is better not to make a practice of pulling up all the weeds in the beds, as they screen the earth and prevent too rapid evaporation.

In the spring and fall of 1899, nine classes made use of the garden, sometimes visiting it to observe and sketch the growing plants, and always finding abundant material for nature work in the schoolroom. The blossoming of five species of violets at one time gave an admirable opportunity for comparative work. The liliaceous plants formed another most interesting group. As soon as the crosiers made their appearance, daily visits were made to the fernery by the ninth grade. Each pupil drew a plan of it, locating the different species of ferns, and watching the development of the crosiers with great interest. The asters furnished large numbers of pupils with material for learning the structure of a composite flower, or for comparison with compositæ already studied.

Each child separated the ray flowers from the disk flowers, considered their arrangement, and compared the blossoms and leaves of several species, observing the difference in the size and color of the blossoms, and in the shapes and surfaces of the leaves. He then painted a spray of some aster, together with a single disk flower and a ray flower, afterwards writing a description of the plant.

We look upon the season through which the garden has just passed as the most successful in its history. The first report of it was published in 1891 under the title, "The School Garden Experiment." Having flourished for nine years without any relapse, it may fairly be considered to have passed beyond the

experimental stage, and to have become a permanent part of the equipment of the George Putnam School, especially for the grammar grades, which can make and have made the most extensive use of it.

In the report of 1898 it was said that the space used for a garden, 72×48 feet, is now so crowded with plants, mostly perennials, that additions have been nearly stopped for lack of room. It is proper to add in this connection that a plot of land of equal size in the girls' yard has already begun to be converted into a garden; and another plot of land, half an acre in extent, adjoining these gardens has recently been purchased by the city; and the Superintendent has suggested that this also should be used as a school garden. So it appears that there is room for almost indefinite expansion.

KATHARINE W. HUSTON.

REPORT ON THE MEDFORD SCHOOL GARDENS.

BY GEORGE E. DAVENPORT.

In submitting a report on the Swan and Curtis School Gardens, in Medford, Mass., it seems well to give a brief resumé of their history, and to include the report on the Curtis School Garden by the principal, Miss Amy W. Jones.

DEAR MR. DAVENPORT: I take pleasure in sending you a report of our school garden work the past year. The fall nature work in connection with bulbs proved very satisfactory, and the beautiful blossoms were also much enjoyed in the spring. This fall we have added to the number of cultivated flowering plants. We have continued our practice of adding to the wild flower collections, by bringing in roots whenever we make trips to the woods. Those already in the garden bloomed very nicely, so that we have been able to use a greater variety of specimens and material from the garden in our nature study, than in any preceding year. The children have taken entire care of the garden this year, spading, planting, weeding, etc. We intend to have the garden furnish practical lessons and to be a benefit to the schoolwork, so that the boys and girls will feel that they know how to start gardens for themselves at their homes.

We have had four new beds made for seed planting. We devoted quite a space to vegetables — corn, beans, peas, onions, carrots, potatoes, etc., and watched the results closely. In this the boys were especially interested.

With this report I enclose two photographs, one of which shows some of the largest pupils at work, and the other a fern and wild flower corner.

Respectfully submitted,

AMY WHITMORE JONES.

Curtis School, Medford.

Nov. 16, 1899.

The Swan School Garden was established in April, 1895, with the means furnished by the School Garden Committee of the Horticultural Society, and a subscription fund from citizens of Medford who were favorable to the plan.

Between twenty-five hundred and three thousand feet of land along the inside of the fence line was laid out into beds, spaded, and thoroughly worked over with rich loam and rotted manure to a depth of nearly two feet and made ready for planting.

Arbor Day (April 26) was chosen for the dedication of the garden, and the children were given an outdoor object lesson in the planting of the seed of *Catalpa speciosa*, one of the grandest of our native trees.

Special exercises were prepared and arranged so that every child could participate, and Miriam Davenport Gow, the youngest child in the school at that time, was chosen to plant the seed. After the planting of the seed each child in turn threw over it a handful of earth at the same time reciting an appropriate verse. The exercises were further carried out by the singing of appropriate songs by the children, and a pleasant address by Rev. Henry C. DeLong. The children were greatly pleased with the thought of raising a school tree from the seed, and watched eagerly for the appearance of the young seed tree which came later on.

At this time also two native trees, *Liriodendron Tulipifera*, the Tulip tree, and *Cladrastis tinctoria*, the Virgilia or Yellow-Wood tree, were planted, and in this way the development of the garden began.

CURTIS SCHOOL GARDEN.

Believing it to be wiser, where there are young children to deal with, to begin with a mixed garden, certain portions were set aside exclusively for native plants, and the children were given permission to bring and plant, under the direction of their teachers, such seeds and plants as they chose in the other beds. The result was even more gratifying than was expected for the first season, as the second prize offered by the School Garden Committee was won, besides a special prize for the best collection of flowering plants and the commendation of the Committee. [See Report for 1895.]

Subsequently some unfortunate circumstances prevented a further development of the garden until 1898, when interest in it revived, and the present year has surpassed all previous ones in the character of the work accomplished.

While certain portions are still kept apart for the children to grow nasturtiums, pansies, geraniums, and such other flowers as children love, the proportion of native plants has steadily increased, until at the present time nearly one hundred and fifty species and varieties of wild flowers, native shrubs, and ferns are planted in the garden.

Experience in transplanting in this garden indicates that the fall is the best time to take up and remove most plants as they are less liable to be seriously affected by the disturbance. Some plants that were transplanted under unfavorable conditions have failed to establish themselves thoroughly, and will have to be replaced, but the greater number have succeeded in doing so, and are now fairly well established. The capacity of the garden is so great that for a long time to come it will be difficult, if not impossible, to overstock it. In setting out plants every possible effort has been made to imbed them in as much of their natural soil as can be obtained.

An attractive feature has been the children's rockery, which they have kept in excellent condition. Violets, hepaticas, anemones, blood-root, columbines, corydalis, and some others have bloomed from the crevices in their order of succession, while fine clumps of the shield ferns, spleenworts, Woodsias, and Polypody have added greatly to its charm.

Throughout the season the garden has received the best of care and the children have made frequent use of it for their nature work.

CORNER OF CURTIS SCHOOL GARDEN.

One of the attractions for passers by has been the children out with their teachers making observations and drawings of living plants, and some of these drawings have been considered worthy of selection for sending to the international exhibition.

The Curtis School Garden is the legitimate outgrowth from the nature work which this school was the first in Medford to take up, under the inspiration of the late Miss Laura Davenport. The garden has been under the care of Miss Amy W. Jones, the principal, from the beginning. In 1898 it received the second prize.

School-garden work in Medford is to receive still further re-enforcement another year by the establishment of a garden at the new Brooks Grammar School, at West Medford, under the supervision of Mr. Lewis F. Hobbs, the principal, and at the Washington Grammar Miss Winifred L. Evans has been fortifying her excellent work on ferns by an outside fernery, which the School Garden Committee trusts will lead to an enlargement of garden work on the Washington School Grounds.

The following list records the more important native plants that have been added to the Swan School Garden during the past two seasons:

Acer Pennsylvanicum, L.
" *spicatum*, Lam.
Actæa alba, Bigelow.
" *spicata*, L. var. *rubra* Michx.
Adlumia cirrhosa, Raf.
Amelanchier Canadensis, Torr. & Gray.
Ampelopsis quinquefolia, Mich.
Andromeda polifolia, L.
Asclepias quadrifolia, Jacq.
Aster cordifolius, L.
" *corymbosus*, Ait.
" *dumosus*, L.
" *lævis*, L.
" *macrophyllus*, L.
" *miser*, L.
" *multiflorus*, Ait.
" *patens*, Ait.
" *puniceus*, L.
Aster Tradescanti, L.
" *undulatus*, L.
Azalea Vaseyi.
Baccharis halimifolia, L.
Cassandra calyculata, D.
Ceanothus Americanus, L.
Celastrus scandens, L.
Chelone glabra, L.
Clematis Virginiana, L.
Clintonia borealis, Raf.
Comptonia asplenifolia, Ait.
Coptis trifolia, Salisb.
Cornus florida, L.
Corydalis glauca, Pursh.
Cypripedium acaule, Ait.
Desmodium paniculatum, D. C.
Diervilla trifida, Mœnch.
Diplopappus linariifolius, Hook.
Echium vulgare, L.
Eupatorium sessilifolium. L

Eupatorium teucrifolium, Willd.
Gerardia pedicularis, L.
Goodyera pubescens, R. Br.
Helianthus divaricatus, L.
Hibiscus Moscheutos, L.
Hieracium venosum, L.
Hudsonia tomentosa.
Impatiens pallida, Nutt.
Ledum latifolium, Ait.
Lilium Canadense, L.
" *Philadelphicum*, L.
Liparis liliifolia, Rich.
Lonicera sempervirens, Ait.
Lysimachia radicans, Hook.
Maruta Cotula, D. C.
Menyanthes trifoliata.
Mitchella repens, L.
Myosotis palustris, Withering.
Myrica cerifera, L.
Nemopanthes Canadensis, D. C.
Œnothera biennis, L.
Orchis spectabilis, L.
Polygonatum biflorum, Ele.
" *giganteum*, Dietrich.
Prunus pumila, L.
Quercus Prinus, L. var. *humilis*, Marsh.
Ranunculus fascicularis, Muhl.
Sericocarpus solidagineus, Nees.
Smilacina bifolia, Ker.
" *racemosa*, Desf.
Solidago bicolor, L.
" *cæsia*, L.
" *Canadensis*, L.
" *lanceolata*, L.
" *nemoralis*, Ait.
" *puberula*, Nutt.
Streptopus amplexifolius, D. C.
Thalictrum Cornuti, L.
Trientalis Americana, Pursh.
Uvularia grandiflora, Smith.
" *sessilifolia*, L.
Vaccinium Vitis-Idæa, L.
Verbena hastata, L.
Viburnum acerifolium, L.
" *dentatum*, L.
" *lentago*, L.
Viola canina, L. var. *sylvestris*, Regel.
Viola cucullata, Ait.
" *lanceolata*, L.
" *pubescens*, Ait.
" *sagittata*, Ait.

89 species. Previously recorded 31 species.
Total 120 species,

to which are to be added several native shrubs donated from the Arnold Arboretum.

Ferns.

Phegopteris Dryopteris, Feé.
Botrychium Virginianum, Swr.
Ophioglossum vulgatum, L.

3 species. Previously recorded 27 species.
Total 30 species, including several varieties.

FRAMINGHAM SCHOOL GARDEN.

REPORT ON SCHOOL GARDEN OF FRAMINGHAM STATE NORMAL PRACTICE SCHOOL.

The establishment of a school garden in connection with a state normal school is an event of more than ordinary importance, because teachers are likely to become interested in the growth of plants and then to interest their pupils in the same direction. The teacher may be the source of inspiration in carrying on garden work for many a year and wherever she goes. To start with the teacher is to start in the right place. So the Normal School in Framingham may be called the pioneer in school garden work in New England at least. Concerning the work there something may be learned from the following extracts from an interesting letter written by Miss J. Angelina Smith, of the Framingham State Normal Practice School:

"The garden was started in the spring of 1897 with a few plants which were the survivors of a wild garden kept up by Miss Hyde for years.

This spring it was enlarged and a walk was added, and this fall all the shrubs, except two forsythias, were put in.

The violets furnished material for several drawing lessons in the spring, and this fall the new class has become much interested in ferns, studying them in the garden and in other localities, with the aid of microscopes, both simple and compound.

Last year and this year so far it has been cared for and enlarged by the eighth grade pupils. The boys have shown fully as much interest as the girls and have hunted woods and meadows to see who could get the most beautiful plants.

WILD GARDEN, NORMAL PRACTICE SCHOOL, FRAMINGHAM, MASS.

FILICES.

Osmunda regalis.
" *cinnamomea.*
Onoclea sensibilis.
Aspidium spinulosum.
" *marginale.*
Asplenium ebenoides.
" *Filix-fœmina.*
Adiantum pedatum.
Dicksonia pilosiuscula.

SHRUBS.

Forsythia.
Clematis Virginiana.
Sambucus Canadensis.
" *pubescens.*

Hamamelis Virginiana (Witch-Hazel).
Ilex verticillata.
Viburnum lentago.
Berberis vulgaris.
Rosa rubiginosa.

Common Flowers.

Sanguinaria Canadensis.
Aquilegia Canadensis.
Gentiana Andrewsii.
Smilacina racemosa.
Hepatica triloba.
Anemone nemorosa.
" *thalictroides.*
Viola pedata (white).
" *palmata* var. *cucullata.*
" *sagittata.*
" *blanda.*
" *lanceolata.*
" *Canadensis.*
" *pubescens.*

WENHAM SCHOOL GARDENS.

In the early spring a prize was offered to the five district schools of Wenham for the best school garden which should be started and maintained during the summer.

A commendable effort was made by each school, which has greatly improved the appearances of the school yards and aroused a new interest among the children.

A sketch of the school garden winning the prize may be interesting. Here was a school of twenty-five children, of ages ranging from five to thirteen years, and representing a dozen families, nearly all farmers or laborers.

The school house stands on a little plot of land overgrown with tansy — neglected and desolate in the extreme. It seemed a formidable task for such a school to grapple with a school garden.

Under the guidance of their most enthusiastic teacher, Miss Alta Hill, the children first planned out what they would try to accomplish the first year. The beds and banks were carefully staked, and as fast as the work could be done, each bed was dug out two feet deep — some three — and filled in with good loam. The digging was mainly done by the parents and friends of the school, and the loam, more than thirty two-horse loads, was given by them also.

The children cut the turf and outlined the beds, while the little ones hauled in their carts all the loam for two large beds.

On one side of the school house a fern bed was made. This the children with their teacher did entirely, planting out ten species of our native ferns.

Before the beds were ready for planting, the season was so far advanced that only two clumps of native shrubs, one of sumach and one of barberry, could be planted; the remaining beds were filled in with perennials and seedlings, and the result has been a most attractive school yard all summer.

The devotion shown by the teacher and pupils in keeping alive, during this unusually dry season, all that was set out, has been almost heroic. Each night after school, everything was thoroughly watered, the water being carried in cans from a brook some distance away.

This autumn they plan to add clumps of a half-dozen more native shrubs, and several new ferns. The small beds for study have been made ready for single specimens of the native flowering plants.

The prize money will be expended on garden tools, and cultivated shrubs and perennials.

It has been no small impetus to the children to know they were working with the Horticultural Society, and they are looking forward to competing for the Society prize another year.

A. P. Cole.

SCHOOL GARDEN AT BATH, MAINE.

Bath, Me., Dec. 5, 1899.

Mr. Henry L. Clapp, *Chairman of School Garden Committee:*

Dear Sir: The following plants were added to the Bath High School Garden during the season of 1899:

Adiantum pedatum.
Amphicarpœa monoica.
Bidens frondosa.
Brunella vulgaris.
Chelone glabra.
Coptis trifolia.
Diervilla trifida.
Erythronium Americanum.
Hypericum Canadense.
Lobelia inflata.
Rudbeckia hirta.
Spiranthes cernua.
Verbena hastata.
Viola Canadensis.

Some other plants have been set out to replace those which died in the previous season.

Since the garden was begun in 1896 some species have spread to a considerable extent, noticeably *Aspidium Noveboracense* and *Oakesia sessilifolia*.

I hope to increase both the size and usefulness of the garden next year.

With thanks for the generous encouragement given me by your Committee, I am

Very truly yours,

VIOLA G. HOGAN.

AN INTERESTING PAPER.

Dr. F. M. Powell, Superintendent of the Institution for Feeble-minded Children in Glenwood, Iowa, on the 14th of December, 1899, read a very able and suggestive paper on "School Gardens" before the Iowa State Horticultural Society. The paper, fortunately, was put into print and a copy was sent to the Chairman of this Committee, who would gladly quote from it at length, were his own report not so long, but will content himself with quoting a few of the interesting sentences with which the report abounds.

"Through information submitted by a Committee on School Gardens and Children's Herbariums, appointed by the Massachusetts Horticultural Society, I believe this state may justly claim the nearest approach to the ideal school gardens."

"Some one has said 'Kindergartners want the earth.' Yes, that is just what will content us, and the children, too — a small patch of Mother Earth, where each child may have his own little garden bed; where he may raise a few vegetables; where he may handle a rake, a spade, and a hoe; where he may delight, if possible, in a watering-pot and a wheelbarrow; where he may dig and plant; where he may watch and wait and reap. It is not only figuratively, but literally, that kindergartners want the earth."

"One of the most interesting and encouraging letters I have received is from a kindergartner in St. Louis who, with the help of eighty pairs of little hands, transformed an old brick-paved yard, twelve by twenty-four feet, into a real, live, flower garden. This yard had been a playground for many years in the lower part of the city where children came from crowded tenements. The children loosened and removed the bricks, afterwards using them as

boundaries. They made beds, transplanted vines from the kindergarten room, planted seeds, trained vines, and took turns in watering the garden."

"A little boy on being taken to a kindergarten thus expressed his disappointment at what he saw, or, rather, at what he did not see: 'Why, it isn't a garden at all.'"

"Three years ago I directed the florist and gardener to plant flowers in ten feet of space next to the Boys' Cottages. The experiment proved a success in improvement of the grounds, protection to buildings, and object lessons for the boys. The flowers have not been rudely molested in any instance, but tenderly cared for. For the last two years vegetable gardens have been successfully cultivated by the children."

GERMAN SCHOOL GARDENS.

In 1899 the Chairman of the School Garden Committee visited a number of school gardens in Germany and learned from the directors much about the extent, stocking, and management of them and the character of the instruction given in them. Those established in Pössneck and Gera were particularly interesting on account of their size, complete equipment, and usefulness to a large number of children. Each is not far from an acre in area and forms an important factor in the educational system of the city in which it is situated.

Since a large proportion of the pupils in German public schools are destined to till the soil, school authorities there consider that it is quite as important that children should be taught early and thoroughly how to cultivate plants as that they should be taught how to read the masterpieces of literature with the rising and falling inflections in their proper places; consequently, the children know the requirements of plant growth long before they are introduced to Schiller and mythology.

In the Pössneck garden the children have the privilege of choosing what they will plant, vegetables or flowers or both; and most of them choose to raise with their vegetables some lovable plants—those with brilliant blossoms and interesting habits, alpine plants, gentians, harebells, primroses, asters, etc. Out of 533 plant beds made and cultivated by the pupils 350 beds contained both flowers and economic plants, such as aromatic herbs, plants producing oil,

plants having fibres which are used in spinning, grains, medicinal plants, poisonous plants, and various kinds of bulbous and tuberous plants. Each kind forms a separate group. Attention is also given to the native shrubs and the evergreen and deciduous trees of the province.

The pupils of eight grades work in the garden an hour a day—sometime from five to seven o'clock in the afternoon. The notes which they take in the garden serve as a basis for compositions on the various kinds of work connected with farm life. Fertilizing, rotation of crops, the effect of the presence or absence of light, heat, or moisture, the birds and insects injurious or helpful to cetrain kinds of plants, and many other kindred topics are written upon. As a consequence the Germans are expert farmers. A ride on a steam train through any of their farming districts would convince an observer of that fact.

A considerable amount of such work in connection with our public schools, especially in the West, would make young people more contented and successful in farming and keep them from rushing into the cities to become clerks, conductors, and genteel non-producers.

The school garden in Gera, although only three years old, now has 800 species of plants; but the director, Mr. Robert Leube, assured me that in three years more there would be 2400 species in the garden.

A novel feature of this garden is a collection of the geological specimens to be found in East Thuringia. The collection is arranged so as to represent the lay, dip, fault, uplift, etc., of geological strata, and the whole artistically and scientifically conceals the perennial spring of water upon which the success of the garden is so dependent.

As in the Pössneck garden, plants of the same family or economic class are grouped together, the tall and quick growing trees being located in the northern part so that their shadows fall away from the garden. There is a basin for aquatic plants, a rockery for Alpine and rock plants, an extensive fernery, and an abundance of umbrageous shrubs under whose dense foliage wood plants find congenial homes.

To this garden hundreds of children come with their teachers regularly to receive instruction in plant life. They do not work in it with garden tools, as the children do at Pössneck.

In Dresden I had the great pleasure of a visit from Dr. O. W. Beyer, one of the most earnest advocates of school garden work in Germany. About the time in which he was school director in Pössneck, some fifteen years ago, he published a book of two hundred pages called "Naturwissenschaften in der Ertziehungsschule" which treats of all forms of manual training suitable for school children. Apparently all the German school gardens are laid out precisely along the lines marked out by Dr. Beyer in his chapter on school gardens. He did not succeed in establishing the garden during his term of office, the burgomaster of that time being indifferent to the matter; but he sowed the seed that enabled his successor, Dr. Lotz, to found the garden with the aid of the new burgomaster, who favored the enterprise in every way.

The consideration of other school gardens and the mention of other advocates of them must be put aside for another time, on account of the unusual length of this report.

SCHOOL GARDEN PRIZES.

In competing for and determining the prizes offered for the establishment, maintenance, and use of school gardens, I recommend the careful consideration of the following points, mentioned in the order of their relative importance:

1. Adherence to the printed instructions; at least such instructions should be considered of primary importance, and other meritorious points, not mentioned in the instructions, of secondary importance. No rule should be established to bolster up a particular case.

2. It is of the highest importance that the actual use of the garden as an educational means should be illustrated and manifested by pupils' work in drawing, painting, and writing on paper, where cramming and copying can be detected and judged according to its merits if any. The extent to which the pupils' proper work is carried out through the school and the individuality of each pupil's work are important determinants. The genuineness of the work should be evident on the face of the papers; the tracks of the pupils, their excellences and deficiencies should be apparent.

3. Next in importance are snap-shot photographs of pupils sketching, watering, hoeing, digging, comparing, etc. — *not posing*, but really at work in the garden and in unconscious positions.

Time pictures of pupils and teachers in conscious postures, *attitudinizing*, with no evidence of using the garden as a regular source of instruction, should be considered of little value in reference to the real merits of a school garden.

4. Aids to judgment may be furnished by means of photographs of individual specimens or clumps of plants, or of the garden as a whole, to illustrate the abundance, vigor, and blossoming power of plants and their variation under cultivation. So far as such photographs illustrate such points they are helpful; but they do not furnish any evidence that the garden is connected with the school in any vital way.

5. The amount of work done in stocking a garden in a single season is worthy of consideration and should entitle it to a gratuity of some sort proportioned to the amount and quality of the work done; but to award a prize mainly for such work might establish a troublesome precedent. Some enterprising florist might take a notion to stock a garden to advertise his plants. So it is important to consider who does the work and who keeps the garden running.

6. Other things being equal, the garden established and sustained by the teachers and pupils of the school is preferable to that established by an influential or wealthy patron, since the latter, by reason of the uncertainties of wealth and elections, is less likely to be permanent. Interested teachers being on the ground for many years are much more likely to make a close connection between the school and the garden; therefore *reports of what the teachers and pupils really do, written out by themselves* in black and white or illustrated by color *regularly*, are of paramount importance. The garden unrelated to the school has no more educational value than any other private flower or vegetable garden. The garden plus the work of the school with and in it must be considered in determining prizes; and there should be unmistakable evidence that the material for instruction found in the garden has been used regularly, and perhaps it might be added, skillfully, in case of a garden of the highest type and usefulness. Indefinite statements in regard to the enjoyment of the garden, proposed work, etc., are proper enough in the beginning, but they should have no weight in determining prizes.

HENRY L. CLAPP,
Chairman Committee on School Gardens and Children's Herbariums.

CHILDREN'S HERBARIUMS.

Over seventeen hundred herbarium specimens were exhibited in Horticultural Hall, December 1 and 2, 1899. Fortunately this year all the specimens were well displayed, no collections being put under the tables for lack of room, as was the case last year. The tables in both halls were comfortably filled with mounted specimens, which in workmanship were fully equal to any that have been exhibited in previous years.

Vanessa Denton's collection of one hundred and twenty-five specimens was the finest, the arrangement and mounting of the specimens being exceptionally good and the coloring of the flowers being well preserved. Her collection was the best in the exhibition last year. She has exhibited three times.

In previous years George E. Nichols has shown four hundred and fifty-seven specimens and this year he made important additions — seventy-eight flowering plants, thirty-one ferns, ten grasses, and two sedges — having begun to exhibit in 1894, and having exhibited in all five hundred and seventy-eight specimens.

Two Italian boys, William Ghirardini and Charles A. Tosi, from the North End, sent in very good collections. They got their specimens from Franklin Park and vicinity. When they were at the exhibition some one said in their hearing that it was considerable trouble to press plants. One of the Italian boys expressed a contrary opinion, and to show how thoroughly he had mastered the art of pressing plants said, "When I get into the cars with my plants I sit on 'em."

Three brothers, John Murdock, Jr., Richard Murdock, and Joseph Murdock, together sent in over three hundred specimens.

Three members of the French family, Arthur E., Olive L. and Marion L., exhibited two hundred and twenty-seven specimens, all finely mounted. Arthur E. has exhibited five years in succession, and Olive L. three. Marion L., who is only seven years old, exhibited twenty-five flowering plants as her first collection.

Anna M. Christian showed *Aspidium simulatum* Davenport in her fern collection, this being the first time this fern has been shown by a child at our herbarium exhibition.

At different times the curator of the Fairbanks Museum in St. Johnsbury, Vt., and Mr. Jones, Superintendent of Public Schools,

in the same place, visited the George Putnam School to get information concerning the means of interesting children in elementary science work, school gardens, and herbariums. The reports and prize lists concerning the work done by your Committee were taken away by Mr. Jones who had printed a circular very similar to our prize list, instructions and all; and we are very glad to have such good use made of our material. Excluding "Directions for Competitors," the circular is as follows:

THE FAIRBANKS MUSEUM PRIZES FOR CHILDREN'S HERBARIUMS.

The generosity of friends of the schools has made possible the offer of prizes bearing the above name. The competition is open to pupils enrolled during the year 1898 in grades VI to IX of the schools of the Town of St. Johnsbury. The collections for which prizes are offered are as follows:

	1st. Prize.	2d. Prize.
For 100 species of herbaceous flowering plants,	$5.00	$3.00
" 50 " " " " "	3 00	1.00
" 30 sprays of leaves of trees or shrubs, different species,	3.00	2.00
" 20 sprays of leaves of trees or shrubs, different species,	2.00	1.00
" 25 species of ferns,	4.00	2.00
" 15 " " "	2.00	1.00

It is expected that during the spring term the teachers will assist pupils in starting their herbariums by showing them how to collect, press, mount, and name the plants. With the instruction given pupils should be able to continue the work during the summer vacation. The co-operation of parents in this enterprise is particularly desired by the school management.

The prizes will be awarded at an exhibition of the collections to be held during the month of November, 1899. At this exhibition, collections not entered for prizes may be shown, and specimens not included in the groups of plants mentioned will be welcomed.

PRIZES AND GRATUITIES AWARDED FOR SCHOOL GARDENS AND CHILDREN'S HERBARIUMS.

SCHOOL GARDENS.

George Putnam School, Roxbury, first prize	$15 00
Swan School, Medford, second prize	12 00
Curtis School, Medford, third prize	10 00

CHILDREN'S HERBARIUMS.

FLOWERING PLANTS.— For one hundred and twenty-five specimens:	
First prize, John Murdock, Jr.	$5 00
Second, Helen Robinson	4 00
For one hundred specimens:	
First prize, Robert D. Morss	4 00
Second, Ruth Robinson	3 00
For seventy-five specimens:	
First prize, Philip Morss	3 00
Second, Edith Taft	2 00
For fifty specimens:	
First prize, Charles A. Tosi	2 00
Second, William Ghirardini	1 50
For twenty-five specimens:	
First prize, Marion L. French	1 50
Second, Joseph Murdock	1 00
For ten specimens:	
First prize, Winthrop Swain	75
Second, Richard Murdock	50
Gratuities:	
Vanessa Denton, for one hundred and twenty-five additions	5 00
John Murdock, Jr., for one hundred additions	2 00
Bessie R. Parmenter, for one hundred additions	2 75
Olive L. French, for ninety-two additions	2 75
George E. Nichols, for seventy-eight additions	3 00
Arthur E. French, for seventy-five additions	3 00
Stanley Webb, for seventy-five specimens	1 00
Melora E. Warner, for fifty specimens	2 00
Leonard A. Page, for ten additions	25
FERNS.— For thirty specimens:	
First prize, Genevieve Doran	5 00
Second, George E. Nichols	4 00
For fifteen specimens:	
First prize, John Murdock, Jr.	3 00
For ten specimens:	
First prize, Katherine L. Driscoll	2 00
Second, Anna M. Christian	1 00

For five specimens:		
First prize, George E. Cassidy		75
Second, Richard Murdock		50
Gratuities:		
Melora E. Warner, for fifteen additions		3 00
Theresa Gambetski, for ten specimens		75
SEDGES.— For thirty specimens:		
First prize, Olive L. French		3 00
For twenty specimens:		
Second prize, John Murdock, Jr.		1 00
GRASSES.— For ten specimens:		
First prize, John Murdock, Jr.		1 00
Second, George E. Nichols		50
Total for Gardens and Herbariums		$112 50
The amount of money appropriated by the Society for the use of the Committee was		$250 00
Awarded for School Gardens	$37 00	
Awarded for Herbariums	75 50	
Printing and paper	30 25	
Expressage, stamping, postage	11 75	
Advertising	8 40	
		162 90
Balance unexpended		$87 10

HENRY L. CLAPP, *Chairman*, Roxbury,
GEORGE E. DAVENPORT, Medford,
MISS KATHARINE W. HUSTON, Roxbury,
CHARLES W. JENKS, Bedford,
WILLIAM P. RICH, Chelsea,
MRS. P. D. RICHARDS, West Medford,
MRS. M. L. STEVENS, Cambridge,
W. E. C. RICH, *Secretary*, 99 Moreland Street, Roxbury, Mass.

Committee on School Gardens and Children's Herbariums.

REPORT

OF THE

COMMITTEE ON NATIVE PLANTS.

The exhibition of native plants is always an interesting feature of the Society's work, and has become one of its most important on account of its helpfulness to the cause of education in our public schools. These exhibitions, which have been wisely encouraged by the Society, have been fully appreciated by the large number of visitors who have been attracted by them. Especially valuable and helpful have they been to teachers and others who are interested in nature work in our schools, and great benefit must inevitably accrue to the community as a result.

Not only do they enable those who are botanically inclined to study and compare specimens in a living state, but, extending from early spring until late autumn, they assist in making known to the general public the most attractive portion of our New England Flora. This, in connection with the invaluable collections of Fungi exhibited by the Boston Mycological Club, serves to make Horticultural Hall the Mecca for all who are interested in our native plants.

The enthusiasm of the exhibitors is noticeable, and the untiring industry with which they seek out and arrange for exhibition plants seldom seen is worthy of much higher recognition than it now receives. When to this is added the care taken by them to preserve from destruction the choicer of our native plants, and the sacredness with which they guard the little known localities of rare plants, much praise should be given to them.

Unfortunately, the corps of exhibitors was weakened early in the season by an accident to Mrs. Percival D. Richards, of West Medford, whose exhibits of rare native plants have for some years made her name widely known.

The Committee deplore their inability under present rules to provide for some recognition of an exhibit which fails to receive a prize when of unusual merit, and hope that some way may be found for overcoming this difficulty.

There has been no competition for the prizes for cultivated native plants, and only two entries, perhaps owing to the small amount offered, and the Committee feel that the amount should be increased.

There has, however, been shown almost weekly during the season, but not for competition, a series of exhibits of cultivated native plants from the garden of Robert Manning, aggregating a collection of such a character that the Committee deems it worthy of special and honorable mention.

CULTIVATED NATIVE PLANTS EXHIBITED BY R. MANNING, 1899.

MAY 6.

Lindera Benzoin.
Hepatica triloba.
Viola cucullata.
Viola odorata.
Sanguinaria Canadensis.
Dicentra sp.

MAY 13.

Trillium grandiflorum.
Viola pubescens, var. *scabriuscula.*

MAY 20.

Asimina triloba.
Amelanchier Canadensis.
Cercis Canadensis.

MAY 27.

Podophyllum peltatum.
Arisæma triphyllum.
Smilax herbacea.

JUNE 3.

Polygonatum biflorum.
Dodecatheon Meadia.

JUNE 7.

Arisæma Dracontium.
Viola Canadensis.

JUNE 10.

Anemone Pennsylvanica.

JULY 15.

FERNS.

Onoclea Struthiopteris.
Osmunda cinnamomea.
" *Claytoniana.*
" *regalis.*
Adiantum pedatum.
Asplenium Filix-fœmina.
Aspidium acrostichoides.

JULY 22.

Dioscorea villosa (pistillate).
Campanula rotundifolia.

JULY 29.

Hibiscus Moscheutos.

AUGUST 5.

Lilium superbum.

AUGUST 12.

Liatris pycnostachya.
" *spicata.*
Impatiens fulva.
Clethra alnifolia.

SEPTEMBER 16.

Phytolacca decandra.
Arisæma triphyllum in fruit.
Aster Novæ Angliæ.
" " " var. *roseus.*

SEPTEMBER 28.

Celastrus scandens in fruit.

Some of these, such as *Trillium grandiflorum*, *Podophyllum peltatum*, *Arisæma Dracontium*, *Hibiscus Moscheutos*, *Phytolacca decandra*, and some of the ferns showed much improvement in size and other respects from cultivation.

The character of the exhibitions has been well sustained throughout the season, and the Committee has been glad to welcome two new exhibitors, Miss Edith Noyes and Miss R. L. Mann.

April 22. — Mrs. Percival D. Richards made one of her characteristic exhibitions of early spring flowers, mostly violets, bloodroot, and *Draba verna*, and on the 29th, Miss Alice L. Grinnell exhibited a fine collection of thirty species of spring plants, among them five species of violets and *Claytonia Virginica*. A gratuity was awarded to each.

May 6. Mrs. Richards, Miss Grinnell, and the Misses Eleanor A. and Mollie S. Doran exhibited beautiful collections, containing nearly all of the early May flowers, and received the first, second, and third prizes in the order named.

Miss Grinnell's collection contained nine species and varieties of violets, *Corallorhiza innata*, *Trillium erythrocarpum*, and *Actæa alba*. That of the Misses Doran was of uncommon excellence and deserving of special mention, while that of Mrs. Richards, as usual excelled in the number of the rarer of our early spring flowers.

May 13. A gratuity was awarded to Mrs. P. D. Richards.

May 20. Gratuities were awarded to Mrs. Richards and the Misses Doran.

May 27. A gratuity was awarded to Mrs. Richards.

On June 7 and 8 (postponed dates), prizes for native plants were awarded to Miss Grinnell, Mrs. Richards and the Misses Doran, in the order named.

Among the more interesting plants of this exhibition were:

Lupinus perennis,
Lathyrus maritimus,
Clintonia borealis,
Asarum Canadense,
Hottonia inflata,
Lonicera sempervirens,
Polygala paucifolia,
Sarracenia purpurea,
Kalmia latifolia,
Pogonia verticillata,
Arethusa bulbosa,
Liparis liliifolia,
Asclepias quadrifolia,
Utricularia minor,
Castilleia coccinea,
Aphyllon uniflorum,
and three *Cypripediums*.

June 10. Miss Edith Noyes made her first appearance as an exhibitor with a splendid collection of forty-two species and varieties, receiving a gratuity therefor.

July 1. The Misses Doran exhibited fifty-seven, and Miss Grinnell fifty-four species and varieties, well arranged and showing the early July wild flowers to good advantage. A gratuity was awarded to each.

July 8. Miss Grinnell, Mrs. W. S. Eager, and Miss Noyes, in the order named, were awarded prizes. There were also some fine collections from the Misses Doran and Miss Genevieve Doran that were worthy of special mention.

July 15. Miss Edith Noyes was awarded the first prize for cultivated native plants, Miss Grinnell and Genevieve Doran gratuities for wild flowers, and C. C. Kingman, Miss Grinnell, and the Misses Doran, in the order named, were awarded the prizes for hardy (native) ferns.

July 22. Gratuities were awarded to Edith Noyes, Genevieve Doran, the Misses Doran, and Miss Grinnell for native plants.

July 29. Miss Grinnell, Miss Noyes, and Mrs. Eager were awarded first, second, and third prizes in the order named. There was also a collection from the Misses Doran that was worthy of special menton.

August 5. Miss Grinnell exhibited another of her fine collections for which she was awarded a gratuity.

Sabbatiu chloroides, *Goodyera repens*,
Coreopsis rosea, *Cassia Marilandica*, and
Lobelia cardinalis, *Chimaphila maculata*

were some of the rarer plants of this exhibit.

August 12. Miss Noyes was again awarded the first prize for cultivated native plants, thus entitling her to the Appleton Bronze Medal.

At this exhibition also, the Misses Doran had a splendid collection of uncultivated native plants, containing seven species of golden-rod, four asters, three Eupatoriums, and eleven ferns. Miss R. L. Mann also had an excellent display, and both were awarded gratuities.

August 19. The Misses Doran exhibited an unusually fine collection of ten golden-rods and twenty ferns, Miss Grinnell a splendid collection of midsummer plants, and on the 26th, another collection nearly as fine. Miss Mann also made a praiseworthy exhibit on the 19th. A gratuity was awarded to each.

August 26. A gratuity was awarded to Miss Grinnell.

August 29. The Misses Doran were awarded the first, Miss Grinnell the second, and Miss Mann the third prize for their collections.

Mrs. Eager also exhibited a fine collection, and Walter E. Coburn a superb collection of native grasses. A gratuity was awarded to Mr. Coburn.

Among the novelties of this exhibition was *Lysimachia* (*Steironema*) *radicans* Hooker, credited in the Manual to "West Vir-

ginia and southward," but found by Miss Grinnell quite well established, and shown here by her for the first time.

September 9. A special gratuity was awarded the Misses Doran for a superb collection of native plants in fruit. Gratuities were also awarded Miss Grinnell and Miss Mann, and again to Miss Grinnell and the Misses Doran on the 23d.

November 7. The Misses Doran were awarded a gratuity for a beautiful collection of native ferns, evergreens and plants in fruit.

THE AMOUNT AWARDED IN PRIZES AND GRATUITIES IS AS FOLLOWS:

Mrs. P. D. Richards	$19 00
Miss Alice L. Grinnell	59 00
Misses E. A. and M. S. Doran	37 00
Miss Edith Noyes	19 00
Mrs. W. S. Eager	10 00
Miss R. L. Mann	7 00
Walter E. Coburn	3 00
C. C. Kingman	6 00
Miss Genevieve Doran	2 00
Total	$162 00

AMOUNT OF APPROPRIATIONS FOR NATIVE PLANTS.

5 exhibitions, 3 prizes at each, 8, 6, 4 = 18		$90 00
3 " Cultivated Natives, 3 prizes, 3, 2, 1 = 6		18 00
1 " Hardy Ferns, 3 prizes, 6, 5, 4		15 00
Total amount for prizes		123 00
Appropriation for gratuities		50 00
Total amount		$173 00
Awards. Prizes for Native Plants	$90 00	
" " Cultivated Native Plants	6 00	
" " Hardy Ferns	15 00	
Gratuities	51 00	
Total		162 00
Balance		$11 00

MEDALS AWARDED.

Appleton Silver Medal to Miss Alice L. Grinnell for three first prizes for native plants.

Appleton Bronze Medal to Miss Edith Noyes for two first prizes for cultivated native plants.

The Committee would have liked to award the Society's Silver Medal to Robert Manning for special exhibits of cultivated native plants made by him during the season if the appropriations at its disposal would have warranted its doing so, but finds itself obliged to be content with a special and honorable mention.

Respectfully submitted,

GEORGE E. DAVENPORT,
For the Committee.

PRIZES AND GRATUITIES AWARDED FOR NATIVE PLANTS.

1899.

APRIL 22.

Gratuity:—

Mrs. P. D. Richards 1 00

APRIL 29.

Gratuity:—

Miss Alice L. Grinnell 2 00

MAY 6.

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Mrs. P. D. Richards 8 00
Second, Miss Alice L. Grinnell 6 00
Third, Misses Eleanor A. and Mollie S. Doran 4 00

MAY 13.

Gratuity:—

Mrs. P. D. Richards 2 00

MAY 20.

Gratuities:—

Mrs. P. D. Richards 1 00
Misses Eleanor and Mollie Doran 1 00

MAY 27.

Gratuity:—

Mrs. P. D. Richards 1 00

JUNE 7 AND 8 (*postponed dates*).

NATIVE PLANTS.—Collection of thirty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell 8 00
Second, Mrs. P. D. Richards 6 00
Third, Misses Eleanor and Mollie Doran 4 00

JUNE 10.

Gratuity:—

Miss Edith Noyes 2 00

JULY 1.

Gratuities:—

Miss Alice L. Grinnell 2 00
Misses Eleanor and Mollie Doran 2 00

JULY 8.

NATIVE PLANTS.—Collection not exceeding forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Mrs. W. S. Eager	6 00
Third, Miss Edith Noyes	4 00

JULY 15.

HARDY FERNS.—Collection of named species and varieties:

First, C. C. Kingman	6 00
Second, Miss Alice L. Grinnell	5 00
Third, Misses Eleanor and Mollie Doran	4 00

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	3 00

Gratuities:—

Miss Alice L. Grinnell	2 00
Miss Genevieve Doran	1 00

JULY 22.

Gratuities:—

Miss Edith Noyes	1 00
Miss Genevieve Doran	1 00
Miss Alice L. Grinnell	1 00
Misses Eleanor and Mollie Doran	1 00

JULY 29.

NATIVE PLANTS.—Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

First, Miss Alice L. Grinnell	8 00
Second, Miss Edith Noyes	6 00
Third, Mrs. W. S. Eager	4 00

AUGUST 5.

Gratuity:—

Miss Alice L. Grinnell	2 00

AUGUST 12.

CULTIVATED NATIVE PLANTS.—Collection of species and varieties not common to cultivation:

First, Miss Edith Noyes	3 00

Gratuities:—

Misses Eleanor and Mollie Doran	3 00
Miss R. L. Mann	1 00

AUGUST 19.

Gratuities:—

Misses Eleanor and Mollie Doran	3 00
Miss Alice L. Grinnell	3 00
Miss R. L. Mann	1 00

AUGUST 26.

Gratuity:—

Miss Alice L. Grinnell	2 00

AUGUST 30 AND 31.

NATIVE PLANTS.—Collection, not exceeding forty bottles of named species and varieties, one bottle of each:

Misses Eleanor and Mollie Doran	8 00
Miss Alice L. Grinnell	6 00
Miss R. L. Mann	4 00

Gratuity:—

Walter E. Coburn, Special Collection of Native Grasses	3 00

SEPTEMBER 9.

Gratuities:—

Misses Eleanor and Mollie Doran	4 00
Miss Alice L. Grinnell	2 00
Miss R. L. Mann	1 00

SEPTEMBER 23.

Gratuities:—

Miss Alice L. Grinnell	2 00
Misses Eleanor and Mollie Doran	1 00

NOVEMBER 7.

Gratuity:—

Misses Eleanor and Mollie Doran	2 00

APPLETON SILVER MEDAL.

Miss Alice L. Grinnell, she having taken three first prizes for Native Plants.

APPLETON BRONZE MEDAL.

Miss Edith Noyes, she having taken two first prizes for Cultivated Native Plants.

HONORABLE MENTION.

Robert Manning, for a series of exhibits of Cultivated Native Plants.

REPORT

OF THE

Committee on Forestry and Roadside Improvement,

FOR THE YEAR 1899.

By HARVEY N. SHEPARD, Chairman.

The Committee on Forestry and Roadside Improvement respectfully reports that it has been engaged during the preceding year upon two branches of the work committed to its charge; one, a compilation of the statutes of the Commonwealth relative to trees, which is nearly complete and ready for publication, if the Society shall so authorize; and second, a thorough investigation regarding street or roadside trees in every part of the state, especially what kinds are most frequent; what kinds do best; which, if any, have generally failed; what noteworthy examples of individual trees are on record; whether the value of property abutting on the road has been increased by the planting, or decreased by the felling, of trees along the roadside; whether Arbor Day is observed; whether school children are interested in roadside improvement; in what conditions of soil, moisture, and exposure, trees grow best; what is the effect upon them of electric wires, pipes, lights, and pavements; to what extent roadside trees are placarded with advertisements; from what diseases or pests they suffer; to what extent tree guards are used, and what are the existing by-laws of the town relative to roadside trees.

To obtain this information about four thousand copies of a circular were distributed in the early summer to the Mayors of cities, the Selectmen of towns, the principals of high schools, the members of this Society, the members of the Forestry Association,

the members of the Appalachian Mountain Club, the officers of Agricultural and Horticultural Societies and Farmers' Clubs, and many more to individuals likely to be interested. Replies began to come in almost at once, and though the circular set October first as the time when, if possible, they were all to be in they are still arriving.

Replies have been received from one hundred and twenty-five cities and towns well distributed over the state; and the number, source, and character of these replies is such as to indicate a widespread and strong interest in our roadside trees. Not only has the circular given us much desired information but it has brought us into sympathetic touch with men and women throughout the Commonwealth who are interested in roadside improvement and who anxiously await the help which we should be able to give. This Society can well organize and wisely direct a great share of this now fast-growing interest and enthusiasm. Mr. James Sturgis Pray, the member of our Committee who has undertaken most of the labor in this branch of our work, and to whom the credit for the result is altogether due, has given a good deal of time, not only in the matter of the circular, but in a personal investigation, having made a reconnoissance from Cambridge to Greenfield, down the Connecticut Valley to Long Meadow, thence to Westfield, and both north and south from Pittsfield.

The Committee regrets that it has not so far finished its work as to be able to make a complete report to the Society, but it believes that in the early part of the coming year it will be ready to submit an interesting and useful pamphlet containing a compilation of the statutes, and also a collation from the information already obtained and still coming relative to roadside trees. For this work we respectfully request that an appropriation may be given to us in the sum of three hundred dollars.

For the Committee,

HARVEY N. SHEPARD,
Chairman.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1899.

By JOSEPH H. WOODFORD, Chairman.

The Schedule List of Exhibitions during the past year called for about the same number as in former years, and they all have been very fully attended.

At only two of these shows has any admittance fee been asked, and we are glad to observe the amount received for admissions shows quite an increase over last year. The receipts for the two shows, according to the Treasurer's books will be found at the end of this report.

We are glad to know that the reporters of the daily press have been on the alert all through the season, and that our shows have been so faithfully and fully reported.

The arrangements of the shows have been as varied as possible in the limited space at our command, yet as a general thing they have met the approval of the public and the exhibitors.

We are glad to chronicle the unflagging interest which the gardeners manifest in the exhibitions, not only by contributing to their success but also in profiting by the success of their competitors. Their exhibitions are truly educators to all who take any interest in the growing of anything pertaining to horticulture.

The amount of money placed to the credit of this Committee has nearly all been expended, and for the benefit of the Society. We are now looking with pleasant anticipations to the (we hope) near future when we shall be domiciled in a new and commodious

hall where sufficient space on the ground floor will be provided not only for our exhibitions but for the comfort and convenience of our members and patrons.

The receipts for the Spring Show were . . .	$145 75
The receipts for the Chrysanthemum Show were .	945 50
Total	$1,091 25

All of which is respectfully submitted,

Jos. H. Woodford,

Chairman.

REPORT

TO THE

STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1899.

On March of this year the Massachusetts Horticultural Society had the seventieth anniversary of its organization and found itself in a most flourishing condition.

The Annual Spring Exhibition was held March 21–24, inclusive, at which were shown cinerarias in large quantities, roses, and a very beautiful orchid for the first time on exhibition. There was a specially fine exhibition of carnations, violets, apples, pears, strawberries, and vegetables in the Lower Hall.

On the 8th of May the Society held a fine exhibition of plants, flowers, and vegetables.

June 1 and 2, the Society held a Rhododendron Show, which was a very excellent exhibition, every available space being occupied by these beautiful flowers. In the Lower Hall were exhibited fine specimens of fruits, flowers, and vegetables. This exhibition was exceedingly good considering the dryness of the season.

June 22 and 23 was held the Rose and Strawberry Exhibition. The finest collection of strawberries was one of seventy-five baskets containing from one to three quarts each. Hothouse grapes, cut flowers, and vegetables were also shown.

August 30 and 31 was held the Annual Plant and Flower Show, which, the officers of the Society say, was the best ever made. A large variety of plants, flowers, grapes, and other fruit and vegetables were shown.

September 28 and 29 was held the Annual Fruit and Vegetable Exhibition. Splendid specimens of all kinds of autumn agricultural products filled both halls and in addition, the exhibition of dahlias by itself was well worth seeing. Some of the pumpkins and squashes were extremely large, one of the former weighing seventy-seven pounds.

November 7–10, inclusive, the Society held a Chrysanthemum Exhibition which was larger than usual owing to the exhibition of many new varieties. In the upper hall the potted plants were arranged with great care, and displayed their flowers to the best advantage, and were excellent examples of the gardener's skill.

April 22 the Society held a meeting and authorized a committee to purchase a lot of land on the corner of Massachusetts and Huntington Avenues, comprising 22,500 square feet, and authorized the Finance Committee to sell or improve the Society's real estate on Tremont Street as the Committee shall deem for the best interest of the Society. The President was authorized to appoint a committee of five members, of which he should be chairman, with full powers to erect a building on the corner of Massachusetts and Huntington Avenues, for use of the Society at a cost not exceeding $225,000. A new building is very much needed by the Society where they can have more room and better ventilation for keeping plants than in their present one.

I would suggest that the Society appoint one committee whose duty it shall be to appoint all sub-committees; also that the Society hold fewer Saturday exhibitions, which are not generally patronized except by a few exhibitors, in this manner saving some of their money to make larger premiums at their annual exhibitions. At the present time, with the requirement that all exhibits shall be kept fresh, the exhibitor winning a first prize does not receive enough money to pay for the original exhibition, to say nothing of the expense of keeping it fresh. I think by giving fewer and larger prizes their money would be more widely distributed through the State than it is today.

N. I. Bowditch,

Inspector.

REPORT

OF THE

Committee on Lectures and Publication,

FOR THE YEAR 1899.

The Committee on Lectures and Publication beg leave to submit the following report:

During the lecture season they secured the following course of lectures which they believe will compare favorably with those of any previous season:

January 14. "Ancient and Modern Theories of Disease, with Special Reference to Diseases of Plants caused by Parasitic Fungi," by William T. Sedgwick, Professor of Biology, Massachusetts Institute of Technology, Boston. This lecture was delivered on the John Lewis Russell foundation.

January 21. "Experimental Work in Field and Garden," by Aaron Low, Hingham.

January 28. "Peach Culture," by J. H. Hale, South Glastonbury, Conn.

February 11. "Injurious Insects and their Transformations," by Professor Clarence M. Weed, New Hampshire College Agricultural Experiment Station, Durham, N. H.

February 18. "Why Crops must have Nitrogen and How it can be Provided," by Professor G. C. Caldwell, Cornell University, Ithaca, N. Y. With stereopticon illustrations.

February 25. "The Agriculture of Ancient Times compared with Massachusetts Agriculture," by Hon. William R. Sessions, Secretary of the Massachusetts State Board of Agriculture, Springfield.

March 4. "Questions Answered and Unanswered; the Season of 1898 along Horticultural Lines," by Walter F. Taber, Poughkeepsie, N. Y.

March 11. "Market Gardening," by Herbert W. Collingwood, New York, N. Y.

March 18. "Horticulture in Japan," by John K. M. L. Farquhar, Boston. With stereopticon illustrations.

March 25. "Roadside Treatment; Actual and Possible," by Mrs. F. H. Tucker, Newton.

During the year four parts of the TRANSACTIONS have been published, viz. Parts I and II, 1898; Part I, 1899, and Part III, 1896. The Schedule for the year has also been published, besides several minor publications.

Your Committee would suggest to the chairman of each committee of the Society that it is very desirable that their reports should be made ready as soon as possible after the duties of the current year have ceased, and be handed in to the Secretary in order that the yearly TRANSACTIONS shall be made ready and printed as soon as possible.

All which is respectfully submitted,

AARON LOW,
Chairman.

REPORT

OF THE

COMMITTEE ON THE LIBRARY,

FOR THE YEAR 1899.

As usual the report of this Committee will be brief, for the Librarian includes in his report such items of interest as there may have been in connection with the Library during the year. We have not had the Stickney Fund to draw upon, our enjoyment of the donor's generosity having lapsed by the expiration of the term for which he desired that we should have the use of it.

So well did he calculate that the fund has enabled us to procure nearly all of the really extensive and costly works now existing on the subjects to which this Library is devoted.

We asked for and received an appropriation of one thousand dollars at the beginning of the year, and that sum, one hundred dollars less than we have previously had, proved sufficient. We shall ask for the same amount for the year 1900, but, so complete has the library become, it is probable that the time is not far distant when a smaller sum will suffice.

The various departments of the Library work have made satisfactory progress; the card catalogue of accessions has been kept up and much work has been done on the catalogue of plates. We hope that the beginning of a similar catalogue of subjects may be not very far away.

For the Committee,

W. E. Endicott,

Chairman.

REPORT

OF THE

SECRETARY AND LIBRARIAN,

FOR THE YEAR 1899.

Since a copy has been sent to every member of the Society it seems hardly necessary to say that the first part of the TRANSACTIONS for 1899 was ready, if not as early as if no hindrance had been placed in the way by the failure of one of the lecturers to return his paper, which he had taken home for revision, yet with a reasonable degree of promptness. This paper, I may add, was never returned, and the Committee on Publication were obliged to content themselves with the publication of the abstract printed in the *Transcript* at the time of its delivery. It is to be hoped that no such hindrance will again occur, but it is impossible, when a lecturer desires to take his paper home for revision before final publication, to refuse, and it seems equally impossible to make lecturers sensible of the absolute necessity of a prompt return if the publication of the TRANSACTIONS is not to be delayed, and a chairman of a committee or a lecturer has it just as much in his power as ever to delay publication by negligence in making his report or in returning his paper with revisions.

The two parts preceding that above mentioned, viz, the first and second parts for 1898, have also been published during the year, and also the third part for 1896, being the List of Library Accessions during the year, so that we are in a hopeful way to bring up all arrears. There still remain the third parts for 1897 and 1898, and it was hoped to print the first of these during the present year, but it was ultimately found impossible to do this consistently with justice to other work, but Part III for 1897 is now in an advanced state of preparation. As these third parts form an annual supplement to the Library Catalogue no pains are spared to have them ready at the earliest possible moment, consistent with fulness and accuracy.

During the present and the preceding year the number of Special Meetings for the transaction of important business relating to the Hayes estate, and the purchase of land and the erection of a building for the better accommodation of the Society, has probably been greater than in all the previous history of the Society, and has added materially to the work in the Secretary's department. The number of members added to the Society during the past year has been greater than for many years previous, with the like result of increased work for the Secretary and his assistants.

One of the conditions of the Stickney Fund was that the income of $700 should be expended for *books* in each and every year, but now that the Society's interest in that fund has expired, it was deemed best, in the present crowded state of the Library Room, not to purchase so many books as heretofore, at the same time not neglecting any opportunity to secure a rare and desirable book or to complete a set, or any valuable current publication. The Committee therefore asked for $1,000, $100 less than the total of the income of the Stickney Fund and the Society's appropriation of $400 for periodicals, binding, etc., and it was purposed that the purchase of books be further reduced by employing a larger amount than heretofore in binding such books already in the library as needed it. This purpose has been carried out as far as possible, but owing to the time necessarily given to the TRANSACTIONS it has been impossible to devote as much as we should have liked to give, to the preparation of books for the binder or to the Card Catalogue of Plates.

When the present gallery in the Library Room was built in 1889 the Library Committee was desirous of having it extended around the smaller room, and also to have a stack room on the level of the gallery, built as a half story in the staircase hall. In December, 1893, the subject of extending the gallery around the smaller room was again brought up, and on both these occasions plans and estimates for the necessary alterations in the building and the construction of bookcases for the new gallery and stack room were procured. The present year the President, in his annual address suggested that such alterations might relieve the very congested condition of our books, and asked that the Library Committee give the matter consideration again, which was accordingly done. This was before it was decided whether the Society should

remain in the building and endeavor to adapt it to its enlarged work or erect a new building, and it was felt that if we remained in this building the place above mentioned would be the best and indeed the only way of gaining additional accommodations for the Library. Plans and estimates were therefore more carefully considered than ever before at the expense of much thought and time.

The present year is memorable for the completion of Sargent's "Silva of North America" as originally planned, though a supplementary volume is promised. This is beyond comparison the most magnificent botanical work ever published in this country. Mouillefert's "Arbres et Arbrisseaux" has also been completed. Other noticeable books are "An Old English Garden" by the Countess of Warwick; Haité's "Plant Studies," and Davis's "Ornamental Shrubs," the last supplying more fully than before, information on its subject which has long been wanted. Simon and Cochet's "Names of Roses" is a valuable book of reference. King's Photographs of American Parks form a valuable continuation of his similar collection of English photographs, and is to be followed by more views in this country and also in Europe. The new American edition of Burberry's "Amateur Orchid Cultivator" edited by Dr. J. M. Kitchen is a valuable handbook of that family of plants. Books of the character of "Lamia's Winter Quarters," by Alfred Austin; Mrs. Earle's "Potpourri from a Surrey Garden;" Miss Jekyll's "Wood and Garden," etc., dealing with the literature and amenities of horticulture, more than with practical instructions have been thought desirable as calculated to increase the taste for rural life, and have accordingly been added. Another class of books, which has grown up in the last few years, represented by Maud Going's "Field, Forest, and Wayside Flowers," F. Schuyler Mathews's "Familiar Features of the Roadside," Mrs. Frances Theodora Parson's "How to Know the Ferns," etc., is an attempt to enable persons to become acquainted with the names and affinities of plants, who lack either the time or the disposition to make a systematic study of botany. Judging from the circulation of these books and the reports of those who have read them, the efforts of their authors have met with a considerable degree of success.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT.

FOR THE YEAR 1899.

MASSACHUSETTS HORTICULTURAL SOCIETY, *in account current with* CHARLES E. RICHARDSON, *December 30th, 1899.*

DR.

To amount paid on account of Library in 1899:		
Appropriated by the Society	$1,000 00	
Balance of Josiah Stickney Fund	1 00	
		$1,001 00
To amount paid Interest on Funds for Prizes, credited opposite		1,742 72
" " Interest paid on Mortgage	3,937 50	
" " " " " Loan	198 90	
		4,136 40
" " paid on Prizes awarded in 1898, viz.:		
" " " Plants	1,727 50	
" " " Flowers	2,042 75	
" " " Fruit	1,666 00	
" " " Vegetables	1,147 00	
" " " Gardens and Greenhouses	580 00	
" " " H. H. Hunnewell Prizes for Rhododendrons	105 00	
" " " H. H. Hunnewell Triennial Prizes	160 00	
		$7,428 25
" " " Lot on Massachusetts and Huntington Avenues		225,000 00
" " " Harvard College		12,000 00
" " " H. H. Hunnewell account of old mortgage		1,000 00
" " " Salaries of Treasurer, Secretary and Assistants		4,300 00
" " " " " Committees		1,218 00
" " " City Taxes		4,466 96
" " " Legal Services		926 25
" " " Incidentals		1,031 03
" " " H. S. Adams		4 00
" " " Committee of Arrangements		395 55
" " " Committee on School Gardens and Children's Herbariums		50 40
Amount carried forward		$264,700 56

Amount brought forward	$264,700 56
To amount paid Insurance	634 32
" " " Repairs	89 67
" " " Exhibition Ware	54 60
" " " Heating	897 24
" " " Lighting	771 69
" " " Water Rates	225 98
" " " Lectures	281 31
" " " Labor	2,345 37
" " " Stationery, Printing, and Postage	2,630 78
" " " on account Real Estate in South Boston	168 99
" " " Committee on Forestry and Roadside Improvement	106 29
" " " on account Building on Massachusetts and Huntington Avenues	5,387 25
	$278,294 05
Balance of Cash December 30, 1899	23,920 27
	$302,214 32

Cr.

By Balance of account rendered December 31, 1898			$14,105 60
Received from Building in 1899, viz.:			
Rents of Stores	$17,506 15		
" " Halls	1,315 00		
		$18,821 15	
Received Income from Mt. Auburn Cemetery		5,117 66	
" State Bounty		600 00	
" Admissions and Assessments		4,852 00	
" Annual Exhibitions	$1,091 25		
Less Expenses	331 24		
		760 01	
" Interest on Bonds	6,445 00		
" " " Deposit in Bank	178 74		
		6,623 74	
" Bequest of Francis B. Hayes on account		15,744 24	
" on account on Mortgage		225,000 00	
" from A. P. Loring, Executor		7,500 00	
" " H. H. Hunnewell, Prize Money, 1898		47 00	
" " Sale of Transactions		10 00	
" " Sale of Copies of History		5 00	
" H. E. Woodward in Settlement of Old Debt		835 08	
" Bills Receivable		450 12	
Amounts carried forward		$286,366 00	$14,105 60

Amounts brought forward		$286,366 00	$14,105 60
Received Interest credited the following Funds charged opposite:			
Samuel Appleton Fund .	$50 00		
John A. Lowell " .	50 00		
Theodore Lyman " .	550 00		
Josiah Bradlee " .	50 00		
Benjamin V. French " .	25 00		
W. J. Walker " .	117 72		
Levi Whitcomb " .	25 00		
Benjamin B. Davis " .	25 00		
Marshall P. Wilder " .	50 00		
John Lewis Russell " .	50 00		
H. H. Hunnewell " .	200 00		
Francis Brown Hayes " .	500 00		
Henry A. Gane Memorial Fund,	50 00		
		1,742 72	
			288,108 72
			$302,214 32

(Signed) CHARLES E. RICHARDSON,
Treasurer.

Approved:

H. H. Hunnewell,
Augustus Hemenway,
Francis H. Appleton,
} *Finance Committee.*

ASSETS AND LIABILITIES OF THE MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 30, 1899.

ASSETS.

Real Estate		$475,000 00
Stereotype Plates and Copies of History		246 50
Lake Shore & Michigan So. R. R. Bonds		10,415 25
City of Newton Bonds		24,228 75
Chicago, Burlington & Quincy R.R. Bonds		1,000 00
Atchinson, Topeka & Santa Fé R.R. Bonds		44,693 25
Chicago, Burlington & Quincy, Nebraska Extension, R.R. Bonds		50,012 50
Kansas City, Clinton & Springfield R. R. Bonds		1,980 00
Sinking Fund		23,872 50
Furniture and Exhibition Ware		7,729 50
Library		39,112 47
Bills Receivable		624 05
Cash on hand and in Bank		23,920 27
		$702,835 04

LIABILITIES.

Mortgage			$225,000 00
Prize Funds invested in Building, viz.:			
Samuel Appleton Fund,	$1,000 00		
John A. Lowell "	1,000 00		
Theodore Lyman "	11,000 00		
Josiah Bradlee "	1,000 00		
Benjamin V. French "	500 00		
H. H. Hunnewell "	3,000 00		
W. J. Walker "	2,354 43		
Levi Whitcomb "	500 00		
Benjamin B. Davis "	500 00		
Francis Brown Hayes "	10,000 00		
Henry A. Gane Memorial "	1,000 00		
		$31,854 43	
Amounts carried forward		$31,854 43	$225,000 00

Amounts brought forward		$31,854 43	$225,000 00	
Prize Funds invested in Bonds:				
John Lewis Russell Fund	1,000 00			
Marshall P. Wilder "	1,000 00			
H. H. Hunnewell "	1,000 00			
		3,000 00		
			34,854 43	
Prizes for 1899 payable in 1900			8,349 60	
				$268,204 03
Surplus				434,631 01
				$702,835 04

CHAS. E. RICHARDSON,
Treasurer.

Membership Account of the Massachusetts Horticultural Society, December 30, 1899.

Life Members per last report	535		
Added in 1899	146		
Commuted from Annual	1		
		682	
Deceased		23	
			659
Annual Members per last report	203		
Added in 1899	7		
		210	
Resigned	1		
Commuted to Life	1		
Deceased	5		
Dropped for non-payment for two years	4		
		11	
			199
Present Membership			858

INCOME FROM MEMBERSHIP.

146 new Life Members @ $30	$4,380 00
1 Commuted to Life @ $20	20 00
7 new Annual Members @ $10	70 00
Annual Assessments	382 00
	$4,852 00

CHAS. E. RICHARDSON,
Treasurer.

Dr. *Massachusetts Horticultural Society in account with the Proprietors of Mount Auburn Cemetery.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1899.

To cost of filling up and improving land at Mt. Auburn for the year ending Dec. 31, 1899. The Massachusetts Horticultural Society being charged with their proportion of the same:			
Birch to Eagle and Cherry Avenues	$148 50		
Yew and Fountain Avenues	121 88		
Glen Avenue	500 06		
	$770 44		
One-fourth of $770.44 is	$192 61		
Balance due Mass. Horticultural Society,	5,117 66		
		$5,310 27	
By Sales in January			
" " " February			295 00
" " " March			180 00
" " " April			991 00
" " " May			3,758 00
" " " June			1,458 25
" " " July			780 00
" " " August			2,418 00
" " " September			1,440 00
" " " October			4,571 00
" " " November			4,036 85
" " " December			1,440 00
			$21,368 10
Net amount received from Receiving Tomb			1,338 00
			$22,706 10
Less graves repurchased			65 00
			$22,641 10
Deduct for annual expenses			1,400 00
			$21,241 10
Mass. Horticultural Society, ¼ part of $21,241.10			$5,310 27

E. & O. E.

H. B. MACKINTOSH, *Treasurer.*

December 31, 1899.

MASSACHUSETTS HORTICULTURAL SOCIETY

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN. *Dr.*

For *one-fourth part* of the following *expenditures for grading* new *lands for sale* during the year 1899:

Birch to Eagle and Cherry Avenues.

66 days, men		$148 50

Yew and Fountain Avenues.

32½ days, man and horse		121 88

Glen Avenue.

38 days, men	$85 50	
64½ days, horses	96 75	
84¾ days, man and horse	317 81	
		500 06
		$770 44
One-fourth of $770.44 is		$192 61

JAMES C. SCORGIE,

Supt. of the Cemetery of Mount Auburn.

MOUNT AUBURN, December 31, 1899.

I certify the foregoing to be a true copy of improvements for the year 1899, rendered by the Superintendent.

H. B. MACKINTOSH,

Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1900.

President.

FRANCIS H. APPLETON.

Vice-Presidents.

CHARLES H. B. BRECK, of Brighton. BENJAMIN P. WARE, of Clifton.
WALTER HUNNEWELL, of Wellesley. SAMUEL HARTWELL, of Lincoln.

Treasurer and Superintendent of the Building.

CHARLES E. RICHARDSON, of Cambridge.

Secretary and Librarian.

ROBERT MANNING, of Salem.[1]

Professor of Botany and Vegetable Physiology.

BENJAMIN M. WATSON, of Jamaica Plain.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Delegate to the State Board of Agriculture.

WILLIAM H. SPOONER, of Jamaica Plain.

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1 Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, 101 Tremont street, Boston.

STANDING COMMITTEES.

Executive.

THE PRESIDENT, FRANCIS H. APPLETON, CHAIRMAN.

THE CHAIRMAN OF THE FINANCE COMMITTEE, H. H. HUNNEWELL, *Ex-officio.*

WILLIAM C. STRONG.
WILLIAM H. SPOONER.
NATHANIEL T. KIDDER.
BENJAMIN C. CLARK.
WALTER HUNNEWELL.
CHARLES W. PARKER.
CHARLES F. CURTIS.

Finance.

H. HOLLIS HUNNEWELL, OF BOSTON, CHAIRMAN.

FRANCIS H. APPLETON.
AUGUSTUS HEMENWAY.

Lectures and Publication.

AARON LOW, OF HINGHAM, CHAIRMAN.

JAMES H. BOWDITCH.
E. W. WOOD.

Library.

WILLIAM E. ENDICOTT, OF CANTON, CHAIRMAN.

GEORGE W. HUMPHREY.
WALTER S. PARKER.
GEORGE E. DAVENPORT.
CHARLES W. SWAN.

Plants.

WILLIAM WALLACE LUNT, OF HINGHAM, CHAIRMAN.

JAMES WHEELER.
WILLIAM J. MARTIN.
ARTHUR H. FEWKES.
ROBERT CAMERON.

Flowers.

J. WOODWARD MANNING, OF READING, CHAIRMAN.

MICHAEL H. NORTON.
KENNETH FINLAYSON.
FREDERICK S. DAVIS.
JAMES COMLEY.

Fruits.

E. W. WOOD, OF WEST NEWTON, CHAIRMAN.

CHARLES F. CURTIS.
O. B. HADWEN.
WARREN FENNO.
SAMUEL HARTWELL.
J. WILLARD HILL.
SUMNER COOLIDGE.

Vegetables.

WARREN H. HEUSTIS, OF BELMONT, CHAIRMAN.

CEPHAS H. BRACKETT.
VARNUM FROST.
WALTER RUSSELL.
AARON LOW.
GEORGE D. MOORE.
JOSHUA C. STONE.

Forestry and Roadside Improvement.

HARVEY N. SHEPARD, CHAIRMAN.

NATHANIEL S. SHALER.
J. D. W. FRENCH.
J. WOODWARD MANNING.
JAMES STURGIS PRAY, SECRETARY.

Gardens.

PATRICK NORTON, of Dorchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND ARRANGEMENTS, *Ex-officiis*.
HENRY W. WILSON. JACKSON T. DAWSON.

For Establishing Prizes.

WILLIAM J. STEWART, of Winchester, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis*.
WILLIAM J. MARTIN.

Committee of Arrangements.

JOSEPH H. WOODFORD, of Boston, Chairman.
CHAIRMEN OF THE COMMITTEES ON PLANTS, FLOWERS, FRUITS, VEGETABLES, AND GARDENS, *Ex-officiis*.
ROBERT FARQUHAR.

MEMBERS FOR LIFE.

Members of the Society and all other persons who may know of deaths, changes in residence, or other circumstances showing that the following list is incorrect in any particular, will confer a favor by promptly communicating to the Secretary any needed corrections.

Information, or any clew to it, is especially desired in regard to members whose names are marked thus.†

Adams, Mrs. Charles Francis, South Lincoln.
Adams, Henry Saxton, Dorchester.
Adams, Luther, Newton.
Alger, Rev. R. F., Becket.
Allen, Hon. Charles H., Lowell.
Allen, Thomas, Boston.
Ames, F. Lothrop, North Easton.
Ames, Mrs. F. L., North Easton.
Ames, George, Boston.
Ames, John S., North Easton.
Ames, Miss Mary S., North Easton.
Ames, Oakes, 2d, North Easton.
Ames, Oliver, North Easton.
Ames, Preston Adams, Boston.
Amory, C. W., Boston.
Amory, Frederick, Boston.
Anderson, Larz, Brookline.
Andrews, Charles L., Milton.
Andrews, Frank W., Washington, D. C.
Andros, Milton, San Francisco, Cal.
Appleton, Francis H., Boston.
Appleton, William S., Boston
Ash, John, Pomfret Centre, Conn.
Asmus, Ernst G., West Hoboken, N. J.
Atkins, Edwin F., Belmont.
Ayer, James B., Boston.
Bailey, Jason S., West Roxbury.
Ball, George H., Boston.
Bancroft, John C., Boston.
Banfield, Francis L., M.D., Worcester.
Barber, J. Wesley, Newton.
Barnard, James M., Boston.
Barnard, Robert M., Everett.
Barnes, Walter S., Somerville.
†Barney, Levi C., Boston.
Barry, John Marshall, Boston.
Barry, William C., Rochester, N. Y.
Bartlett, Edmund, Newburyport.
Bartlett, Francis, Beverly.
Baylies, Walter C., Taunton.
Beal, Leander, Swampscott.
Becker, Frederick C., Cambridge.
Beckford, Daniel R., Jr., Dedham.
Beebe, E. Pierson, Boston.
Beebe, Franklin H., Boston.
Beebe, J. Arthur, Boston.
Bigelow, Albert S., Cohasset.
Bigelow, Joseph S., Cohasset.
Bigelow, Dr. William Sturgis, Boston.
Black, George N., Manchester.
Blake, Miss Anne, Brookline.
Blake, Mrs. Arthur W., Brookline.
Blake, Edward D., Boston.

Blake, Francis, Weston.
Blake, Frederick A., Rochdale.
Blakemore, John E., Roslindale.
Blanchard, John W., West Newton.
Blinn, Richard D., Chicago, Ill.
Bliss, William, Boston.
Boardman, Samuel M., Hyde Park.
Boardman, T. Dennie, Manchester.
Bôcher, Prof. Ferdinand, Cambridge.
Bockus, Charles E., Dorchester.
Bosler, Frank C., Carlisle, Penn.
Bowditch, Charles P., Jamaica Plain.
Bowditch, Ernest W., Milton.
Bowditch, James H., Brookline.
Bowditch, Nathaniel I., Framingham.
Bowditch, William E., Roxbury.
Bowker, William H., Boston.
Brackett, Cephas H., Newton.
Bremer, Mrs. John L., Manchester.
Bresee, Albert, Hubbardton, Vt.
Brewer, Francis W., Hingham.
Briggs, William S., Lincoln.
Brigham, William T., Honolulu, Hawaii.
Brooks, J. Henry, Milton.
Brooks, Lawrence, Groton.
Brooks, Peter C., Boston.
Brooks, Shepherd, Boston.
Brown, Charles E., Yarmouth, N. S.
Brown, Edward J., Weston.
Brown, George Barnard, Brookline.
Brown, John M., Belmont.
Brown, John T., Newburyport.
Brown, Samuel N., Boston.
Bullard, John R., Dedham.
Burlen, William H., Boston.
Burnett, Harry, Southborough.
Burnham, John A., Manchester.
Burr, Matthew H., Hingham.
Buswell, Frank E., Brooklyn, N. Y.
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.

Cabot, Dr. Arthur T., Boston.
Cabot, Edward C., Brookline.
† Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Cameron, Robert, Cambridge.
Campbell, Francis, Cambridge.
Capen, John, Boston.
Carlton, Samuel A., Boston.
Carr, Hon. John, Roxbury.
Carter, Charles N., Boston.
Carter, Miss Maria E., Woburn.
Cartwright, George, Dedham.
Casas, W. B. de las, Malden.
Chadbourne, Marshall W., East Watertown.
Chaffin, John C., Newton.
Chamberlain, Chauncy W., Brookline.
Chase, Andrew J., Lynn.
Chase, Daniel E., Somerville.
Chase, George B., Dedham.
Chase, William M., Dorchester.
Cheney, Amos P., Natick.
Cheney, Mrs. Elizabeth S., Wellesley.
Childs, Nathaniel R., Boston.
Choate, Charles F., Southborough.
Christie, William, Newton.
Claflin, Hon. William, Boston.
Clapp, Edward B., Dorchester.
Clapp, James H., Dorchester.
Clapp, William C., Dorchester.
Clark, Benjamin C., Boston.
Clark, B. Preston, Cohasset.
Clark, Miss Eleanor J., Pomfret Centre, Conn.
Clark, J. Warren, Rockville.
Clarke, Miss Cora H., Boston.
Clarke, Eliot C., Boston.
Cleary, Lawrence, Roxbury.
Clough, Micajah Pratt, Lynn.
Cobb, Albert A., Brookline.
Cobb, John C., Milton.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, South Lincoln.
Collamore, Miss Helen, Boston.
Converse, Elisha S., Malden.

Converse, Col. H. E., Malden.
Coolidge, Joshua, Mount Auburn.
Coolidge, J. Randolph, Chestnut Hill.
Coolidge, Mrs. J. Randolph, Chestnut Hill.
Coolidge, T. Jefferson, Jr., Boston.
Cottle, Henry C., Boston.
Cowing, Walter H., Brookline.
Cox, Thomas A., Dorchester.
Coy, Samuel I., Boston.
Crane, Zenas, Dalton.
Crawford, Dr. Sarah M., Roxbury.
Crocker, Hon. George G., Boston.
Crocker, Miss S. H., Boston.
Crosby, George E., West Medford.
† Crowell, Randall H., Chelsea.
Curtis, Charles F., Jamaica Plain.
Curtis, Charles P., Swampscott.
Curtis, Charles P., Jr., Boston.
Cushing, Livingston, Weston.
Cushing, Robert M., Boston.

† Daggett, Henry C., Boston.
Dalton, Charles H., Beverly.
Daly, John C., Roxbury.
Damon, Frederick W., Arlington.
Dana, Charles B., Wellesley.
Daniels, Dr. Edwin A., Boston.
Davenport, Albert M., East Watertown.
Davenport, Edward, Dorchester.
Davenport, George E., Medford.
Davis, Edward L., Worcester.
Davis, John, Lowell.
Davis, L. Shannon, Brookline.
Dawson, Jackson T., Jamaica Plain.
Dee, Thomas W., Cambridge.
Denny, Clarence H., Boston.
Denton, Eben, Dorchester.
Dewson, Francis A., Newtonville.
Dexter, F. Gordon, Boston.
Dexter, George, Beverly.
Dike, Charles C., Stoneham.
Doliber, Thomas, Brookline.
Donald, William, West Roxbury.
Dorr, George, Dorchester.
Dove, George W. W., Andover.
Dowse, William B. H., West Newton.
Draper, Hon. Eben S., Hopedale.
Draper, George A., Hopedale.
Dreer, William F., Philadelphia, Pa.
Dumaresq, Herbert, Chestnut Hill.
Duncan, James L., Chelsea.
Dunlap, James H., Nashua, N. H.
Durant, William, Boston.
Durfee, George B., Fall River.
Dutcher, Frank J., Hopedale.

Eaton, Horace, Cambridge.
Edgar, William W., Waverly.
Eldredge, H. Fisher, Boston.
† Eldridge, E. H., Roxbury.
Ellicott, Joseph P., Boston.
Elliot, Mrs. John W., Boston.
Elliott, William H., Brighton.
Endicott, William, Boston.
Endicott, William, Jr., Boston.
Endicott, William C., Jr., Danvers.
Endicott, William E., Canton.
Estabrook, Arthur F., Boston.
Ewell, Warren, Dorchester.

Fairchild, Charles, Boston.
Falconer, William, Pittsburgh, Pa.
Farlow, Lewis H., Newton.
Farnsworth, Mrs. William, Dedham.
Farquhar, James F. M., Roslindale.
Farquhar, John K. M. L., Roxbury.
Farquhar, Robert, North Cambridge.
Faxon, John, Quincy.
Fay, H. H., Wood's Holl.
Fay, Joseph S., Jr., Wood's Holl.
Fenno, L. Carteret, Boston.
Fessenden, George B., Allston.
Fewkes, Arthur H., Newton Highlands.
Finlayson, Kenneth, Brookline.
Fisher, James, Roxbury.
Flagg, Augustus, Boston.
Fletcher, George V., Belmont.
Fletcher, J. Henry, Belmont.
Fletcher, John W., Chelsea.

Flint, David B., Boston.
Foster, Charles H. W., Brookline.
Foster, Francis C., Cambridge.
Fottler, John, Jr., Dorchester.
Fowle, George W., Jamaica Plain.
Fowle, William B., Auburndale.
French, Miss Caroline L. W., Boston.
French, J. D. Williams, Boston.
French, Jonathan, Boston.
French, S. Waldo, Jamaica Plain.
French, W. Clifford, Cambridge.
Frohock, Roscoe R., Malden.

Galloupe, Charles W., Swampscott.
Galvin, John, Boston.
Gardner, George A., Boston.
Gardner, George P., Boston.
†Gardner, Henry N., Mount Auburn.
Gardner, John L., Boston.
Gardner, Mrs. John L., Brookline.
Gardner, William Amory, Groton.
Gaston, William A., Boston.
Gibbs, Wolcott, M.D., Newport, R.I.
Gill, George B., Medford.
Gillard, William, Dorchester.
Gilmore, E. W., North Easton.
Gilson, F. Howard, Wellesley Hills.
Glover, Joseph B., Boston.
Goddard, A. Warren, Brookline.
Goddard, Joseph, Sharon.
Goodell, L. W., Dwight.
Gorham, James L., Jamaica Plain.
†Gould, Samuel, Boston.
Gowing, Mrs. Clara E., Kendal Green.
Gray, James, Wellesley.
Gray, Mrs. John C., Boston.
Gregory, Hon. James J. H., Marblehead.
Grew, Edward S., Boston.
Grey, Benjamin, Malden.
Guild, J. Anson, Brookline.

Hadwen, Obadiah B., Worcester.
Hale, James O., Byfield.
Hall, Edwin A., Cambridgeport.
Hall, George A., Chelsea.
Hall, George R., M.D., Warren, R.I.
Hall, Jackson E., Boston.
Hall, Osborn B., Malden.
Hall, William F., Brookline.
Halliday, William H., South Boston.
Hammond, Gardiner G., New London, Conn.
Hammond, George W., Boston.
†Harding, George W., Arlington.
Harding, Louis B., Stamford, Conn.
Hardy, F. D., Cambridgeport.
Harlow, James F., Quincy.
Harris, Charles, Cambridge.
Harris, Thaddeus William, A.M., Keene, N. H.
Hartshorn, Arthur E., Worcester.
Harwood, George Fred, Newton.
Haskell, Edwin B., Auburndale.
Haskell, John C., Lynn.
Hastings, Levi W., Brookline.
Hatch, Mrs. C. S., North Cambridge.
Hatch, Edward, Boston.
Hawken, Mrs. Thomas, Rockland, Me.
Hayward, George P., Roxbury.
†Hazeltine, Hazen, Boston.
Hemenway, Augustus, Canton.
Hemenway, Mrs. Augustus, Canton.
Henshaw, Joseph P. B., Boston.
Henshaw, Samuel, Cambridge.
Hewett, Miss Mary C., Canton.
Hews, Albert H., North Cambridge.
Hilbourn, A. J., Boston.
Hill, John, Stoneham.
Hittinger, Jacob, Mount Auburn.
Hoar, Samuel, Concord.
Hodgkins, John E., Portsmouth, N. H.
Hoitt, Hon. Charles W., Nashua, N. H.
Hollingsworth, Amor L., Milton.
Hollingsworth, Z. T., Boston.
Hollis, George W., Grantville.
Holmes, Edward Jackson, Boston.

Holt, Mrs. Stephen A., Winchester.
Hooper, William, Boston.
Horner, Mrs. Charlotte N.S., Georgetown.
Horsford, Miss Kate, Cambridge.
Hovey, Charles H., South Pasadena, Cal.
Hovey, Stillman S., Woburn.
Howard, Joseph W., Somerville.
Hubbard, Charles Wells, Weston.
Hubbard, James C., Everett.
Humphrey, George W., Dedham.
Hunnewell, Arthur, Wellesley.
Hunnewell, Henry Sargent, Wellesley.
Hunnewell, H. Hollis, Wellesley.
Hunnewell, Walter, Wellesley.
Hunt, Dudley F., Reading.
Hunt, Francis W., Melrose.
†Hunt, Franklin, Boston.
Hunt, William H., Concord.

Jack, John George, Jamaica Plain.
Jackson, Charles L., Cambridge.
Jackson, Robert T., Boston.
James, George Abbot, Nahant.
Janvrin, William S., Revere.
Jeffries, William A. Boston.
Jenks, Charles W., Bedford.
Johnson, J. Frank, Malden.
Jones, Jerome, Brookline.
Jones, Dr. Mary E., Boston.
Jordan, Eben D., Boston.
Jordan, Henry G., Hingham.
Jose, Edwin H., Cambridgeport.

Kakas, Edward, West Medford.
Kellen, William V., Marion.
Kelly, George B., Jamaica Plain.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
†Kendall, Joseph R., San Francisco, Cal.
Kendall, Dr. Walter G., Atlantic.
Kendrick, Mrs. H. P., Allston.
Kennedy, George G., M.D., Roxbury.
Kent, John, Chestnut Hill.
†Keyes, E. W., Denver, Col.
Keyes, John M., Concord.
Kidder, Charles A., Southborough.
Kidder, Nathaniel T., Milton.
†Kimball, A. P., Boston.
Kimball, David P., Boston.
King, D. Webster, Boston
Kingman, Abner A., Brookline.
Kingman, C. D., Middleborough.
Knapp, Walter H., Newtonville.

Lamb, Horatio A., Milton.
Lancaster, Charles B., Boston.
Lanier, Charles, Lenox.
Lawrence, Amory A., Boston.
Lawrence, Amos A., Boston.
Lawrence, James, Groton.
Lawrence, John, Groton.
Lawrence, Rt. Rev. William, Boston.
Learned, Charles A., Arlington.
Lee, Daniel D., Jamaica Plain.
Lee, Francis H., Salem.
Lee, George C., Newton.
Leeson, Hon. Joseph R., Newton Centre.
Lemme, Frederick, Charlestown.
Leuchars, Robert B., Dorchester.
Lewis, Edwin C., Taunton.
Lewis, William G., Framingham.
Lincoln, George, Hingham.
Lincoln, Col. Solomon, Boston.
Little, James L., Brookline.
Little, John Mason, Swampscott.
Locke, Isaac H., Belmont.
Lockwood, Rhodes, Boston.
Lodge, Richard W., Boston.
Loftus, John P., Dorchester.
Loomis, Elihu G., Bedford.
Loring, Augustus P., Beverly.
Loring, Mrs. William Caleb, Beverly.
Lothrop, William S. H., Boston.
†Lowder, John, Watertown.
Lowell, Abbott Lawrence, Boston.

Lowell, Augustus, Boston.
Luke, Otis H., Brookline.
Lumb, William, Boston.
Lunt, William W., Hingham.
Lyman, George H., Wareham.
Lyman, Mrs. Theodore, Brookline.
Lyon, Henry, M. D., Charlestown.

Mabbett, George, Plymouth.
†Mahoney, John, Boston.
Mallet, E. B., Jr., Freeport, Me.
Mann, James F., Ipswich.
Manning, Jacob W., Reading.
Manning, J. Woodward, Reading.
Manning, Mrs. Lydia B., Reading.
Manning, Robert, Salem.
Manning, Warren H., Brookline.
Marshall, Frederick F., Everett.
Marston, Howard, Boston.
Mason, Miss Ellen F., Boston.
Mason, Col. Frederick, Taunton.
Matthews, Nathan, Boston.
May, Frederick W. G., Boston.
McCarty, Timothy, Providence, R. I.
McWilliam, George, Whitinsville.
Melvin, James C., West Newton.
Merriam, Charles, Boston.
Merriam, Herbert, Weston.
Merrill, Hon. Moody, Roxbury.
Metivier, James, Cambridge.
Milmore, Mrs. Joseph, Washington, D. C.
Minot, Charles S., Milton.
Minton, James, Boston.
Mitton, Edward J., Brookline.
Mixter, George, Boston.
Monteith, David, Dedham
Montgomery, Alexander, Natick.
Moore, John H., Concord.
Morgan, George H., New York, N.Y.
Morse, John T., Jr., Boston.
Moseley, Charles H., Dorchester.
Mudge, George A., Portsmouth, N. H.
Murphy, William Bowen, Boston.
Mutch, John, Brookline.

Nevins, Mrs. David, Methuen.
Newman, John R , Winchester.
Newton, Rev. William W., Pittsfield.
Nickerson, George A., Dedham.
Nickerson, Mrs. George A., Dedham.
Norton, Charles W., Allston.
Norton, Edward E., Boston.

Oakman, Hiram A., North Marshfield.
Olmsted, Frederick Law, Jr., Brookline.
Olmsted, John C., Brookline.
Orpet, Edward O., South Lancaster.

Packer, Charles H., Boston.
Paige, Clifton H., Mattapan.
Parker, Augustus, Roxbury.
Parker, Charles W., Boston.
Parkman, Henry, Boston.
Parsons, John E., Lenox.
Partridge, Horace, North Cambridge.
Patten, Marcellus A., Tewksbury.
Paul, Alfred W., Dighton.
Peabody, Francis H., Boston.
Peabody George A., Danvers.
Peabody, John E., Salem.
Peabody, S. Endicott, Salem.
Peck, O. H., Denver, Col.
Peck, William G., Arlington.
Peirce, Miss Marion W., Topsfield.
†Perry, George W., Malden.
Pfaff, Col. Charles, South Framingham.
Philbrick, William D., Newton Centre.
Phillips, Mrs. John C., North Beverly.
Phillips, William, North Beverly.
Pierce, Dean, Brookline.
Pierce, George Francis, Neponset.
Poor, John R., Brookline.
Pope, Col. Albert A., Cohasset.
Porter, Alexander S., Boston.
Porter, James C., Wollaston.
Potter, Joseph S., Fredericksburg, Va.

Prang, Louis, Roxbury.
Pratt, Laban, Dorchester.
Pratt, Lucius G., West Newton.
Pratt, Robert M., Boston.
Prendergast, J. M., Boston.
Prescott, Eben C., New York, N. Y.
Pringle, Cyrus G., Charlotte, Vt.
Prouty, Gardner, Littleton.
Putnam, George, Manchester
Putnam, Joshua H., Newton Centre.

Quinby, Hosea M., M.D., Worcester.

Raddin, Everett W., North Cambridge.
Rand, Miss Elizabeth L., Newton Highlands.
Rand, Harry S., North Cambridge.
Rand, Oliver J., Cambridgeport.
Rawson, Warren W., Arlington.
Ray, James F., Franklin.
Ray, Hon. Joseph G., Franklin.
Raymond, Walter, Boston.
Read, Charles A., Manchester.
Reardon, John B., Boston.
Reed, Henry R., Jamaica Plain.
Rice, George C., Worcester.
Richards, John J., Boston.
Richardson, Charles E., Cambridge.
Rinn, J. Ph., Boston.
Ripley, Charles, Dorchester.
Ripley, Ebed L., Hingham Centre.
Robbins, I. Gilbert, Melrose Highlands.
Robinson, John, Salem.
Robinson, Joseph B., Dorchester.
Robinson, Warren J., Somerville.
Rogers, Mrs. Jacob C., Peabody.
Roy, David Frank, Malden.
Ruddick, William H., M.D., South Boston.
Russell, George, Woburn.
Russell, Hon. John E., Leicester.
Russell, Walter, Arlington.

Salisbury, William C. G., Brookline.
Saltonstall, Richard M., Newton.
Sanford, Oliver S., Hyde Park.
Sanger, Mrs. George P., Boston.
Sargent, Charles S., Brookline.
Sargent, Mrs. Charles S., Brookline.
Sargent, Mrs. Francis W., Wellesley
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Boston.
Schlesinger, Barthold, Brookline.
Scorgie, James C., Cambridge.
†Scott, Charles, Newton.
Sears, Miss Clara E., Boston.
Sears, Miss Emily E., Boston.
Sears, Dr. Henry F., Boston.
Sears, J. Montgomery, Boston.
Sears, Mrs. J. Montgomery, Boston.
Shaler, Nathaniel S., Cambridge.
Shaw, Christopher C., Milford, N.H.
Shaw, Francis, Wayland.
Shaw, Mrs. Robert G., Wellesley.
Sherman, William H., Boston.
Shorey, John L., Lynn.
Shuman, Hon. A., Roxbury.
Sias, Charles D., Wenham.
Siebrecht, H. A., New Rochelle, N.Y.
Simpkins, Miss Mabel, Yarmouth.
Skinner, Francis, Boston.
Skinner, Francis, Jr., Boston.
Sleeper, Henry Davis, Boston.
Smith, Calvin W., Wellesley Hills.
Smith, Charles H., Newton Highlands.
Smith, Charles S., Lincoln.
Smith, Edward N., San Francisco, Cal.
Smith, George O., Boston.
Smith, Thomas Page, Waltham.
Snow, Eugene A., Melrose.
Snow, Samuel T., Cohasset.
Sohier, Col. William D., Beverly.
Souther, Charles H., Jamaica Plain.
Spaulding, Edward, West Newton.
Speare, Alden, Newton Centre.
Spooner, William H., Jamaica Plain.
Sprague, Hon. Charles F., Brookline.

Sprague, Isaac, Wellesley Hills.
Springall, George, Malden.
Stearns, Frank W., Newton.
Stedman, Henry R., M.D., Roslindale.
Stevens, Hon. Moses T., Andover.
Stewart, William J., Winchester.
Stone, Charles W., Boston.
Stone, Prof. George E., Amherst.
Stone, George F., Chestnut Hill.
Strater, Herman, Roxbury.
Strong, William C., Waban.
Swain, Charles E., Roxbury.
Sweet, Everell F., Malden.

Talbot, Mrs. I. Tisdale, Boston.
Tarbell, George G , M.D., Boston.
Taylor, Charles H., Boston.
Taylor, Horace B., Portland, Me.
Temple, Felker L., Boston.
Tenney, C. H., Methuen.
Thayer, Mrs. Alice R., Boston.
Thayer, Eugene V. R., South Lancaster.
Thayer, Mrs. Eugene V. R., South Lancaster.
Thayer, John E., South Lancaster.
Thayer, Mrs. John E., South Lancaster.
Thayer, Nathaniel, Lancaster.
Thayer, Mrs. Nathaniel, Lancaster.
Thayer, S. V. R., Boston.
Thiemann, Hermann, Manchester.
Thomas, W. B., Manchester.
Thurlow, Thomas C., West Newbury.
Tilton, Stephen W., Roxbury.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Toppan, Roland W., Malden.
Torrey, Everett, Charlestown.
Tower, Miss Ellen May, Lexington.
Trepess, Samuel J., Glencove, L. I., N. Y.
†Turner, John M., Dorchester.
Turner, Roswell W., Boston.

Vander-Woerd, Charles, Waltham.
Vaughan, William Warren, Boston.
Vinal, Miss Mary L., Somerville.

Wakefield, E. H., Cambridge.
Walcott, Henry P., M.D., Cambridge.
Waldo, C. Sidney, Jamaica Plain.
Wales, George O., Braintree.
Walker, Miss Mary Sophia, Waltham.
Walley, Mrs. W. P., Boston.
Walsh, Michael H., Wood's Holl.
Walton, Daniel G., Wakefield.
Ward, Francis Jackson, Roxbury.
Ward, John, Newton Centre.
Ware, Benjamin P., Clifton.
Ware, Miss Mary L., Boston.
Warren, Samuel D., Dedham.
Washburn, Andrew, Hyde Park.
Watson, Benjamin M., Jamaica Plain.
Watson, Thomas A., East Braintree.
Watts, Isaac, Waverly.
Webber, Aaron D., Boston.
Webster, Hollis, Cambridge.
Weld, Christopher Minot, Jamaica Plain.
Weld, George W., Boston.
Weld, Richard H., Boston.
Weld, Gen. Stephen M., Dedham.
West, Mrs. Maria L., Neponset.
Weston, Seth, Chelsea.
Wheeler, Frank, Concord.
Wheeler, James, Brookline.
Wheeler, Wilfred, Concord.
Wheelwright, A. C., Brookline.
Wheelwright, Edmund M., Boston.
Whitcomb, William B., Medford.
White, Francis A., Brookline.
White, George R., Boston.
White, Joseph H., Brookline.
Whitney, Arthur E., Winchester.
Whitney, Ellerton P., Milton.
Whitney, Henry M., Cohasset.
Whittier, George E., Groton.

Whittier, William Benjamin, South Framingham.
Wigglesworth, George, Milton.
Wilbur, George B., West Newton.
Wilder, Edward Baker, Dorchester.
Wilder, Henry A., Malden.
Willard, E. W., Newport, R. I.
Willcutt, Levi L., Brookline.
Williams, Miss Adelia Coffin, Roxbury.
Williams, Benjamin B., Boston.
Williams, John Davis, Boston.
Williams, Philander, Taunton.
Willis, George W., Chelsea.
Willis, Joshua C., Roxbury.
Wilson, Col. Henry W., Boston.
Wilson, William Power, Boston.
Winthrop, Robert C., Jr., Boston.
Wolcott, Hon. Roger, Milton.
Wood, Edmund M., Natick.
Wood, William K., West Newton.
Woods, Henry, Boston.
Wright, George C., West Acton.
Wright, John G., Brookline.
Wyman, Oliver B., Shrewsbury.
Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

Members of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Allen, Charles L., Floral Park, N. Y.
Alles, William H., Chestnut Hill.
Anderson, George M., Milton.
Arnold, Miss Sarah L., Newton Centre.
Atkinson, Edward, Brookline.
Ayres, Miss Helen F., Medford.

Badlam, William H., Dorchester.
Barker, John G., Melrose.
Barr, John, Wellesley.
Bigelow, Arthur J., Eastlake, Worcester.
Bigelow, Mrs. Nancy J., Southborough.
Bird, John L., Dorchester.
Blomberg, Carl, North Easton.
Bock, William A., North Cambridge.
Bolles, William P., M.D., Roxbury.
Boyden, Clarence F., Taunton.
Braman, George H., Newton.
Breck, Charles H., Newton.
Breck, Charles H. B., Brighton.
Brunton, Frank, Newport, R. I.
Butler, Edward, Wellesley.

Carpenter, Frank O., West Roxbury.
Carter, Mrs. Sarah D. J., Wilmington.
Cary, Miss Alice B., Lexington.
Chase, Joseph S., Malden.
Chase, Leverett M., Roxbury.
Chase, Philip A., Lynn.
Chubbuck, Isaac Y., Roxbury.
Clapp, Henry L., Dorchester.
Clark, John W., North Hadley.
Clark, Joseph, Manchester.
Clark, Theodore M., Newtonville.
Clinkaberry, Henry T., Trenton, N. J.
Collins, Frank S., Malden.
Comley, James, Lexington.
Coolidge, David H., Jr., Boston.
Coolidge, Sumner, East Watertown.
Cotter, Lawrence, Dorchester.
Cotting, Charles U., Boston.
Crosby, J. Allen, Jamaica Plain.
Curtis, Joseph H., Boston
Curtis, Louville, Tyngsborough.

Davis, Frederick, Boston.
Davis, Frederick S., West Roxbury.
Dawson, Charles Jackson, Newark, N. J.
Derby, William H., Revere.
Dolbear, Mrs. Alice J., College Hill.
Doran, Enoch E., Brookline.
Dorr, George B., Boston.
Doyle, William E., East Cambridge.
Duffley, Daniel, Brookline.

Eaton, Warren E., Reading.
Endicott, Miss Charlotte M., Canton.
Eustis, William Tracy, Brookline.
Ewell, Marshall F., Marshfield Hills.

Fenno, Warren, Revere.
Fisher, Sewall, Framingham.

Fitzgerald, Desmond, Brookline.
Fletcher, Fred W., Auburndale.
Forbes, William H., Jamaica Plain.
Francis, George E., M.D., Worcester.
Frost, Varnum, Arlington.
Fuller, T. Otis, Needham.

Gibbon, Mrs. James A., Boston.
Gill, Mrs. E. M., Medford.
Gilman, Hon. Virgil C., Nashua, N. H.
Grant, Charles E., Concord.
Grew, Henry Sturgis, Boston.
Grey, Thomas J., Chelsea.

Hall, Charles H., M.D., Corning, Cal.
Hall, Stacy, Boston.
Hallstram, Charles W., Boston.
Hargraves, William J., Jamaica Plain.
Harris, Frederick L., Wellesley.
Harrison, C. S., York, Nebraska.
Harrison, Thomas, Melrose Highlands.
Hartwell, Samuel, Lincoln.
Hatfield, T. D., Wellesley.
Hersey, Alfred H., Hingham.
Hersey, Edmund, Hingham.
Heustis, Warren H., Belmont.
Hill, J. Willard, Belmont.
Hinds, Warren D., Townsend.
Hobbs, George M., Boston.
Hollis, George, South Weymouth.
Houghton, George S., West Newton.
Hubbard, F. Tracey, Cambridge.
Huston, Miss Katharine W., Jamaica Plain.

Ireland, Robert D., Winthrop.

James, Robert Kent, Dorchester.
Jameson, G. W., East Lexington.

Keith, Mrs. Mary R., Washington, D. C.
Kelsey, Harlan P., Boston.
Kemp, William S., Brookline.
Kennard, Frederic H., Brookline.
Kenrick, Miss Anna C., Newton.
Kinney, H. R., Worcester.

Lancaster, Mrs. E. M., Roxbury.
Laurie, Robert, Newport, R. I.
Lincoln, Miss Agnes W., Medford.
Lomax, George H., Somerville.
Loring, Charles G., Boston.
Loring, William C., Beverly.
Lothrop, Thornton K., Boston.
Low, Hon. Aaron, Hingham.

Manda, W. A., South Orange, N. J.
Manning, A. Chandler, Reading.
Martin, William J., Milton.
Masten, Cornelius E., Dorchester.
Maynard, Charles, North Easton.
McLaren, Anthony, Westwood.
Meriam, Horatio C., D.M.D., Salem.
Metcalf, Dr. Ben H., Winthrop.
Milman, William, Roxbury.
Moody, Abner J., Boston.
Moore, George D., Arlington.
Morgan, George M., Boston.
Morison, George Abbot, Cambridge.
Morrison, William, Cohasset.
Moseley, Frederick Strong, Newburyport.
Munson, Prof. W. M., Orono, Me.

Newton, John F., Roxbury.
Nicholson, William, Framingham.
Norton, Michael H., Boston.
Norton, Patrick, Dorchester.

Olmsted, Frederick Law, Brookline.

Park, William D., Boston.
Parker, John, Newtonville.
Parker, Walter S., Reading.
Patterson, William, Quincy.
Peirce, George H., Concord Junction.

Petremant, Robert, Brooklyn, N. Y.
Pettigrew, John A., Jamaica Plain.
Pickman, Dudley L., Boston.
Pierce, Mrs. F. A., Brookline.
Plimpton, Willard P., West Newton.
Pray, James Sturgis, Cambridge.
Purdie, George A., Wellesley Hills.

Rea, Charles H., Norwood.
Rea, Frederic J., Norwood.
Rich, Miss Ruth G., Dorchester.
Rich, William E. C., Roxbury.
Rich, William P., Chelsea.
Richards, Mrs. P. D., West Medford.
Robbins, Oliver R., Weston.
Robinson, Walter A., Arlington.
Ross, Charles W., Newtonville.
Ross, Henry Wilson, Newtonville.
Rothwell, James E., Brookline.

Sander, Charles, Brookline.
Saunders, Miss Mary T., Salem.
Scott, Augustus E., Lexington.
Scudder, Samuel H., Cambridge.
Searles, E. F., Methuen.
Seaver, Edwin P., LL.D., Waban.
Sharp, Miss Helen, Boston.
Sharples, Stephen P., Cambridge.
Shaw, Hon. Edward P., Newburyport.
Shepard, Harvey N., Boston.
Sheppard, Edwin, Lowell.
Southworth, Edward, Quincy.
Squire, Miss Esther A., North Cambridge.
Stearns, Mrs. Charles A., East Watertown.
Stearns, Charles H., Brookline.
Stevens, Mrs. Mary L., Cambridge.
Stevens, Miss Mary O., North Andover.
Stone, Joshua C., Watertown.
Storer, Charles, Providence, R. I.
Story, Miss Sarah W., Brighton.
Strange, David T., Stoneham.
Sullivan, Michael, Revere.
Sutherland, George A., Roslindale.
Swan, Charles W., M.D., Brookline.

Tailby, Joseph, Wellesley.
Teele, William H., West Acton.
Terry, Rev. Calvin, North Weymouth.
Thatcher, William, Brookline.
Tobey, Rufus T., Roxbury.
Travis, Charles B., Brighton.
Tyndale, Theodore H., Brookline.

Vaughan, J. C., Chicago, Ill.

Warren, Samuel H., Weston.
Welch, Patrick, Dorchester.
Westwood, Thomas H., Jamaica Plain.
Wheeler, Henry A., Newtonville.
White, Maurice P., Roxbury.
White, W. Henry, Lowell.
Whitney, Joseph, Cambridgeport.
Whiton, Hon. Starkes, Hingham Centre.
Wilkie, Edward A., Newtonville.
Winter, William C., Mansfield.
Wolcott, Mrs. H. L. T., Dedham.
Wood, Mrs. Anna D., West Newton.
Wood, Elijah A., West Newton.
Wood, E. W., West Newton.
Woodford, Joseph H., Boston.
Woods, Henry F., Boston.

Young, Charles S., Newton Centre.
Young, E. Bentley, Boston.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXII.

Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments, and any Annual Member, having paid all dues, may become a Life Member by the payment of twenty dollars in addition thereto.

Annual Membership.

Every Annual Member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIII.

Withdrawal or Discontinuance of Membership.

Any member may withdraw from the Society, on giving notice to the Treasurer and paying the amount due from him. Any member who shall neglect for the space of two years to pay his annual assessment, after due notice from the Treasurer, shall cease to be a member. The Treasurer shall give notice of such withdrawals or discontinuances to the Secretary, who shall erase such members' names from the list.

The attention of Annual Members is particularly called to Section XXIII.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Joseph Maxwell, *elected in* 1830, *and* George W. Smith, *elected in* 1851.

Hon. George S. Boutwell, Groton.
H. W. S. Cleveland, Chicago, Ill.
Joseph Jefferson, Buzzard's Bay.
Major L. A. Huguet-Latour, M. P., Montreal, Canada.
Joseph Maxwell, Rio Janeiro, Brazil.
Donald G. Mitchell, New Haven, Conn.
Hon. J. Sterling Morton, Ex-Secretary of Agriculture, Nebraska City, Neb.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Samuel B. Parsons, Flushing, N. Y.
George W. Smith, Boston.
Hon. James Wilson, Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following list is inaccurate in any particular, will confer a favor by promptly reporting to the Secretary the needed corrections.

Information, or any clew to it, is especially desired in regard to Alexander Burton, *elected in* 1829; S. Reynolds, M.D., 1832; *and* Francis Summerest (or Summerer), 1833.

Édouard André, Editor-in-chief of the Revue Horticole, Paris, France.

Professor L. H. Bailey, Horticultural Department, Cornell University, Ithaca, N. Y.

John Gilbert Baker, F.R.S., F.L.S., Keeper of the Herbarium of the Royal Gardens, Kew.

Charles Baltet, Président de la Société Horticole, Vigneronne, et Forestière de l' Aube, Troyes, France.

Peter Barr, London, England.

Archibald F. Barron, Turnham Green, London, W.

Napoleon Baumann, Bolwiller, Alsace.

D. W. Beadle, 303 Crawford St., Toronto, Ontario.

Professor William J. Beal, Agricultural College, Michigan.

Prosper J. Berckmans, Ex-President of the American Pomological Society, Augusta, Ga.

Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.

Dr. Ch. Bolle, Berlin, Prussia.

John Croumbie Brown, LL.D., Haddington, Scotland.

Professor J. L. Budd, Ames, Iowa.

William Bull, Chelsea, England.

F. W. Burbidge, M.A., Trinity College Botanic Garden, Dublin, Ireland.

Alexander Burton, United States Consul at Cadiz, Spain, Philadelphia.

Maxime Cornu, Director of the Jardin des Plantes, Paris, France.

Daniel T. Curtis, Dorchester.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

W. T. Thiselton Dyer, C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew, England.

Parker Earle, President of the American Horticultural Society, Roswell, N.M.

George Ellwanger, Rochester, N.Y.

Henry John Elwes, F.L,S., F.Z.S., Colesborn, Andoversford, Gloucestershire, England.

William G. Farlow, M.D., Professor of Cryptogamic Botany, Harvard University.

B. E. Fernow, Forestry School, Cornell University, Ithaca, N. Y.

Hon. Robert W. Furnas, Ex-President of the Nebraska State Horticultural Society, Brownville.

Charles A. Goessmann, Ph.D., LL.D., Chemist of the Hatch Experiment Station of the Massachusetts Agricultural College, Amherst.

George L. Goodale, M. D., Professor of Botany, Harvard University, Cambridge.

Obadiah B. Hadwen, President of the Worcester County Horticultural Society, Worcester.

Professor Byron D, Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.

J. H. Hart, Superintendent of the Botanic Garden, Trinidad.

Dr. F. M. Hexamer, Editor of the American Agriculturist, New York.

J. W. Hoffmann, Colored State University, Orangeburg, S. C.

J. C. Holding, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.

The Very Rev. S. Reynolds Hole, D.D., Dean of Rochester, Rochester, England.

Sir Joseph Hooker, K.C.S.I., The Camp, Sunningdale, England.

Josiah Hoopes, West Chester, Pa.

George Husmann, Napa, Cal.

William J. Johnson, M. D., Fort Gaines, Ga.

Charles Joly, Honorary Vice-President of the Société Nationale d'Horticulture de France, Paris.

Sir George King, Superintendent of the Royal Botanic Garden, Calcutta.

Professor William R. Lazenby, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.

Max Leichtlin, Baden-Baden, Germany.

G. F. B. Leighton, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

Victor Lemoine, Nancy, France.

T. T. Lyon, President of the Michigan Horticultural Society, South Haven.

Dr. Peter MacOwan, Director of the Botanic Garden, Cape Town, Africa.

Dr. Maxwell T. Masters, Editor of the Gardeners' Chronicle, London.

George Maw, Benthal, Kinley, Surrey, England.

T. C. Maxwell, Geneva, N. Y.

Thomas Meehan, Germantown, Pa.

Dr. Charles Mohr, Mobile, Ala.

F. W. Moore, A. L. S., Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.

Dr. Daniel Morris, C.M.G., D.Sc., M.A., F.L.S., Assistant Director of the Royal Botanic Gardens, Kew, England.

George Nicholson, Curator of the Royal Gardens, Kew, England.

Peter Nøvik, Secretary of the Norwegian Horticultural Society, Christiania.

William Paul, Waltham Cross, London, N.

Professor D. P. Penhallow, Director of the Botanic Garden, Montreal, Canada.

Henry Probasco, Cincinnati, O.

P. T. Quinn, Newark, N. J.

Cavalière Enrico Ragusa, Palermo, Sicily.

D. Redmond, Ocean Springs, Miss.

S. Reynolds, M. D., Schenectady, N. Y.

Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.

William Robinson, Editor of Gardening Illustrated, London.

Edgar Sanders, Chicago, Ill.

William Saunders, Horticulturist and Superintendent of Garden and Grounds, Department of Agriculture, Washington, D. C.

William R. Smith, Superintendent of the Botanic Garden, Washington, D. C.

Robert W. Starr, Port William, N. S.

Dr. Joseph Stayman, Leavenworth, Kan.

William Sumner, Pomaria, S. C.

Francis Summerest.

William Trelease, Director of the Missouri Botanic Garden, St. Louis.

Dr. Melchior Treub, Director of the Botanic Garden, Buitenzorg, Java.

H. J. Veitch, Chelsea, England.

William Watson, Assistant Curator of the Royal Gardens, Kew, England.

CONTENTS.

EXPERIMENT STATION REPORTS WANTED.

The Massachusetts Horticultural Society is endeavoring to collect complete sets of the Bulletins and other publications of all the Agricultural Experiment Stations in the United States and Canada. Those named below are wanting, and any person having a spare copy will confer a favor by addressing the Librarian of the Society, Horticultural Hall, No. 101 Tremont Street, Boston.

Alabama (Ag. and Mech. College Station).— Bulletins 4–6 (1884), 7–10 and 1–4 (1885), and 5–9 (1886). 7th Annual Report, for 1894, and 9th, for 1896.

Alabama (Canebrake Station).— All Bulletins later than 18, and all Annual Reports later than the 3d, for 1890.

Arizona. — 4th Annual Report, for 1893.

Arkansas.— Bulletin 1. All Annual Reports later than the 4th, for 1891, except the 8th, for 1895.

California. — Bulletins 32, 1878, and 1, 2, 3, 5, and 50, New Series.

Colorado.— Bulletin 3.

Connecticut (New Haven Station).—Bulletins 1 to 67, inclusive. Annual Reports for 1877 to 1883, inclusive.

Florida.— Annual Report for 1892.

Indiana.— (Purdue Univ. School of Ag.). — Bulletin 1. College Reports 1 to 14, inclusive.

Kentucky.— Bulletin 10.

Michigan.— Special Bulletins 1, 3, and 5. 6th Annual Report, for 1892–93, (contained in Report of Michigan Board of Agriculture, 1893.)

Missouri. — Bulletins 9, 13, 15, 16, 19, 20, 25, and 26 of Old Series. All Annual Reports since the 1st, for 1888, except those for 1896 to 1899, inclusive.

New Jersey.— Bulletins 1, 4, 5, 15, 27, and 28.

New York (Cornell).— Annual Report, 1882–83 (Report of Agricultural Department of Cornell University)

North Carolina. — Bulletins 1 to 56, inclusive, and 69, 2d ed. 1st to 7th Biennial Reports. Meteorological Division, Bulletin 2 (68*b*), and 2d and 3d Annual Reports, for 1888 and 1889. Special Bulletins 1 (77*a*) and 4 (82*a*). Weekly Weather Crop Bulletins 1–21, 1888; 1–24, 1889; 1–25, 1890; 2 and 4, 1891.

North Dakota.— 4th Annual Report, for 1893.

Ohio.— All Bulletins of First Series, except 16, 17, 18, and 19.

Oklahoma. — Annual Report for 1897–98 and all previous to that for 1896–97.

Pennsylvania. — Annual Reports for 1869, 1872, 1879–80, 1881, 1882, 1883, and 1884. [All issued by the State College.] Bulletin of Information No. 1.

South Carolina.— All Bulletins of the Old Series (previous to 1888) on the work of the Experimental Farm of the South Carolina College. 3d Annual Report, for 1890, and 6th, for 1893.

Texas.—College Bulletins 1–5, 1883–1887.

Washington. — 6th, 7th, and 8th Annual Reports, for 1895–96, 1896–97, and 1897–98. All Bulletins later than 27.

West Virginia.— Special Bulletin — Potash and Paying Crops, 1890.

Wyoming.—Bulletins 2 to 4, 9, and 10.

Ontario Department of Agriculture, Toronto.—Bureau of Industries. — Agricultural Returns to the Ontario Bureau of Industries, Nov. 1882 (5th), Aug. 1883 (7th), and Nov. 1887 (20th).