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# TRANSACTIONS

OF THE

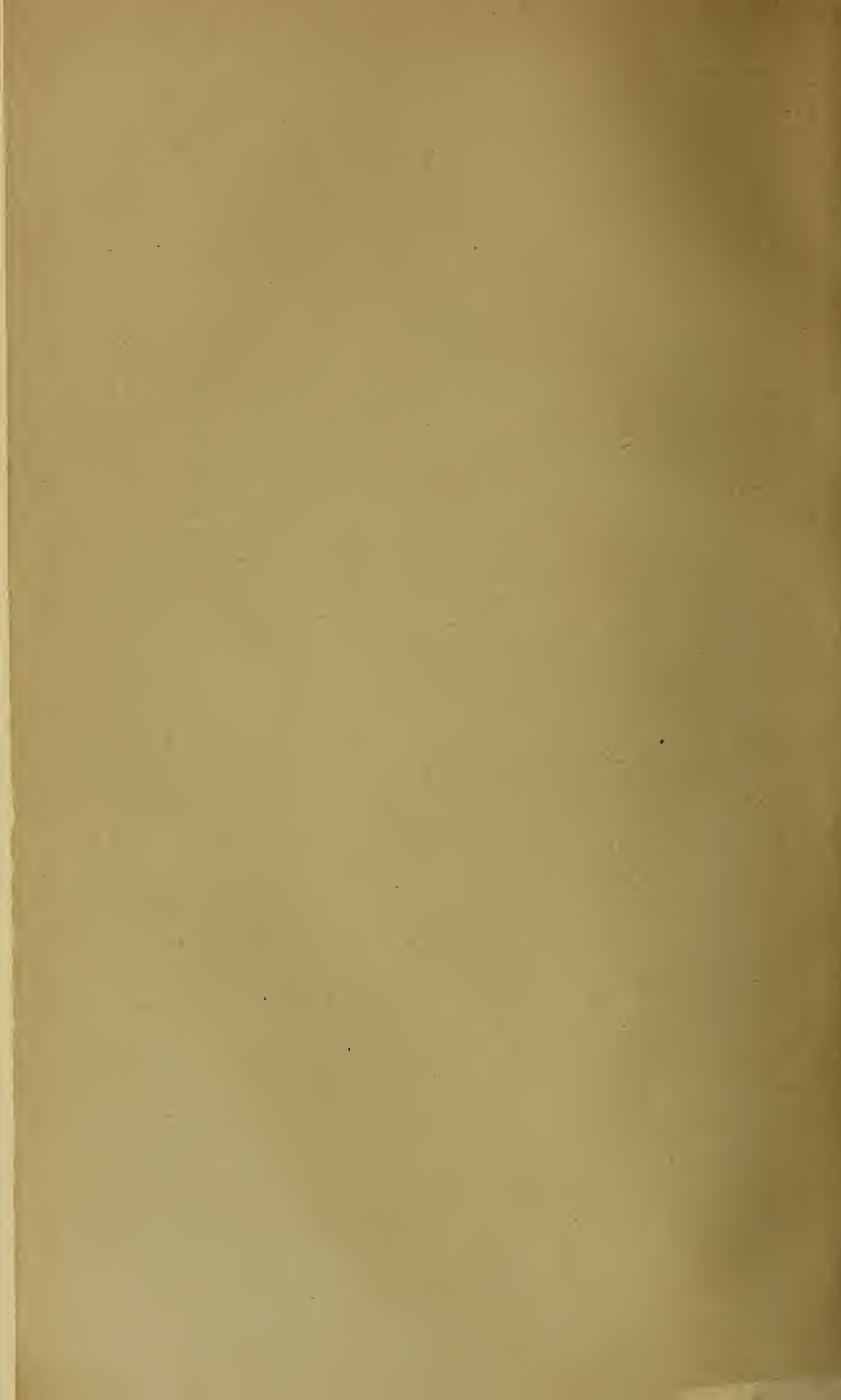
## Massachusetts Horticultural Society,

FOR THE YEAR 1884.

PART I.



BOSTON:  
PRINTED FOR THE SOCIETY.  
1885.





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The following papers and discussions 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 Transcript. As here presented, the papers are printed in full, and the discussions are not only fuller than in the weekly reports, but have been carefully revised by the speakers.

The Committee on Publication and Discussion 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 papers 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.

O. B. HADWEN,	}	<i>Committee on Publication and Discussion.</i>
WILLIAM H. HUNT,		
FRANCIS H. APPLETON,		



# TRANSACTIONS

OF THE

## Massachusetts Horticultural Society.

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### BUSINESS MEETING.

SATURDAY, January 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

The President delivered his annual address, which was received with frequent applause, and, on motion of William H. Spooner, it was unanimously voted that the thanks of the Society be presented to the President for his able and interesting address, and that a copy be requested for publication.

### ADDRESS OF PRESIDENT HAYES.

Extending to each other the kindly greetings of the season, we have assembled on this our anniversary to review the Society's work of the past year, to make such suggestions as our experience may dictate for advancement in the loved pursuits associated with this place, and to consider what we can do for increasing the usefulness of this institution and perpetuating it to the most distant generations.

While always recognizing with gratitude what has been accomplished in previous years, by this Society, we can look upon what has been done during the past year with peculiar satisfaction, as showing marked progress in our work. It is universally admitted by those best qualified to judge that never before have our discussions been so well conducted and so interesting as they have been for the past year. They have not only been well attended by our members, but many have come from a distance, as well as

from our neighborhood, to receive both instruction and pleasure in listening to distinguished proficient in horticulture, who can, from their rich experience, give that valuable information which can nowhere, in this country certainly, be obtained so well as in this hall. It is no small privilege to one interested in the cultivation of flowers, fruits, and vegetables to be permitted to hear able essays and discussions on horticultural subjects, and have, on his inquiry, the doubts and trouble which he meets with in his gardening resolved and removed as far as possible. Moreover, the weekly careful publication, by our Secretary, of the Society's proceedings benefits not only those who attend our meetings but the entire community in a very important manner, which service those interested in horticulture gratefully appreciate.

Our exhibitions of the past year have been remarkably good, considering the unpropitious season. They have been better attended by the public than they have been for many years, our exhibition receipts being \$350.12 in excess of the previous year; and this success encourages our Society to put forth stronger inducements to make its exhibitions more varied, useful, and beautiful in the future.

The library has been enlarged, and such conveniences as were desirable for the protection of our valuable books and easy access to them have been procured.

All the committees of the Society have done their work faithfully and to the general satisfaction of our members.

The success of this Society depends very much upon the wisdom and labors of the Committee of Arrangements. We all cannot but appreciate the excellent service rendered by our associate, Charles H. B. Breck, who has filled the chair of this committee for the past sixteen years, and now when, at his request, he has been relieved from the discharge of those duties which he has long and ably performed, it is our good fortune to have another member, well qualified, fill the vacant chair, under whose earnest and vigorous administration, supported as he will be by the able associates of his committee, we hope and believe the progress of the Society will be continued and uninterrupted.

Our financial situation also is much improved. During the past four years, though the Society has expended large sums of money in repairing and improving its estate, in removing restrictions upon and remedying alleged defects in the title to its property, in paying during the past year about one thousand dollars as dam-

ages for the loss of a person's life on account of the fall of ice from the roof of our building, which the usual precautions taken by our Superintendent against such an accident could not prevent, and notwithstanding the increase of our taxes caused by an increase in the valuation, by the city assessors, of our property, we have yet been able to pay, during the past year, nine thousand dollars of our floating debt, and shall have the means of paying the remaining three thousand dollars of this debt at its maturity this month. We have also, during the past year, renewed our mortgage debt of sixty thousand dollars, reducing the annual interest from five and one-half to four and one-quarter per cent. for a period of five years. Thus the amount of annual interest has been reduced from what we paid four years ago, by \$720, on the floating debt of \$12,000, now paid, or provided for as above stated, and \$750 per annum on our mortgage debt, showing a reduction of interest in all of \$1,470, annually, from the present time.

We are now practically free from a floating debt, and it should be the aim of the Society to so husband its resources as not only to have on hand sufficient cash assets to meet contingencies, but to provide for the establishment of a fund from our savings which shall free us eventually from our mortgage debt, that we may in a few years hold our estate free of all incumbrances, and so transmit it to our successors.

But I would not advise such management of our property, or parsimony in our expenditures, as might impair the efficiency of our Society, and prevent stimulating by a judicious increase of our prize-list the growth of the useful and beautiful products of the earth; on the contrary, I think the increase we have lately made in the appropriations to various committees at the suggestion of the Committee on Establishing Prizes is eminently wise, and I trust there will be a gradual moderate increase made in future years to these appropriations according to our means, and such additional expenditures made from our income as good judgment will justify for augmenting the usefulness of our Society.

It will give me great pleasure to see at a proper time the enlargement of our library accommodations, so that we may be able to receive in our library room all our books and papers, many of which have to be stored in different parts of our building not easily accessible and not so safely placed as is desirable. I hope we shall be able to have galleries about our library walls, with suitable alcoves for receiving our books, or otherwise have our library so

remodelled as to make it not only more useful but more tastefully arranged than it now is, and better fitted for the preservation of our collection of books, which is probably the largest and most valuable in the world upon horticultural subjects, and which will be certainly increasing in number for many years through the liberal provision made for the purchase of books by the founder of the Stickney Fund.

Though circumstances have prevented the improvement of our real estate during the past year so as to augment very largely our revenue, yet I am happy to report that all our stores are well rented at fair rates to good tenants, and that while we have realized from the stores an income of about the same amount for the last as the previous year, we have secured rentals for the year which we have now entered upon aggregating more than twenty-five hundred dollars in advance of the past year.

There is so great a competition among lessors of halls which have been lately erected that we have not obtained for the past year, nor can we expect in future, so large a revenue from our halls as we have heretofore received in some years. It is therefore of importance that the Society should alter and improve that part of its estate used for stores as soon as it can be done to our advantage.

We shall receive from the Proprietors of Mount Auburn Cemetery \$4,399.68 as our share of the operations of that corporation during the past year, which is an increase of \$444.87 over what was received the previous year from this source.

The payment of taxes on our estate imposes a burden of more than \$3,500 annually of expenditure. There seems to be no good reason why the State should not give to horticultural societies the same assistance it offers to the agricultural, in exemption from taxation. The Worcester County Horticultural Society has recently taken the initiative in endeavoring to obtain relief from taxation, and our Society has voted to coöperate with that and other horticultural societies in this State in petitioning the Legislature for such relief.

I would suggest the importance of establishing liberal prizes in various specialties of horticulture for stimulating cultivation by small growers, so that those of limited resources may be induced to compete, without exceeding their means, with the wealthier, for the honors and rewards of our institution. It would be unwise, however, to do anything which would tend to lessen the ambition



of distinguished and successful florists, or gentlemen of means, to add to their gardens new and valuable specimens in horticulture, which must be imported at a large expense; for by such importations the whole community is benefited, and the scope of the Society's usefulness is greatly extended.

I trust that the Society's interest in window-gardening will not diminish, but increase, and that measures will be taken to foster this desirable branch of horticulture more than has been done heretofore, and as our means will permit.

It is but just, in concluding the review of our work, that I should bear witness to the ability and fidelity manifested by our Treasurer and Secretary in the performance of their respective duties during the past year.

*Ladies and Gentlemen:*— We are very fortunate in having still with us so many of the eminent horticulturists who have done invaluable service in building up our institution to its present distinguished position of usefulness. Let us never forget them, nor fail to appreciate what they have done for us and the cause to promote which this Society was established. But we must remember that, however wise men are and however important may be their services, yet they must, from time to time, in the order of nature, pass away from the scenes of their earthly labors. The strength and permanence of our Society must be maintained and secured by introducing young and vigorous blood into our body corporate. Let, therefore, young men and women be introduced and encouraged by you to work in the field which we have cultivated with much satisfaction; so that, when the elders rest from their labors, the young may be ready and able to take up the work and prosecute it with as much, if not more, diligence and success than those who have gone before them, and thus our beloved Society will never suffer from the decrepitude of age, but ever be an active and earnest organization, carrying out the objects of its founders in promoting the study of nature and benefiting mankind.

The Treasurer requested further time to prepare his annual report, which was granted.

On motion of William H. Spooner, Chairman of the Committee on Plants and Flowers, an appropriation of one hundred dollars was voted, to be used at the discretion of that Committee for the encouragement of the exhibition of flowers during the winter months.

The appropriations for the year 1884, recommended by the Executive Committee on the first Saturday in November, and then laid on the table, were taken up and unanimously passed, as follows:—

For Prizes and Gratuities,	
For Plants and Flowers . . . . .	\$1,750
Fruits . . . . .	1,000
Vegetables . . . . .	550
Gardens . . . . .	150
For the Committee on the Library for the purchase of magazines and newspapers, binding of books, continuing the card catalogue of plates, and in- cidental expenses of the Committee . . . . .	400
For the Committee on Publication and Discussion . . . . .	150
For the expenses of the Committee of Arrange- ments . . . . .	300

EDMUND D. STURTEVANT, of Bordentown, N.J., and  
WILLIAM E. DOYLE, of East Cambridge,  
having been recommended by the Executive Committee as mem-  
bers of the Society, were, on ballot, duly elected.

Adjourned to Saturday, January 12.

## MEETING FOR DISCUSSION.

### MANURES: THEIR PREPARATION AND APPLICATION.

Benjamin P. Ware, who had been appointed to open the subject, said that he felt some embarrassment in speaking of it in the presence of many persons who were in the habit of handling large quantities of manure: it seemed like bringing coals to Newcastle; but he hoped to draw out something from those who had had so much experience. The subject is very broad, including all materials that may be used as fertilizers; but he should refer mainly to those used by farmers. Here they have more resources than in a sparsely populated place. There is hardly a manufacturing establishment that does not have waste products of value, either as fertilizers or divisors, and worth at least the cost of teaming. But the first and main resort of the farmer is to the stable and barn, which afford complete and reliable manures. At farmers' meetings, if one states an experiment with fertilizers, another will

come forward with a different story to refute it; and such is the diversity of results, from diverse circumstances of climate and soils, that it is probable we know little of the value of stable manure. In most of the modern city stables all the liquid manure goes into the sewers, and when the manure is taken to the farm it is thus bereft of half its value. Last Monday, after an expenditure of four millions of dollars on sewers, the city of Boston began forcing into the sea as much more in value. Our country is almost inexhaustible in its resources, or it could not stand such waste. All barns and stables should be so arranged as to save the liquid excrement. This is done by many, but others lose it. The speaker has so arranged his barns, which accommodate twenty or thirty horses, and nearly as many cows, that the liquid manure is all received in a large tank.

Sea-shore drift and all vegetable matter from the sea form valuable manures, as does also the refuse of tanners, curriers, and glue-makers. The last is difficult to handle, but is especially valuable on moist grass lands and orchards, and, when ploughed into such, the effect is visible for years. Spent tan and the refuse after making extract of logwood are burnt under steam-boilers; but the ashes are of little value: the extract seems to take all the valuable quality. Wood-ashes are obtainable from Canada, but cost about all they are worth. Leached ashes are well worth their cost. Where a heap has laid, the fertilizing effect has been visible for years. They are not worth as much since the new process for extracting potash was introduced as before.

Mr. Ware said he would venture to mention salt as a manure. He had seen very valuable results from its use. If not plant food, it is certainly taken up by plants, as is shown by their salt taste. For mangels, carrots, and cabbages, it is valuable in connection with other manures, and farther inland it must be more valuable. He had seen large crops of grass where salt had been washed from fish which was in process of curing. He would apply from ten to twenty bushels per acre of refuse salt, which can be obtained very cheaply.

There is value, as a manure, in meadow mud. He would not dig and cart it to the field directly, but would expose it to frost for two years, when it would become a valuable absorbent and contain valuable fertilizing qualities. A specimen which had barely a trace of nitrogen, by exposure for two years, became rich in nitrogen. It is a good divisor, and gives valuable results with sea

manure,— much better than sea manure alone, the latter, by its violent and rapid fermentation, developing what was latent in the mud.

Night-soil is valuable, but it will not do to depend upon it alone ; it must be used in connection with other manures. Used alone it would prove disastrous.

Farmers should depend mainly on their barns for manures, and use commercial fertilizers to eke them out and assist them. A report from the Connecticut Agricultural Experiment Station says that the price of commercial fertilizers is from thirty to thirty-five per cent. above the value of the materials, and farmers pay that for mixing and manipulating them. This may do on a small scale ; but the speaker recommended to farmers using large quantities to buy the materials and mix them, and save this expense. One of the most important of these ingredients is fish pomace, which farmers can buy as cheap as the manufacturers, and they should buy it by the ton and compost it in the field. Manufacturers are doing a good work, but the farmer must save all he can. Many fertilizers are purchased by the manufacturers' analysis, but even when these are correct, we may pay thirty or forty dollars for what is not worth over ten or fifteen dollars. Stable manures have a double or triple duty to perform : they not only supply plant food, but they have a chemical or mechanical action that brings out the fertilizing properties in the soil. Commercial fertilizers leave the soil in a sodden condition ; and this should be taken into consideration in deciding on their economy as compared with stable manures.

In regard to the application of manures Mr. Ware said that the time has gone by when farmers need fear to spread manures at any time lest they should lose by evaporation. Ammonia does not form as such when manures are spread. If the land is in good condition for teaming they may be applied at any time. Green manure harrowed in in the fall will be plant food in the spring. Fresh manure, if it does not injure the crop, will induce stalks rather than seed or fruit. It should be composted to produce seed or fruit ; but, if foliage is wanted, it may be applied green. A bad smell does not necessarily indicate plant food, neither does color. The speaker can judge by the smell when manure is matured and in the condition to produce fruit. If applied in autumn it will be in very nearly the same condition in spring as if composted. He did not feel sure that fertilizing properties are not added to manure in composting. During the last war with England, when

every source of saltpetre was sought, the manufacturers found that by pitching over their nitre heaps the quantity was increased, though the speaker could not say how. Nitrogen is expensive, and difficult to retain and hold. Lawes and Gilbert have experimented in regard to it for thirty years, and have come to the conclusion that they know very little about it. It has the appearance of accumulating in the nitre-beds ; and, if this is so, composting has an advantage, besides maturing the manure, of adding nitrogen from some source.

The finer the condition into which we can get manure the more accessible it is to crops. There are two kinds of manure-spreaders in the market, either of which will do the work better than it can be done by hand. Six cords spread in this way will do as much *present* good as eight cords spread by hand. He referred to where from six to ten cords are used ; if twenty or thirty cords were to be applied it would be as well to spread by hand. He believed in applying manure as fast as made. He would not object to spreading on snow, but would object to applying freely on frozen ground or on a steep hill. He had, however, seen water colored by manure washed down into a hollow, where the crop did not appear to be the better for it. He would apply manure on the surface and harrow it in, but never plough it in, unless he ploughed a second time. If manure is applied in the autumn, and the ground is ploughed in the spring, it brings up the soluble portion that has washed down.

In answer to an inquiry how to apply liquid manure Mr. Ware said that there is a difficulty in doing it. He has an absorbent bed near his tank and dips the liquid into it ; and he recommended this method. Some bed their cattle with dry meadow mud, sawdust, or sand, which absorbs the liquid, and then it goes in with the solid part. Applied by means of a water-cart it may be as valuable ; but it is a more costly way of using it. He advised not to top-dress grass land, as a general practice, but, after four or five years, to put on manure, plough up, and re-seed. There is great value in the decaying sod. He preferred to put manure on ground that he is going to till rather than to top-dress grass with it ; and he would plough first, and then apply the manure, and harrow in thoroughly. The principles he had laid down might be true in one place and not in another.

W. W. Rawson said that he had been experimenting twenty years in market gardening with stable manure, of which he uses

from fifteen to twenty-five cords to the acre, with five or six tons of guano, a ton of ammonia, and half a car-load of ashes, on seventy-five acres. Stable manure is now cheaper than he ever knew it before. Mr. Ware spoke of applying manure on the surface of the ground in fall. The speaker had applied twenty-five cords in this way upon one acre, and on another acre adjoining thirty cords of coarser manure, which was ploughed in six inches. The next spring they were both ploughed and cultivated alike, and he could see no difference in the crops. He keeps experimenting all the time, and always gets good crops. Last year was exceptionally severe in regard to drought. He uses one-half salt-water from Mystic river for irrigating cabbages and cauliflowers, and thinks it better than fresh. He has two windmills for raising water, and has spent two thousand dollars on water-works. He thinks horse manure is worth as much as cow manure, if in as fine condition. Cow manure is very heavy, and its mechanical action on the land is like that of commercial fertilizers; while horse manure is light and strawy, and leaves the land in better condition.

George Hill said that farmers admit manure to be at the bottom of all good culture. He agreed with Mr. Ware on many points, but disagreed with him on others. The supply, varieties, and cost of manure are all important. The prices of fertilizers vary from a dollar or a dollar and a half for stable manure, before moving, to sixty dollars or more, per ton, and it is a question which is most economical. Stable manure costs, at the stable, three dollars per cord, weighing from two to three tons; and ammonia costs ninety dollars per ton. Some fertilizers are composed largely of substances costing not over one dollar per ton, and are sold for thirty or forty dollars for the same quantity, and it is a question whether or not to purchase them. Beyond ten miles from the city there is not a fair supply of stable manure. He thought night-soil the substance nearest to plant food; but, while the night-soil applied to a piece of ground might all be taken out by crops in one year, stable manure will be effective for several years. Some have thought that the loss of the liquid part of stable manure makes no perceptible difference in its value; but he could not agree to that. Muck may be valuable as a fertilizer. He thinks manure is best put under ground as soon as possible. There is the greatest waste in throwing away the sewage of Boston and large manufacturing places. It is next in value to manure, and its loss is a permanent drain upon the fertilizing resources of

the State. Senator Hoar says that only four per cent. of the food consumed in this State is produced here, and we ought to produce more. The speaker believed that sewage would not go to waste many years longer, and asked if it could not be settled so as to be saved. Of the two thousand four hundred and sixty counties in the United States, four in this State stand highest in the value of their productions in proportion to the value of the soil, and of these Essex, Middlesex, and Worcester are first.

Edmund Hersey said that the subject before the meeting is difficult to handle. The varying character of soils is an important element, and every man must study his own soil. What may do for one man's soil may not do for another's; what has been applied to the soil and what has been taken from it are considerations having a great deal to do with the problem of judicious manuring. We are driven to study it because no man can teach us to solve it. A man who has been applying twenty-five or thirty cords of manure per acre is very differently situated from one who has applied but two or three to soil perhaps poor to start with; and the same rule will not do for both. The soil of the first is filled with manure in all stages of decomposition, while the other has very little in it. One buys concentrated fertilizers; the other, stable manure. The comparatively barren soil needs stable manure, while the other is more in need of concentrated fertilizers. The speaker could not stand up and tell any man how to fertilize his soil, but would advise him to study his soil and the wants of the growing plants, and make himself familiar with the character of the different fertilizers. We may learn general principles here, and then we must go home and apply them in our farming. We must supply to our crops those materials that they need, and those fertilizers that furnish the needed materials cheapest.

Samuel Hartwell said that he lives outside of the radius of ten miles from the city, and that his greatest anxiety is to get sufficient manure. He keeps a team on the road a large part of the time, but cannot get enough to apply fifteen or twenty cords to the acre. He believes cow manure, from well fed animals, better than horse manure. Horse manure shrinks, and cow manure remains in the ground longer, and is better for fruits: it does not act so quickly. He is now using considerable quantities of meadow mud. An Irish neighbor mixes mud with his manure, and in a dry season his corn is better than the speaker's. Mr. Hartwell puts a foot and a half of mud on the bottom of his barn-cellar, and throws down the manure

on it; the hogs work it over, and then he puts on another layer of muck. He had also added ten or twelve cords of leaves, which will be mixed with the manure by spring. Muck is much more valuable on some soils than on others. He finds it a good thing to help out his manure. There is not enough money left from the proceeds of the crops, after paying for commercial fertilizers, when employed alone, but they may be used to advantage in the hill to start crops. He referred to Dr. Nichols's recommendation of chemical fertilizers, and thought he got the money to buy them in some other way than by farming. The speaker never favored the use of salt; but a man in Concord had a field of cabbages which, he was told, needed salt, and was advised to sprinkle it into the heads. He did so, and they headed up remarkably well, and he sold them where they wanted them again the next year.

Mr. Ware said, in answer to an inquiry as to the value of clay, that it is very valuable in certain places, on soils of peculiar quality. Water percolating through soils has its fertilizing qualities absorbed by clay. Its mechanical effect on light soils is very beneficial. It should be spread on in the fall.

John Fillebrown said that he had used all kinds of manure, and had come to the conclusion that he could raise better crops with night-soil than with any other manure. He did not agree with Mr. Ware that it produces disastrous results if used continuously. He put eight loads on less than half an acre in the fall, and in spring ploughed, and planted cabbage greens April 1st. May 1st, he planted summer squashes, and picked, one week, sixty dollars' worth. On the 1st of June he wanted to plant carrots, and used night-soil, putting the rows fourteen inches apart, with radishes between. The radishes were as handsome, and the carrots as smooth and good, as he ever saw. He composted meadow mud with night-soil, and applied a light shovelful in the hill to Savoy cabbages on the 5th of August, and they grew so rapidly that he had to cut them to keep them from cracking. He had used tide-water for watering tomatoes in a dry summer so freely that the ground was whitened. It would have killed the plants early in the season, and would kill melons at any time, but is good for cabbages, celery, or horseradish. He had teamed clay two miles and a half, and applied to light land at the rate of from ten to fifteen cords an acre, and it was worth as much as horse manure. The effect remains; and he would use more if he could get it.

Leander Wetherell believed in the good effect of salt and muck.



He thought muck had been undervalued since Dr. Loring de-claimed so earnestly against it. The speaker took muck out of a swamp composed largely of vegetable mould, and used it side by side with stable manure, on light soil, and saw no difference in the crops. It was an advantage to the land, and there is no doubt that light sandy or gravelly soil applied to meadows is equally beneficial. He advised the exchange of swamp land and sandy land, one for the other, as a top-dressing.

Mr. Ware said that green manure applied in the fall would be matured by spring. He would not put it on in spring, except for plants of which the foliage is the useful part.

Hon. Marshall P. Wilder spoke of the agricultural meetings at the State-House in former years, when the subject now before the meeting was discussed, and said that it is as important now as it was then. Its principles are not only fundamental but immutable, and it is no matter how often they are repeated. A few years ago he had two farms, and tried all kinds of chemical fertilizers on them. It is a fact that we could not get along in our farming without chemical fertilizers. It is better to apply manures near the surface. The late Hon. Benjamin V. French ploughed in manure a foot or more deep, and it produced no effect whatever. The soil and the manure should be properly prepared. The finer you can make the particles of manure the more efficient it will be. He had found cow manure produce better effects than horse; when you buy it you get pretty nearly what you pay for. People may say these things are hackneyed; but you cannot bring the truth too often before us, whether relating to the culture of the soil or the soul.

The subject for the next Saturday was announced as "Small Fruits—What shall we Plant, and How shall we Cultivate them?" to be opened by E. W. Wood.

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## BUSINESS MEETING.

SATURDAY, January 12, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

On motion of Edward L. Beard, Chairman of the Committee of

Arrangements, that Committee was authorized to procure five hundred vases of one size, and one hundred and fifty of another.

Adjourned to Saturday, January 19.

### MEETING FOR DISCUSSION.

#### SMALL FRUITS — WHAT SHALL WE PLANT, AND HOW SHALL WE CULTIVATE THEM?

E. W. Wood, Chairman of the Fruit Committee, who had been appointed to open the subject, said it had often been remarked that we fail to appreciate a thing until we are deprived of it; and this is true with regard to small fruits. Travellers abroad are unable to purchase them as freely as they can here, and there is nothing that they miss more. There is no place where they are grown more easily, or in greater perfection, than here. We wonder that in the Old World so much pains should be taken to produce fruits and flowers, as was done, for instance, by a lover of them in Paris, who put a garden on the roof of his five-story house, where he cultivated pans of roses and other flowers, which grow here almost as regularly and certainly as grass.

Mr. Wood said that, among small fruits, he should speak of strawberries, raspberries, currants, and grapes. Of these, the strawberry is, perhaps, the most important and the most difficult to discuss, because no fruit is so variable. If we refer to the prize-lists of this Society, and of New York and Western societies, we shall find that the kinds for which premiums are offered and awarded vary greatly in each. Many of the kinds most approved in States west of this have been tried here and have failed. There are two classes of cultivators of strawberries, those who grow for the market, and those who raise them for family use. For the latter purpose the varieties of the finest quality should be selected, though they may not be so prolific as those grown for market. Mr. Wood said that any list he might suggest would be very likely to differ from one proposed by another cultivator near by, but he recommended for market, from his own experience and observation, the following, which are placed in the order of their value: Charles Downing, Sharpless, Hervey Davis, Cumberland, Miner's Prolific, Manchester, Wilson, and Crescent.

The Charles Downing is the most popular variety introduced since the Wilson, and stands first among cultivators everywhere,

being larger and of better quality than the Wilson. Three years ago it rusted, and the speaker lost a large portion of his, but since then he has seen no rust. The Sharpless is comparatively new, and has proved desirable both for market and home use. It is the largest strawberry of good quality, — twenty-three berries have filled a quart box. A neighbor of Mr. Wood paid thirty-five cents for such a box, which was at the rate of a dollar and a half for a hundred berries.

The Hervey Davis is a seedling raised by John B. Moore, and has been tried here for ten years, — long enough to prove that it has come to stay. The speaker hoped for an improvement in selling strawberries; at present, they are bought by consumers more ignorantly than any other fruit. They know something about the varieties and qualities of pears, but they buy strawberries wholly by the looks. He asked a dealer in Quincy Market if there was no way to make the varieties of fine quality pay; and the dealer replied that until last season he had been unable to accomplish anything in that direction, but a grower who had a large quantity of the Hervey Davis, and wished to get the best price for them, asked him to call the attention of his customers to them and he did so, with the result that soon all his supply of this kind was engaged a day beforehand, not only by consumers but by other dealers.

The Cumberland and Miner's Prolific are generally grown on a large scale in Concord and vicinity. The Manchester is a new kind, of vigorous growth; but the color is not good, and the hull is so deeply planted that it is difficult to remove. It is not suited to amateur culture. On light soil, a little dry, no kind will produce so much as the Wilson; it looks well and brings a good price before it is ripe, and is marketed in that condition; when fully ripe it is as dark as the Agriculturist, and is of fair quality. The Crescent is claimed to be the lazy man's strawberry; it is not of large size, and in quality is not superior to the Wilson. It is only desirable for the money it will bring when no other kind is in the market. A grower in Belmont gave his Crescents to his neighbor and marketed his Hervey Davises.

For amateur culture Mr. Wood recommended the Hervey Davis, Wilder, Seth Boyden, Hovey, Jucunda, and La Constante, in the order named. The Hervey Davis is not as productive as the Downing or Sharpless, but it comes through the winter in good condition, has great vigor, which it retains through the season,

stands up well in drought, and continues long in bearing. The Wilder is of the finest quality, but has not proved prolific under all conditions. The Seth Boyden is a good bearer, and of good quality, and remains in good condition after picking. The Hovey fails to do what it formerly did ; as with the Brighton Pine, the fruit seems to be all gone after the first picking. In regard to growth it maintains its pristine vigor, but makes many barren plants, and does not produce the quantity it did twenty years ago. The Jucunda requires heavy clay soil, and higher cultivation than most kinds, and, if it has these, is handsome, of excellent quality, and fairly productive. La Constante is the standard of quality, and when well grown almost invariably takes the first prizes in the exhibitions ; but it is a shy bearer, and not reliable for a crop. Many are induced to grow it from seeing the specimens shown, but, not giving it the extra care it needs, are disappointed. Mr. Wood concluded his remarks on varieties by saying that many cultivators might think the varieties and arrangement named by him not the best ; and it is true that strawberries differ much in only a few miles' distance, and allowance must be made for difference of soils and situations.

In regard to culture, as a general rule, the best land for English hay is good for strawberries. English hay suffers from drought, and the same is true of strawberries ; and, as the first continuous dry weather comes when they are maturing, land subject to drought should be avoided. The ground should be in the highest condition when the plants are set. The large Belmont growers find it most profitable to take but one crop, planting vegetables between the rows the first year, and ploughing in the strawberries and planting vegetables as soon as the crop is gathered the second year, thus getting two crops of vegetables and one of strawberries in two years. For family use they are generally grown in plats, and, as it is difficult to fertilize them after the ground is covered, they should have all the manure possible given them before setting out. If fresh stable manure is applied then, it will be in condition for plant food before the runners spread. The speaker sets his rows three feet apart, and the plants eighteen inches in the rows, and lets them run the first season. The large growers put the rows four feet apart, and cut off the runners, so as to leave paths between ; but, for family use, they can be picked from beds with but little injury to the plants. When the crop is gathered he digs in the plants so as to leave beds three feet wide with three-foot spaces

between; and they will give nearly as good a crop the second year as the first. The third year they are all dug under, for it is more work to weed them than to set a new bed.

Of raspberries Mr. Wood recommended the Franconia and Herstine for Red, and the Souhegan and Gregg among the Black Caps. Raspberries are not so generally grown as strawberries: it is more difficult to protect them; but statistics show that they give more money from the same extent of ground. The Franconia is one of the oldest and best known kinds, and takes the most prizes. The Herstine is generally grown for market, though the Cuthbert is reputed more prolific. The Clarke is as hardy as any; the speaker grew a bed of it for seven years without any protection, but then lost it entirely. It is of fine quality, and desirable for family use, but too soft for market. The Saunders is of the finest quality, but too soft to be desirable for market. The McLaren's Prolific is a new kind, shown for the first time last season; it resembles the Hornet, and is of good quality, and is reported by the exhibitor to be vigorous and productive, and in every respect the best he has ever grown.

Black Cap raspberries are not esteemed here; they are too wild and rampant growers, and the fruit of most varieties is dry. They will, however, grow on dry land, and need no winter protection. The Souhegan and Gregg are the best varieties.

Of currants the Versaillaise and French Transparent have taken the most prizes. The speaker esteems the Versaillaise the best red currant. It has been objected to it that it does not give as large a crop as some varieties; but he had never failed to get a good crop; the branches of his bushes are bent to the ground with the weight of the fruit. A large grower from Belmont was in his grounds and asked him what currant he cultivated, and, when he answered the Versaillaise, replied that he was surprised, for he had pulled up and thrown away all his years ago. He recommended, as much preferable, a variety obtained from the Cushing Place, and now generally grown at Belmont and Arlington. Last year a neighbor of the speaker, who grew the common varieties for market, sold them for two dollars per bushel, while the speaker got four dollars and eighty cents per bushel for his Versaillaise. The currant is a most profitable and most accommodating fruit; it can be grown in a pear or apple orchard between the rows, and will return enough to pay for cultivating the whole orchard. The French Transparent is distinct from the Dana's Transparent; the

former is as large and handsome as the latter, and of better quality.

The last season offered the best exhibit of grapes for many years. They suffer less from drought than other fruits, and long-continued dry weather gives the fruit the best quality. But these very favorable seasons lead people to set out varieties that will disappoint four years out of five. If we mention the Concord, Moore's Early, Worden, and Delaware, which may be recommended in the order named, we have come to the end of those that can be relied on invariably. The Brighton is of most excellent quality, but sometimes mildews, and is an entire failure. The Eumelan is less shown than any other equally good variety. Last year they were as good as outdoor grapes could be. Of Rogers's hybrids the Massasoit, Wilder, and Lindley are among the best; the last, when in perfection, is as good as many grapes grown under glass, but it is less productive than the others. Among the new white grapes are the Francis B. Hayes, Prentiss, and Pocklington. If the first of these is as good as it was last year, it will be unquestionably the best white grape, and will carry the name of the President of this Society down to future generations. It will be second in value only to Moore's Early. The Prentiss is not grown as much as it deserves to be. The Pocklington was not ripe when shown at our Annual Exhibition last year. For New England we must adhere to the requirement of earliness in grapes. Once in four or five years even the Concord fails to ripen. Dr. Fisher, of Fitchburg, one of the best cultivators, has lost his crop twice in twelve years.

Mr. Wood closed by saying that the subject before the meeting is of the highest importance. He was surprised that every family does not have a plentiful supply of small fruits: they are more valuable for health than the services of a physician, and are associated with the pleasantest memories of childhood.

Hon. Marshall P. Wilder said that Mr. Wood's remarks were highly practical,—the result of long experience tempered with conservative views. He should himself have made just such a selection of strawberries as Mr. Wood, though he might have placed the Wilder before the Hervey Davis. The Charles Downing is spread all over the country, as is shown by the catalogue of the American Pomological Society, and it increases in favor every year. It can be grown almost without care, and, unlike the Wilson and Crescent, is of remarkably good quality. Mr. Downing is fortunate in having such a fruit to bear his name. We must have one mammoth

kind, and one is enough; and we have it in the Sharpless. The Hervey Davis is one of the best in quality. The speaker desired handsome form and color in strawberries; and we have it in the Hervey Davis and Wilder. The former was raised from seed of the latter. The Hervey Davis is going to stay with us; it comes in early, and bears sufficiently, and holds out late, and the more it is known the better it will be liked. The strawberry is the most capricious of fruits; a variety will sometimes be a dead failure within twenty miles of where it succeeds perfectly. A neighbor of his grows two acres of the Wilder strawberry, and will not grow any other,—and the same with the Versaillaise currant. The Manchester is wonderfully vigorous, surpassing even the Sharpless. The speaker does not believe in the deterioration of varieties. The White Doyenne pear prospers in Nebraska, and he knows the Hovey strawberry is sometimes as fine as ever. The Franconia raspberry, introduced more than forty years ago, still stands, and will continue to. He esteems the Knevett's the best red raspberry; but Mr. Wood's list is a good one. The Souchetti (white) is the kind he depends on for family use. The Versaillaise currant is everywhere reported as the most profitable. His crop from bushes planted ten or fifteen years ago, between lines of pear trees, brought him one hundred and forty dollars.

Mr. Wilder next spoke of grapes, and remarked how certainly a good thing will take its place. The excellent quality of the Lindley is becoming appreciated, and neither it nor the Wilder ever mildews with him. Moore's Early is so popular that the demand for vines cannot be answered. He thinks very highly of the Francis B. Hayes; it is the best white child of the Concord, and he believes that it is going to succeed almost everywhere, and will give larger bunches than it has yet. We are planting seed that is going to rise up and bless the world after we are gone. In cultivating fruit we must rely on practical experience, and not on what we guess.

Benjamin G. Smith said that he commenced the culture of fruit twenty years ago, with the determination to have his ground prepared in the best manner, and to collect every variety of small fruit worth growing, so as to test the possibilities of a small area. His soil being naturally heavy, he underdrained and subsoiled thoroughly, at the same time working in plenty of sand and barnyard manure. He cultivates the Pioneer for an early strawberry, and the Wilder, Hervey Davis, Downing, Cumberland, and Miner's

Prolific, for later. The James Vick has thus far disappointed him. He has Versailles currant-bushes twenty years old, and one with a stem three inches in diameter, still vigorous, and producing fine fruit. The Victoria, or Houghton Castle, had done well with him, but he did not recommend it particularly. It is late, continuing into September, and very productive, but not of so good quality as the Versailles. He cuts out the old wood from his currant-bushes. His crop of English gooseberries has not failed for ten or twelve years. They are sheltered from the burning sun of noon, but have the morning and afternoon sun. The ground was thoroughly prepared, and they are pruned very severely. English cultivators talk about gooseberry trees, and some of his plants have stems two inches thick, though short. He has found the Franconia, on the whole, the most satisfactory raspberry, though he grows also the Cuthbert, Souchetti, Caroline, Gregg, and Shaffer's Colossal; but the last three are not of the highest quality. Of blackberries he grows the Dorchester and Snyder. He has experimented with twenty or thirty kinds of grapes, and will discard all but about half a dozen.

Mr. Wilder said that it is no object to grow Black Cap raspberries here; we have got beyond it. The Souhegan is the best; it is juicy, while the others are dry. The Caroline, a yellow one, is spirited and excellent, and very hardy. These two can be recommended.

Mr. Smith gave an account of his success in cultivating the High Bush blueberry. The late Joseph Breck told him that he might as well attempt to tame a North American Indian; but he saw it fruiting at the Botanic Garden, in Cambridge, and experimented with a few plants, which he set on the east side of a high fence, subsoiling the ground and working in from fifty to a hundred loads of muck or leaf mould. Some of the plants must have been ten or fifteen years old when set, and they have grown and fruited well.

John B. Moore said that in fertilizing ground for strawberries or raspberries it is detrimental to use partially decomposed manure, especially on sandy soils. Strawy manure makes soil more liable to suffer from drought, which is the worst thing a cultivator of these fruits has to contend with. Raspberries are especially liable to injury, and should receive a heavy mulching the first of June, which must be removed after the crop is gathered, or it will bring the fibrous roots too near the surface; and the



same treatment is beneficial to currants. He would not cultivate raspberries more than five or six years in one place, as the soil gets exhausted. To do so is not following the ways of nature, which reproduces the raspberry from the roots that spread from place to place. We can aid the ways of nature, but we cannot beat them. After three or four years raspberry plants become old stubs. The same reasoning applies also to strawberries. The Franconia is firm and carries to market well, but it is not cultivated as much as it was a few years ago. He cannot grow it on his place, but on high, rocky land, a few miles away, it proves what Col. Wilder had said of it. The speaker could not say what variety is better. The Souchetti is of fine quality, but too soft to send to market unless the hulls are left on. He has not seen a quart of Wilder strawberries in the market for four years, but he has seen some Hoveys. One reason for the failure of the Wilder to come into general cultivation is, that it inherits from its female parent, the Hovey, and to even a greater extent than that possesses it, the tendency to produce sterile plants. He went through his bed with a large knife, and cut out all the sterile plants. People want a large strawberry, and he did not feel it his duty to sacrifice his interest to correct the public taste, but for his own use he wants a strawberry that he can go into the field and eat; and this he can do with the Wilder and some other varieties. He would not throw away the Rogers grapes if he had them, but he would not plant them for market purposes. He thinks the Massasoit the most desirable; it is more productive and a little earlier than the Lindley, but the latter is of finer quality.

Mr. Wood said, that, in the peculiar "Concord sand," in which Mr. Moore grows his strawberries, he might be unable to use fresh manure; but the speaker had used both old and fresh, and the latter in large quantity, and it assimilates before the roots reach it.

Mr. Moore said that the difference in soils would account for the difference in the effect of fresh manure.

Mr. Smith said that he had grown raspberries successfully in the same place for twenty years; but he would not advocate doing it generally, — he only asserted the fact.

William C. Strong thought the currant referred to by Mr. Wood as cultivated in Belmont and Arlington is the May's Victoria. He considers it very valuable; it is not so acid as the Versailles. He fruited Fay's Prolific for the first time last year; he was not sure but it is larger than the Versailles, and, though not yet all

that has been claimed for it, it is promising. He asked whether the Cherry currant is distinct from the Versaillaise.

William D. Philbrick said that the currant grown at Belmont, resembling the May's Victoria, was got by Henry Locke from Jacob Hittinger. It is known as the Belgian, and is very productive, late, and holds on well. He grows it as a late kind in connection with the Cherry as early. The Cherry, as grown by Mr. Locke, is distinct from the Versaillaise.

Mr. Wood said that the currant he had in mind was received by Samuel Barnard, of Belmont, from Samuel R. Payson.

J. W. Manning spoke of Lovett's Improved as the sweetest red currant. In size it is half-way between the Cherry and the Red Dutch. He received it from the Messrs. Clapp, who raised twelve hundred bushels of this and other varieties in one year. J. S. Stickney, of Wauwatosa, Wisconsin, raises the Cherry and Red Imperial currants; the latter is so firm that he has no difficulty in sending it to Kansas City or the Rocky mountains.

Dr. Howland Holmes said that the currant which he spoke of at a meeting of the Society last season as the Belgian or Grand Imperial is much the same as the Versaillaise. If he were setting out currants to-day he should not give it preference over the Versaillaise.

Mr. Wilder said that in this discussion the importance of irrigation had been overlooked. We have not control of the clouds, and no man can successfully cultivate strawberries year after year without irrigation. He agreed with the views expressed by Mr. Rawson at the last meeting in regard to the value of irrigation. We must come to it, and our best farmers are taking the subject into serious consideration. Manure is ineffectual without water. Strawberries are very likely to suffer from drought just as they are swelling off, and, as he had often said before, they need water, water, water!

Joseph H. Woodford spoke of the value of cold storage in preserving fruits. One of his neighbors tried the experiment of placing three pecks of Sheldon pears in cold storage last fall, when he would have been glad to give them away to get rid of them, and a gentleman from New York, who saw them yesterday, offered ten dollars for them to put on his table. If sound pears are selected when there is a superabundance and sent to cold storage, every one can have pears on his table for six months of the year.

Mr. Wilder said that he ate Anjou pears this morning which were kept without ice.

It was announced that, on the next Saturday, John G. Barker would read a paper on the "Care and Cultivation of House Plants."

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### BUSINESS MEETING.

SATURDAY, January 19, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President alluded to the loss sustained by the Society in the death of Edward S. Rand, who perished in the wreck of the steamship "City of Columbus" on Friday morning. Mr. Rand was one of the oldest members of the Society, and a Vice-President from 1858 to 1861, and still retained a warm interest in it.

A letter was read from Peter Henderson, of New York, offering premiums, to be awarded by the Society, for specimens of the Sunset rose and White Plume celery. The letter was referred to the Executive Committee.

Adjourned to Saturday, January 26.

### MEETING FOR DISCUSSION.

#### THE CARE AND CULTIVATION OF HOUSE PLANTS.

By JOHN G. BARKER, LYNN.

The subject of discussion to-day, The Care and Cultivation of House Plants, assigned me to open, has been written upon, rewritten, and discussed so many times, and with such acknowledged ability, that I do not expect to present anything new for your consideration; but if what I may say shall only draw from others of more experience their ideas, it may not be all loss that I make the attempt.

Among the many arts which are constantly improving in this aspiring age none have made a greater progress than gardening. It is a delightful recreation, affording the greatest pleasure in its

results, and confined not to the wealthy alone, nor to any particular class or society, or quarter of the globe. Flowers are, of all embellishments, the most beautiful; nothing can compare with or equal them. No matter how elegant the furniture, or grand the decorations of your rooms, flowers always have a place in them, and are the first things admired by your friends. The love for them commences in infancy; it remains the delight of youth, increasing with our years, and is the joy and happiness of our declining days.

The most essential requisite to the successful cultivation of plants in the house is a good window; what is called a bow or bay window, facing the south is best, the advantage being that it gives light on three sides, while the ordinary window gives it only on one. Another desirable feature is a glass door, or sashes, to shut off the window from the room. This will be found to be of immense advantage, particularly when sweeping and ventilating the room; the door being then closed, so as to keep off the dust as well as to prevent the cold air from rushing on the plants.

Ventilation, of course, is very essential, but should always be given at the top of the window. Cleanliness cannot be too well attended to; it is just as desirable to keep plants clean, if we want them healthy, as it is our bodies, if we want to be free from disease. Washing the leaves with a sponge with water of the same temperature as the air of the room will be a great help to their successful growth, as will also be an occasional sprinkling on a fine day, which may be given with a small brush where you cannot conveniently use a syringe. Perhaps there is nothing more annoying to the cultivator than the green fly. While smoking with tobacco is the swiftest and most effectual remedy, there are not many who care to have the fumes of tobacco fill the room, for, no matter how closely you shut your window, the scent will get out more or less. This can be remedied by making an infusion of tobacco water, as follows: fill a pail with the stems of tobacco, pour upon them all the water the pail will hold, let it stand twenty-four hours, and then use in the proportion of one-half pint of the infusion to a pail of water, which will be strong enough if the stems are good. The plants which are infested can be taken from the window, turned downwards, placing the left hand over the top of the pot to prevent accident to the plant, then plunging the plant in the liquid once or twice, until the flies drop off. This will be found quite effectual. Keep some of the infusion always on hand, and on the

first appearance of the green fly your remedy is always ready. After using the infusion rinse the plant in clean water of the same temperature as the room. I knew a florist, in Philadelphia, who always syringed his plants with a solution made in the manner indicated; he never fumigated; and I visited his houses frequently, and his plants were always clean.

A scaly insect, more common on Oleanders and other thick-leaved plants, adheres so closely to the stems and leaves that it is not so easily destroyed. These may be washed with whale-oil soap and water, or, what I think is better, Gishurst Compound. A sponge dipped in a little sweet or kerosene oil and wiped up the stem and under the leaves occasionally will keep off the scale quite effectually. I recently cleaned two large Epiphyllums with kerosene oil. During the summer they had been neglected and got very dirty; the oil was used liberally, and I confess with some doubt as to how the free use of it on that occasion would affect the plants. They were not injured in the least, but, on the contrary, are showing signs of a remarkably fine growth. I think these directions for the eradication of the green fly and scale will, if followed up, be found effectual for the red spider.

Watering, injudiciously done, is a great injury to plants; too much water is more frequently the trouble than not enough. The soil on the top of the pot generally shows when the plants need water, which is when it looks dry on the top. When you do water, let it be done thoroughly, and not in a mere dribble, that will not go more than half through the soil. The only rule I know for watering is to give it when the plants need it, never using it fresh from the pump or aqueduct without taking the chill off by letting it stand in the room or adding a little warm water. Plants grown in warm rooms require to be kept at all times moist but not saturated; but as the days grow longer, and the sun gets higher, and the plants begin to grow and flower, more water will, of course, be required. For the plants on the shelves close to the glass it will be found that a box placed on the shelf and then filled with sphagnum, plunging the plants therein, will be of great help, keeping the plants at a much more even degree of moisture and avoiding the spattering of the soil on the shelves and the glass. Plant the *Lycopodium denticulatum* in the sphagnum, and you have a clean green carpet for your plants. I would not, however, let it grow in the pots sufficiently to cover the soil, as you could not see so well when water was required for the plants.

I think a good rule to go by in regard to heat is that when you feel comfortable yourself; — not too hot nor too cold, — it is about right for house plants, as most of those which are grown in rooms are from temperate climates. Never be without a thermometer; 70° to 75° by day and 45° at night will be a good temperature. Arrange the blinds to slide between the shelves and the glass, and, if the weather is unusually cold, you will find no greater help than outside wooden shutters to put up in front of your window. Make them in small sections, light, and easy to handle, so that they can be put up by any one who happens to be at home.

Having glanced briefly at some of the requisites necessary in the care of plants, we will look a little at the kinds and cultivation. In our bay-window, at each side, we would have a vine of some kind, perhaps the variegated *Cobæa scandens* on one side and a *Tropæolum* on the other. A wire or wires may run up each side and over the top; to this train your vines, and let them hang from the top in festoons. In place of these some of the *Maurandias* (which are very pretty), or such other vines as will meet your taste, may be used; then, with some hooks in the top of the window to suspend one or more hanging-baskets on, we have our window started. In these baskets the *Saxifrage umbrosa*, better known as London pride, although old and common, and also the common Moneywort (*Lysimachia nummularia*), will be very pretty, and, with such other plants as your taste may dictate, your baskets will add materially to your window.

For general cultivation a very pretty plant, and one which is highly recommended, is the *Torenia Fournieri*; the habit is dwarf and compact, and the flowers are produced in such great numbers as to form a complete bouquet; the foliage is a dark green, in striking contrast with the flowers, the color of which is a dark blue, with a bright yellow spot on the under lip. Being an annual, and easily raised from seed, it is all the more desirable.

Callas are beautiful for both foliage and flowers. Don't overpot them, for when they are pot-bound and well watered they bloom all the better. A very essential point in their culture is a thorough rest in summer, by turning the pots on their sides under a wall or fence and letting them remain there until they show signs of growth in the fall; then shake off all the old soil, repot in new, and bring to the light and water.

Geraniums will be the standard plants, and, with the many varieties which we now have, all so good, there can be but little

danger of making a mistake in the selection of varieties. For single varieties, Gen. Grant and Orbiculatum for scarlet; May Queen and Master Christine for pink; Miss Gertrude and Mrs. George Smith for salmon, with Paul Lucca and Snowflake for white, will be a good selection. For double varieties I recommend Bishop Wood, crimson shaded with cherry red; Henry Cannell, bright scarlet, and of fine habit; and Mad. Thibaut, fine pink.

A few pots of Carnations will work in well. Although Petunias are considered common, what can make a better show? A few pots of Mignonette, Sweet Alyssum, and Candytuft will add to the fragrance.

For the arrangement I would place these and all soft-wooded plants nearest the light, and the hard or smooth-leaved plants, such as Ficuses, Gardenias, Daphnes, *Hoya carnosa*, Dracænas, and Coprosmas behind them. In suggesting these, I speak from experience; the best Hoya I ever knew was grown in a window and stimulated with soapsuds as regularly as washing day came round; the same may be said of Gardenias.

Among bulbs, Hyacinths come first, and should be potted in November and December, and placed in the cellar or outside, where they will not freeze, covering up the pots entirely. Here they will root, and by bringing them out a few at a time, every week or ten days, after the first of January a display of these beautiful flowers may be kept up many weeks. I would also add Crocuses and Tulips if you wish them. I potted a quantity one winter, and, for want of a better place, put them under the piazza floor and had no trouble with them whatever.

The Oxalis, Sparaxis, and Tritonia must not be omitted; and I must not fail to call your attention to the great value of the Cyclamen for this purpose; it is an admirable window-plant.

The plants I have mentioned have been selected with the view that we have a good bay-window; but I would make one more suggestion: I would have this floor a little higher than that of the room, and laid so that the lowest point shall be in the centre, and with a pipe to carry off any waste water while washing or that may come over when watering, I think you have the starting-points of success for a good window-garden. This pipe may run outside the wall or into a pail or barrel in the cellar.

We must not omit the north or more shaded windows; for these, the oak-leaved Pelargoniums, *Aloysia citriodora*, and many of the

variegated leaved plants, as well as all of the finer ivies, will do well.

Plant-cases might also be mentioned as very desirable where a window cannot be entirely given up. This, however, is only a suggestion, as I have already taken more time than I intended; I will, however, suggest one more plan for decorating a room. Procure a pan twelve or more inches across and six deep; place in the centre of this pan a seven or eight inch pot; then place the proper drainage and soil in the pan. Plant in the pan any of the varieties of *Tradescantia* or *Lycopodium denticulatum*, which will grow and cover the surface of the pan and hang over the sides; in the pot, in the centre, put a nice plant of *Coprosma Bauereana*, *Dracæna*, Palm, or any plant which suits your fancy. Place the pan on a stand just large enough to hold it, opposite the window, and, with one or two brackets on each side of the window for such plants as you may choose, you have a decorated window or windows with very little trouble. The pot and pan being covered by the vine or moss, growing there and hanging over the sides of the pan, neither is seen, and in the pan a few cut flowers can be placed to enliven it, and they will last a long while. In this way you can have a pretty stand all the time, and can change your centre plant whenever you desire without breaking up all the pan. When more than one is used in a room I would not have any two alike.

My last suggestion is in regard to potting. Give plenty of drainage, and cover with a little moss or rough material to prevent its getting clogged up, for, if the surplus water does not pass off, your soil will become sour, the roots will rot, and the plant will die. For the plants that I have recommended a compost of one-third leaf mould and two-thirds of good turfy loam, with a little sharp sand, will answer well, adding a little fine manure for the geraniums and other soft-wooded plants; and for the bulbs, especially the hyacinths, a liberal supply of well-decomposed cow manure will help very much to give you good flowers.

Mr. President, I am aware that I have touched only very imperfectly upon a subject where there is so much to be said. I have taken a leaf from my own experience, and what I have omitted I hope the gentlemen and ladies present will supply, as I feel that they can; but this one thing I am sure you will all agree with me in, that in this as well as any other undertaking the great aid to success is enthusiasm in our work.



## DISCUSSION.

Hon. Marshall P. Wilder expressed the pleasure he felt in hearing this compact essay, and corroborated what the writer had laid down as the essential principles of window culture. More than fifty years ago, the speaker cultivated house plants in Montgomery Place, and this leaf from Mr. Barker's experience sounded like one from his own. Perfect drainage, whether in a flower pot or in the open field, is the basis of all successful culture. He has adopted the system of placing moss over the crocks in the bottom of his flower pots, and using plenty of both. The roots pierce into the moss, and find moisture to sustain the plants. It is essential not to over-water; do not let plants suffer, but never give them water until they are thirsty, and then water thoroughly, and afterwards withhold it until they cannot do without it. Light, air, and moisture are the great prerequisites for successful plant culture.

Gas, either illuminating or from coal fires, is bad for plants; it is almost impossible to grow them with either. He is acquainted with a gentleman in Dorchester, who is older than himself and knows more, and who grows camellias, Chinese azaleas, and similar plants in a room with a north window where there is no fire heat. He adheres strictly to the principles of watering laid down by the speaker, and, whenever the weather is mild enough, takes his plants out on the piazza in the shade and lets them have a little fresh air, and it is wonderful how it revives them. It is a great privilege to have a window such as the essayist has described, where plants can be grown so much better than directly in the room.

William C. Strong said that he felt a very deep interest in the subject under discussion. He considered it very important, and wondered that house plants are not more generally grown, when their cultivation is so simple and easy. The true way to enjoy them is to make pets of them, and the educating influence on children will be excellent. We are highly favored in our climate, so clear and sunshiny compared with the foggy weather of England, which is so much farther north, and what is done there can certainly be done here. It has been said that plants will not thrive where furnace heat and gas-light are used; but the plant is the best test of a healthy atmosphere, and if it will not thrive, the air is not fit for human beings. If the air is pure we can cultivate plants in

our windows as well as anywhere, and they will afford the greatest pleasure to visitors. Roses can be bloomed in January, as was shown by the specimens on exhibition. What is needed is perfect control over moisture and temperature; and they color better here than in England. Kerosene is difficult to use in the house, because it does not unite with water, but, by beating or churning up one part with two parts of common soft soap, it can be mixed with water, and then forms an effectual remedy for red spider and mealy bug. The speaker had tried this and knew it to be effectual. The proportions may vary from one part of water and one of the emulsion to ten of water to one of the emulsion. For delicate greenhouse plants it must not be as strong as for out-door use. It must be strong enough to kill the insects without injuring the plants, and the best way to ascertain whether it will answer is by trial. The strongest mixture mentioned should be used only on cacti, or to destroy lice on the bark of trees, or on other plants which are not liable to injury by strong remedies.

President Hayes asked for suggestions for overcoming the difficulties arising from gas and furnaces.

William D. Philbrick said that there is a practical way of getting over the difficulty of impure air, which is by building out a bay-window and partitioning it off as the essayist had recommended; but the trouble then is that it is too cold, and to obviate this he recommended carrying a pipe from the furnace, around the floor, or a water-back and heating-coil, independent of the hot-air arrangement. With a miscellaneous collection of half-hardy plants, overheating is most injurious, causing them to grow spindling. The temperature should be from 60° to 65°; and they cannot have too much sunlight. A high temperature is worse at night, or in a dark day, than in bright sunlight.

Mrs. E. M. Gill said that before she had a furnace and gas she had three hundred plants — azaleas, camellias, heaths, etc., — all over her house, but since the furnace and gas were introduced she had been obliged to discontinue their cultivation. She wanted the room in the dwelling for her children. She gave her geraniums to a friend, who grew them so as to be healthy and free from rust, and who also cultivated beautiful fuchsias in a chamber where little heat was given.

Leander Wetherell knew a lady in Haverhill who had about the same number of plants thriving in her sitting-room, and another lady in Deerfield, who was equally successful in cultivat-

ing plants in a room warmed only by a wood fire. Both these collections were exceedingly luxuriant in growth and flowering.

Mr. Strong thought it an important point whether the plants were injured by the hot-air furnace or by the illuminating gas.

Mr. Wilder wished to correct any impression that he might have given that plants can be grown in a room without any heat. Though there was no fire in the room he spoke of, it received heat from the adjoining room.

William H. Badlam thought that if gas from a furnace injured plants, the furnace must be badly constructed or managed, or else out of order. He has a furnace, and his plants look well, but he always keeps the damper open an inch or an inch and a half, to carry off the gas. The damper has in the centre a hole an inch and a quarter in diameter, which cannot be shut.

Mr. Barker thought Mr. Badlam had hit the nail on the head. He agreed also with Mr. Strong that the health of plants is a good indication whether the air of our rooms is healthful for ourselves. He had seen a *Hoya carnos*a, in a back street in Chicago, on a trellis four feet high, which was a mass of bloom. It got its stimulant from the wash-tub. He knew, also, of Gardenias thriving within five feet of the cooking-stove, and of a beautiful plant of *Poinsettia pulcherrima* in a sunny window in Lynn. It is a great mistake to force plants too early in the season; they should be kept along through the winter, until the days are longer and the sun is higher. In forcing grapes when the ground is frozen we work against nature; and he knew an instance where an entire house was destroyed by an attempt to start the vines before the border was thawed.

Mr. Wilder said that the *Hoya carnos*a is a trailing plant, which he would not have supposed adapted to house culture, but he knew a clergyman who had two windows filled with it, and found it easy of culture.

Mr. Strong thought that, with a wrought-iron furnace and a large volume of air brought in from outside, plants could be grown as well as with a wood fire. We can cultivate plants to greater perfection in houses with furnace heat than we can out-doors. He would hail their cultivation in the house as one of the best indicators of a healthy atmosphere. We can saturate the atmosphere with moisture, and we ought to have more moisture in the air of our houses.

William H. Hunt said that he has a conservatory, about eight

feet by twelve, attached to his house, and found it difficult to keep it from getting too hot by day, and to keep it warm enough at night, and he made a frame above the pipes where he put pans from four to six inches deep and two inches wide and filled them with water, placing over them little boxes for plants or cuttings. He now has good control of the heat and a good atmosphere, but he cannot suit the temperature to all plants. He agreed with Mr. Strong that plants can be grown perfectly with a furnace; he knew a lady who did it.

John B. Moore said he believed that he could grow plants with a furnace as well as in a greenhouse. What are the conditions of plant growth? One is freedom from gas, which affects people as well as plants. Chrysanthemums last in his house for a month. Plants cannot be grown in the greenhouse without ventilation. He used to try to grow plants in his house with coal stoves and the chimneys bricked up, but without success. Now he has a furnace and open fires, and they succeed. Good drainage is of the utmost importance. He would add to the three requisites for plant culture named by Mr. Wilder, light, air, and moisture, one other, — something for the plant to grow in. It must have good soil, and there is nothing better than half-decomposed sod. Plants will thrive in it even without manure. It is a great mistake, often made by ladies in the country, to collect the mould from hollow trees and call it leaf mould; the rotten sod is better and much less trouble. After the plant is supplied with soil it can be ruined by watering. We should follow the course of nature, which gives us a good heavy shower, and then sunshine and heat until the plants want water again. A continual drizzle is injurious. You can tell by rapping with the knuckle on the side of a pot whether the soil is in need of water. Last year he only watered his roses twice, and was not sure that he had not given them too much. It is a question whether constant syringing does not induce mildew.

Mr. Wilder said there is no doubt that too frequent watering is very injurious.

Mr. Badlam said that watering is not the only thing requiring attention, — a moist atmosphere is essential. Furnace heat is too dry, except with excessive evaporation of water. To remedy this he plunges his pots half their depth in sphagnum moss, in a tray at a south-east window, and at the joint of the sashes he has a smaller tray. He cultivates a hundred pots of Geraniums, *Manettia bicolor* (though it is difficult to keep the mealy-bug from it), Helio-

tropes, Carnations, Begonias, English, German, and Grape-vine Ivies, Dracænas, Abutilons, Primroses, Oxalis, Coleus, etc., and they all do well with care.

Mr. Barker agreed with Mr. Badlam in regard to the good effect of sphagnum in regulating the moisture. Where we can live is the best place for plants to live. Over-watering is very difficult to manage; it is a greater mistake than giving too little water.

Mr. Wilder said that over-watering rots the roots of plants. He had a gardener who watered his camellias once a day, and they became waterlogged, and dropped their buds, and he let them stand three weeks without water, which was as long as he dared to.

Mr. Philbrick said that some furnaces give as pure air as a wood fire, but many are faulty and leaky. The chief difficulty is in defective draught of the chimney.

Mr. Wetherell asked if there be any specific rule for watering.

Mr. Barker said that the top of the soil in the pots indicates when water should be given. Not so much is required in dull as in sunny weather, and more is needed in the long days than in short ones. By tapping on the side of a large pot it can be judged whether it needs water.

Mr. Strong said that a plant in vigorous growth should have more water than when dormant or growing slowly.

President Hayes said that he built a conservatory on the back of his dining-room, which is not heated by his furnace but by a fireplace. The conservatory has shutters to exclude the gas, but they also exclude the heat, and he was obliged to put in a coil of pipes, which required a separate furnace below, and now, though the conservatory is up high and exposed to the wind, the difficulty is to keep the heat down when the sun shines. It is very important to exclude gas, and he has to shut up the conservatory when the gas is lighted; but with the greatest care he cannot grow plants there as well as he would like to, and has to bring them in from his greenhouse at Lexington.

Robert Manning mentioned the blue Browallia as doing better than any other plant in his sitting-room. Mr. Barker and Mr. Badlam agreed that it is one of the most desirable plants for house culture.

Edward L. Beard thought bulbs very eligible for house cultivation, and that with more knowledge of them we should find them better than Tea roses, etc. Their cultivation is easy and

simple. He imports every year Hyacinth, Polyanthus narcissus, and Paper narcissus bulbs, and after January they keep the greenhouse gay. He pots them in succession for a month, and puts them in a cool cellar, first watering them and afterwards covering them with tan, and has a constant succession of flowers. He commended their culture, though the bulbs must be bought anew each fall. With furnace heat we lose sight of the temperature; 70° is too high; at 60° the plants will struggle along,—but there is every difference between 60° and 70°. At 70° only hard-leaved plants will thrive.

The subject of the next meeting was announced as “Planting Shade and Shelter Trees,” to be opened by Leander Wetherell.

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### BUSINESS MEETING.

SATURDAY, January 26, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

William C. Strong moved that a committee be appointed to prepare resolutions expressive of the sense of the Society on the death of Edward S. Rand. The motion was unanimously carried, and the Chair appointed as that committee Mr. Strong, Hon. Marshall P. Wilder, and John G. Barker.

Adjourned to Saturday, February 2.

### MEETING FOR DISCUSSION.

PLANTING SHADE AND SHELTER TREES: WHAT SPECIES ARE MOST DESIRABLE AND THE SOILS BEST ADAPTED TO THEM.

By LEANDER WETHERELL, Boston.

The theme assigned to me by the Committee on Discussion is one of great practical importance to both horticulturists and farmers over this State whose noble name the Horticultural Society bears. It is not anticipated, I presume, by any who have come in hither, that I am to discuss landscape gardening or forestry, as the theme designated does not include either.

“Trees for Shade and Shelter:” the first signifies protection from the burning rays of the summer sun, an important considera-

tion in a country remarkable for the clearness of its atmosphere ; the second, trees to screen or protect cultivated grounds from the cold winds from the north and north-west, especially in respect to gardens and fruit orchards, and serving as well for wind-breaks for homesteads and grounds contiguous thereto. Trees that furnish desirable shade for dwellings should, in their selection, be chosen also with reference to their beauty and adaptability to soil as well as for shade, in order that they may be decorative as well as useful, thus combining the beautiful and the useful. In the summer an humble, modest dwelling with a grass-plot before it, shaded by an oak, an elm, or a maple tree, is more attractive to the passer than a showy mansion wholly unprotected by a tree from the burning rays of the summer sun. The pilgrim and the wayfarer welcome trees by the roadside under whose umbrageous boughs they may pause and rest their tired and wayworn limbs ; and in their meditations they will hardly fail to remember with gratitude the kindly foresight of him who spared or planted the trees which have contributed so much to their comfort. Trees should, therefore, be planted by the roadside as well as about dwellings. Groups of trees should be provided in pastures where the live-stock of the farm which graze thereon in the summer may find shelter from the heat of the sun.

There is nothing about the old homestead of my boyhood life which I recall with more distinct and pleasant recollection than the four large trees near the house, to wit : a majestic white oak (*Quercus alba*), a stately elm (*Ulmus Americana*), and two large shell-bark hickories (*Carya alba*). A little removed from the house were three large chestnuts (*Castanea vesca*), which, like the preceding trees, were quite notable for size and longevity. The hickories and the chestnuts were good annual nut-producers, and the nuts of one of the hickories were very remarkable both for size and quality. These did much with the chestnuts, apples, and sweet cider to make cheerful the domestic rural fireside in days of auld lang syne. There are few things in early life that become more deeply impressed upon the mind than the memory of notable trees provided by a former generation as decorations of the old homestead.

The influence of trees upon the healthfulness of the atmosphere should be considered by all owners of real estate. Trees, as also more lowly plants, imbibe carbonic acid with other gaseous, volatile products exhaled by animals and the decomposition of organic

matter, and thus do much to purify the atmosphere. Humid air, charged with miasma, is deprived of it by trees, says Becquerel. Localities in Italy were observed by Rigaud de Lille which were preserved from fever by a screen of trees, while other localities not thus protected were subject to fever. This belief, that trees are a protection against malarious influences, is very common among Italians.

Lieut. Maury stated that he believed that a few sunflowers planted between the Washington Observatory and the marshy banks of the Potomac saved the inmates of the Observatory from intermittent fevers, to which they were subject before the planting of the sunflowers. The experiment of Maury has been repeated in Italy. In fact, it is generally conceded that plant and forest screens are a protection against noxious exhalations from marshes and other like sources of malarious diseases when located at the windward of them. The swamps of the South as also those of the Carolinas and Virginia were not unhealthy even to white men so long as the forests remained, but became insalubrious when they had been felled by the woodman's axe.

Scientists now teach us that forests serve as promoters of the health of animals both mute and human. What is poison to breathing animals is food for plants; and trees thus serve to purify the air and to make it health-promoting for both man and beast. In one of the oldest books of the library of this Society it is recorded, "the tree of the field is man's life."<sup>1</sup> The teachings of modern science do most emphatically confirm this quotation. Trees undoubtedly were the forerunners, the John-the-Baptists, of man, and the lower animals, as we are pleased to call the mutes. Therefore enough is suggested by what has been said to demonstrate the sanitary influences of plants, trees, and forests. Let all, therefore, who own land enough to plant a shrub or tree fail not to plant one the coming spring, if they have not already done so. What shall it be? Soil, and adaption thereto, should determine the answer.

This inquiry leads to the brief consideration of the selection of trees for planting: "What are the species of trees most desirable for 'shade and shelter,' and the soils best adapted thereto?" constitute the theme assigned to me.

The first tree I shall name is the Oak, which has not inaptly been

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<sup>1</sup>Deuteronomy xx, 19.



called the "King of the Forest." No other tree is so frequently named in the book of Genesis as the oak. The famous oak of Mamre, called Abram's Oak (*Quercus pseudo coccifera*), was recently figured in the Transactions of the Linnæan Society by Dr. Hooker. It is popularly believed to indicate the spot where grew the oak under which the patriarch pitched his tent. The Arcadians believed the oak the first tree that was created. It has a large trunk, and sends out its limbs over the soil:—

"These monarchs of the wood,  
Dark, gnarled, centennial oaks,"

seem to bid defiance to time. Generations of men succeed generations, while the oak withstands the storms of a thousand winters and more. Herodotus informs us that the first oracle was that of Dodona, dwelling in the celebrated oak grove of that name. The oak was famous among the Romans and was dedicated by them to Jupiter. To come down to our own English ancestors, the Druids, the priests and wise men of the Britons, deemed the oak sacred, and sacrificed under it, cutting the mistletoe from its trunk. The name of "Gospel oak" is still heard in many of the old English counties, pointing back to the time when penitential psalms and gospel truths were uttered beneath their shade. Many trees in fatherland still bear this appellation, though the name has not been newly bestowed for many generations.

The size and age to which the "King of the Forest" attains are noteworthy. Humboldt mentions an oak near Berlin measuring nearly ninety feet in circumference near the base. A tree in the same neighborhood was blown down in a storm in 1857, which measured sixty-six feet in circumference. Their ages have been estimated at from one thousand to two thousand years. Gilpin, in his "Forest Scenery," reports a few venerable oaks that chronicle ages before the Conquest. Of the most venerable of these monarchs is one in Norfolk, reputed to be "the Old Oak" during the reign of William the Conqueror, and said to be fifteen hundred years old, a plate being attached to the tree bearing the following inscription: "This oak, in circumference at the extremity of its roots is seventy feet, in the middle, forty feet." This was in 1820. The King's Oak, in Windsor forest, is represented as having been a favorite tree of William the Conqueror, and the largest in the forest, and is reputed as being upwards of a thousand years old,

measuring, some twenty years ago, twenty-six feet in circumference three feet from the ground. An oak in Dunnington park ran up fifty feet before a limb appeared, the base squaring five feet. An oak in Holt forest in Hampshire measured, in 1759, thirty-four feet in circumference seven feet from the ground. An oak felled at Norbury, as stated by Dr. Platt, was of the enormous size of forty-five feet in circumference, so that, when it was lying upon the ground, two men mounted upon horses on opposite sides were concealed from the view of each other. He also mentions an oak in Keicot, beneath whose branches it was computed that four thousand three hundred and seventy-four men could have stood. The largest sum ever realized from the sale of one tree was that of the Gelonas Oak, a few miles from Newport, Monmouthshire, felled in 1810. According to the "Gentleman's Magazine" for 1817, it was sold, standing, for one hundred guineas, under the belief that it was unsound, and was resold for four hundred and five pounds, and subsequently was sold again for six hundred and seventy-five pounds, and was found to contain two thousand four hundred and twenty-six cubic feet of timber. Its bark was estimated to weigh six tons.

There have been some memorable oaks in the United States, of which two are here referred to, which the writer has seen. The first to be mentioned is the celebrated Charter Oak, of Hartford, Conn., which was visited by the writer in its green old age. It was blown down some years ago. It was a grand old tree.

The Wadsworth Oak, in Geneseo, N.Y., near the River Genesee, was a giant of the forest. It grew in one of the most fertile valleys of the Middle States. The tree was of extraordinary size, and for many years it attracted large numbers of travellers journeying to the Niagara Falls and to the West. Its trunk measured thirty-six feet in circumference, and the tree was a marvel to all who saw it. The writer has never seen so remarkable a specimen of the old forest growth, whether of the oak or other species of indigenous trees, east of the Mississippi river, as was this gigantic veteran. In Flushing, Long Island, formerly grew a rare specimen of the oak. It measured a little short of thirty feet in circumference.

The oak is acknowledged to be the most picturesque of trees. As a shade tree it cannot be excelled. Of the oak family there have been enumerated by botanists more than one hundred and thirty species. Michaux the elder described twenty, and Michaux

the younger twenty-six, species of North America; and Nuttall, thirty-two. George B. Emerson found twelve species growing in considerable numbers in Massachusetts. De Candolle, in his "Prodromus," described two hundred and eighty-one species of the oak growing on this planet.

The first to be named for planting is my favorite tree, the White Oak (*Quercus alba*). Bryant, the American poet, in his "Forest Hymn," says of this oak:—

"Not a prince  
In all that proud old world beyond the deep  
E'er wore his crown as loftily as he  
Wears the green coronal of leaves with which  
Thy hand has graced him."

The tree needs little description, as it is well known to all present. Mr. Emerson said of the white oak that it is beautiful in every stage of its growth, and is, therefore, a most desirable ornamental tree, and concludes with these words, "Let every one who has an opportunity to do so plant a white oak." He measured one of this species in Bolton that was nineteen feet in circumference just above the surface of the ground, and one in Greenfield that was seventeen and a half feet in circumference. The one referred to as near the homestead of the writer was about fifteen feet in circumference near the surface of the earth. The soil suited to their growth is a strong tenacious loam. There is ample room to suit the most fastidious taste in the oak family.

The next tree to be named is the Elm (*Ulmus Americana*), which is a great favorite, or was formerly, among the people of New England, especially of Massachusetts and Connecticut, where there are still many trees of magnificent beauty and of great size and grandeur of appearance. They are among the early bloomers of spring. The sturdy trunks and graceful boughs are unequalled, as all will readily admit. The memorable Old Elm of Boston Common, recently blown down, as measured in 1844 by George B. Emerson and Professor Gray, was at the ground twenty-three and a half feet in circumference, and three feet from the surface seventeen feet and eleven inches. It is unnecessary to dwell upon the description of the large elms of Massachusetts, as they are well known to many of my auditors. The elm is more easily transplanted than the oak, as it roots nearer the surface of the ground. Some of the most magnificent specimens are still growing along the valley of the Connecticut river in the States of Massachusetts and

Connecticut. It is found in a great diversity of soils, but never, or rarely, in its most gigantic form and greatest beauty, except in rich, moist ground, such as is found along the banks of large rivers, between the forty-second and forty-fifth degrees of north latitude. No other shade tree has been more frequently planted in Massachusetts, unless it be the Rock or Sugar Maple (*Acer saccharinum*).

The Sugar Maple, like the elm, has long been a favorite shade tree in Massachusetts. It is the most notable tree of the maple family. It is found from 48° north, to Georgia, and from Nova Scotia to the Rocky mountains. Its foliage is a dark and beautiful green, and is clean from insects or parasites, which is more than can be said for the elm. It is indigenously common in the Eastern, Middle, and Northern States and is less common in Eastern Massachusetts than in Western, where it is very common. In Blandford, Mass., a rock maple is mentioned by Mr. Emmons that was four feet through near the surface and was one hundred and eight feet high, and when cut, produced seven and a half cords of wood. This was an indigenous forest tree. In Stockbridge, Amherst, Deerfield, Sunderland, and Belchertown are planted double rows of rock maples, which are magnificent decorations of the principal streets. The soil suited to their growth varies. The sugar maple is indigenous to sweet, rich, mountain soils, which, when the forests are removed, produce the richest blue grass pastures.

The Japanese Maples are decorative, and are deemed hardy. The Norway Maple is a fine tree. Wier's Cut-Leaved Maple is a beautiful tree, and may be planted for decorative purposes as well as for shade; it is known by botanists as *Acer dasycarpum*, variety *Wierii laciniatum*. The species is called White Maple. It grows rapidly and is a handsome, clean tree, like all the species of maple. The Red Maple, called also Swamp, Scarlet, or Soft Maple, is a tree desirable for its great beauty in early spring and autumn. Its early crimson or scarlet leaves in late summer and early autumn render it very attractive to lovers of autumn leaves. Whatever may be the cause, the æsthetic effect of the decay of autumn leaves is that of infinite beauty, and our own native poet, Bryant, must have been thinking of the maples when he said: —

“ And when the autumn comes, the kings of earth,  
 In all their majesty, are not arrayed  
 As ye are: clothing the broad mountain side  
 And spotting the smooth vales with red and gold.”

Mr. Emerson says of the rock maple: "In Stockbridge, Deerfield, and many other of our most beautiful Western towns, a single or double row of rock maples is the appropriate and magnificent ornament of some of the principal streets and roads. They elevate the public taste; and they may easily be made also to contribute to sustain the public burden." The rich orange tints of the sugar maple in the decay of the autumnal season, blending with the scarlet of the red flowering maple, the crimson of the tupelo and sumach, and the buff and yellow of the birches serve to increase its value as a desirable shade tree.

The Large-Leaved Maple (*Acer macrophyllum*) is a superb tree. It varies in height from forty to ninety feet, and its graceful form, with widely spreading branches, serves to give it a place among the most desirable shade trees.

The White Wood or Tulip Tree (*Liriodendron Tulipifera*) is a tall, upright tree. It is common in Western Massachusetts, in several towns on the Westfield river, particularly in the town of Russell. Michaux says that, in favorable situations in a deep, moist soil, it attains great size, and is one of the largest trees indigenous to the United States east of the Rocky mountains.

The flower is likened by Pickering to a chalice: —

— "Through the verdant maze  
The tulip tree  
Its golden chalice oft triumphantly displays."

The Linden or Lime tree (*Tilia*), as an ornamental shade tree, is to be recommended to planters. Its growth is rapid, and it is a good species for shelter planting as well as for shade, whether about the homestead or in the pasture.

The European Linden is a beautiful tree, superior to the American. The lindens, when in bloom, attract honey-bees, particularly the American species, called the Basswood tree (*Tilia Americana*), from which they gather honey of the finest quality. The linden grows to the height of from eighty to ninety feet. Its foliage is beautiful at all times, and particularly so in autumn.

The Beech, the Horse Chestnut, the Acacia, the Chestnut, the Ash, the Black Walnut, the Catalpa, the Larch, and other species of trees will suggest themselves to the planters of trees for shade.

There is no department of artificial tree planting more generally overlooked by gardeners, fruit-growers, and farmers than that of

planting trees for shelter or wind-breaks, to protect plants, shrubs, and fruit trees from cold north and north-west winds, where they are not sheltered by hills, as is sometimes the case. Perhaps, in some localities, north-east and east shelters should be included with the west.

What species of evergreen trees are best adapted for this purpose next presents itself for brief consideration. The first tree I shall name is the White Pine (*Pinus strobus*), called also Weymouth Pine. The bark is smooth and the trunk straight, growing to the height of from eighty to a hundred feet, and being sometimes from five to seven feet in diameter. When young, its branches are whorled, from the surface of the ground upward. It is indigenous all over New England. The late Rev. John Lewis Russell, of Salem, a former member of this Society, described a tree of this species, in Hingham, "which, thirty-two years after it was planted, had grown to the height of sixty-two and a half feet, and measured seven feet in circumference." The Pitch Pine, the Scotch, and the Norway Pine should be named; also, the Hemlock, the Black or Double Spruce, and the White Spruce, the American Arbor Vitæ, the American Holly, the Juniper, the Silver Fir, and the Larch. The last, though not an evergreen, is yet a rapid grower, and should be included among the trees desirable for screens and wind-breaks.

Thus, Mr. President, in discussing the theme assigned me in this series of weekly meetings, I have sought to present it in a practical light, and if I have failed to do so in respect to my selection of the trees named for shade and shelter, yourself, sir, and the members of the Society have the matter before you for further consideration, emendation, and discussion.

#### DISCUSSION.

William T. Brigham was called on, and said that he had just come from the forests of Central America, where the luxuriance of vegetation was in marked contrast to our own scattered shade trees; but there, as elsewhere, there were solitary trees of great antiquity, whose age was merely a matter of tradition. In the Plaza of Sacapulas stands a Ceiba tree (*Eriodendron*), reputed to be a thousand years old; it is some thirty feet in circumference of stem. At Heliopolis, in Egypt, he had seen a Sycamore tree which the

tradition of Christian and Moslem alike declares sheltered the Holy Family in the flight into Egypt. In the tropics, as the growth is continuous, there are no annual rings, and this uncertain method of computation is not applicable to the living tree. He was able, however, to give the age of one large elm planted by his great-grandfather, William Brigham, in 1727, at the family homestead, in Grafton, Worcester county. Some twenty years ago this was eighteen feet in circumference three feet from the ground, and the branches spread over a circle one hundred and eighty feet in diameter.

Mr. Brigham said that, although the matter was not strictly germane to the subject under discussion, he wished to tell the Society about a garden he found in the highlands of Guatemala. After a journey of some six weeks through the forests and over the mountains of this flourishing republic, he came to the city of Sololá, in the midst of the volcanic district that stretches along the Pacific coast line for many hundred miles. From the Public Garden the view comprised the magnificent volcanic cones of Atitlan and San Pedro, rising from the shores of Lake Atitlan eighteen hundred feet below the level of the plateau on which Sololá stands. The volcanoes of Agua and Fuego were plainly visible in the distance, but, strangely unfamiliar as all this landscape was, the garden was of the most homelike character. In latitude  $14^{\circ} 45'$  N., at an elevation of some six thousand feet above the sea, there was but one plant (the orange) that is not commonly grown in our Massachusetts gardens. Indeed, there were not so many tropical species as are found in our northern gardens. The complete list is here: Sweet-peas, which grow over the shrubs to a height of twelve to fifteen feet and blossom all the year; three or four kinds of pelargoniums; carnations of four colors; marigolds, which grow wild here, and are much used for church decorations; campanulas; white and pink yarrow; sweet william in bud in November; four or five pinks; *Dianthus Heddewigii*; chrysanthemums in bloom; white iris; scabious; chelidonium, double and single; princess's feathers, used in churches; poppies; fuchsias; linaria, *Lilium candidum*; œnothera; gilliflowers; gladiolus; antirrhinum; peach in blossom and fruit, in every stage like the orange; sunflowers; abutilons, white, pink, and crimson, growing to large trees; ragged lady; four roses; yellow sweet clover; spider lily; blue African lily (*Agapanthus*); canna; single hollyhocks; lupins; long-leaved euphorbia; several sedums; wood pink; cypress, like the Monterey;

dahlias ; mignonette ; violets. A similar though not so extensive a garden was seen at Quezaltanango at an elevation of seven thousand feet.

Of the native flowers, whole fields of *Stevia* attracted both the senses of sight and smell. The wild dahlias were very fine, often growing to the height of fifteen feet and a diameter of eight feet. A single pink variety was common with stems three inches thick ; also white and double white, much resembling a ragged chrysanthemum. These sometimes grew on the long top of *adobe* walls, and appeared to form no tubers, as indeed there would be no occasion for this growth.

Guatemala seems the home of the convolvulus. Fifteen species were noted ; three of them excited admiration : one, with flesh-colored corolla, ran over the tree tops ; another was of a clear light-blue color, and the third, dark French-blue, with corolla five inches in diameter. Four fine passion-flowers were observed. But October, November, and December are not months when flowers are most abundant here.

William C. Strong agreed with the essayist in regard to the importance of tree planting. There is no doubt that the climate here has been disastrously affected by cutting off the trees ; and planting more forest will change it. There is a forest in New Hampshire so dense that the thermometer is higher in it than outside, and robins, quails, and other birds make it their winter quarters. The thermometer is higher in the vicinity of evergreens than away from them. Moist land is best adapted to the growth of forests. He sells more rock maple trees than of all other shade trees together, but does not think it desirable to the extent to which it is used, as sometimes in double rows on each side of the street in towns in the western part of the State. It is clean and free from insects, regular in outline, and dense in foliage, but the uniformity is objectionable, and the sun does not penetrate the dense foliage, and the ground underneath remains wet. In this respect it is only less objectionable than the horse chestnut, which is entirely unfit for an avenue tree. The elm, with its graceful gothic arches, so lofty, light, and airy, is vastly superior to either ; but it feeds greedily, and we must be careful not to plant it where it will extend its roots into our gardens. Though the elm is so superior to the rock maple as an avenue tree, it may also be planted in groups. The oak is very desirable. The white maple (*Acer dasycarpum*), and its cut-leaved variety are more rapid in growth than the rock



maple, and less dense but more liable to be broken, and not as long lived. The red maple is desirable for variety, but the Norway maple is the best of all the family; it takes a fine golden color in the fall. The speaker is partial to the black walnut, with its open, graceful, palm-like foliage. We do not want density of foliage, and the maple and especially the horse chestnut are objectionable immediately around the house. We should be very careful what trees we plant very near our dwellings. The Cut-Leaved Birch and the linden are desirable.

Mr. Brigham did not think the horse chestnut so objectionable as Mr. Strong, and spoke of the magnificent avenue of four rows of these trees two miles long, in Busby park, planted by Cardinal Wolsey. The shade of the horse chestnut is not so dense but that grass will grow under it. The Lombardy Poplar is still cultivated in Italy. A cutting planted in 1867 is now a foot in diameter, and as high as the third or fourth story of a house, and shows no signs of decay. It is suitable for city planting, as it will grow on bare gravel.

Mr. Strong said that for certain effects, as, for instance, when a grotto-like effect is desired, there is nothing equal to the horse chestnut. There is one on the Peter Faneuil estate, in Brighton, which is a forest in itself.

President Hayes spoke of the park at Althorp, the seat of Earl Spencer, which is set with trees each bearing an inscribed plate, to denote the planting by successive owners, the first in 1579, with the motto, "Be up and doing, and God will ye prosper," which he thought not yet out of date or inapplicable to tree planting.

C. M. Atkinson said that the man who plants trees builds his own monument; there is no greater blessing that he can confer on posterity. He spoke of a magnificent hickory on the street leading from the Cattle Market hotel to Brighton station, which in autumn is a pyramid of gold, and of the fine *Virgilia* at the old Winship nursery. He was glad to hear Mr. Brigham speak of the horse chestnuts at Hampton; but they are too gross feeders for street trees, and they drop their foliage early. The elm is most satisfactory for this purpose though the horse chestnut is most gorgeous when in bloom.

J. W. Manning spoke of the Edwards Elm, at Northampton, which measures twenty-seven feet in circumference, and of others measuring from eighteen to twenty feet. The Byfield Elm measures, at three feet from the ground, twenty-seven feet. He showed

chestnut posts from a fence in New Hampshire more than a hundred years old, and still sound, and silver-leaved maples, two years from the seed, which grew from six inches to two and a half feet the first year, and five feet the second year, some of them being at the end of the second year an inch in diameter and seven feet high. He had gathered and planted seed of Wier's cut-leaved maple, and from a quarter to a third of the seedlings were cut-leaved, some being much more finely cut than the parent; the remainder were normal.

F. L. Capen thought the elm a very objectionable tree, from its liability to be infested with canker-worms. The rock maple has the advantage of yielding sugar, and the chestnut, beech, and shagbark produce nuts.

David W. Lothrop spoke of a gentleman who procured a quantity of maple and American and English elm trees for street planting, and when the speaker objected to the last-named variety of elm as being ungraceful in middle and old age, the gentleman replied that it was very popular, or nurserymen would not have so many on hand; while the speaker drew the opposite inference. He would plant the American elm in streets, yet not exclusively, but would intersperse them with maples. They should not be less than forty feet apart. Much has been said of the majesty of the oak; but it is difficult to transplant, and nurserymen do not keep them on hand. He has retained fifteen on his grounds; they are not so symmetrical or graceful as the elm, but are free from insects, and show a healthy, glossy leaf through the hottest seasons. The Silver Poplar, or Abele, grows very rapidly, a tree thirty years old being fifty feet high and seven feet in circumference; but the speaker generally dislikes it, though he might plant it for immediate effect. It will grow in gravelly situations, where few other trees will, and soon makes a dense shade. The horse chestnut is handsome in spring, when making its annual growth, but becomes brown and dingy in autumn. Maples are so varied and beautiful in the autumn that he felt an interest in the question whether or not the poorest could not be grafted with the finest. The Norway spruce is the best tree for protection, and the white pine comes next,—the former grows rapidly, two on his place having grown sixty feet high in thirty-two years.

J. M. McCullough, of Cincinnati, thought too much importance was ascribed to the oak. It can be made into a hedge. It also furnishes tannin; and there is no white oak bark left. If we quit

ship-building it will be of no use to grow oaks. The pine furnishes nine-tenths of all the timber used in this country. The Norway spruce is the most valuable of all trees for shade and roadsides. He would abandon the abele, or silver poplar. He had heard it said that it was the only tree in the infernal regions, and that a switch of it was brought thence by Hercules and planted. He believed the story, for in the West every avenue leading to a grog-shop is lined with it! The Deciduous Cypress (*Cupressus distichum*) makes more wood than any other tree, and it is hardy at Cincinnati. The rock maple is the most graceful tree, except the tulip tree, and is also valuable for timber. The red maple makes hard timber. The ash grows slowly, but makes good timber. Blistered ash is from trees exposed to the sun, and, like bird's-eye maple, is valuable for veneering. The tulip tree is the most beautiful of all, but has only a narrow geographical range.

Hon. Marshall P. Wilder said that the subject under discussion is a most important one. In planting, we must give attention to the location, and what we need the trees for. He liked Mr. Wetherell's suggestion to plant shade trees in pastures, and he agreed with Mr. Strong that a variety of trees is desirable. The horse chestnut is beautiful, but it destroys all vegetation beneath it. The tulip tree is one of the most beautiful on his grounds. He has one with a wistaria climbing over it. The linden is one of the best shade trees. He has a Cut-Leaved Weeping Birch sixty feet high. It is a very beautiful tree, and is becoming more and more popular; but he would not plant many, as the white stems have an effect like monuments in a cemetery. The catalpa is a very desirable ornamental tree. The *Magnolia acuminata*, or Cucumber tree, forms a very beautiful tree. The Ash-Leaved Maple is a tree of fine form, and as rapid in growth as the white maple, and has pretty flowers. Trees afford comfort, food, and health, and grand old trees naturally create in us a sentiment of reverence.

Mrs. H. L. T. Wolcott inquired why nothing had been said of the hardy catalpa (*Catalpa speciosa*). She had been trying to do some tree planting, and had studied the writings of Mr. Sargent, who describes the hardy catalpa as beautiful in flower, and very graceful, as well as valuable for timber. The *Acer Negundo*, or ash-leaved maple, promises to be a great acquisition. She is partial to lindens, but last year they were covered with rose-bugs. Her husband is opposed to pastures, and believes in silos, and consequently she has to do her tree planting by the road-sides.

Mr. McCullough pronounced the hardy catalpa a myth. Catalpa flowers, when fed on by bees, make poisonous honey. The linden makes the best feed for bees, and should be planted for that purpose. The catalpa is indigenous to the Wabash valley, and the wild honey there is poisonous, — not deadly, but unsafe. Catalpa wood is very desirable, and makes good gate-posts; but for railroad ties, the speaker would rather have Osage orange.

Mr. Wilder referred to the Paddock Elms, which formerly stood on Tremont street, opposite Horticultural Hall. The New England Historic Genealogical Society got trees from the James M. Robbins place in Milton, where the Paddock Elms grew, and sent them to the Maine State Historical Society, by which they were planted. It has been suggested that the city authorities should perpetuate the stock in the mall or on Commonwealth avenue.

John B. Moore agreed generally with the essayist but more with Mr. Strong in regard to the choice of roadside trees. The elm is the best of all; its liability to be eaten by canker-worms is no objection, for it can easily be protected from them. As a general rule, with different soils we must have different trees: the scarlet maple is fine in soils adapted to it; but it requires a moist soil, and will not grow everywhere, while the elm is not circumscribed by the limits of a particular soil, but will grow in wet places or in sand-banks. It sends its roots to a great distance, and he believed it would find water if there was any within half a mile. He has an elm tree near his barn, which, at three feet from the ground, girts eleven feet. It has probably sent its roots into the barn cellar. No wind will break the limbs of a weeping elm except when they are loaded with ice. Where maples would be torn to pieces, the elm will make a good tree. The abele is the meanest of all trees; he would rather have a Lombardy poplar, but would rather have both out of sight.

Evergreens are best for shelter, but should be several rods from the point to be sheltered. He cannot make grape vines grow within two or three rods of a wood. The white pine is one of the best for this purpose: it makes a dense shade, and grass will not grow under it. The hemlock is the most beautiful of evergreen; he has seen them in pastures in New Hampshire and Massachusetts wonderful in size and beauty, — five or six feet in diameter, and of perfect shape, with limbs to the ground, — more beautiful than any he had ever seen in cultivation.

Benjamin G. Smith recommended the Striped Barked Maple

or Moosewood, where a tree of small growth—twenty-five or thirty feet high — is desired.

Warren H. Manning thought that most of those present would agree with Dr. Warder that the *Catalpa speciosa* is distinct from the *C. bignonioides*. It has been confused with *C. Kœmpferi*. *C. bignonioides* is not hardy here. Wounds do not heal as readily on the latter as on the *C. speciosa*. The wood of *C. speciosa* is extremely durable. A locality in the valley of the Mississippi was submerged and the catalpas in it were killed, and fifty years from the time of submersion many of the trees were still standing, and the wood showed no signs of decay either in or out of the water. There are two varieties of the Negundo, one making a small and poor shade tree, and the other, a large and handsome one. The latter is planted in Washington. The Scotch elm is not eaten by canker-worms, as the English and American elms are. The oaks, hickories, tupelo, and *Virgilia* are difficult to transplant, and therefore not as well suited to the wants of the average planter as the rock maple and white ash are. The *Catalpa speciosa* is easily transplanted.

President Hayes recommended the Nordmann's Spruce as most lovely and quite hardy, and spoke of the beautiful tulip trees at Parsons' nursery, Flushing, Long Island, as worth a journey there to see. They rise to the height of forty or fifty feet without a limb.

Mrs. Wolcott objected to the trees mentioned by the President, as being too expensive.

Mr. Wetherell said that he avoided the abele and Lombardy poplar because of the labor involved in keeping down the suckers. Both the European and American lindens are sometimes perfectly defoliated by caterpillars. He was aware of the difficulty in transplanting the oak, hickory, and chestnut; but Professor J. B. Turner, of Springfield, Illinois, showed him a hickory tree which he had transplanted successfully. It had a tap root twenty-five feet in length, which was carefully dug up and replanted, being then coiled in the hole.

A paper on "Lawns and Walks and Public and Farm Roads," by Col. Henry W. Wilson, was announced for the next Saturday.

## BUSINESS MEETING.

SATURDAY, February 2, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

William C. Strong, chairman of the committee appointed at the last meeting to prepare resolutions in memory of Edward S. Rand, reported the following:—

In common with the public the Massachusetts Horticultural Society has been pained and shocked by the disaster which befell the steamer "City of Columbus," and especially so upon finding the name of one of our esteemed life members, together with several of his family, among the lost. It is therefore

*Resolved*, That, in the death of Edward Sprague Rand, the Society has lost one who has rendered it valuable professional services, and who was in former years a Vice-President for several terms, and largely interested in our art, giving the same exact care to the culture of his trees and plants as characterized him in the pursuit of his legal profession, thus conspicuously illustrating the only basis of real success.

*Resolved*, That while the sudden and appalling end of his plan in seeking a more genial winter home is a shock to our nature, yet we recognize a kind Providence in translating one who was so well prepared, with the briefest apprehension or pain, to that land

"Where the tree of life is ever vernal,  
And the pleasures are immortal."

*Resolved*, That we extend our sympathy to the surviving friends in their deep sorrow.

WILLIAM C. STRONG,  
MARSHALL P. WILDER, } *Committee.*  
JOHN G. BARKER,

Mr. Strong said that those who had been members of the Society for the last twenty years would not need to be reminded of Mr. Rand's character. As a lawyer he was prominent in his specialty as a conveyancer. At one time he was one of the largest contributors to our exhibitions, and took as many prizes as any

one. He brought to the culture of his plants the same care and exactness that he exercised in his profession. His collection of orchids was one of the largest of the time, and a large part of it was donated to the Botanic Garden. We have known of his pecuniary misfortunes, and that he surrendered all he had to meet his obligations. He has done a noble life work, and left an example for us to follow.

John G. Barker concurred in all said of Mr. Rand in the resolutions as containing in a small compass all necessary to be said. In character he was a true gentleman ; and he was a much respected and esteemed member of the Episcopal Church, and received its highest honors as a layman. The speaker had charge of his place when he was most extensively engaged in horticulture, and preserved all his premium cards. He took all the first prizes for plants, his collections including the *Medinilla magnifica* and *Cyanophyllum magnificum*. His collection of orchids was excellent, and his estate was a model of neatness. His character shone in all that he did, and he appreciated all that was done for him, and the speaker was glad to have the opportunity to bear witness to his worth.

Hon. Marshall P. Wilder said that it would appear very strange if he did not rise to speak a word in regard to Mr. Rand, whom it was his privilege to know for more than half a century. He was a true Christian gentleman, lovely in his character, — modest, tender, and unassuming. He was the legal adviser of this Society, and an extremely prudent counsellor. He felt a lively interest in the Society, and while Vice-President kept up the practical culture of plants at considerable expense, and brought to our exhibitions many fine specimens of new and rare species.

President Hayes added a word of testimony to the uprightness and excellence of Mr. Rand's character. He knew his father, and knew how he was brought up. He was a profound believer in Christianity, and could go down to his grave unflinchingly. He was a scholar, a lawyer, and a lover of nature, and in all relating to the Society, and especially in regard to the library, he was adapted to be of eminent service to it.

The resolutions were unanimously adopted, and it was voted that a copy be sent to the family of Mr. Rand.

The Secretary presented a circular from Parker Earle, President of the Mississippi Valley Horticultural Society, inviting coöpera-

tion in the International Exhibition of Fruits, to be held under the direction of that Society, in connection with the World's Industrial and Cotton Centennial Exposition, in the city of New Orleans, commencing on the first Monday of December, 1884, and continuing six months. The subject was referred to the Executive Committee.

LEVI W. HASTINGS, of Brookline, and  
THOMAS A. WATSON, of East Braintree,  
having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

Adjourned to Saturday, February 9.

### MEETING FOR DISCUSSION.

LAWNS AND WALKS: MAKING AND KEEPING THEM IN ORDER;  
PUBLIC AND FARM ROADS: HOW SHALL THEY BE MADE AND  
REPAIRED?

By Col. HENRY W. WILSON, Boston.

The word "lawn" originally signified a bit of untilled grass land or glade in the depths of the wood, which was sung by the poets as a very pretty and sentimental sort of thing. Then it was sought to be produced nearer home, to heighten the landscape effects and add a new charm and dignity to the residence.

It is no exaggeration to say that there is hardly anything about the estate, whether it be large or small, which so completely marks the style of the master of the place as the treatment, appearance and adornment of the lawn. Not every owner is the master of his place, and the general surface, appearance and surroundings of the lawn indicate with unfailing accuracy the style and manner of the man who reigns over it.

The lawn is, and will always continue to be, the most attractive and fascinating feature in landscape gardening, and to harmonize its trim, clean, and velvety appearance with the more rugged and unbroken foliage of the evergreens which border it, is the most gratifying success of the gardener. To some people any bit of grass is a lawn, and one kind of grass looks as well as any other, only it would seem as if the coarser the grass and the rougher the surface the more natural it appears to them.

The principle which should guide in the treatment of the lawn is



very different from that which directs all other attempts to beautify and adorn the grounds, for this reason, that, when the ornamentation sought is by the introduction of trees, we select the most perfect types of their species, so that the copse or plantation will assume a truly natural appearance. A weeping tree seems to me to be as much out of place in a conspicuous position on a lawn as would a fir tree beside a fountain; but some people have a passion for weeping trees.

On the other hand, the lawn, in its perfection, is purely artificial in everything that marks its distinguishing characteristics. The surface must be made as smooth as it can possibly be made; this condition certainly is not natural in New England. The turf is cultivated simply as turf, and not for the natural functions of vegetation, to grow as grass and furnish forage; in the most brilliant rays of a midsummer sun it must not sear or blanch; it must be simply a velvety carpet of living green from early spring time until the coming of frost and snow. Besides, the designer must have the art to conceal its truly artificial character and make it appear that this elegant, emerald surface, which should be soft and delicate enough for a fairy dance, is the most natural thing to expect to find, set right in the midst of its fringing plantations of evergreens, and that the residence was only put where it is that the owner might take this bit of loveliness all in.

The first thing to do, after having determined to make a lawn, is to establish its size. There are lawns, and there are simple grass plots which their affectionate owners fondly dignify by that name.

Men strive to magnify the importance of everything nowadays. They buy a country house, with a couple of acres of land, and at once it becomes an "estate;" a young fellow obtains the employment which he has craved and diligently sought, he "accepts a situation." Singers no longer sing, they "render a selection;" they are no longer singers even, they are absorbed in that mystical word "talent." The musician once played upon his harp or piano or organ, he now "presides." Every little pond is a lake. Now when we attempt the decoration of nature we must leave false-heartedness and fustian alone.

A lawn must necessarily be of such a size that the proper treatment in harmonizing its surroundings will not dwarf its appearance and cause it to look like an oak-opening in the woods; but when, as is often the case, the lawn comprises hundreds of acres, and, with its plantations, assumes the character of a park, no specific rules

can be laid down, as each case would require special treatment; but one thing must be borne in mind, and that is, that the hand of art must be so carefully concealed that the most artificial embellishments will appear to be some of the beauties of nature.

I have in my mind a bit of grass land, which its owner thinks to be a charming lawn, of a couple of acres. Much pains are bestowed upon it; it is freely sprinkled with a hose during the hot dry weather; it is as flat as a pancake, and is bordered by rows of mingled evergreen and deciduous trees that stand out as stark and stiff as a line of marines at a ship's gangway. Unless the area of the lawn be adequate for proper treatment the term is simply a misnomer.

It must be of living green. This is attained only by the proper management of the moisture in the soil. Grass roots will penetrate to the plane of permanent moisture and no farther, and, provided that plane is at as great a depth as four feet below the surface, no drouth or sun can wither or sear the turf if all else is properly and well prepared.

The next thing to decide is what the slope and character of the surface is to be. Most lawns are surfaced to a true plane and generally have the appearance of sagging in the centre. This arises from an optical illusion, whereby perpendicular parallel lines appear curved toward each other, and a flat horizontal surface appears concave.

To correct or obviate this defect, which is really a blemish, the surface should be planned so as to give a gentle swell to the ground, which, by a careful study of the contours before starting, can be accomplished with very little difficulty. The change in the appearance of grounds, by attention to this little detail, is as great as the difference in the appearance of a man stooping or standing erect.

The next point to consider is the drainage. If the land is dry and gravelly its drainage will be natural enough without any artificial aids, but the difficulty of making a proper lawn is greatly increased thereby.

If the subsoil is of a gravelly clay or hard-pan, as much of our New England lands are, it will be found to be indispensable to drain with proper pipes laid four feet deep and thirty to forty feet apart, according to circumstances. This will dispose of the surplus water and suffer the grass roots to penetrate to such a depth, in search of moisture, that they will be sure of finding it at all times.

I shall assume that this part of the work is intelligently planned and executed faithfully and properly.

If the soil is rather light and underlaid by gravel, it will be difficult to make a lawn to stand protracted dry weather, but it can be greatly improved by spreading from two hundred to three hundred loads to the acre of any kind of clayey material, which, if left to the action of the frost during the winter, will become disintegrated and friable, and, in the spring, ploughing it in as deeply as can be done with the best plough and team attainable.

The selection of this material is important, for not all clay will answer, although most kinds will; but the test of its excellence is that the action of frost must thoroughly pulverize it to a complete powder. A perfect incorporation of such material with a dry, sandy or gravelly subsoil, works a wonderful change in its texture; it becomes more retentive of moisture, thus contributing to the object to which all our labor is directed, that of giving permanence to the verdancy of the lawn.

A good dressing of peaty muck will do much to give body to such a soil when treated as described. If the soil is light, you will acquire an addition of pure vegetable matter, which should be comparatively free from nitrogen, as this element would unduly stimulate its solution, and the consequent rapid growth of the grass; this is not desirable. All mud is not muck, as the word is used by agriculturists. Many men, failing to note the distinction, have spent their labor on worthless material, as the boy did who mistook the pignut for the walnut, and gathered his bag full. No man who ever tried pure vegetable muck from the swamp was ever disappointed, and, if he mixed with it a bushel of salt and a barrel of lime to three cords, he obtained as good a material as he could possibly put upon the land to promote the growth of blue grass and white clover. Perhaps the best way to do this is to make the salt into a brine, slack the lime with the brine and then incorporate the powdered hydrate of lime with the dried muck, which will be greatly improved if it has lain exposed to alternate freezing and thawing during the winter.

If the subsoil is a boulder clay or hard-pan, the easiest and cheapest method of loosening it up is by deep ploughing, running the plough three times in the same furrow if necessary, and by this means a depth of two feet or more can be reached, and the grass will be enabled to stand the drouth exceedingly well, more especially if the land be underdrained as recommended. After the

surface is well pulverized and harrowed, seed down with not less than three bushels of mixed blue grass and white clover to the acre, say two and one-half bushels of blue grass and the rest clover and fragrant vernal grass. Some persons would add timothy or red-top, or both; but there is no need of so doing, as those first mentioned are all the grasses which are necessary to cultivate, and the quicker you get them established the better.

When the very perfection of a turf is desired, and the cost is not restricted, establish the grades which you desire the surface to have if any change from the present condition is desirable, and then trench the soil from two and one-half to three feet in depth; the last will give the most perfect satisfaction, laying the drain tiles as the trenching proceeds. This will be done the more easily, as the trenches for the drains would have to be only one foot deep if the trenching is carried down three feet.

If this work is properly conducted, when it is finished, the lawn is all drained, surfaced and ready to be seeded down.

Some have recommended a hoed crop to be cultivated on the lawn for the first year, for the sake of the tilth. It is true that this might enrich the soil and give a stouter growth of grass; but it is verdure that is wanted and not hay; besides, the enrichment of the soil will prevent the very fineness of texture in the grass, which it is desirable to obtain, as the great beauty of the lawn when established; furthermore, one year is practically lost in the cultivation or cropping of the land.

Another suggestion which is offered, and often followed, is, to sow oats or other grain with the grass. This is probably thought to be best because it is often done where grass is to follow grain as a crop, and it is thought that the grass becomes better established; but no beneficial result was ever obtained by thus sowing a lawn. If grain is sown it will only occupy ground in which grass roots should be getting established, and where they must finally grow after the grain is gone; the continual cutting to which it will be subjected will prevent the grain from furnishing any protection to the grass, and it will only tiller out into broad spreading plants and rob the proper grasses of their food.

Sow nothing but just such seed as you desire to cultivate. If the soil is good average land, treated as described, no manure as fertilizer will be recommended; but let all the wood-ashes, leached or unleached, and all the old lime rubbish that can be obtained, be spread over the surface and carefully incorporated with the soil.

Endeavor to sow the seed just preceding a change of the weather which indicates rain. After sowing harrow in well and roll with a garden roller.

As soon as the grass is well started roll it one day and cut it with a lawn mower the next day; follow this up every ten days and, if the lawn can be finished during the month of May, by autumn you will have a good velvety turf, whereas, if mixed grass and grain were sown, the stouter and more robust grain would have so robbed and overshadowed the weaker grasses, that at the end of two years you would not be so well off as at the end of the first year by the above treatment. The better way is to plant just the grass you want and get it established as speedily as possible.

Thorough drainage and deeply stirring and pulverizing the soil are the two principal secrets in obtaining perfection in a lawn. Any one can cut grass when it grows, if it can only be made to grow.

It will be found economical to thus thoroughly prepare the soil for a lawn, if a perfect and unfading one is desired. Few persons stop to think of the constant expense that is entailed if constant watering with a hose is required in dry weather; and, besides, the grass will not be as vigorous as when by deep tillage the roots are enabled to draw their own nourishment in the natural way.

**BOUNDARIES.** — Most lawns bound on the highway, and too often are fenced on one side or more with the old boulder stone wall.

If the lawn is on a level with the top of the wall, thus hiding it from view, there is no comment to make; but if not, then the sooner the wall is put out of sight the better. Next to an iron fence about a cemetery lot, a stone wall around a lawn is the least attractive thing that can be imagined for such a purpose, and, if a fence must be maintained, let it be of wire, with light iron rod or gas-pipe standards. It looks rather more ample and generous to merge the surface of the lawn in the sidewalk, as if it were a part of the grounds themselves. The practice of discarding boundary walls and fences, between the highway and the lawn, is becoming more general, and has many pleasant features, with many drawbacks, which are largely the result of local peculiarities, prejudices, and misdemeanors.

It will be well to border the lawn with a plantation of trees. The manner of doing this is to be determined by the views to be obtained from the house, which control every other consideration; but if

views of distant scenery or of the water cannot be incorporated into the vistas of our lawn, then it is the better plan to make bordering plantations of evergreens, planting them with an irregular margin of smaller trees and shrubs, forming inviting nooks, which are delightful for their sunny warmth in the chilly days of spring and fall. If the trees are well grown, so that they throw out their branches close to the ground, the surface of the lawn will seem to merge in the foliage of the trees with a delightful illusion.

Some people have a great fancy to plant irregular beds of flowers in the lawn. This of course is a matter of taste purely, but it does seem to destroy the beauty of the lawn, which is in a swelling, unbroken carpet of green. The shade of the trees on the north side of the lawn, however, affords an excellent place to plant beds of roses where they can be protected from the unwonted brightness of the sun both in summer and winter.

Top-dress the lawn with well-rotted compost, wood-ashes, phosphates and ground plaster whenever the health and vigor of the grass may require, using your judgment in the matter of feeding the grass when it seems to need it, just as you would feed anything else. By continually rolling and cutting, a thick turf is assured and a permanent unfading lawn is yours.

There is a great difference in taste as to the introduction of statuary upon the lawn; in fact, tastes are often a matter of fashion or of cultivation any way, just as one learns the use of unnatural things or becomes addicted to any habit; so the taste may be educated, but, at the same time, not elevated or purified.

It may be a mark of a cultivated taste to grope around among the ruins of a heathen civilization and drag out of their mouldering heaps the lascivious and licentious statues of the days of their depravity and degradation; to go into ecstasies of delight over the exquisite modelling of their figures; to expend large sums in their purchase and in the erection of costly temples for their preservation; and to call this all a love of art, if it be, it is neither elevated, nor pure, and, after all is said and done, you have only a lot of rubbish which, if left exposed in the street, would render you liable to indictment and your collection to destruction as offensive to good morals.

The Greeks and Romans introduced statues into their gardens, and therefore some will always maintain that it is correct for us to do the same, making no account of the great difference and un-

suitableness of our climate for the introduction of statuary into ornamental gardens. If there is anything in the world that looks cold and stiff, it is a marble statue on a lawn, or a dog standing at an everlasting point at invisible game, or the effigy of an orator, mutely calling upon the Olympian Jove to strike down his uplifted arm, or apparently uttering words to that effect. Downing has quoted very aptly in this connection some appropriate lines from Pope in sarcastic allusion to the same freaks of fancy in his day:—

“ Statues growing that noble place in,  
 All heathen goddesses most rare,  
 Homer, Plutarch and Nebuchadnezzar,  
 Standing naked in the open air!”

Works of art are very difficult things to harmonize in ornamental grounds. A well-designed fountain is a pleasing feature in the centre of a lawn, that is, if it is a fountain designed for water and not to show the skill of the artist, the stone-cutter, or the iron-founder; or an abject thing in a drizzle, like that in the Public Garden.

It requires a great deal of skill to handle water properly in the form of fountains for purposes of decoration. The most famous jet in the world is the Emperor fountain, at Chatsworth, which plays one hundred and ninety-five feet in a solid stream. The volume of water required is so vast that it can be used only upon perfectly calm days, or the wind would blow the masses of spray over the surrounding lawn and do a great deal of damage; it gives one an idea of immense power but not of beauty. There are many forms in which a much less volume of water would produce finer effects for decoration. If excessive quantities of water fill us with a sense of force and power, so a diminutive or inadequate supply seems to me altogether trifling and puerile.

Choice vases, judiciously disposed about the grounds in chosen spots, are not only ornamental but useful, when filled with tender or trailing plants that cannot well be set out in the border, and aid to heighten the effect sought to be produced.

If you have a passion for rock-work, beware that you do not make an imitation of a rubbish heap. Use natural, moss-grown bowlders, in irregular masses, with ferns and trailing vines, and don't be too ambitious.

There is a benefit in cutting the lawn as often as possible before

anticipated rain. The removal of the foliage of all plants reduces their power to resist the heat of the sun or the dryness of the air, and if the cutting be followed by showers, or by a thorough irrigation, the turf will rally more quickly from the shock of the cutting.

The blue grass and white clover are, without doubt, the finest plants for lawns, from the beauty and thickness of the turf which they make, and their delicious fragrance when mown; they are both fond of calcareous soils, and the only way that fondness can be met in New England is by a free use of lime while making the lawn; two hundred bushels per acre would not be an excessive quantity for the soil when it is trenched or subsoiled. At least two bushels of plaster per acre should be used, with the annual top-dressing.

This liberal supply of the natural element in the food of these plants will insure their luxuriant growth. Cease cutting the lawn early in September, and let the grass form an adequate cover to protect the sod against any vicissitude of winter.

AVENUES AND PATHS. — These are located and constructed either for utility or ornament. When for use entirely they should be as direct as possible, without unnecessary windings or detours. When either is made as an adjunct to ornamental grounds, some people fall into the error, that, because a great artist once said that “the line of beauty is a curve,” consequently all things crooked must be pleasing and therefore ornamental; so they proceed to lay out their avenues upon this principle and introduce their curves with perfect abandon, the seeming excuse for a crook here being that there was a corresponding or a worse crook somewhere else.

At all points where avenues deviate from a direct line there should be close plantations or a clump of trees, so that it may appear to be the most natural thing in the world that the detour was necessary, even though when understood the matter appears to be no plainer than the reason for the pond upon the Public Garden, — not that the water was especially attractive or that the pond itself is either very beautiful or essential, but it made the building of a bridge necessary to cross it, and that is reason enough, for which we should always be sufficiently grateful.

The location of our walks and avenues thus subsides into a matter purely of taste, and there we all differ; but their construction is as purely a matter of fact, and in that all must agree, for facts are stubborn things.



Water is the bane of an avenue; as ordinarily constructed it saturates the earth of which the avenue is made, swells the clayey subsoil when frozen, and leaves it a perfect mortar-bed in a thaw; altogether the two principal things for a properly constructed avenue to resist are the wear of travel above and the flow of water beneath.

After the location of an avenue or path has been decided upon, the customary plan has been to dig up the turf and loam, filling the shallow trench thus formed with any clean material that may be convenient, without much attention being paid to its selection, but the surface is raked and rolled until it looks as fine as a daisy. This has been the case in most instances that have come under my observation.

The interesting experience with this sort of work comes in the spring-time, when the walk becomes a sort of a blind drain for all of the moisture of the surrounding soil to run into, and is little better than a puddle. The clayey subsoil, which is our commonest sort, absorbs water like a sponge and swells surprisingly; when frozen it is all ridges and ruts, but when the frost leaves it, — either occasionally during the winter or finally in the spring, — it gives us more discomfort to the square yard than can be endured with equanimity.

After enduring in impatience, and trying the various remedies suggested by drain diggers and contractors, the difficulty is generally got over by laying a plank walk, or the use of a composition of gravel and mineral pitch or asphaltum.

Now, one-half of the labor and expense required to lay a plank or composition walk would construct one of equal width that would be smooth, hard and dry at all times and seasons. If a simple path is all that is required, three feet may be adequate; but a walk should be of ample width for two persons to walk abreast, which calls for not less than five feet in width.

In making simple paths or walks, of three to five feet in width, cut a clean trench twelve to fifteen inches in depth, according to the nature of the ground; then lay an inch drain tile in the middle of the cut, care being taken to avoid sags in the grade, either of the walk or the drain, but, when unavoidable, be sure to have a sufficient outlet at the lowest point. Obtain good, coarse, gravel, and screen it twice, using the coarsest for the bottom, the second next, and the reserve finest for the top layer. Upon the second layer put a thin covering of binding gravel, so called, about an

inch or two in thickness ; this kind of material is simply a glacial drift, composed of mingled clay and sharp, angular, unwashed gravel ; it packs firmly together and makes a covering perfectly impervious to water ; upon this put the final coating of fine gravel, and roll carefully and well.

A walk so made can be done for less than any plank or composition walk of equal width ; it will not decay in a few years, like wood, or smell of the gas-house like the composition, but in all seasons and all weathers it will be a sound, dry, beautiful walk.

If anything, the color of our gray gravels will be found more agreeable to the eye and the absence of heat will be more especially discernible to the foot than with the composition walks which are laid in such quantities in all of our suburban towns.

For an avenue which is expected to endure the wear of vehicles the preparation should be somewhat deeper and more thorough, although the mode of construction is substantially the same.

The excavation should not be less than eighteen inches deep ; some recommend surfacing the bottom so as to leave it crowning, with the highest point in the middle. I have tried this method with good results, but the plan which was successful under the worst circumstances is to make the excavation the lowest in the middle, and lay a drain tile along the centre, increasing the diameter of the pipe, as we proceed in distance, from the very highest part of the walk or avenue.

The first nine inches of this excavation make a nice place to deposit the old walls and rough stone to be found everywhere in Massachusetts.

If the stones in the wall are too large don't waste labor in trying to break them up ; almost any contractor will take them away and return you an equal or greater bulk of chip stone ballasting from the quarry in their stead. Do not let a laborer of a truly scientific turn of mind spend his lifetime in trying to solve the Chinese puzzle of fitting these stones together into a sort of mosaic pavement ; it will be useless, if he lives to succeed, and the excessive cost will make it anything to you but a joy forever ; the perpetual puttering that is spent upon this kind of work, at this stage, is what occasions the enormous cost which deters so many from trying to have a truly fine avenue.

Let the stones remain where they are dumped, and take pains to see that they are dumped carefully, and so disposed afterwards as to present a tolerably fair surface and no more. Over this foun-

dation lay screened gravel, exactly as directed for walks, and the avenue is completed, only you may need a heavier roller.

In selecting gravel avoid all that has a washed or rolled and pebbly appearance; such gravel will never become compacted and afford a smooth, hard surface, but will be always loose and mealy.

Gutters not only give the avenue a nice and proper finish but prevent the continual wash which ultimately renders the margins of the avenue unsightly, without continued repairs, the necessity for which should be avoided.

It will be found desirable to introduce catch-basins at intervals, particularly at any change of grade, to allow the surface water to pass off by an underground drain, which, in some cases, should have a connection with the drain beneath the centre of the avenue. This is a detail to be specially studied and will vary with circumstances.

The surface of all avenues should be crowned slightly, and only sufficiently to cause the water to flow away easily without washing in a violent shower.

The construction of first-class avenues and walks will thus be seen to be a very simple matter, dependent entirely for its success upon the supervision that is given to the work, and in no way commensurate with the price you pay for it. Carelessness at a critical point may render the whole useless and the expenditure thrown away.

Many persons are continually disturbed by the growth of grass in their walks and avenues. If the material has been well selected it will not afford much encouragement for grass, and nothing should be put into such work that will afford a support for any form of vegetation, but a great deal of loamy subsoil is used for the surfacing of walks because it will roll so nicely and compactly, but this material is soon prepared by the action of the elements to support a luxuriant growth of grass. If much of this material has been used it will be continually muddy in wet weather, and the cheapest way will be to strip it off and put on selected gravel properly. Should the trouble be not great the grass can be subdued, and no harm done, by a light sprinkling of fine salt, or with salt-water, once in a while, which will prove to be a sovereign remedy. By attention to these suggestions, perfectly dry, clean and satisfactory walks and avenues may be secured at a minimum cost.

For farm roads and highways, the same principles which I have

indicated must be observed, except that the degree of elaboration, in each instance, will be controlled by the amount of travel to be provided for and the kind of material convenient for use ; but, in all cases, you must guard against water above and beneath. The stones which are so carefully excluded from the road and piled against the wall should make the foundation of the road-bed, and, if it is properly prepared, it will last for a generation.

No plough should ever be put on the highway, and the fine sand or loamy material which has collected in the ditches beside the road should never be put upon its surface. It is rare in New England that the line of a road upon the high ground does not run in close proximity to the best material for road construction.

In wet ground the labor of building the road is increased ; but it must commence with the exclusion of all vegetable material and the water ; without this all attempts to construct a proper way for teams will be in vain. Through swamps no rules can be laid down beforehand, and gumption is the highest requisite for success ; but the thorough drainage of the ground is still the principal thing to be done. If water is entirely excluded and the most substantial material obtainable is used for the surfacing, there need be no trouble or complaint about a road anywhere, and it can be depended upon that undue economy, in the first instance, in preparing the foundation of the roads, is the dearest policy in the long run ; it only entails continued expense for repairs and restricts the amount of draught of the teams hauling over it. It should be continually borne in mind that, other things being equal, that road is the cheapest upon which a team can draw the heaviest load, and that the limit to the burden is the weight which the team can haul through the softest spot or up the steepest grade. If these things are constantly kept in mind, by those having the charge of town-ways, a great improvement would be speedily noticeable in very many places. I have made no mention of grades, as it is presumed that any one would easily perceive, from every-day experience, that steep grades are detrimental and by all means to be avoided. It was long since demonstrated that it is easier to go around a hill than over it. But I am sure that if the labor necessary to overcome the physical difficulties in road construction be guided by the principles which I have indicated, there will be no trouble in building, using, and maintaining highways.

## DISCUSSION.

Charles M. Hovey was called on, and said that Col. Wilson's paper was so exhaustive that it could not be further elaborated or added to so as to be of benefit. He agreed with the essayist in regard to the use of vases, statuary, and rock-work, and said that we owe him our thanks for the views expressed on these points. Great care should be exercised, in the use of statues especially, not to undertake too much. A little plot of not more than two hundred feet square, by a cottage, denominated a lawn, with a pile of rocks, having a pipe at the top, with a little drizzle of water, shows a demoralized and not a cultivated taste. Drooping trees are often planted in the centre of a lawn; but nothing can be more out of place: they should be around the edge. Curved lines are very beautiful; but walks should be straight, and not curved, when there is no reason for departing from straight lines. Asphalt walks are reminiscences of gas-houses. Trees on lawns should be so planted as to be deemed an improvement and heightening of the natural beauty of the scene, and at the same time to conceal the hand of art. The terms "picturesque" and "gardenesque" have been used to denote two differing styles of planting, the picturesque being crooked and irregular; but it is impossible to define such points exactly. Loudon used the term gardenesque to denote a beautiful rather than a picturesque style. Another authority says that any scene that will make a picture is picturesque.

In regard to seeding, Mr. Hovey differed somewhat from the essayist. He would not use so much white clover, — perhaps not any, but would use Rhode Island bent grass in preference, or would make the greater part of that grass, with a little blue grass. Do not plant any grain with the grass, for the gain is not half so much as the loss. Some would scarcely water a lawn at all, while others would set the hose, and let it run; the latter looks best for a time, but so much water keeps the grass growing too late in the fall, and soon dead patches begin to appear. He had known lawns greatly injured by too much manuring. A lawn well made in the first place does not need more than ordinary care.

Col. Wilson said that his purpose was to describe a lawn that would need no watering and no care. He has a croquet ground prepared in this way; it is purely artificial, and has had no watering or top-dressing for ten years, and stands wear and drought.

J. M. McCullough said that the Kentucky blue grass is *Poa*

*pratensis*. He recommended the meadow fescue (*Festuca pratensis*) and sweet vernal grass (*Anthoxanthum odoratum*) with red clover; the last not so much for the eye as for the support of life: it will fertilize the ground and purify the air.

Col. Wilson said that thirty-four years ago A. J. Downing recommended the same kinds and quantities of seeds that he had advised for a lawn, and he had always used the mixture and found it good.

Rev. A. B. Muzzey, said that he never heard such a paper as Col. Wilson's read without reproaching himself for not coming oftener to these meetings. He spoke of the danger of departing from nature and introducing artificial things, as at the gardens of Versailles and St. Cloud, where no tree is allowed to grow in a natural way, and which had little charm for him. He was pleased with the paper for the simplicity with which it followed the order of nature, and he asked why we should import ornaments for our gardens from Greece or Rome. The Massachusetts Horticultural Society has done, and is destined to do, a great deal in keeping things in conformity with republican principles, and in preventing people from copying miserable fashions from France, as many have been copied, and some persons think must be, because it has always been so. Do not plant according to what somebody else does, but go out on the hills and fields and observe the order of nature.

Hon. Marshall P. Wilder said that he was pleased and surprised at the excellent and elaborate paper that had been read. His own experience confirmed what had been said by the essayist and by Mr. Hovey. In making a lawn we should begin with proper drainage and thorough preparation of the soil, and should sow plenty of seed of the right kind. He did not like prepared mixtures, but thought they had worked great mischief, and had abandoned all but Rhode Island bent grass and white clover. He was pleased to hear what was said in regard to statues and other improper ornamentations, which are always distasteful to a correct eye, but was a little surprised at the objection to a vase or plot of flowers in the centre of a lawn, and was glad to be instructed. He had a flower bed in the centre of his lawn, but should remove it, recognizing the objection as a just one.

John B. Moore said that he was pleased with Col. Wilson's paper, but not surprised. He liked what was said in regard to statuary; he objected to the statues of heathen gods and goddesses,

and particularly when they have no clothes on. He has a piece of grass which he cuts frequently and keeps to look at, and had tried two mixtures, which were not half as good as blue grass and clover with Rhode Island bent grass. As to the treatment of lawns, in November out goes from the city load after load of coarse manure, which is spread on lawns, and looks and smells badly, and is detrimental to the grass, bringing in weeds and inducing coarseness. It is much better to wait until spring, and then give a dressing of wood ashes.

Mr. Wilder approved the warning given by the last speaker against dressing lawns with stable manure. It had cost him hundreds of dollars to extirpate the weeds brought into his lawn in that way. He advised the use of chemical fertilizers on lawns.

Benjamin P. Ware said that, in regard to the building of roads, he would emphasize the very judicious recommendations of the essayist concerning drainage. This should be from the higher to the lower portions of the highway, and could be effected at little expense in building. It might also be done to old roads and be of lasting benefit.

Leander Wetherell said that he was a strong advocate for blue grass (*Poa pratensis*), known also as spear or June grass. No other species makes so fine herbage as Kentucky blue grass, and it is superior to all others for lawns. It seeds in June, and after that furnishes a green and most luxuriant growth of spear grass. Brutus Clay told him he had plucked a spear three feet in length. It does not seed the second time in the same season, as timothy does. He would on no account use clover of any species for lawns, but would not object to a little Rhode Island bent grass. He believed in thorough under draining for walks and avenues; when well drained, a walk will remain in good condition. Compared with this method of building roads the common method is costly and extravagant. Drainage is especially necessary where a road is wet and inclined to be muddy.

President Hayes said that when he began to make his lawn the ground was full of large bowlders, and there was an apple orchard in the front part, with hillocks around the trees. He dug up the apple trees and hundreds of tons of stone, and afterwards added a wood with pitch pine stumps. He ploughed and manured the ground, and procured grass seed of Messrs. Hovey, which did very well. He afterwards covered the lawn with wood ashes, which produced an abundant growth of white clover. The

lawn is in two plateaus, and he had carted in thousands of loads of loam to make the upper plateau. He does not water much, as it does not compensate for the trouble, but cuts the grass weekly, and rolls it often, but does not approve of very close cutting. Col. Wilson's essay is practical and sensible, and commends itself to every person's judgment.

Mr. Wilder advised not to shear a lawn after frost comes, but to let the grass remain and form a covering for the winter.

Mr. Hovey advised to cease watering after the first of September.

John Fillebrown said that a gentleman in Medford had a piece of ground where the worms ate off the grass, and he put on salt at the rate of forty bushels to the acre, which caused the grass to grow so vigorously that it looked more like rye, and, though it was on a very light knoll, he had a fine crop of hay. No manure was used besides the salt, and the worms had not been heard from since.

Mr. Hovey said that, as a rule, salt should be handled with the greatest care; he had many times been the victim of its use. He once had an azalea which had wilted, and by mistake he gave it water which had salt in it, and, though he washed it out, the plant died. In 1833 his father's grounds were overflowed by salt-water three inches in depth, and, though it remained but a short time, thousands of plants were injured, and after every rain the ground was white.

Mr. Wilder said that, under certain circumstances, salt in minute quantities may be beneficial to plants, but he had had four fine pear trees near an asparagus bed killed by salt applied to the asparagus, and we must be very careful in its use.

Col. Wilson said that, chemically, salt is a chloride of sodium, and the soil will scarcely absorb it beneficially. Chlorine, even in limited quantities, is deadly to animal and vegetable life. The only benefit of the soda is to convert nitrogen into its various forms by the various chemical reactions in the soil. Soda applied to grasses where there is organic matter in the soil is thus of great benefit. To kill worms in the soil either nitrate of soda or muriate of potash, largely diluted, may be used with great advantage.

Mr. Moore said that twenty-five or thirty years ago he used fifteen hundred bushels of salt in one year and did not want to use it again. It is not a manure in any sense of the word, and, besides killing worms, is beneficial only by attracting moisture. It is worse than



useless on asparagus, and Joseph H. Fenno had pear trees killed by the tide flowing in on them. Salt must be used very carefully, if used at all.

Notice was given that on the next Saturday the subject for discussion would be "Peaches and Plums; their Cultivation and Varieties, and the Treatment of their Diseases," to be opened by John B. Moore.

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### BUSINESS MEETING.

SATURDAY, February 9, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

The President, as Chairman of the Executive Committee, to which was referred a letter from Peter Henderson, proposing to give certain prizes, to be awarded by the Society, reported that it was not deemed advisable by the Committee to accept the proposition made by Mr. Henderson, it not having been the general policy of the Society to offer such prizes. The report was accepted.

The Annual Report of the Treasurer was read by the Secretary, accepted, and ordered to be placed on file.

The Secretary read a letter from Arnold A. Rand, expressing his appreciation of and thanks for the resolutions passed by the Society in memory of his father, Edward S. Rand.

Adjourned to Saturday, February 16.

### MEETING FOR DISCUSSION.

PEACHES AND PLUMS; THEIR CULTIVATION AND VARIETIES AND  
THE TREATMENT OF THEIR DISEASES.

John B. Moore had been appointed to lead the discussion, and said that the peach was introduced from Persia, which corresponds in latitude to the Southern States of the Union, and thus, being a native of a warmer climate than ours, is hardly at home in the climate of New England, unless by a long course of acclimation it has become suited to the conditions in which it is here placed. It

is one of the finest fruits, and we all desire to grow it, and the question is how we shall do it. The first thing to do is to select a suitable location, and the best will be found on high ground, at least partially protected from cold winds, and with a warm, rather light soil, where the wood will finish its growth and ripen early. Ripe wood implies well matured fruit buds. But even in the best location, no grower expects a crop more than two or three times in five years in orchard culture. With moderate growth the tree will be more permanent and better able to withstand the winters than with a too vigorous growth. The speaker had seen quite a number of times, on a hill slope, the line of winter killing of fruit buds so plainly marked that twenty feet below a certain line the buds were all killed, and twenty feet above they were all good, showing the benefit of high ground.

A proper site being selected, the next point is the preparation of the soil. If the land is in condition to produce thirty or forty bushels of corn to the acre it is rich enough. If it is rich enough for pear trees it will be too rich for peaches. He would apply no stable manure except when a crop of fruit is set; then manure may be applied with impunity to carry it out. Trees of one year's growth from the bud are the best to plant. Natural trees are not more hardy than budded. The best trees are those grown four or five feet high the first year, with sufficient distance between them, giving plenty of room and air, so that they will be well branched and stocky. When planted every side limb should be cut off; they will die if they are not cut off. They should be planted as carefully as any other tree, from sixteen to eighteen feet apart. It has been the custom to plant closer; but then there is no room to cultivate with a horse, and it is inconvenient getting out the fruit. The dense shade spoils or deteriorates the fruit on the lower part of the tree, and no good fruit is produced except at the tops of the trees. Plenty of sun and air give better colored and flavored fruit, and one bushel of good fruit is worth two of poor. The fruit is more easily handled, and there is no excuse for crowding where land is as cheap as it is here. Mr. Moore said he liked to see a peach tree in good shape; he does not believe in allowing them to branch down to the ground. They will split down just as easily as if branched higher, and, after trimming off all the side branches at the time of planting, so that only a bare rod is left, he heads down to a uniform height of four feet by measure, which is easier than to do it by guess. The vigorous shoots will

come from the upper part, and will often make a growth of two feet in length the first year. The weak shoots starting less than eight inches below the top should be cut off during the summer, but only gradually, for the tree must have leaves to enable it to make roots. The land must not be allowed to run to weeds or grass, but should be cultivated in some hoed crop that will not exhaust the soil. Do not crowd a potato hill or anything else too close to the young trees, but be satisfied if the crop pays the expense of cultivation and keeps the soil mellow and in good condition to absorb the rain.

The next spring after planting, cut out all the branches but four or five of the best, and, in pruning to give shape, shorten these about two-thirds, always cutting to an outside bud, which will make a lower and more spreading tree. Never shorten the small branches, but only the leading ones. A year afterwards pursue the same course. This will make the trunk larger, and the limbs larger where they join it than they would otherwise be; and, the limbs being shorter, the weight of the fruit will exert less leverage, and they will hang nearly to the ground without needing a prop, which is liable to work out, to keep them from breaking.

The fruit must be thinned when the crop is set. The speaker never saw a workman with sufficient courage to thin peaches sufficiently. He has showed his men just what to do, but they fail to do it. A good rule is to pick off as many as you think ought to be thinned out, and then to take off half the remainder, and never leave two together. The proper time to thin is when the fruit is stoning, and is about as large as a walnut. It must be done before the stone is hardened. The exhaustion of the tree is from the formation of seed, not of pulp, and consequently a small fruit will exhaust it as much as a large one. It is a good deal of work to thin the fruit properly, but you will get as many bushels; and one bushel of fruit thinned is worth three not thinned; and, if the trees are pruned as directed, half the work can be done while standing on the ground.

Stable manure should not be used; bone and wood ashes are undoubtedly the best fertilizers. The experiments of Professors Goessmann and Penhallow are of considerable importance, apparently showing that trees once diseased with the yellows have been restored to health by the application of muriate of potash; but the speaker had not succeeded in doing this.

Muriate of potash is undoubtedly valuable as a fertilizer, and he

would use it on a young orchard. The yellows is the worst drawback on the cultivation of the peach. The peach borer which works just under the bark, can be kept down without much trouble by cutting out, or by putting a little mound of lime or ashes around the trunk of the tree. Nursery stock is often infested with borers, and in buying trees it would be well to reject such. No other insect troubles the peach.

In regard to varieties there is nothing new that is particularly desirable. For market there is nothing better than Crawford's Early. The Foster is a seedling from it, perhaps a little rounder and higher colored. Crawford's Late is sometimes touched by the frost before it ripens. The Oldmixon Freestone is a strong grower and productive, but in quality is not quite as good as Crawford's Early (though on this point tastes may differ), and does not sell as well. Mr. Moore advised to plant for market mainly Crawford's Early with a few Crawford's Late.

In the cultivation of plums the worst difficulties are the curculio and the black knot. Some years ago the latter destroyed most of the plum trees in this State, but of late the speaker had found no difficulty in keeping ahead of it; indeed on his trees it had grown less every year. Professor Farlow says it is caused by a fungus, and that one reason why cutting it off did not check it is that the pieces cut off were dropped on the ground, and the vitality of the spores was not destroyed by the winter. They should be picked up and burnt immediately. The curculio has not troubled the speaker because his trees, of which there are about twenty-five, are planted in a hen-yard, where the insects become food for the hens. They thin out the fruit a little, but not enough to injure the crop. These trees have been planted five or six years, and some of them have borne more than a bushel of fruit each.

The best soil for plums is a strong loam; the curculio is not so troublesome there as in lighter soils. Plum trees thrive particularly well in the vicinity of Ipswich, and seem almost as hardy as apple trees. Many varieties have a tendency to make long, sappy shoots, which should be shortened so as to cause the tree to spread laterally instead of running up. The small branches should not be pruned off, as the fruit buds are formed on them. An excessive crop must be thinned. The present generation hardly knows what a good plum is, and only wants plums to can or preserve. Those who remember when the finest plums were produced in abundance are few in number, and it takes a good while to educate the public taste.

The Bavay's Green Gage is fine for table or market ; it ripens very late. The Bradshaw is large and showy, but not of the highest quality. Coe's Golden Drop is productive, and one of the very best ; it is very late and hangs on well. The Green Gage is of the highest quality. The Imperial Gage is almost as good in quality and a better grower. The Jefferson and Lawrence are among the best. Pond's Seedling is of splendid appearance, but the quality is not very good. Prince's Yellow Gage is of the best quality. Smith's Orleans and Washington are large and fine, but the latter is inclined to rot. The market is not discriminating as to quality, large, showy varieties selling best, nearly all those purchased being used for preserves. As market fruits, and for canning, the Lombard and Damsons will bring as much money as any.

E. W. Wood was next called on, and said that the two fruits under discussion, when well grown, afford as much satisfaction as any ; but some years ago they became more difficult to grow than they had been before, and people were discouraged, and the trees, especially the plum, became almost extinct. The Green Gage is the standard of quality in plums, but the tree is a poor grower. Most people buy fruit by the eye, and the Green Gage does not show like the Bradshaw.

The great obstacle to the cultivation of peachès here is the yellows. It cannot be that the soil is worn out, for there is plenty of new land. The speaker went to Worcester when a boy, and in D. Waldo Lincoln's nursery, on a sidehill, saw a line on the lower side of which there was no fruit, while those above the line had a full crop. It must be remembered that we are not in the most favorable location for the culture of this most delicious fruit. If Dr. Goessmann's experiments are successful it will be one of the best results of the Agricultural College. The Hale Brothers, of South Glastonbury, Conn., thought, from an experience of several years, that if sufficient lime was used around peach trees it would prevent the yellows ; but Dr. Goessmann found more lime around diseased trees than elsewhere. Others have thought they had found a panacea for the disease, and then their trees have been overcome by it. A peach orchard was entered for the prize offered by this Society, which the owner thought perfectly healthy, though there was yellows in an old nursery not fifty rods away ; but before the crop was gathered the yellows appeared, and the orchard is now virtually destroyed. The disease was in the trees in the nursery, and probably in the seed planted, and the question is, where a

more healthy stock can be found. The stones should be carefully selected from the healthiest trees, and not picked up indiscriminately in the market and elsewhere. Budded trees have died in three or four years, while natural trees of late varieties known as "frost peaches," have remained healthy in fruit and foliage for twenty years.

Charles M. Hovey said that his experience in the cultivation of the peach and plum was confined to a limited number of trees. His views in relation to the yellows and black knot were at variance with those generally entertained, and he had not heard of any experiments to convince him of their incorrectness. He agreed with Mr. Moore in regard to the cultivation of peaches, but does not like low limbs on any kind of tree. On high land, with a dry bottom, the wood will mature and the trees will go through the winter more safely than on low, moist land. Mr. Moore is correct in regard to the use of stable manure for peach trees, but it will do no harm if too much is not used. The peach bears only on the young wood, and must be pruned back. A peach tree in his father's garden, planted in 1815 or 1816, was twenty feet high in 1830, and free from the yellows. In New Jersey and Delaware the cultivators of peaches do not pretend to grow trees over five or six years, and, under these circumstances, it is useless to spend a great deal of time in pruning. He advised to plant frequently, so as to keep up a succession of trees. The yellows does not appear until the trees have borne two or three heavy crops of fruit. In houses trees fifteen or twenty years old never have the yellows, which would appear as if the disease was caused by climatic influences. As far south as Georgia there are occasional cold winters when Tea roses and raspberries get injured from the effects of the cold, and produce few flowers or fruits. The speaker did not think the yellows a contagious disease. It might be that peach trees injured by the winter, if cut down and fertilized with potash, would recover. The peach is undoubtedly one of the most valuable fruits. Many years ago, the speaker had a collection of seventy varieties, planted six feet apart in one row, for the purpose of testing them. Many proved synonymous with others. All grew and bore so abundantly that the ground was covered with the fruit, and he picked six or seven bushels, but got only a dollar per bushel. At about the same time he planted thirty rows of peach pits, which were budded, and, after the salable trees were taken out, some of the crooked trees and seedlings produced delicious fruit, among

the latter being the White Ball and Cambridge Belle. Scarcely any of them died of yellows.

Mr. Hovey's father had twenty plum trees in his garden, some of which bore as much as five bushels each. The last time they bore such a crop was in 1827 or 1828; then the fruit began to drop, and afterwards the black knot came, and increased so as to destroy the trees about 1835 or 1836. Later the speaker planted fifty specimen trees of as many varieties, which, after bearing one or two crops, became completely covered with black knots, which soon destroyed them, and he had no plum trees left except nursery trees. This disease is unknown in England, and both it and the curculio are rarely seen under glass. In regard to varieties the speaker agreed very nearly with Mr. Moore, but added the McLaughlin as one of the finest varieties. The Lombard takes the eye, and is one of the most profitable kinds.

Joseph Clark had been successful in the cultivation of plums, keeping away the curculio by the use of thin whitewash, the lime being slacked twenty-four hours before using, and applied with a garden engine or hand syringe twice a week, from the 1st to the 20th of June. After that time the insects will not cause the fruit to drop, and the punctures will heal. The insects will not come near the whitewash, and it will all disappear before the fruit is ripe. Jarring down the curculio is successful only when done early in the morning. The black wart was the greatest difficulty he had to contend with; he cut them off, and put them on the brush-heap, where they were burned with other refuse, but they destroyed his trees in nine or ten years, and he advised to plant a succession of trees, — a few every six or seven years. He thought the Imperial Gage the finest kind. The General Hand is very productive, but only of second quality. The Bavay's Green Gage is a larger fruit and more productive than the old Green Gage.

George Hill thought that the ground had been thoroughly covered in discussing peach culture, except in regard to the yellows, and there all theories had failed. The only way to avoid this disease is to plant often, in the hope that some trees will escape. If the trees treated by Professor Goessmann really had the yellows the muriate of potash must be a remedy. The speaker knew no peach trees ten years old except isolated ones.

Hon. Marshall P. Wilder was called on, and said the subject had been so well treated that there was very little for him to add. The object of these meetings is to collect information which is

absolutely correct, and he believed that they had to a great degree effected this object. When he plants peach trees he heads them down to two feet instead of four, as practised by Mr. Moore. They will then make a tree five feet high in one year in a fair soil. There is a great gain — at least a month — by the introduction, within a few years, of many very early new varieties, of most excellent quality, some of which are sent to our market from Georgia as early as the first of June. The speaker had great faith in Professor Goessmann's experiments with muriate of potash; but, when trees can be raised so quickly and easily, he would take out diseased ones and plant anew.

Some locations are very favorable to the plum. Samuel Pond and Henry Vandine were very successful in their culture in Cambridgeport. If planted on a large scale jarring the trees is the best method of destroying the curculio, and is a certain prevention. Ellwanger & Barry, of Rochester, N.Y., have a plum orchard of an acre or more, and from the time of blooming until the 20th of June it is the whole business of one man to attend to them, jarring — not shaking — down the curculios on a sheet, from which they are gathered up and destroyed. If planted in the hen-yard there will be no trouble from curculios. He believed the black knot to be caused by a fungus, and advised to begin when the trees are young, and cut it out before the spores mature.

Benjamin G. Smith had kept away the curculio with whale-oil soap, one pound to five gallons of water, applied every other day with a garden engine. It seems to be offensive to the insects and makes the foliage brighter.

Notice was given that on the next Saturday, Col. Henry W. Wilson would read a paper on "The Practice and Value of Irrigation to our Farmers and Horticulturists."



## BUSINESS MEETING.

SATURDAY, February 16, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting, it adjourned to Saturday, February 23.

## MEETING FOR DISCUSSION.

THE PRACTICE AND VALUE OF IRRIGATION TO OUR FARMERS AND  
HORTICULTURISTS.

By COL. HENRY W. WILSON, Boston.

Few cultivators have experienced the effects of a protracted drouth without feeling that it must be a very pleasant thing to have a sufficient supply of water at command, with which to revive the withered grass and corn or to restore the shrivelling vegetables and small fruits.

If they ever applied their thoughts to the problem how this might be accomplished, the exigency would probably have passed before they realized a clear conception of a beneficial scheme, and, during a succession of favorable seasons, the desire would either fade away entirely, or be postponed until a more convenient season, as is too often the case with matters that require sustained effort, by the average New England farmer.

The purpose of this paper is to show that the science and practice of irrigation have been appreciated in all ages of the world, in countries having every variety of climate, and among peoples of every degree of civilization; while in the execution of the various works rendered necessary for the development of some of the vast projects whose remains are strewn up and down over the surface of the earth, an amount of wealth, skill and labor has been expended which startles the beholder and fills him with amazement.

An attempt will also be made to show, by a brief statement of what cultivators are now doing in this as well as other countries, that an adequate supply of water is at the command of most cultivators, at so little expense for original outlay and maintenance as to be within the means of any resolute or thrifty man, and to

be easily reimbursed by the preservation of a single crop from the effects of a severe drouth.

The practice of irrigation is but little understood except by those who are obliged, by the necessities of the seasons, to follow it continuously from year to year, as the condition of success with any and all of their crops.

It is to be hoped that the time is not far distant when all our farmers and horticulturists will learn that, where favorable conditions exist, the cheapest and wisest thing they can do is to make all necessary arrangements for complete irrigation, as a safe resource in those years when the meteorological conditions of the seasons are disturbed by an irregular distribution of the annual supply of moisture.

Irrigation is an old art, which experience quickly taught the ancient world to be a thing not merely of utility but of prime necessity. Probably the first engineering works executed by man were in connection with some scheme for irrigation.

The first definite record which we have of any such project is that of the construction of the pools of Bethlehem, at Etam, by Solomon, even now called by the natives the Pools of Solomon. The aqueduct which was subsequently rebuilt by Herod, leads the waters of these fountains through a ten-inch earthen pipe to the gardens on the eastern slope of Mount Zion to this day.

These reservoirs are three in number, built of substantial masonry and lined with cement; they are constructed in a narrow valley, one a little higher up than another, and contain respectively 38,000,000 gallons, 24,000,000 gallons, and 16,000,000 gallons, thus having an aggregate capacity of 78,000,000 gallons, or somewhat less than three-fourths of the capacity of the Brookline reservoir of the Boston water works.

The perfect and solid construction of these basins, the use of hollow stone pipes, some of which have been exhumed in recent years, and the thorough understanding of relative levels, as well as a multitude of engineering devices, all indicate that the workmen who planned and executed these works, which, for that time, were of considerable magnitude and are of respectable size, even when compared with similar modern works, must have had a most excellent knowledge of the principles of hydraulic science, to which not many additions have been made by engineers in later days.

That they were intended as works purely for irrigation, we have

Solomon's own language, in his glowing description of the great works which distinguished his reign: "I made me great works; I builded me houses; I planted me vineyards; I made me gardens and orchards, and I planted trees in them of all kind of fruits; I made me pools of water, to water therewith the wood that bringeth forth trees." — *Eccl. 2: 4-6*.

Besides, we remark that the level of the aqueduct was too low to afford a supply for domestic purposes; this was provided by the pools of Gihon, on the west side of Jerusalem.

All through Mesopotamia, and particularly in the country about the sites of ancient Assyria, Nineveh and Babylon, the land is intersected by the extensive remains of irrigating canals and works which were built, in the days of their glory and prosperity, to distribute the waters of the Tigris and Euphrates among the gardens and plantations of those opulent cities, and were doubtless a great part of as well as the source of their wealth; some of the embankments of these old canals are hundreds of miles in length.

These were all grand public works. Private methods of irrigation were upon a more modest scale, often supplementary to these, and may now be seen in active operation in Egypt as well as Palestine.

In some cases the source of supply is an ordinary well, sunk with much labor, in the hard limestone rock; in others, a small stream, or it may be the branch of a large canal. Often the means used for elevation is the simple balanced sweep, so well known through New England a generation or two ago, and which is probably the most ancient of all contrivances for elevating water; combinations on this principle are still in use upon the Nile.

Egyptian paintings and sculptures represent men carrying water in buckets or skins, strung at each end of a pole borne upon the shoulder, precisely in the same manner as the Chinese carry burdens to-day, and as men can be seen carrying water to water the soil in Egypt.

Large and ill-constructed wheels seventy and even ninety feet in diameter, driven by mules or oxen, labor day and night, saddening the air with their laborious groanings as they strain and creak with their burden; over these wheels are passed two lines of ropes, made of withes twisted together, upon which are secured either wooden buckets or earthen jars, as the wealth or poverty of the husbandman compelled him to construct his machine; the buckets or jars passing up full from the fountain are discharged at the top

and descend empty, as in the ordinary chain-and-bucket pump. These contrivances are of comparatively modern invention.

The Chinese have a method of constructing a pump which is ancient with them, but is exceedingly simple, and not susceptible of much improvement in certain cases.

It is to pass a long, continuous canvas belt over a driving wheel; on the outside of the belt are fastened wooden blocks, at intervals, which, by the motion of the wheel, are drawn up through an inclined trough, the lower end of which is placed in the water and the upper end at the point of discharge. As the wheel revolves it draws the belt, and the water is carried up in the trough by the blocks. When properly constructed this is a very efficient pumping machine, and is much used in river work by the engineers and miners of the Pacific coast, being called, from its origin, the China pump.

The water, having been elevated, was at the command of the husbandman and diverted at his pleasure. To this, allusion is made in Prov. 21 : 1 — “The king’s heart is in the hand of the Lord, as the rivers of water; he turneth it whithersoever he will.”

There is another significant allusion to the method of irrigation in Deut. 11 : 10 — “The land, whither thou goest in to possess it, is not as the land of Egypt, from whence ye came out, where thou sowedst thy seed, and wateredst it with thy foot, as a garden of herbs.” This is thought by some commentators to refer to a very general practice in use among Oriental nations of driving those elevating wheels by men, as in a treadmill; but it is by no means certain that such machines were in use in the time of Moses, and the probability is that it refers to the practice of the cultivator in distributing the water upon the land by opening and closing the smaller water-passages with the foot.

In any event, it is clearly apparent that at the earliest dawn of history, both in theory and practice, irrigation was understood and carried out pretty much as it is to-day.

The pools of Samaria, Gihon, Hebron, Siloam, and Bethesda were all of them artificial basins or conduits for the storage or distribution of waters, to relieve either an occasional scarcity or a permanent need.

In Egypt the annual inundation of the Nile has always, from the rainless character of the country, been the condition of the fruitfulness of the soil, as the bulk of the arable land is in the valley of the Nile, and the extent of the rise of its waters has been the

measure of the abundance of the harvest. This rise usually lasts for about two months, in the summer. The extent of the valley is not so great as is generally supposed ; for the most part it is only a strip of country of from five to seven miles in width, including the river, and comprises, with the Delta, only 4,500 square miles or 2,880,000 acres, — a little more than one-half the area of the State of Massachusetts. There is good authority for believing that the inundations of the Nile have increased since the times of the Pharaohs.

The River Nile, as is the case with all sediment-bearing rivers, runs upon the highest ground, the land sloping back on either hand from the river, so that, when the river overflows its banks, all that is necessary to be done is to restrain it by levees and conduct the water, by canals and ditches, over the whole surface of the country. Of course, if the river ran only bank-full, not rising above the height of the banks, all of the irrigating water would have to be pumped into the canals with infinite cost and labor and, as the amount thus obtained would necessarily be limited, scarcity or famine would be inevitable.

Lake Mœris has been from the earliest times a very important part of the irrigating system of the Nile valley. The early travellers who visited that country, to be filled with wonder at every remarkable thing which they saw, yielded too much to their credulity, and reported this lake as an artificial reservoir, excavated by the manual labor of thousands of captives taken in war. This account has passed unchallenged for generations, and has been reproduced in most of our text and reference books, until some practical fellow, who had no veneration for traditions or delusions because they were old, showed very clearly that this lake is a natural basin, beyond a doubt. It is about thirty miles long and seven miles wide, and is connected with the Nile by a canal, which is unquestionably artificial, and called Joseph's Canal, but not after the Joseph of Genesis. The natural level of the lake is such that the waters of the Nile would flow into it in times of inundation, and enormous quantities could thus be stored and afterwards utilized, upon the receding of the river, in prolonging the period of natural flow of the irrigation canals. The slopes of the shore which were thus alternately flooded and drained, were of great fertility, and were cultivated to the very margin of the receding waters.

In Palestine, as now in Italy, France, Germany and a large part of the Pacific coast of the United States, the winter rains sufficiently moistened the earth to assure the husbandman of one

crop, and the watering of the soil by artificial means permitted the growth of two and sometimes three crops, which could not otherwise have been obtained. Well did the sacred writers allude to the hills of Judea as dropping fatness, and the land as flowing with milk and honey. We may realize how, by this means, a land so limited in area could provide a home and a support for the vast population which dwelt there, and, furthermore, create such accumulations of wealth as furnished spoil for the successive generations of plunderers, who swarmed over the land alternately from the east and the west. Truly it was a beautiful land, and well-named Canaan.

In Italy it is estimated that the irrigating canals, with their principal branches, exceed 4,500 miles in length, conveying more than 24,000 cubic feet of water per second and irrigating over 1,600,000 acres. The original cost of these works would represent more than \$200,000,000, which has been extended over a period of more than 700 years. They are chiefly owned by the government.

In Spain, the area of irrigated land is 4,439 square miles, or 2,840,000 acres which is almost precisely the whole amount of land in the valley of the Nile. Of this area no more than 500,000 acres are irrigated by the great canals or irrigation works. For the most part the water is elevated so as to flow upon the land by means of wheels, having either jars or buckets upon their peripheries, and actuated either by the current of the river or by animal power, as in Oriental countries.

A dam constructed in the province of Alicante, in Spain, for the storage of waters for the irrigation of vineyards, is remarkable as being the highest embankment ever constructed for similar purposes. It closes a steep gorge between two mountains, and is  $156\frac{1}{2}$  feet high,  $272\frac{1}{2}$  feet long, and  $69\frac{1}{2}$  feet wide on top. The aqueduct for withdrawing the water is excavated through one of the mountains so that it might be cut through the solid rock and avoid the weakening of the dam, which always occurs when the outlet conduits are carried through the dam itself.

The Moors introduced irrigation into Spain nearly one thousand years ago, and the system of management, care, and administration established by them has been retained in all of their essential features to this day.

Taxes for the use of the water are levied generally in proportion to the area cultivated, in some cases in proportion to the quantity of water used.

The officials who manage these works are elected by vote of the proprietors of the lands, for stated times ; generally for three years. They must be actual cultivators of the soil ; they distribute the water, in time of scarcity, to those who need it most. If the whole crop cannot be saved, by reason of a deficiency of the supply of water, one-half of the field is irrigated and the other half is left to suffer. Hemp, being the most valuable crop, is first attended to ; the next crop in estimation by long custom is the artichoke.

The decision of the official is final, and the person who takes water from the canal surreptitiously is liable to severe punishment.

The ancient Peruvians covered the lowlands of their country with an immense net-work of costly canals for irrigation, which were in use when the Spaniards overran that country. The canal which chiefly watered these sandy and sterile plains, conducted the waters from the heart of the Andes, hundreds of miles away, over arches spanning frightful chasms, and through tunnels which were bored through the living rock without any tool either of iron or steel. The enormous slabs of stone which formed the conduit are fitted together without cement, and the whole work is so stupendous and scientifically constructed that engineers of skill and experience have admitted that it far excelled anything they had ever seen or read of.

The irrigation works of India are extensive beyond the most extravagant flights of the imagination. Every river, including its branches, seems to have been made the object of laborious solicitude for the storage of its surplus waters. Every drainage basin in the hill country has been made the site of a tank. This term gives us the idea of an ordinary cistern which is commonly so denominated. But when we come to appreciate that an East Indian tank is a huge reservoir or storage-basin, sometimes ninety to one hundred feet deep, with enormous embankment dams, and retaining thousands of millions of gallons of water, — that it often becomes the lair of the crocodile, from which it is almost impossible to dislodge him, we are prepared to form a very different opinion of the size of a tank.

To give some idea of the capacity of these basins I will enumerate a few.

The Ponairy tank, at Trichinopoly, has an embankment of 30 miles in length, and a storage area of 70 square miles.

The Veerannum tank has an embankment of 12 miles in length and a storage area of 30 square miles.

Most of these reservoirs were made by the natives so long ago

that all records or traditions of their builders or construction are forgotten ; and yet, in fourteen districts of the Madras presidency alone, the English engineer officers have enumerated 53,000 of these tanks having 30,000 miles of embankment and 300,000 subsidiary works, constructed of masonry. A map of this section of the country reminds one of a frond of the adiantum, so frequent and uniform are these tanks in distribution and appearance.

Perhaps the most remarkable one of all is the Mudduk Masoor, on the River Choardy, built about four hundred years ago, although now broken from defective construction. Its dam was 1,650 feet long, with side slopes  $2\frac{1}{2}$  and 3 to 1 ; maximum height of dam, 108 feet, made solely of red earth and gravel ; breadth of dam at the broadest part of the base, 1,100 feet ; depth of water in the tank, 90 to 95 feet ; drainage area, about 500 square miles, or nearly seven times the entire drainage area of the water works of Boston.

The storage area of this tank was 40 square miles,—equal to the whole water-shed of the Sudbury river,—and its storage capacity was 1,400,000 cubic yards, or 37,800,000,000 cubic feet, or 283,500,000,000 gallons, which is equal to the capacity of two hundred and fifty of the largest basins of the Sudbury river, or three hundred and thirty-eight times the capacity of Chestnut Hill reservoir, and would afford a constant daily supply for one year of nine times the utmost capacity of the Sudbury river conduit.

India is largely intersected with lines of canals, many of them constructed of sufficient size to be used for transportation as well as for irrigation.

One of these, the Ganges canal, is 900 miles long, 170 feet wide, and 10 feet deep ; it carries 7,000 cubic feet per second, equivalent to 245,000 miners' inches of 17,000 gallons per day ; irrigates 1,500,000 acres, and cost to build \$12,000,000,—which sum, contrasting the value of labor and material, is fully equal to \$100,000,000 in the United States. Almost all of the irrigation works of India are in the hands of the government.

In those countries where the annual precipitation of moisture is confined to the few months of winter, and the dry season is protracted through six or seven months, during which, practically, no rain falls, all herbage dries completely up during the summer months. The line or rather plane of saturation in the soil lies at so great a distance from the surface that the roots of shrubs, trees, and vines penetrate to a greater depth, and are thereby better enabled to resist protracted drouth, than in those districts where



the rains commonly fall at intervals throughout the year, as with us.

Take for example the State of California, in the valleys of the Sacramento and San Joaquin; there the annual rainfall rarely exceeds twenty inches, and is sometimes as low as five inches; but twelve or fifteen inches will insure a bountiful harvest if it falls during the later winter or early spring months, and the earth, having absorbed it, is enabled in the spring-time to nourish the crop, and to ripen it, before the dry season has fairly set in. The harvest begins at about the middle of June, and often lasts until the first of November, during which time the harvested crop, whether it be hay or grain, may be left in the field for any length of time, in the perfect assurance that no harm can come to it from either rain or dew.

Where the soil has not been exhausted by continued culture without the use of fertilizers, as soon as the crop is harvested another can be started at once by the use of irrigation, moisture being the only thing wanting in the steady heats of summer to stimulate the most luxuriant growth.

Without irrigation one crop a year may be secured with no apprehension of failure, except in the San Joaquin valley where not more than two good harvests can be expected in five years, but with irrigation two and often three full crops are to be obtained with positive certainty.

In the valley of the Humboldt which was drained, but not watered, by the Humboldt river, until its entire flow was diverted for the purpose of irrigation, lands which, five years ago, the writer saw covered with nothing but the wild sage-brush (*Artemisia sempervirens*), and to all appearance as barren, for tillage purposes, as the malls on our common which, by the way, they much resemble in color and texture, — those lands are today yielding bountifully of wheat and alfalfa, the latter with four crops per year, at an average of four tons of dried hay, at each crop, per acre. The presence of the wild sage is the best indication of the adaptability of the soil to the cultivation of wheat with irrigation.

In Utah there are only about 1,447,000 acres of land adapted for irrigation, about 325,000 of which are now under cultivation. The supply of water is quite limited, as the annual precipitation of moisture is only about one-sixth of that in the New England States, while the evaporation is double. There can be no successful cultivation in Utah without irrigation.

All through the hill country of California every rancher who can by any means obtain a connection with one of the various mining ditches, with which the country is intersected, begins, as soon as his hay crop is secured, to turn on the water and give his fields a thorough saturation: vegetation is stimulated to a new growth, secured at a small expense.

Many of these ditches which were constructed at enormous cost in the heyday of placer mining, now that the placers are all worked out, constitute a perennial source of increase and wealth to the husbandman, who has succeeded to the miner and come to stay.

One of these ditches, called the Bear River Ditch, is 70 miles in length, and cost \$2,500,000 to build, in the year 1851; it carries about 3,000 miners' inches of water, or about 45 cubic feet per second. It was constructed to bring the water of the Bear river down to the rich placer mines of Placer county, and was used for mining exclusively, but not now at all. Running, as it does, through the fertile foot-hills of that county, it is a permanent guarantee of fruitfulness to the vineyards and farms which are being planted at either hand, on lands which lie below the level of the ditch. The number of canals and ditches used for irrigation in California is 225, having a total length of 1,000 miles and irrigating, in 1880, 292,885 acres.

With the positive assurance of sunshine and water the cultivators of those fruitful lands can flatter themselves with the certainty of success, as far as that success depends upon warmth and moisture; but our farmers and horticulturists, to whom both sunshine and storm are often uncertain or stinted, may truly be said to plant with no assurance of a watering by the early or later rains, or that the increase will come in due season.

Concerning the cause of the constant recurrence and frequency of drouths it is of but little use to speculate, as we deal more with facts than philosophy; it is plainly more for the interest of the cultivator, whether he own one acre or many, to cast about him and ascertain whether the conditions do not exist which will enable him, if he avail himself of them, to be independent of the rainfall and sure of his crop in any season.

In Southern California much attention has been given to irrigation within the past few years. Formerly the chief attempts by the native Californians were in the vicinity of the large springs, which are a striking peculiarity of that country, and are called "cienegas." In the vicinity of Los Angeles and San Bernardino,

these springs furnish, in the aggregate, perhaps from 55 to 60 feet of water per second and irrigate about 6,622 acres; each, according to its size, irrigating from 20 to 400 acres.

That section of the State being a true artesian basin, recourse has been had with much success to the artesian wells, which have been sunk in considerable numbers, and depths varying from 50 to 550 feet; and, while many wells have failed to strike water, most of them are flowing wells, having sufficient pressure to deliver water 10, and even in some cases 20, feet above the surface of the ground.

By an estimate made in the office of the State Engineer of California in 1880, there were about 550 flowing wells in the coast valleys of Los Angeles, and additional ones were constantly being put down.

These wells are mainly in three principal districts or groups: one in the neighborhood of Compton, and bordering on the River Los Angeles, another in the vicinity of Artesia, near the San Gabriel, and the third in the settlement of Westminster, near the Santa Aña river.

The greatest discharge observed at any well was 1.7 cubic feet per second. A common amount was 0.2 to 0.3 cubic feet, while the average was no more than 0.1 cubic ft. per second, or 6 cubic feet per minute, equal to 4 miners' inches or 68,000 gallons in twenty-four hours, which, in New England, we should esteem as a goodly stream to flow from the end of a pipe two feet above the surface of the ground.

In the county of San Bernardino there were quite four hundred more wells, but, as the pipes were mostly two inches in diameter, the total estimated discharge was no more than 20 cubic feet per second. These wells flow steadily in a stream from one to three inches in depth over the rim of the pipe, the water falling beautifully in an unbroken sheet or dome until it strikes the ground.

The total cost of the successful wells in Los Angeles county alone was estimated at \$220,000 or about \$400 to each well, and, estimating the aggregate flow at 55 cubic feet of water per second, would bring the cost of the water to \$4,000 per cubic foot per second, which may seem at first to be a pretty high price, without making any account of the numerous failures in sinking unsuccessful wells.

When we consider however that, at an average cost of \$400, a constant supply of pure water is obtained directly in the midst of a farm, from sources which will deliver 68,000 gallons of water in

twenty-four hours, at a height two feet above the surface, that, if money is worth ten per cent per annum on good security, the annual cost of the well is \$40, and that it is a system needing no repairs, securing the certain irrigation of 30 acres which could not otherwise be kept in profitable cultivation, the annual water rental of \$1.33 per acre for such results appears very moderate indeed; being, moreover, less than one-half the price that is commonly paid in irrigating countries, and within a few cents of the average cost of water from the best canals of India, where water is the cheapest in the world.

More water is derived from these wells than the owners are prepared to use; it was in the beginning allowed to run to waste, and to form pools of stagnant water, very injurious to health and of no benefit to the soil. By a law passed in 1874, owners of artesian wells are required to check the flow of their wells when the water is not needed for use.

A striking peculiarity of these wells is their uniform temperature. Four wells near Pomona showed an unvarying temperature of 67° for the entire year; while of all the wells in Los Angeles and San Bernardino counties the temperature, as far as observed, was uniformly 62°. Seven wells on Kern Island have a uniform temperature of 71° both summer and winter.

These wells cost, on an average, about \$2,500 each, but could be sunk now for \$1,600 apiece. They yield from 50,000 to 125,000 gallons each in twenty-four hours.

The irrigating canals of Southern California aggregate about 439 miles in length, carrying about 495 cubic feet per second, and irrigating 57,853 acres in 1880, the total amount of water consumed in irrigation in these several methods being as follows:—

	Feet per second.	Irrigating.
Natural streams by canals,	495	57,853 acres.
Cienegas or springs,	55	6,622 “
Artesian wells,	75	18,000 “
	<hr/>	<hr/>
Total	625	82,475

The Los Angeles water system furnishes about 67 cubic feet of water per second, irrigating 7,755 acres of land; but as the water is used with great prodigality by many of those who have prior right to the water, the most effective duty is not obtained, being only 112.8 acres per foot per second, at a maximum cost of \$143.36

per foot, or an average annual tax of \$1.28 per acre, which corresponds very closely with the most favorable rates elsewhere.

An interesting coincidence in the relation between rainfall and irrigation is shown in the receipts of the city of Los Angeles for the sale of water in the years 1877 and 1878. The rainfall for the winter of 1876-7 was only five and a half inches, consequently the season of 1877 was an unusually dry one; the rainfall for the winter of 1877-8 was 21.26 inches, and was prolonged until late in the spring. The receipts in consequence of the rainfalls were as follows:—

	1877.	1878.
January . . . . .	\$113 00	\$400 00
February . . . . .	544 75	48 76
March . . . . .	1,121 00	12 99
April . . . . .	1,048 75	00 00
May . . . . .	1,138 50	1,045 25
June . . . . .	1,387 75	1,547 50
July . . . . .	1,163 75	1,611 75
August . . . . .	1,016 75	1,652 75
September . . . . .	594 00	792 00
October . . . . .	448 25	432 75
November . . . . .	176 00	230 50
December . . . . .	169 25	267 00

This table plainly shows the effect of the increased rainfall during the winter of 1877 and spring of 1878; it also shows that by the month of May the effect of the natural moisture for the support of growing vegetation is substantially exhausted, while by June, the sole reliance of the cultivator is upon the water of irrigation, and by the last of August the season of general irrigation is about over.

Although an attempt was made to introduce irrigation on a large scale into Cambridgeshire, England, in the sixteenth century, yet it made no progress, as an aid to agriculture, until the commencement of the present century. During the last twenty years much attention has been directed, and with a good deal of success, to the irrigation of grass lands with sewage from cities and towns. A considerable portion of the sewage of Edinburgh has for many years been used, beneficially, upon several hundred acres of adjacent meadows. At least fifty of the most considerable interior cities and towns of England now dispose of their sewage, either wholly or in part, in this manner. One thousand two hundred acres of land

at Gennevilliers are irrigated with the sewage of Paris, and great progress is being made each year in this direction.

Water meadows formed by artificial irrigation have become quite a feature in the agriculture of England and the south of Scotland. More than fifty years ago the great value of irrigating grass lands in temperate climates was demonstrated in that country. It was tried upon a piece of four acres of hillside pasture which had never been esteemed of sufficient value to be even ploughed, and was only used as sort of a chance pasture for cattle and sheep when other pastures were used up.

This piece of carse land was, by the simple flowing of water, made so productive that five and a half tons of dried hay were cut upon it in one season. No account was kept of the amount of water that was used. All through the north of England and in Scotland the use of water is well understood as a means of restoring and increasing the value of pastures and mowing.

For this purpose the water must be constantly moving and not permitted to remain stagnant. Clear water has been observed to be as effectual and beneficial, upon the finer sorts of grasses, as water bearing sediment or sewage; in fact under some circumstances these may be positively injurious.

Pure water exerts a beneficial effect upon soil and vegetation, first, by supplying a sufficient amount of moisture to answer the constant demand of evaporation, which must be met or vegetation will wither and die. Second, by conveying and mingling such an amount of oxygen into and with the soil as could not so easily be done in any other way or manner.

Water absorbs air in definite proportions. This process may be thought to be slow, but it is rapid enough for all practical purposes.

If we take a quantity of pure water which has been freely exposed to the atmosphere and expel the air by the application of heat, we shall find that a given quantity of water absorbs about  $3\frac{1}{2}$  per cent. of its volume of air. On exposing the water to the atmosphere, we shall find at the expiration of twenty-four hours that it has reabsorbed the normal amount of air.

Upon examining this air carefully, we shall find that while it is composed of oxygen and nitrogen, yet they are not in the same proportions as they are in the atmosphere. Water absorbs oxygen more freely than it does nitrogen; therefore, instead of finding 80 parts of nitrogen and 20 parts of oxygen, we find only  $46\frac{1}{2}$  parts

of nitrogen while there are  $53\frac{1}{2}$  parts of oxygen ; from which facts, by a little calculation, we can ascertain that the air freely absorbed by water contains 42 per cent less nitrogen and 165 per cent more oxygen than the free air of heaven.

If we take water that has been sufficiently in contact with the soil to part with its absorbed oxygen, as in the case of drainage waters from underdrained lands, we shall find that in a given quantity of water there is only about one-third as much oxygen, while the nitrogen has but slightly diminished.

The oxygen has decreased from  $53\frac{1}{2}$  parts to  $18\frac{6}{10}$  parts, while the nitrogen has been reduced only from  $46\frac{1}{2}$  to  $45\frac{3}{10}$  ; so that, instead of the air of the drainage water having nearly  $2\frac{7}{10}$  times as much oxygen as the atmosphere, it has lost two-thirds of its oxygen, while its nitrogen has decreased but little.

What has become of the lost oxygen ?

It has been carried by the water, where it could not have gone as air, and furnished the element required to form the nitrates and carbonic acid, thus aiding to dissolve the constituents of the soil and furnish the nutriment of plants.

How this is done forms an interesting and instructive topic of itself, and would consume too much time to be considered in this connection. It has been sufficiently shown, however, that no small function of the water of irrigation is to carry deep into the soil that chemical element of air which is the support of life and heat, viz. oxygen.

During the past thirty years, a great deal of attention has been given to the distribution of manure upon the soil, by dissolving the fertilizing elements in water and delivering it upon the land by means of pipes.

A most striking account was reported by a Mr. Barber, of Muirdrockwood, Kirkcudbrightshire, Scotland. He had twenty-seven acres of land before his house, which was of so poor a quality naturally, that it had never furnished more than a poor feed for two cows only.

Into a suitable covered tank he put the manure from forty cows and four horses, filling the tank from a small stream. With this solution he irrigated twenty-two acres ; the remaining five acres he enriched in the same manner with the soil and offal from the house. By this means the twenty-seven acres were made to yield sufficient fodder for the keeping of forty-four head of stock.

An excellent opportunity was afforded upon this land to con-

trast the effects of manure when applied in the liquid or solid form.

There were several knolls hard by, of similar soil and condition, upon which it was impossible to place the liquid with the pipes, owing to their elevation above the level of the supply tank, and, as they could not be irrigated in this manner, they were enriched with solid manure, applied in the customary manner.

A comparison of results showed that the land which was irrigated with the liquid manure yielded three times as bountiful crops as the other, all the attendant circumstances being equal, such as the area and apparent quality of the land, amount and quality of manure used, etc., etc.

On the farm of P. W. Kennedy, at Myer mill, Ayrshire, manure in a liquid form, diluted with four times its weight of water and distributed through flexible pipes by steam power, enabled five times as many cattle to be fed as had previously been fed from the same land, without any increase in the amount of manure purchased for the farm or any diminution in the fertility of the soil.

Many instances of this kind might be enumerated if time and space permitted, but as they are on the border-line between irrigation and the fertilization of the soil, these may suffice for this occasion. It is a topic that may profitably be enlarged upon and developed at a suitable time.

The great fact which is of interest to us in this connection, appears conclusively from this experience of English agriculturists, that it pays even to pump water by steam power and to distribute it by iron pipes over entire farms, irrigating the surface with a hose under those conditions where it is impossible to use the ordinary methods of irrigation, such as channels, sluices or catch-water meadows. In our neighborhood, and among our own members, this practice is resorted to with profit and entire satisfaction.

The very unfavorable weather of the past few weeks has alone deterred me from making a personal examination of some of the arrangements which have been made by members of this Society, who can tell us, in their own way, how profitable they have found irrigation by these methods to be to them, in their extremity, when they have summoned both wind and steam to their assistance. In one instance, which was alluded to in a previous discussion, in a severe drouth, a steam pump was rigged and the water of Mystic river was poured for seven days and nights upon a parched field, averaging 75,000 gallons per day or a quantity



equal to three inches over the entire surface, at a cost, including all expenses, of perhaps ten cents per 1,000 gallons.

These arrangements are very complete, and the example should be followed by all who would secure the highest culture and the greatest profit with comparative immunity from drouth.

With the experience of the world, in all ages and climes, there is ample encouragement to prepare for irrigation as a means to make good the deficiency of moisture in the years when there is an inequality in the monthly distribution of the rainfall. Our cultivators should not rest easy until they have assured themselves of some source for water which will be adequate to make good all deficiencies of the rainfall, and which they can hold under perfect and undoubted control, free from any interference and, as far as possible, free from tribute to any person.

The first and most natural source to seek for such a supply is a brook. Most farms have one passing through or near to them. If its waters can be diverted, at a sufficient altitude to command the arable land, let it be done: it is the best and, therefore, the proper thing to do; in any event, the higher up the water can be taken the better, as every foot that can be saved in height will save a foot of pumping.

If the brook is high enough and runs with anything of a stream, during the dry months, no reservoir will be needed for storage, but the water can be conducted and spread upon the land when wanted.

If there is no brook at hand, there are but few places in Eastern Massachusetts where copious wells may not be sunk, which will afford an ample supply for the requirements of ordinary cultivation. Whether the supply be from wells, or from a brook of low altitude, adequate storage must be prepared.

The cheapest machine for the elevation of water is an ordinary plunger pump, driven by a windmill, — not a loose-jointed affair, with adjustable vanes, such as would drive one frantic with its perpetual rattle and clatter, but one with a permanent set to its vanes, with no loose parts to get adrift in a gale, and so contrived that a violent wind or storm will turn it immediately to one side, or, as it is termed, “throw it out of the wind,” thus reducing to the smallest limits the surface exposed to the force of the storm.

When once adjusted, a good windmill need not and will not cost \$5 per year for repairs of every name and nature, — which practically gives one its labor for nothing.

For irrigation on an ordinary farm or market garden, the smallest wheel, to be of real practical benefit, should be at least 14 feet in diameter, elevated about 40 to 45 feet above the ground. Such a wind-engine would cost, all set up ready for duty, about \$300, exclusive of the pump, and could be safely calculated to operate, on an average, eight hours per day through the summer months in any locality. It could be depended upon with certainty to elevate 8,000 to 10,000 gallons of water in twenty-four hours to a height of 50 feet, or to draw it from a well 25 feet deep and raise it 25 feet above the surface.

The conditions which will determine the elevation and quantity to be pumped are the source from which the water is taken and the lay of the land. Of course, where the purpose is solely for irrigation, it is unnecessary to pump any higher than the highest land to be irrigated.

If more water is required than one wheel of this size will furnish, it will be found in most cases to be more desirable to increase the number than the size beyond 16 feet in diameter.

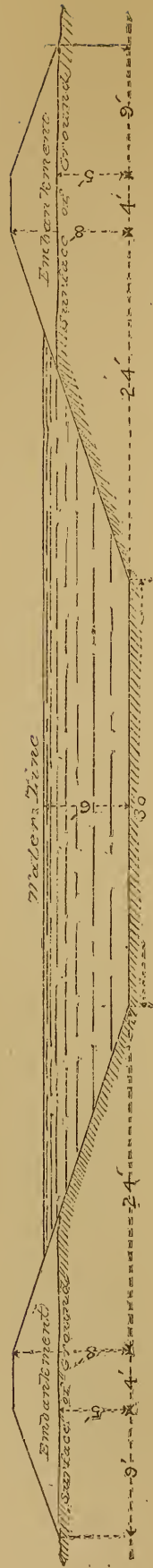
There must be ample storage provided, as the pump will yield but a small stream constantly, while, when irrigation is required, we shall want a large flow at intervals. For this purpose tanks are constructed, sometimes of fair size and of wood; but it is the more useful plan to construct them still larger and of earth.

To do this successfully requires the thoughtful attention of an experienced person, and it is wise to follow the directions of some one familiar with the construction of such work, for, otherwise, you may only invite disaster: water is by no means an easy thing to hold, and it sometimes takes its leave suddenly, when 1,000 or 1,500 tons of water will not have the most pleasant effect, if it comes booming across your arable land.

The reservoir should be calculated to have a depth of not less than 6 feet, when full, as that is the least depth that will discourage the growth of rank aquatic plants, which would speedily turn your reservoir into a morass.

No rule can be laid down for the location of such a reservoir, except, to take every advantage of the peculiar configuration of the ground, to cheapen its cost or to increase its security. Under the most unfavorable circumstances of location about 450 cubic yards of excavation and embankment will make 110,000 gallons of storage, which is fully adequate for the complete irrigation of two acres at one time, and, with a 14-foot wheel, would require eleven days to fill.





SCALE 15 FT = 1 IN.

SKETCH FOR PROPOSED  
RESERVOIR.  
TO HOLD 110,000 GALLONS.

One great advantage in having as large a reservoir as possible is in affording an opportunity for the water to become as warm as the sun and air will make it. Warm water possesses a vastly more stimulating effect on vegetation than does cold water. The water in the irrigating canals of California has been observed as high as  $90^{\circ}$  to  $105^{\circ}$  in July and August. The temperature of Kern lake in August and September was  $90^{\circ}$ .

The accompanying sketch shows clearly the size, proportions and manner of adapting such a reservoir, when it is constructed upon the surface of the ground, as upon the top of a knoll or hill.

The cost of such a work, if paid for outright, ought not to exceed \$100 in ordinary earth; but as it represents not more than 50 days' labor of one man, it could easily be constructed, at odd jobs, by the laborers ordinarily employed upon the place. No materials need be required except good gravel and clay, or common hard-pan which makes a perfect hydraulic embankment. It is needless to use cement or other expensive materials.

The location of the reservoir should be such that the last drop can be drawn out and usefully employed.

Since writing the above I find the statement that James Vick, the eminent horticulturist of Rochester, N.Y., in the years from 1875 to 1879 inclusive, irrigated his nurseries, consisting of 15 acres of land, besides supplying all the water for five large green-houses, dwelling-house and stable. This he accomplished with a windmill 16 feet in diameter, and the power furnished by it was adequate to pump fully twice the water if it had been required. The actual amount of water was not given by Mr. Vick; but the head was 25 feet. This is about as complete a statement of actual results as I have found in print.

A good 16-foot windmill is estimated to furnish about 3 horse-power, when driven by the ordinary summer breezes. It will average 8 hours' pumping throughout the season, although at times it will run for the whole 24 hours, and at other times it will stand still for a week. It will cost, with tower and pump complete, in the neighborhood of \$400 to \$450. It should pump, on the average, 15,000 gallons per day, and in 7 days would fill the reservoir, before proposed, of 110,000 gallons' capacity; during 5 months, it would or should pump 2,250,000 gallons to an altitude of 50 feet, or enough to furnish an irrigation, during the season, of 6 inches upon 15 acres. It will be seen that this estimate agrees with Mr. Vick's experience to the letter.

The most profitable reservoir for use with a wheel of this size would be one about 65 feet square, on the average interior slope. With a depth of 8 feet such a basin would hold 250,000 gallons, and afford the means of irrigating 5 acres at one time with 2 inches of water.

It is customary to use an open ditch for the distribution of the water: it is more cheaply and easily prepared than any other method, and if there is any seepage, by reason of the porous condition of the soil, it is not lost, as, the ditch being on the highest ground, the water is all utilized; but it may be necessary to carry the water either across depressions or to a distant part of the field or farm, in which case it will be found preferable to use a 4-inch glazed drain-pipe than to make an open ditch. This pipe will easily and safely bear a head of 50 feet, and as the head will be but slight, if the water is allowed to run freely, the pressure will be very little indeed.

A 10-inch pipe, running free with a head of 16 feet, will deliver as much water as a secondary ditch which will occupy, with its banks, a strip of land 26 feet wide and convey water enough to irrigate 80 acres of land. So it will readily be seen that, for the small farm or market garden, where but 10 or 12 acres are to be watered, a 4-inch pipe will be sufficient to carry all the water that will be necessary, and by laying it two feet below the surface it will be beneath the reach of plough or spade.

About 50,000 gallons of water will ordinarily be required to give an acre of land a proper saturation, and no irrigation can be at all satisfactory which attempts to do any less.

As the gardener has often observed, both in the greenhouse and garden, a slight watering only proves to be an aggravation and oftentimes an injury, while the only benefit is derived from a thorough drenching, so in our climate, with ordinary soils such as are found to be advantageously cultivated; it will require about two inches in depth over the entire surface to make a useful irrigation of almost any crop. This, without making account of loss by leakage and by evaporation, will amount to 50,000 gallons in round numbers.

The useful application of water by irrigation is a knack, — I had almost said science, — requiring observation and practice to carry it out with any measure of success. It is manifestly impossible in a paper like this to make anything more than the most general allusion to it.

For the grass crop, water is easily laid on ; two waterings, in ordinary dry summers, will insure a second crop each year, fully equal to, if not in excess of, the crop usually secured as the first one ; besides, the possession of these appliances would positively assure the farmer of two heavy crops of hay the same season, where one is sometimes a failure and often long in doubt.

It may therefore be moderately estimated that two tons of hay per acre could be secured, in addition to what is now obtained, and this, upon ten acres, would amount to 20 tons of hay, as a modest estimate of the yearly advantage of the possession of these facilities for irrigation. If the land otherwise has proper culture and nourishment, this increased yield would amount to 40 tons. There is positively no way in which our dairy farmers can so greatly increase the productiveness of their grass land.

For vegetables and small fruits the value of water would be greatly increased in dry years, while for strawberries the benefit would be greater than anything of which our cultivators have hitherto dreamed.

Drouth is the constant dread of the strawberry grower, as the strawberry is a thirsty plant, and seldom gets water enough.

Ten years ago the writer suggested sub-irrigation as beneficial for the strawberry, and prepared a plan for the scheme, but it met with no response. Within a few years, a large grape-grower, Mr. G. G. Briggs of Davisville, Yolo county, Cal., has tried sub-irrigation for the grape upon 400 acres of vineyard. With us, our grapes cannot be made too dry, but with the Californian, irrigation makes fine large grapes for the table or for raisins.

Ordinary irrigation has some disadvantages in such a vineyard : the surface is rendered, for the time, soft and muddy. The roots of the vines must run deeper into the soil than with us, as the upper twelve inches of soil is utterly devoid of moisture, being simply a body of dust all summer long ; it has been observed that irrigation, as commonly practised, has had the tendency to encourage the growth of the roots nearer the surface than was consistent with safety.

At Hofwyl, near Berne, Switzerland, a tract of bog was reclaimed, by under-drainage, and the mouths of the outlets were so fixed that they could be stopped at the pleasure of the proprietor, so that, when the surface of the soil became too dry, the water could be retained and, on closing the drains, it would flow back and saturate the earth sufficiently to irrigate the crop. Mr. Josiah Crosby, of Arlington, has tried the same plan, with useful results.

One great advantage to be attained by sub-irrigation will be to obviate the enormous evaporation and consequent loss of heat that is sustained whenever the surface of the ground is moistened in summer. The loss both of heat and moisture by evaporation is surprising when it is carefully considered. This refrigeration of the earth and air is unfavorable to the best results in all cases where a high temperature is requisite for success.

This mode of irrigation has been tried to a limited extent at Los Angeles and promises good results. The irrigating pipes used there are continuous, laid with a machine, at the rate of 1,600 feet per day, with the labor of three men. The material of which the pipe is made is a composition of Portland cement, lime, sand and gravel, with a little potash and linseed oil. The pipes are laid from 18 inches to 24 inches below the surface, in a line parallel with the trees or vines to be irrigated; opposite each tree or vine a plug is inserted in the top of the pipe, which plug is perforated with a small hole, and over this a piece of larger pipe is placed, reaching to the surface and open at the bottom. The distributing pipes are connected with main pipes which lead from the reservoir, and thus the only labor requisite is in turning the water on and off.

At a trial with an orchard of three acres of young trees, which was piped in this manner, a thorough irrigation was effected in thirty minutes, with the expenditure of 400 cubic feet of water, or less than 3,000 gallons. Such an application twice a month had caused a growth of twice the size of trees of the same age, planted in the same soil, with the same cultivation, but irrigated in the usual manner by surface irrigation.

By this method no water appears upon the surface and the ground does not cake and bake with the heat of the sun; there is no needless loss of moisture or of heat by evaporation, and yet the land remains moist and mellow.

Another great advantage is in the fact that this method of irrigation encourages the penetration of the roots to a greater depth than is the case with ordinary irrigation, which induces them to spread near the surface, to be easily and injuriously affected by the intense heat of midsummer.

If this system proves to be all that it now promises, it will be possible to irrigate 9,000 acres of vineyard or orchard with one cubic foot of water per second, which is a degree of economy and efficiency not dreamed of hitherto. From these results there is every reason to expect that, if a strawberry bed be formed as



usual, with the addition of an inch drain tile, laid with proper joints 18 inches below the surface of the middle of the bed, and so contrived that water could be turned into it with just pressure enough to fill the pipe, the most satisfactory and perfect irrigation would be attained with the least expenditure of water.

In laying drain tiles for sub-irrigation, if the whole joint is left loose and unpacked the water will run so freely as to prevent its perfect distribution. It is the better method to determine how often it will be requisite to leave an opening; ordinarily it will be sufficient to leave a vent at every third or fourth joint. If the other joints are closed with cement, then, in case of any changes or repairs, it is equivalent to the destruction of the pipe to attempt to do anything with them; but if some old woollen rags be torn into strips and wound around each spigot end until it is a snug fit for the socket, it will make a joint tight enough; one that will constantly grow tighter, and still be easily loosened in case it is necessary for removal or repairs. At the joint where it is intended for the water to find vent have some strips of felt which will be thick enough to pack the pipe and long enough to nearly encircle it, leaving a small opening at the top through which the water can escape. Over this opening place a cover like an old preserve can, having a scallop cut out of opposite sides of the upper end; this will serve as a shield, and also as a reservoir to hold a fixed amount of water which will facilitate the complete saturation of the soil.

Some writers have injected the idea into their descriptions of irrigating works "that the running streams should be tapped so that the water should flow in (to the canal) from the bottom of the current when it is most charged with sediment." This is of a piece with a good deal of modern science that is assumed and taught in schools and text-books.

This dictum that sediment bearing waters should be used for irrigation has passed from one to another, and has been taught by scientific men, who seem to forget that the word science signifies a knowledge of the nature of things, and that the men most familiar with the nature of things are too busy to write books.

The truth of the matter is that all waters which are heavily charged with sediment are a positive injury to any useful vegetation. The willow and cotton-wood are about the only things which can survive an overflow of such earth-burdened waters.

Whenever irrigating waters are heavily charged with silt or sediment it becomes a question of great difficulty how to remove it.

This is particularly true of some of the old mining ditches of California, as well as the great canals that are supplied from the Ganges. The waters of this great river bear more sediment than those of any river hitherto examined, excepting the Sacramento, which owes the immense quantity of sediment borne by its waters to the pernicious practice of hydraulic mining, which, until recently, was extensively carried on at the head waters of its principal affluents. It has been estimated by English engineers that the waters of the Ganges canal alone bear along 13,000 cubic yards of silt per day.

These sediments, when coarse, are borne along by a violent stream, whose grade is five inches per mile, and which, when it pours over the surface, covers every green thing with a bed of fine sand. The lighter calcareous muds are not so easily thrown down, but pass upon the land in the form of silt, the impalpable particles of which are drawn by the percolation of the water into the interstices of the soil, which become so tightly closed as to prevent the free entrance of the air, and ultimately, the absorption of the irrigating water; the whole surface becomes coated with a crust of baked clay which is alike impervious to water or the atmosphere and surely destroys all the finer grasses and vegetables.

This difficulty has proved to be the chief drawback with all attempts to utilize town sewage by irrigating grass lands: the fine particles of solid matter are borne by the water and, although so fine as to be freely transported by the current and impossible of extraction by any method hitherto tried, yet they quickly close all the interstices of the soil with a mass of mud. This is itself of a fertilizing nature; yet, by the exclusion of the atmosphere, vegetation is speedily destroyed. In this manner the very object sought to be attained is defeated: there can be no purification of sewage, by irrigation, unless light, air and vegetation can act in conjunction with the soil in the work of eliminating and usefully combining the impurities with which the sewage is laden. This is the result of the best experience and therefore the best scientific authority.

In a series of carefully conducted experiments made in England some years ago, it was clearly proved that in the irrigation of grass land no advantage could be discerned in the quality or quantity of the crop when sewage was used for irrigation, over the results obtained by the use of pure water from the river, although chemical analysis showed the sewage to be highly charged with

fertilizing elements, and therefore that it should be, according to scientific deductions, the more valuable for irrigating purposes.

A knowledge of the nature of things teaches us, very conclusively, that the elements necessary for the encouragement and support of plant life must not only be present in the soil or the waters with which it is irrigated, but it is essential that they should be in proper condition for assimilation by the existing growth of vegetation.

It is finally conceded by those who have had the best experience in such matters that sewage irrigation cannot be an assured success until some convenient and effectual method can be devised to extract the solid particles from the water.

The ranchers among the foot-hills of California, who irrigate their land with water from the old mining ditches, in which the waters are often loaded with sediment, are obliged to resort to various expedients to precipitate the sediment before using the water; otherwise the soil would speedily become coated with an impenetrable covering of clayey mud which excludes both air and moisture, and defeats the very purpose of the irrigation.

Thus the intelligent cultivator has been taught, by the very nature of things, that all sediment should be extracted as far as possible from the water before it is admitted into the irrigating ditches, while scientific writers are inculcating the importance of using water which is the most highly charged with sediment. Permeability of the soil to the air is as requisite as the percolation of the water itself.

There is no disputing the proposition that sediment as borne by all rivers contains the elements of fertility, but it is for a future crop and not for the present one; irrigation is mainly used, or would be with us, for the growing crop.

Barren and sandy wastes have been reclaimed and rendered fertile by the deposit of the dense sediments from muddy rivers and canals; but this is a different kind of an improvement entirely.

These sediments are called silt when they are so fine and clayey as to be borne by ordinary river currents through the valley lands. Silt is the detritus of the hills and mountains under the destructive action of ice, sun, frost and rain.

How it is produced, transported, constituted, and utilized for the comfort and wealth of man is a question as broad and comprehensive as the one we are considering today; and, while kindred in its nature, still it is rather a digression to touch upon it.

It is simply necessary to add that, where sediment-bearing waters have been used upon the growing crops, the most observing cultivators have found, as the result of their experience, that only alfalfa, rye and other rugged grasses can stand it, and these become so coated with mud that cattle will refuse to eat the hay until driven to it by hunger.

The irrigating season in England is almost altogether during the colder months of the year, beginning in November and ending in March or April. When the grass begins to vegetate, the intervals of irrigation are shortened, until the grass is sufficiently grown for cutting or pasturage, when it is withdrawn altogether.

By this means a good crop of grass is produced on those water-meadows very early in the spring, before the dry upland grass has begun to start, and rich feed is thus furnished for flocks and herds.

**VALUE OF WATER FOR IRRIGATION.** —When we endeavor to determine the actual value of water for the purpose of irrigation we are in a worse quandary than in trying to estimate the value of commercial fertilizers.

If by the use of water a valuable crop can be raised, with absolute certainty, which would otherwise occasionally fail for the lack of summer rains, then no price at which water is sold would be considered too dear.

The price of water from the Boston water works is 20 cents per 1,000 gallons, at which rate an irrigation of 1 gallon per square foot would cost only \$8.71 per acre. If this would save a strawberry crop, who would higgler at the cost? Even for the hay crop it would pay; yet this is four times the highest price ever paid for water in Spain, and recorded as showing the extravagant prices paid in seasons of scarcity. Some of our cultivators near Boston have been glad to obtain water for irrigation in dry times even at this large price.

The charge for water in Chicago is 8 cents per 1,000 gallons, which is twice its cost to the city, and therefore a source of profit. This is a rate that the market gardener can afford to pay when it is used carefully and prudently. In this connection it may be well to look at the prices at which water is furnished to farmers in various irrigating countries. These are rates charged by the grand canals which are hundreds of miles in length, distributing water by the million cubic feet, and irrigating hundreds of thousands of acres; they may not prove to be much of a guide in the direction

in which we are looking, still they are useful in giving us a comprehensive view of the matter.

In India, by the West Jumna canal, the maximum charge is \$2.50 per acre, minimum charge 67 cents, and the average charge is \$1.25 per acre per annum; by the Bari Doab canal the maximum charge is \$2.94 per acre, minimum charge 75 cents, and the average charge is \$1.17 per acre per annum; by the Ganges canal, the maximum charge is \$2.20 per acre for sugar-cane, minimum charge 60 cents for cereals, and the average charge is \$1.21 per acre per annum, which rate would be equivalent to  $\frac{1}{4}$  of a cent per 1,000 gallons, if the land received four irrigations per year, which is about the average for crops.

In Italy the rate for water varies from 60 cents to \$3.00 per acre per year. From the Cavour canal, recently constructed, the charge is from \$87.39 to \$69.91 per cubic foot per second for the year, which is equivalent to  $\frac{1}{3}$  to  $\frac{1}{4}$  of a cent per 1,000 gallons.

In Spain there are the greatest fluctuations in the price of water, from the fact that water is there a necessity every year, while in some years the supply is scanty; many of the irrigation works and canals being in the hands of those not owners of the soil, it is sold to the highest bidder, instead of being justly and impartially distributed among those who are accustomed to use and depend upon it.

In some districts the old Moorish works belong to the proprietors of the soil, as an appurtenance not susceptible of alienation therefrom; and, in these cases, the cost of the water to the proprietors is simply the cost of maintaining the canals and works.

In Lorca and Elche there are daily exchanges for the sale of water, and in the year 1861, which was a year of drouth, the price ran as high as \$11,000 per cubic foot per second, which large sum, when transposed into gallons, is about  $4\frac{4}{10}$  cents per 1,000 gallons, deliverable, for the year, or  $8\frac{8}{10}$  cents per 1,000 gallons during the growing season.

From the Henares canal the annual rate is fixed by the government at \$1,875.00 per cubic foot per second, which would be a little less than 0.74 of a cent per 1,000 gallons deliverable. An irrigation of 2 inches would cost, at that rate, 37 cents per acre, and, as the irrigating season continues for only one-half of the year, the cost of the water would be practically double these figures, unless the cultivator could utilize the water during the winter months.

At Lorca the same amount would cost \$2.50, and at Alicante, it

would vary from 25 cents to \$5.77 according to the scarcity of the water.

From the new canal, at Navarra, the farmers have agreed to pay \$3 per acre annually for a total irrigation of 10 to 12 inches, which would bring the cost of an irrigation of 2 inches to from 50 cents to 60 cents per acre.

From the San Joaquin and Kings River canal, in California, the rates are fixed by the area irrigated: for cereals, \$2.50 per acre, per year; for alfalfa, \$3 per acre; for market gardens, \$5; wild grass land, 75 cents, and for the irrigation of second crops, \$1 per acre. In Yolo county, the cost of water ranges from \$1 to \$3 per acre per annum.

These figures are instructive as showing how cheaply water can be furnished under favorable conditions of supply, but of course, they do not give us an adequate idea of the cost of water to husbandmen who are obliged to raise their water by mechanical means, as has been done in Egypt from the earliest ages, and is now, to a greater extent, in Spain, where, of 2,840,000 acres irrigated, only 500,000 acres are returned as irrigated from the principal canals, by gravity, leaving 2,340,000 acres to be irrigated by all sorts of mechanical contrivances, mainly by rude wheels having jars or buckets secured to their perimeters, and driven either by the current of the river or by animal power. No means exist of ascertaining the cost in these cases, but it is safe to assume that, if it will pay to pump water in one place when it is wanted, it will in another, more especially when the salvation of a valuable crop depends upon its being done.

There is probably more land irrigated by mechanical means in Spain than was ever irrigated in any way throughout the whole valley of the Nile, which we are accustomed to think of as the region where, of all places in the world, irrigation is most extensively conducted.

HOW SHALL WATER BE APPLIED? — In valley lands, where the surface is a broad plain with a gentle and uniform grade, the same definite plan can be carried out in each case; but upon our New England farms, with their more irregular surfaces and steeper slopes, no definite plan can be laid down.

Each case must be considered separately, and by an experienced person, if one would not obtain his information in the bitter and costly school of experience, which some men strangely prefer.

Grass land is easily managed, if the surface is quite or nearly

flat, by forming it into planes of from 30 to 40 feet in width, having a slope in each direction of 1 to 12 or 15. On the ridge of these planes the water can be conducted, and allowed to flow over the surface. The surplus which is not absorbed by the soil will run into the depression and pass away by a drain, which must be prepared to prevent the settling of stagnant water.

On lands which have nearly a uniform grade of less than 12 feet to a mile the cheapest plan will be to throw up ridges or levees from 6 inches to 12 inches high and with 20 feet base, which must be carefully made at a uniform level, each levee to flow the water back to the base of the levee next above. This is called the check-levee system. By this means the entire surface can be irrigated at less cost per acre, for labor, than by any other system. Another method is to divide the entire area into small plots or compartments, separated by ridges of earth, with broad bases; these plots are filled alternately with water as required, where it is permitted to soak away into the soil. In all of these cases the levees are constructed with scrapers, and with so broad a base and flat a slope that all sorts of farm machinery may be drawn over them without difficulty or obstruction.

There was a very elaborate system of canals and ditches, with cross-furrows for distribution, which was introduced upon the Dos Palos ranch, of 5,956 acres, in the San Joaquin valley, California. The cost of the distribution canals and ditches alone was over \$50,000, or about \$10 per acre. This work attracted a good deal of attention, and, in the report of the United States Commissioners upon the irrigation of the Pacific coast, made in 1874, it was noted especially for its excellence; very elaborate drawings were also given illustrating the plan of construction, which was highly commended.

In 1880, however, the engineers of the State of California reported that the whole experiment had proved to be a disastrous failure and had been abandoned. The system of secondary and tertiary ditches, with the cross-furrows, had been swept away and a system of check-levees introduced, at a much less cost which was about as follows, per acre: —

Earthwork . . . . .	\$1 64
Waste and drainage gates . . . . .	0 51
	—
Total . . . . .	\$2 15

The average cost of the primary and lateral canals, including their waste and side gates, was about . . . . .	4 00 per acre
	<hr style="width: 10%; margin: 0 auto;"/>
making the total cost about . . . . .	\$6 15 per acre
	<hr style="width: 10%; margin: 0 auto;"/>

as against \$10 per acre, the first cost by the previous plan; the total loss being about \$20,000.

One great evil, attending the introduction of this or of any other new method, arises from the great inclination of well-meaning people to accept the sanguine expectations of their promoters as facts accomplished, and to herald them as successful, when the result proves them to be far from it; this only causes subsequent disappointment, if not loss, to innocent parties when the true facts are developed.

Of the accompanying drawings, the first shows a section of this mode of irrigation as first executed, with its system of primary, secondary, and tertiary ditches; the dotted lines show the cross-furrows, by which the water was to be distributed upon the land.

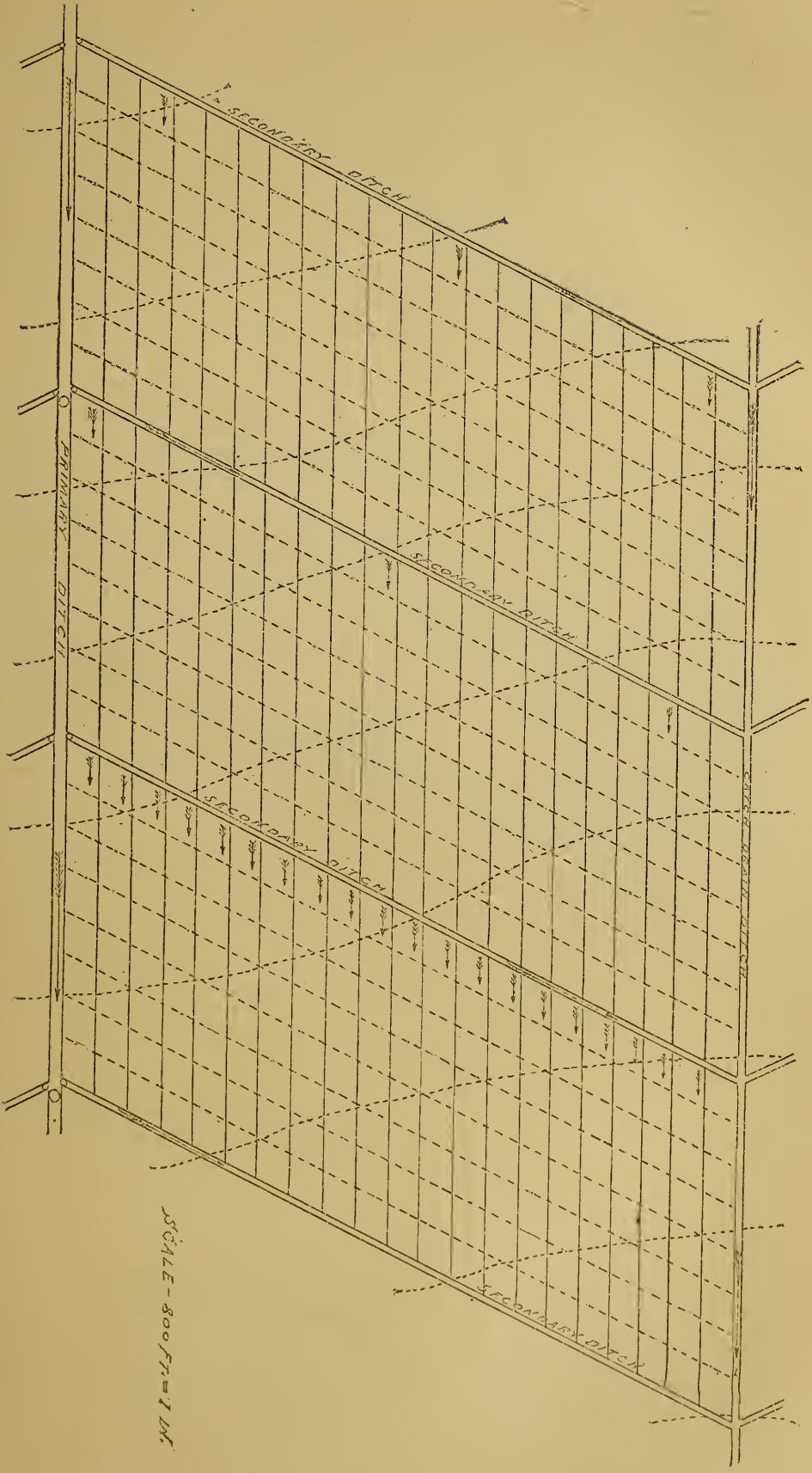
The second plan shows the method which was substituted; the dotted lines show the check-levees thrown up along the contours of equal elevation, the water being supplied direct from the primary ditches. If the surface of the land is steeper than 1 in 12 then the water can be taken around on the highest contour level that can be reached, and suffered to flow over the land in a thin sheet until the land is well irrigated.

Where the water has thus been permitted to flow in this manner for two or three weeks at a time, during the winter, if the weather is not intensely cold, — with intervals of exemption, during the milder weather, when the soil could become comparatively dry, — a great improvement in the quality as well as the quantity of the grass, has been noticed. An uninterrupted flow of water has proved to be unfavorable for the choice grasses and only served to encourage the growth of coarse aquatic plants. The flow of the water in winter has been found to counteract the action and intensity of the frost, to a great degree.

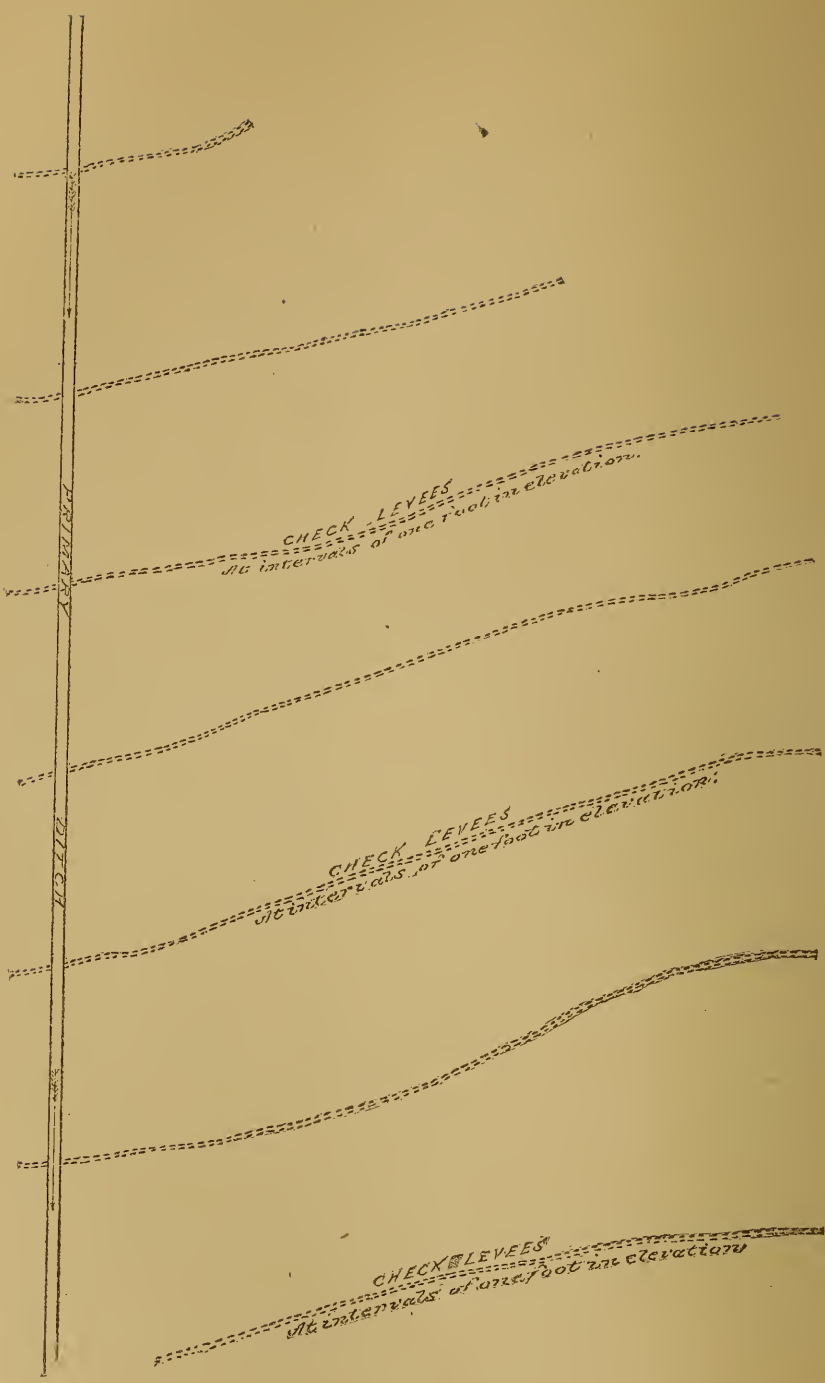
To use water successfully on a tilled crop is learned more readily and effectually with a hoe than with a book. One can get but a very imperfect idea of the operation from any sort of a description.

Arable land, to be irrigated, must be ploughed so that the furrows will lie along the slope of the surface, at a grade of not more than





SCALE - 800 FT. = 1 IN.



SCALE BAR



one foot in twelve. Of course the upper ends of these furrows will commence at intervals beside the ditch, which is higher up than the land. Small holes or checks are inserted in the side of the ditch and stopped with a plug. One of these being removed, the flowing stream is guided by the hoe into the first furrow, and followed in its course along the line by the irrigator, who prevents the stream from getting astray as it works from side to side, sometimes pausing for a moment as the thirsty earth sucks it up, and then, overflowing the slight dam, running briskly to the next hollow; he keeps it in a direct channel of its own, and carefully prevents two or more of the streams from uniting in a single channel, which, if allowed to happen, creates by the union a small-sized torrent, and does more or less damage before it can be stopped. An adroit man will manage at the same time several streams, running parallel with each other.

A very good and successful manner of distributing water upon hoed crops is to plant the rows at a slight grade, as specified before, and when irrigating, to pass the water from the highest to the lowest grade in a wooden box, either 8" × 10" or 10" × 12". In the sides of this box holes 1 inch to 1½ inches in diameter are bored, midway from the top to the bottom, and stopped; blocks, with handles for convenience of manipulation, are inserted below each of the three or four upper holes, and the plugs are withdrawn. When the water is let into the box or sluice, the effect of the upper block is to dam the water back sufficiently to cause it to run out of the hole, it may be on either side (to be followed along the row as before described). The stream also flows over the block, and any surplus, more than can run through the holes, thus passes to the next, and so on until the water is all distributed. When a line of plants has had water enough, the block on that line is removed and the water ceases to flow as it passes down the sluice below the level of the holes. This is by far the most workman-like mode of distributing water; the work is not only better done, but the necessity is obviated of making so many openings in the irrigating ditch. This is called the "tapon" system.

The general method is to conduct each stream until it becomes finally absorbed by the soil and then permit it to run as long as may suit the pleasure or commend itself to the judgment of the gardener. But it by no means follows that each stream must receive the constant attention of the operator while it is running: a skilful irrigator quickly sees how he may set numerous streams running safely, and leave them while his attention is directed elsewhere.

Whatever the locality and whether the irrigation is to be regular or occasional, the methods to be employed are substantially the same, varying only with the circumstances peculiar to each case.

The utility of irrigation on a farm or market garden can be quickly determined by the cultivator from a brief experience; but in all cases where it has been tried judiciously it has proved to be a satisfactory and paying investment.

**COST OF LABOR FOR IRRIGATION.** — This is difficult to determine, because in those countries where irrigation is largely conducted, labor is about the cheapest thing there is, and no accurate accounts or statistics are kept.

In the San Joaquin valley, California, the conditions as to the value of farm labor more nearly approximate to our own, and, in several instances, the cost of laying on the water has been noted for reference.

The labor of one man was sufficient to water 30 acres in twelve hours, with a depth of 0.45 feet or 5.4 inches, at a cost of 5 cents per acre.

Five hundred and twenty-three acres were irrigated in twelve hours by the aid of 3 ditches, at an expense for labor of 3 cents per acre, — quantity of water not noted.

On 1,500 acres of grass land prepared with the check-levee system, when the levees were badly infested by the gophers and considerable expense was required in repairs, the cost for labor was about 13 cents per acre.

One foot in depth was put upon 300 acres in 10 days, at a cost of 10 cents per acre.

In Yolo county, where 9,000 acres of farms and vineyards are irrigated, the cost for labor is from 20 cents to 30 cents per acre per annum.

In the Mussel slough country, the cost of distribution was from 25 cents to \$1.00 per acre, averaging about 50 cents.

**THE AMOUNT OF WATER REQUIRED FOR IRRIGATION.** — This will vary greatly with the locality, character of the soil, amount of rainfall and its distribution, the amount of percolation, the temperature and the crop.

In Italy, as well as in India, the husbandman is not dependent entirely upon irrigation for his harvest, as the total amount of rainfall is very considerable in both countries; but the amount of water furnished by their irrigating canals is so vast and the price so low that the most prodigal use and waste are permitted. A fair

estimate of the best results obtained in those countries would be from 200 to 250 acres of cereals irrigated with one cubic foot per second.

In Spain, however, although the extreme dryness of the climate renders cultivation of the soil well-nigh impossible without irrigation, the amount of grain irrigated by one cubic foot per second is as much as 240 acres, owing, probably, to a more economical use; in one district, where water is very scarce, as many as 1,000 acres have been successfully irrigated with one second-foot.

Considering the relative summer temperature and rainfall of Eastern Massachusetts, it is safe to conclude that this volume of water would adequately irrigate 400 acres in any year; but this amount will vary with the year, the crop, and the soil.

In the great valley of California it has been estimated that 12 inches of water will yield four cuttings of alfalfa (meaning by this, water of irrigation in addition to the average annual rainfall of from 10 to 15 inches), which amounts to 3 inches of water for each crop; that amount is not so effective as 2 inches would be in Massachusetts.

Taken altogether, one year with another, it is safe to assume that one gallon of water per square foot will be adequate for one thorough irrigation, and, making allowances for loss by leakage and evaporation, it is safe to calculate upon 50,000 gallons per acre. If grass land is irrigated once in six weeks a regular supply of 10,000 gallons per day will successfully irrigate  $7\frac{1}{2}$  acres in the driest year.

In gardens and in the cultivation of vegetables, it is not likely that this estimate would be varied much either way: some vegetables might require more water, but the special mode of irrigation required with tilled crops would tend to a more direct application of the water to each plant, and a consequent economy in its use.

Under ordinary circumstances it will be merely requisite to make good the deficiency of the rainfall below the monthly average.

The difficulty with us in our climate is not that we have too little rain in the aggregate, but that it is so unevenly distributed. Often-times by far the larger part of the annual rainfall will come in the autumn and early winter, when it is far less useful than in the spring and early summer. Sometimes as much as one-fourth of the annual rainfall occurs in one month in summer, and then the crops will fail because of excessive dryness during the following months.

Now the problem for us to solve is, how much of the annual supply of moisture is of actual use in support of vegetation, and how much water of irrigation will be required, either at one time or in the aggregate, to average up these fluctuations and save the crops. This can best be estimated from the records showing the deficiency of rainfall, together with the greatest amount of precipitation in single storms. The first topic to consider in this connection is the relative distribution of rainfall.

DISTRIBUTION OF RAINFALL.— During the past forty years the average annual rainfall in the city of Boston has been 50.01 inches, while within thirty miles of Boston it has been about 45.57 inches, with a monthly average of 3.79 inches; varying from 3.22 inches in May to 4.77 in August. Taking the months when moisture is more directly useful to growing crops, say April, May, June, July, and August, the actual amount averaged, during the forty years, an aggregate for these five months of 19.46 inches, while the average precipitation due to those months as  $\frac{5}{12}$  of the year amounted to 19.95, so nearly do the monthly and aggregate rainfalls equalize themselves in a long series of years. But the difficulty, for which we are seeking a remedy, arises from the fact that, while the figures average up well finally, yet the surplus of last year is of no manner of use to relieve this year's drouth, neither does the probability of a superabundance next year make it any better.

One would naturally say, from a casual glance at these averages, that the rainfall was pretty uniformly distributed; but, upon a more careful inspection of the monthly fall, we see that it varies from 0.58 up to 12.38 inches; that in eight years, during the month of May, the rainfall was less than 2 inches, while the average for that month is 3.95 inches. In seven years the rainfall for the month of June was less than 2 inches, while the average for that month was 3.48; the largest rainfall observed in June was 8.09 inches in 1858. In seven years the rainfall for the month of July was less than 2 inches, while the average for that month was 3.54, and the largest fall observed was 12.38 in 1863. In five years the rainfall in the month of August was less than 2 inches, the smallest being 1.18 in 1881, and the largest fall being 10.48 in 1872, against an average for that month, in forty years, of 4.77 inches. Notwithstanding all this diversity and irregularity, the total annual rainfall appears to be gradually but steadily increasing, whenever closely observed; thus the average rainfall in the Eastern States for the decade 1841-50 over that of 1831-40 showed an increase of 6 per cent.

The total rainfall in Boston, for the twenty years from 1862 to 1882, exceeded that of the twenty years from 1842 to 1862, by  $9\frac{83}{100}$  percent. These observations were made by but two men for forty years, and the great variation cannot be attributed to difference of methods.

In New York and adjacent States the increase for the decade 1857-66, over that of 1847-56, was 9 per cent. In Salt Lake valley, Utah, the increase in ten years has been shown to be fully 10 per cent, and has not only been remarked by the farmers but has actually caused a rise of 12 feet in the Great Salt lake.

In 1880 the deficiency of the rainfall in Boston, below the average for forty years was, for the year, 11.12 inches, for the five growing months it was about  $7\frac{3}{4}$  inches, and during three consecutive months the deficiency was 6 inches.

In 1881 the deficiency for the year was only 0.79 of an inch, for the five months it was about 6.80 inches, and for two consecutive months the deficiency was  $4\frac{1}{2}$  inches.

In 1882 the deficiency for the year was 6.19 inches, for the five months it was 7.60 inches, and for three consecutive months it was 5.75 inches; so that the deficiency for the year was brought into the three months when most rain is required, viz., June, July, and August.

In 1883 the total deficiency was 14.53 inches, for the five months it amounted to 8 inches, while  $6\frac{1}{2}$  inches of this were in the three consecutive months of June, July, and August. This proved to be the climax of one of the driest continuous periods of which there is any record.

Now with regard to the rain that falls. It has been observed that it is the heavy rains, giving the earth a thorough saturation, that afford a beneficial influence upon vegetation; therefore let us see what is an average heavy rain.

During the past twelve years, in the city of Boston, the largest amount of rain that has fallen in a single storm was 5.43 inches, — on the 20th of November, 1876. The heaviest monthly storms during this period have yielded more than 5 inches of precipitation but two times; from 4 to 5 inches, 4 times; from 3 to 4 inches, 10 times; from 2 to 3 inches, 21 times; from 1 to 2 inches, 65 times; from  $\frac{1}{2}$  to 1 inch, 28 times; less than  $\frac{1}{2}$  an inch, 15 times; from which we see that 37 of the principal monthly storms afforded more than 2 inches, 43 less than 1 inch, while 65 gave from 1 to 2 inches.

The average of these storms for each month has been, during this period, for April, 1.49 inches; May, 1.20 inches; June, 1.82 inches; July, 1.36 inches; August, 2.04 inches.

These are the storms which furnish the most beneficial supply of water during the months in which the rains have their most useful effect; and it is more than probable that fully one half of the annual summer rainfall comes in little showers that afford but very small benefit to vegetation.

From the figures here presented it must be quite apparent that an irrigation of 2 inches is more effective as a supply of moisture than the average rain-storm.

It is also a fair presumption from these data that a total irrigation of 4 inches during the three dry months of 1883 would have kept the moisture in the soil fully up to its average amount.

It is the percolation of the moisture well into the soil that is to be desired, and not a continuous moistening of the surface. For this reason a ceaseless sprinkling is not so beneficial as an occasional saturation; and the best time to irrigate is immediately after a shower which has simply wet the earth without drenching it. A continual moistening of the surface will only promote evaporation and refrigeration of the soil, which, in a temperate climate, is to be avoided with all crops requiring warmth as an element of success.

Upon the estimate that 4 inches of total irrigation would have maintained an average condition of moisture in the soil during the three dry months of 1883, as before stated, it would have required two irrigations of 2 inches each, at intervals of 45 days. During this period, a 16-foot wheel should deliver not less than 675,000 gallons of water, at a height of 50 feet above the surface of supply, and would thus afford ample irrigation for 13.5 acres of land. This approaches very closely to the previous estimate.

There need be no hesitation in assuming that the cultivator who could have placed 4 inches of water upon his fields, during the past season, would have been more than repaid for the entire outlay requisite to accomplish it, besides enjoying the pleasurable satisfaction of seeing his crops increase, rather than diminish, under the continued bright sun and dry weather.

This irrigation would cost, probably, in interest on investment, repairs and depreciation, about 3 cents per 1,000 gallons, or \$3.00 per acre; expense for labor not over \$1.50 per acre, making a total of about \$4.50 per acre, which is all that it need to cost to irrigate land suitably situated and properly treated.



But, says one, my land is flat, I have no place to put a reservoir, I have no brook, and I need irrigation; what shall I do?

Go to the lowest place and bore a trial well, to see if water can be obtained in adequate quantities; if you can obtain a good well you are all right; if not you must buy water of somebody, or go without.

A well must be sunk that will yield 15,000 gallons per hour in an emergency; lay a line of iron pipes not less than 3 inches in diameter right through your land, placing hydrants at proper intervals. Procure a good, portable, upright, tubular, five-horse-power boiler, as rated by the boiler-makers, which will give you sufficient power; obtain a 7" x 12" direct-action steam pump with the necessary connections, and place the entire outfit properly in a suitable building at or over your well; this structure need not be large or expensive, but it should be strong and substantial, with all safeguards against accidental or incendiary fires. When you have done this you are ready for any emergency. If the drouth comes on and you want water, all that you have to do is to start your pump. Any intelligent man will quickly learn how to make steam safely, at a pressure of 30 to 40 pounds; and the pump will run itself if you only give it steam.

Have a stand-pipe connected with your works, so that there will be no danger of breaking things by starting the pump before the hydrant is opened. No general estimate of the cost of such works can be given that will be at all satisfactory. If it will pay to do at all, the true and economical way is to have it studied and planned by a competent person. The actual cost of pumping ought not to exceed 5 cents per 1,000 gallons, when the works are used as they should be. This would make 4 inches of irrigation cost, for water, \$5.00; for labor, about \$2.00; a total of \$7.00 per acre for the season, allowing as much as 100,000 gallons to be delivered upon each acre during the time.

There are good reasons to expect that an injector may, after all, prove to be the most desirable and economical sort of pumping engine. An experiment, tried by the writer, gave an unexpected result. An injector was placed 20 feet above a reservoir in which the temperature of the water was 60°. The injector was started and the water drawn at the rate of 400 gallons per hour, when it was found that the temperature of the discharge was 82°, a rise of 22° in the temperature of the water, caused by the condensation of the steam necessary to lift it, which is a little more than 1° in temperature for each foot of elevation.

When it is considered that the great objection to the use of water from wells, for irrigating purposes in the heat of summer, arises from its low temperature, and that by this method all of the heat of the steam is utilized in elevating the temperature to a most desirable point, it is reasonable to presume that this mode of raising water may yet prove to be a favorite one with agriculturists, in such cases.

To raise water 50 feet will require a steam pressure of but 35 lbs. An injector of 1,000 gallons' capacity per hour will cost \$25; one of 5,000 gallons, \$65; one of 10,000 gallons, \$75; and one of 15,000 gallons, \$85. These machines are small, and therefore portable and cheap; they are not liable to get out of order, and merely require shutting the steam on or off; a simpler contrivance for pumping cannot be imagined.

While it has been clearly shown how wide are the fluctuations in the annual and monthly precipitation of moisture, it will be necessary, for a full understanding of the relation that rainfall may have to fruitfulness, to consider also the relative temperature for the time being. Thus it will readily be perceived that a low temperature with a light rainfall may accompany a fair harvest; whereas a season of high temperature, with a moderate rainfall, may have a total failure of most crops; on the other hand, a low temperature and excessive rains will blight everything but the forage crops; while a high temperature, with great moisture, will stimulate an enormous growth of grass and afford no opportunity either to cure or to secure it, will promote the growth of mildew and all sorts of offensive fungi, and greatly retard, if not utterly prevent, the maturity of seeds of fruits, as well as the bearing wood and buds of trees and vines.

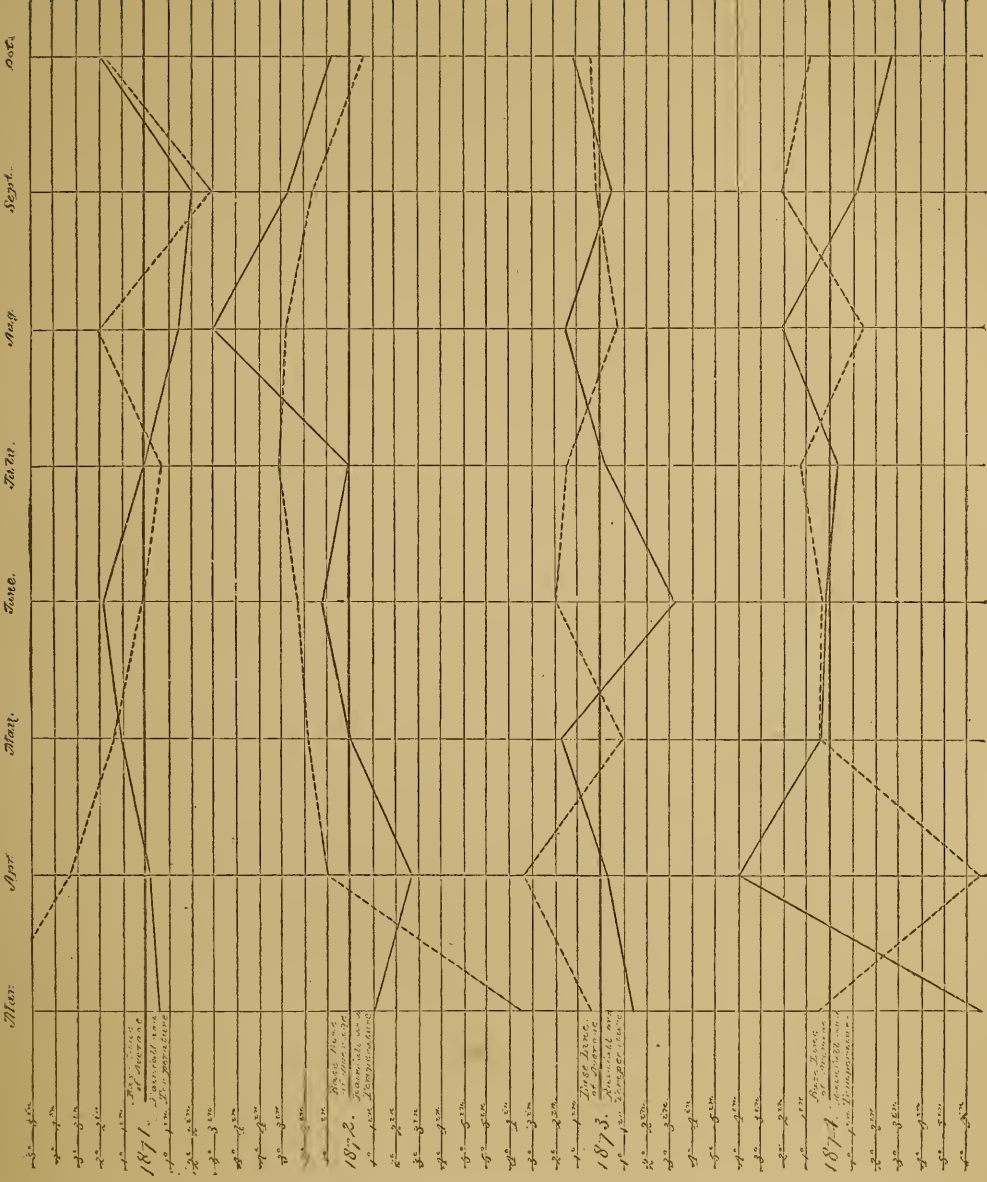
The forage crop generally requires more water and less heat than any other, and is often quite successful in years of the general failure of other tilled crops.

By the several diagrams accompanying, it has been sought to render apparent how a conjunction of these wide fluctuations of temperature and rainfall has been of moment in affecting the several crops as reported for each year. In these diagrams the assumed base line, to which both temperatures and rainfall are referred, has been employed to represent, at once, the mean temperature and mean rainfall for each month, as indicated by repeated observations, over a wide district, extending through many years. The oscillations of temperature are indicated by a dotted line,

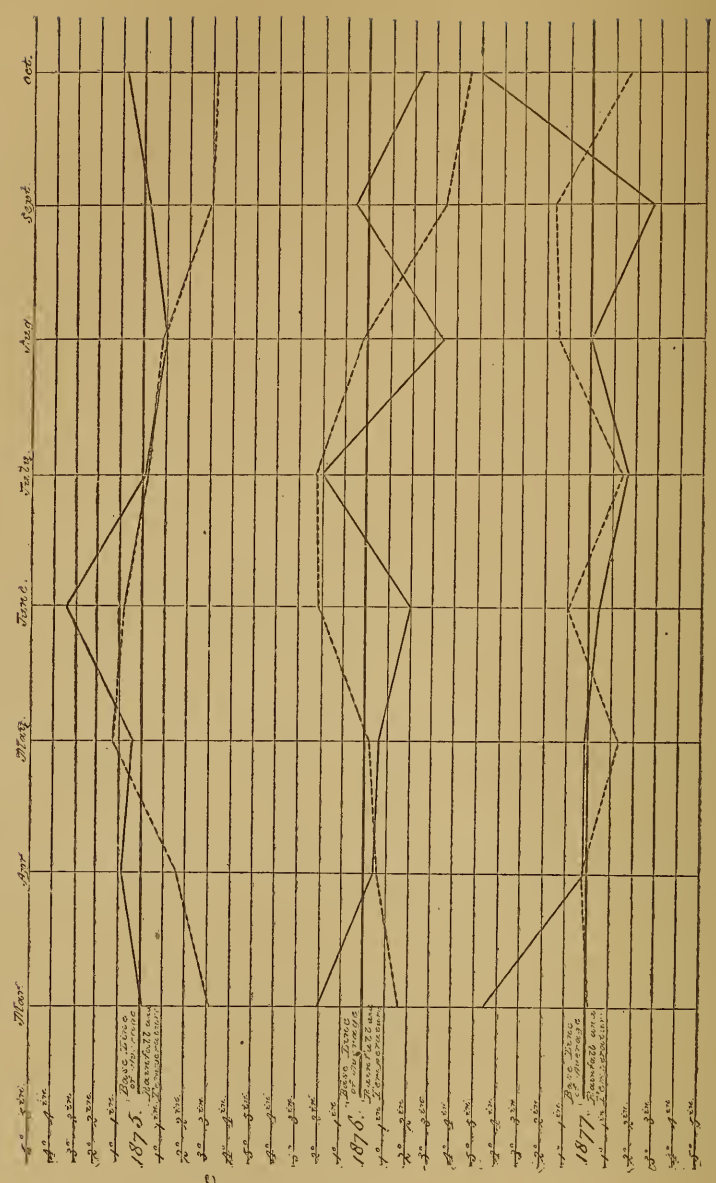
Curves  
of  
Relative  
Rainfall  
and  
Temperature  
of  
Boston  
U.S. Signal  
Service  
Station.

Dotted Lines  
show the Monthly  
Fluctuation of Tem-  
perature.

Full Lines  
show the Monthly  
Variation of Rain-  
fall.

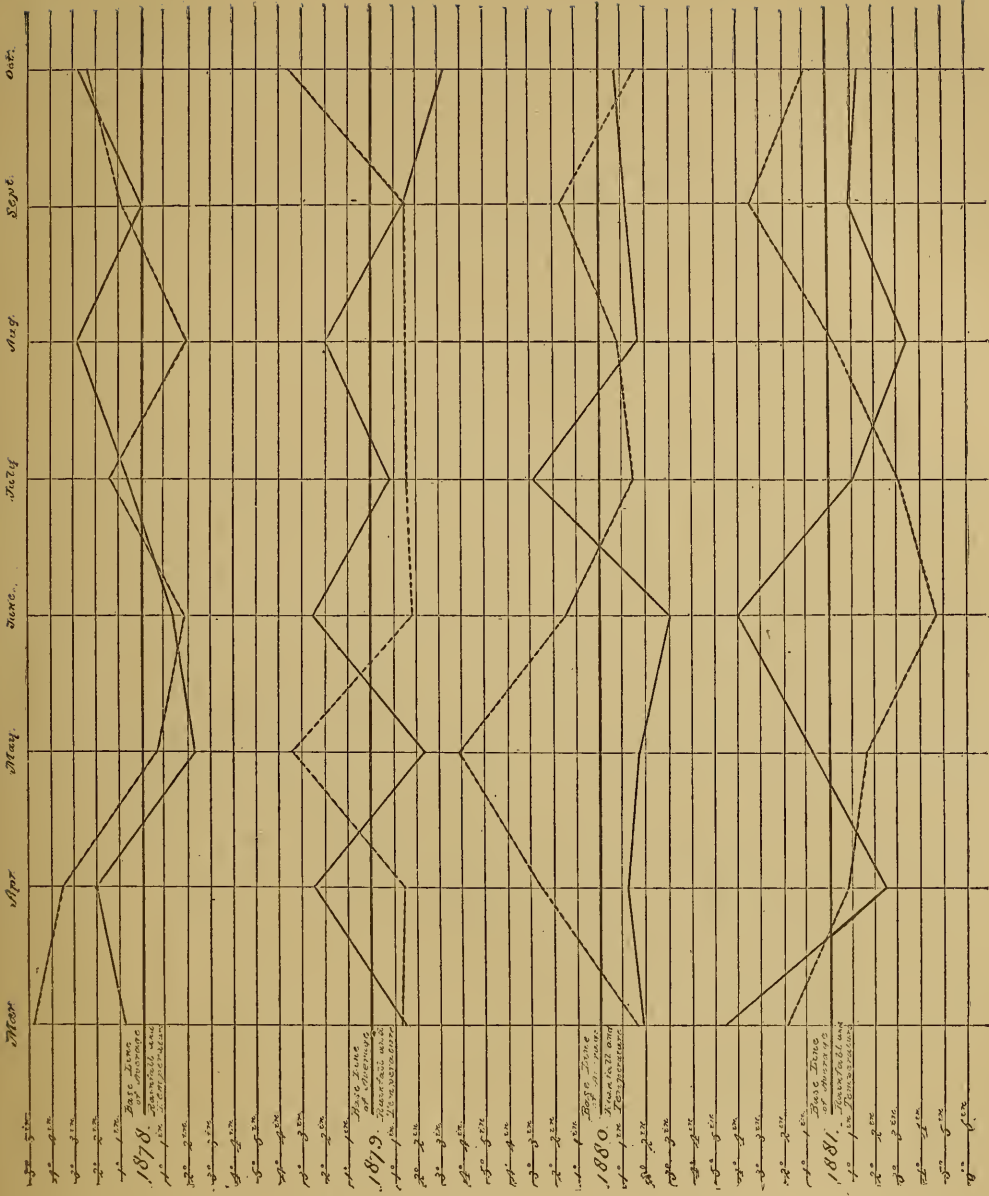


Curves  
of  
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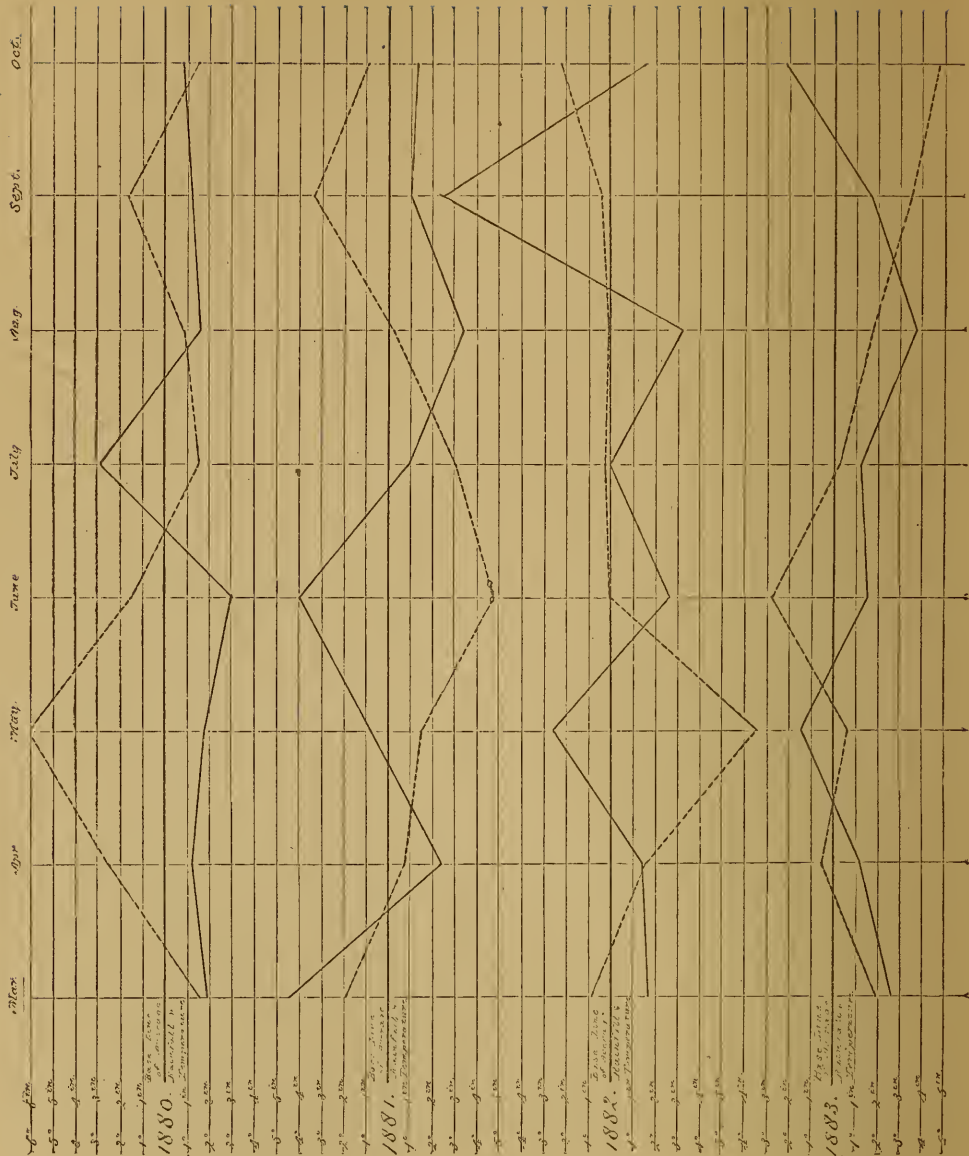
Dotted Lines  
show the Monthly  
Fluctuation of Tem-  
peratures.  
Full Lines  
show the Monthly  
Variations of Rain-  
fall.

Curves,  
of  
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Rainfall  
and  
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of  
Boston  
U.S. Signal  
Service  
Station.



Dotted Lines  
Show the Monthly  
Fluctuation of Tem-  
perature,

Full Lines  
Show the Monthly  
Variation of Rain-  
fall.



Curves  
of  
Relative

Rainfall  
and

Temperature  
of  
Boston

U.S. Signal

Service

Station.

----- Dotted Lines  
Show the Monthly  
Fluctuation of Tem-  
perature.

----- Full Lines  
Show the Monthly  
Variation of Rain-  
fall.

and of rainfall by a full line. As these are drawn above or below the base line, they indicate relatively an excess or deficiency, either of heat or moisture, or both, and a glance is sufficient to make it apparent to the eye whether the season was cold or hot, moist or dry. It will be found, in nearly every case, that there is perfect correspondence between the state of things indicated by the contrasted lines, and records made by observing men who noted the relative condition of the weather and the different crops at the time.

DIVERSION OF STREAMS FOR THE PURPOSE OF IRRIGATION.— In the older and more thickly settled States of the Union the legal rights and limitations, to the use of the water of streams, are pretty well understood and defined. In the absence of any public grant, the language of Mr. Chief-Justice Shaw, of the Massachusetts Supreme Judicial Court, has been taken as the basis of the definition of riparian rights, in the United States, viz. :—

“ It has sometimes been made a question whether a riparian proprietor can divert water from a running stream for purposes of irrigation. But this we think is an abstract question, which cannot be answered either in the affirmative or negative, as a rule applicable in all cases. That a portion of the water of a stream may be used for the purpose of irrigating lands is, we think well established as one of the rights of the proprietors of the soil along or through which it passes. Yet a proprietor cannot under color of right, or for the purpose of irrigating his own land, wholly abstract or divert the watercourse, or take such an unreasonable quantity of water, or make such an unreasonable use of it as to deprive other proprietors of the substantial benefits which they might derive from it, if not diverted, or used unreasonably.”

The general application of this rule has been to divide the use of water into two kinds, natural and artificial. The natural use of water is deemed to be that for domestic purposes and the watering of stock. These wants must be met if men are to inhabit the earth, and therefore they are esteemed absolutely necessary and consequently natural.

All other uses, while they may be proper and conducive to happiness and lawful, are not necessarily indispensable to the existence of man or beast ; in fact they could be very well dispensed with, as they are acquired uses, and therefore artificial. From these considerations, mainly, it results that water may be used from a stream, for purposes of irrigation and for manufactures, provided that a

sufficient quantity is permitted to continue in the channel, for the natural wants of proprietors below and for the preservation of fish.

By a recent decision of a California court, this principle was affirmed and a proprietor on a stream was enjoined from diverting all of the waters of a stream for irrigation; it being decided that sufficient water must be permitted to flow to supply the domestic wants and the stock of the riparian proprietors below.

If a spring flows on one's land, and the water runs over or through a neighbor's land adjoining, all of the water may be used for the supply of stock or domestic requirements. So with a stream flowing through one's land, the whole of the water may be consumed if the natural wants of the proprietor demand it; or the owner below may wholly consume, for his natural wants, what is left and comes to him, and proprietors below have no cause for complaint; but none of the water can be diverted for purposes of irrigation or manufactures until there is sufficient for the natural wants of all below.

When any of the water of a stream, so diverted for any lawful purpose whatever, is not consumed, it must be returned to the stream again within the premises of the person so diverting it. In the States and Territories where there are large areas of the public domain it has been the custom for any person who wanted to make any use of the water of a stream to divert any portion or the whole of it, whether he owned any land bordering on the stream or not. Valuable rights have thus been legally acquired, with no more effort than the simple posting up a notice on a tree, of the intention to take the water, and recording the fact with the county records.

To so great an extent has this abuse been carried in California that in two counties alone, those of Fresno and Tulare, where agriculture is dependent upon irrigation, there were three hundred and thirteen claims, for the control and diversion of the water of Kings river, that had been entered in conformity to law, amounting in the aggregate to 23,899 cubic feet of water per second; while the maximum observed flow of the river was but 9,030 cubic feet per second, and the minimum flow but 210; and the average for the year was but 1,719 cubic feet per second. Thus a paper claim has been set up, by these enterprising forestallers, to nearly three times the maximum flow of the river, and about fourteen times its average.

By the report of the U.S. Geological Survey of the arid lands of the United States it appears that the present and future wel-



fare of more than four-tenths of the area of the United States is dependent upon irrigation. It will be therefore quite apparent that, unless the rights to the waters of rivers and streams in the new States and Territories are more carefully guarded and regulated, there is more to be feared from a water monopoly than from a monopoly in land.

So much injustice and hardship have arisen, under this condition of things, that in the new constitution of California express provision was made prohibiting the further acquisition of what are termed water-rights; that is to say, rights to divert the water of a stream cannot be acquired without a positive grant from the State Legislature.

With regard to the right to water beneath the surface of the soil, the case is entirely different. You may sink wells on your own premises and draw water from them, even though such a use should be attended with the failure of your neighbor's well. Water can be appropriated to private use, to the exclusion of other persons, until it comes to the surface, and even then, unless it forms a perfectly defined stream.

When deep excavations or galleries have been dug for a water supply, in the gravel beds bordering upon rivers whose waters were used for manufacturing purposes, it has been held that such excavations intercepted streams of soil waters which were seeking the river even though they should stand at a higher altitude and at a lower temperature than the water of the river itself; damages have been awarded against the cities and towns making such arrangements for the source of their water supply.

Although the grounds of these decisions have not been explicitly stated, they are presumably, that the use of the water for manufacturing purposes had become a vested right, and that the use of it for the supply of a city or town was not such a use as might, with propriety, be made by an individual riparian owner.

**DETERIORATION OF SEED BY IRRIGATION.** — The testimony of all careful observers, in districts where irrigation is largely practised, is to the effect that very abundant irrigation accelerates the germination and growth of plants, but retards the maturity of seeds; and that, where an excess of water is supplied, the texture of all vegetables and fruits, as well as their flavor, is thereby greatly impaired, besides being rendered much more liable to decay. Dryness is essential to the development of flowers and seed. The deduction from this will be that the best seed can hardly be pro-

duced upon lands that require constant irrigation. The finest flavored fruits are always obtained without irrigation, even in those districts where the practice is rendered necessary for ordinary field crops. Furthermore, it has been observed that where choice seeds have been used in well-watered Italian gardens, although the first crop was of a satisfactory quality, yet the stock rapidly deteriorated in the following years and fresh seed had to be obtained.

Irrigated wheat has a thicker skin and consequently more bran than that raised without irrigation; the color of the flour is slightly darker, but it is otherwise of equal quality. The straw of all cereals has been noted as being rendered tougher by irrigation, and the threshing is somewhat more difficult, owing to the adhesion of the grain to the husk.

**SANITARY EFFECTS OF IRRIGATION.** — There is no doubt that irrigation, as practised in many localities, has the effect to increase and aggravate all forms of malarial diseases; but this fact should not cause us to summarily condemn the practice without examination.

Upon inquiry it will be found that in those districts where irrigating canals have been principally introduced for fostering the growth of rice, hemp, sugar-cane and forage plants, the natural unhealthfulness of the lands, attendant upon the ordinary growth of the crop, is aggravated by the great amount of water that is used by heedless and slovenly management and by the consequent increase of moisture, with corresponding reduction of the temperature of the atmosphere through excessive evaporation.

In one instance which was observed, the amount of water poured over a field of grass averaged more than 3 feet and 6 inches in depth for every day during the entire year. Thus in each 24 hours an amount of water equal to or greater than the whole rainfall of a year, was flooded over the land. It must be expected, as a matter of course, that such a practice, regularly continued, would render any locality unhealthy. But when a sufficient amount of moisture is applied to meet the requirements of vegetation, and no more, and where proper arrangements are made that any excess shall speedily be conducted away by proper drains, instead of gathering in stagnant pools, then and there irrigation will not be found to render the locality at all unwholesome.

In almost all districts where irrigation is extensively used, the extreme abundance and cheapness of the water induces extrava-

gance and wastefulness in its use. Moreover, water is there used to promote the cultivation largely of those crops which, when grown in the more natural way, are of all others the most noted for their unhealthfulness.

In Italy, as well as India, rice and hemp are largely cultivated in this way; in those districts of Spain where water has to be husbanded with care, some crops having to be cut off altogether and left to suffer, hemp is the last thing to be cut off.

SUMMARY.—It is very evident from common experience that injurious droughts are increasing in frequency, and the careful consideration of the subject will develop the following simple but significant truths:—

That whatever may be the cause of this deficiency of moisture, whether it be from the destruction of the forests or not, the simplest and cheapest remedy at the hands of the agriculturist is in irrigation.

That, whenever a supply of water can be obtained, the cost of pumping it will not exceed 3 cents per 1,000 gallons, for an amount of 10,000 gallons per day, pumped to a height of fifty feet above the surface of supply; this cost will include interest on the cost of the fixtures and reservoir, necessary repairs and depreciation; being moreover less than  $\frac{1}{6}$  the price charged by the city of Boston for metered water, and considerably less than the price charged for irrigation anywhere that the present generation has constructed the works, and seeks to make them pay a remunerative income.

That, should a brook or spring be not available, there are few places where an adequate supply may not be obtained by sinking wells.

That the cost and arrangement of the works will vary so much with different locations and circumstances that no schedule of cost can be given, but the cases will be rare where \$750 to \$1,000, discreetly expended, will not furnish ample water for the irrigation of fifteen acres of tillage land.

That the preservation of a single crop in a year of unusual drouth would reimburse the whole expense.

That the positive assurance of immunity from the effects of drouth should induce all cultivators to secure at once the means of irrigating their lands, if possible.

That, besides the security afforded in the case of an excessive drouth, it will be found that water can be used very profitably, in almost any season, with a great variety of crops; and, lastly, —

That the great wonder is that our farmers and horticulturists have disregarded this matter for so long a time.

#### DISCUSSION.

Hon. Marshall P. Wilder thought that the essayist had not used too strong language in speaking of the importance of irrigation. It cannot be overstated. With it we are sure of success in droughts, and without it we are sure of failure. It is especially important for strawberries, which are sometimes almost destroyed by drought. We cannot control the clouds, but we can control water. Col. Wilson's elaborate paper is of great historical interest. Mr. Wilder introduced to the meeting —

William C. Barry, of Rochester, N.Y., who, after thanking the meeting for their kind reception of him, said that we have been growing fruits and flowers so easily hitherto without irrigation that little attention has been given to the subject, but we shall soon need to practise watering. He had seen irrigation in Europe, and by means of it we can effect wonderful improvements in strawberries. The subject is prolific and intensely interesting.

Warren Heustis said that by practical experience he had found irrigation exceedingly profitable in the culture of flowers. He uses a windmill, which paid for itself the first year.

W. W. Rawson thought the expense of irrigating would be more than was estimated by the essayist. The speaker estimated the cost of applying 2 inches of water to an acre of land at \$20, when raised by a steam-pump and distributed either by hose or iron pipes. It required two days' and two nights' labor. He prefers a horizontal boiler to an upright one; he has a 10-horse-power engine and a 2½-inch pump. The pump must be moved, and a movable boiler, engine, and pump would cost about \$1,000, and he knows that it would pay in every such season as the last. He agreed with the essayist in regard to the capacity of windmills. The essayist said that water was needed only from April to August, but for the last three or four years he had found it most useful in September. The crops which he watered were cauliflowers, celery, cucumbers, lettuce, and others. He has two windmills, — one with three tanks, and one with one tank, — which are excellent when there is wind enough to carry them. He is getting up a pump to carry round his grounds with two horses, which will pump 50,000 gallons per day. It will require 1,000 pounds of coal and four men, at a total expense of about \$20, in-

cluding two horses part of the time. Water must be carried to the highest point on the land. The vegetables grown by the aid of irrigation are not of better quality than those grown in a wet season without irrigation, but they sell better than if grown in a dry season without watering.

Mr. Wilder thought that the best kind of celery would become pipy with rank growth from excessive wet.

Mr. Rawson thought that the Boston Market celery never became hollow. Celery will not grow well in too wet land, but it does not become hollow. It should be grown in well-drained land.

Mr. Barry said that in the last season, which was cool and wet at Rochester, trees grew only eighteen inches, when they should have grown three or four feet. Celery failed, for the same reason, though they had had it remarkably fine in previous years. The case was the same with gooseberries and other small fruits. Layers made small growth, though the land was all tile-drained.

Mr. Rawson said that celery grows best in cool nights.

Col. Wilson said that water from a clay-pit would be no better than any other except for sandy land. We should avoid getting it too roily, for we do not want merely clayey sediment. What is wanted is enough water to make up the deficiency of rain. The last four years have been the driest known, and we needed to make good the deficiency. He had aimed to show that irrigation is an old thing, and a good thing to-day.

John Fillebrown said that some years ago he laid a 3-inch pipe 100 rods, and pumped from Mystic river, forcing the water 2,200 feet, and getting a stream from a  $\frac{7}{8}$ -inch pipe which afforded 100 gallons a minute. The water was somewhat brackish, but he used it on various crops with success. Afterwards the town works supplied him, and he neglected his own pump; but the town cut him off, and now he is putting in pipes and will soon have a supply of his own. He has used tide-water with success on cabbages, celery, horseradish, and onions. At one time he applied Mystic water to a field of green tomatoes at the rate of one hundred gallons per minute, and had a good crop. When the ground was dry, it was white with salt. He thought that irrigation pays.

William H. Badlam said that Mr. Rawson's point appeared to be that his water cost too much. The expense of raising water 20 feet is about double than that of raising it 10 feet.

Mr. Rawson said that the difference would be only in the amount of coal used; the cost of attendance would be the same.

Mr. Fillebrown said that he found no difficulty in forcing water through his pipes horizontally. The expense of raising it vertically is about one-third more than forcing it horizontally.

Col. Wilson said that a 3-inch pipe is the proper thing, if an iron pipe is to be used. The friction would not be as great in proportion as with a smaller pipe. Friction is a burden to the pump. Second-hand hose from the fire department would answer. He would put on as warm water as he could get, but would put on cold well-water rather than none, though not upon the leaves of plants. Water in a reservoir would be at a temperature of 85° or 90°. The choice might be between the plants parching and using cold water.

Notice was given that at the next meeting the subject would be "The Culture of Dandelions, Asparagus, Spinach, and Brussels Sprouts," to be opened by William D. Philbrick.

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#### BUSINESS MEETING.

SATURDAY, February 23, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed at the meeting on the 29th of December, 1883, to prepare a memorial of Dr. Louis Édouard Berckmans, reported the following:—

The Committee appointed to submit resolutions on the death of Dr. Louis Édouard Berckmans, a Corresponding Member of this Society, report the following:—

*Resolved*, That in the death of Dr. Louis Édouard Berckmans, a Corresponding Member of the Massachusetts Horticultural Society, we have to deplore the loss of one of the most distinguished pomologists of our age, — the pupil of Van Mons, the co-laborer with Esperen, Bivort, and other savants of Europe, and the father of our associate, the Hon. Prosper J. Berckmans, President of the Georgia Horticultural Society.

*Resolved*, That in the character of Dr. Berckmans we recognize his varied and valuable services in the production of new fruits and the delineation and description of those most worthy of cultivation in our own land, and we gratefully record our apprecia-

tion of these services. Especially would we remember him as the friend of this Society, the lover of the fine arts and rural life, and as a benefactor to the pomology of the world.

*Resolved*, That these proceedings be entered on our records, and that a copy be sent to his son in Georgia.

Mr. Wilder added that Mr. Berckmans was a distinguished man in the land of his birth. From his early days he was a lover of fruit culture, and of rural life. He was a man of immense zeal in the culture of fruit and in the promotion of pomology, and originated many new fruits. He brought to this country the residue of Dr. Van Mons's collection of seedling fruit trees, including scions from trees of the eighth generation, and planted more than ten thousand of them at Plainfield, New Jersey. Not many among these have, however, proved of distinguished excellence. He made other extensive plantings at the place mentioned, but circumstances forced him to Augusta, Ga., where he established the nursery now carried on by his son, Hon. Prosper J. Berckmans, also a Corresponding Member of this Society. Here he made an annual visit to the mountains of Georgia, and afterwards planted an orchard in a secluded place at Rome, in the mountain region of that State. He was a most exquisite painter of fruits, and made a collection of paintings of many varieties, with the foliage. He not only effected much for pomology himself, but did a great deal by exciting others to the same good work.

Robert Manning was called on, and spoke of the great variety of Van Mons's seedling fruits received by his father many years ago, when voyages were so long and the means of communication so infrequent that Belgium was much farther away than now, and Dr. Van Mons seemed hardly more than a mythical character. But when Mr. Berckmans came to this country, — a man who had been intimate with Van Mons, Esperen, and other Belgian pomologists, and was familiar with the history of all the new Belgian fruits raised by Van Mons, or collected by him, — the information he imparted to us threw a great deal of light on what had before been obscure and uncertain, and seemed to give reality to what had previously appeared dim and unreal.

The resolutions were unanimously passed.

Adjourned to Saturday, March 1.

## MEETING FOR DISCUSSION.

THE DANDELION; ITS POSITION AS A VEGETABLE, ITS VARIETIES,  
AND THEIR QUALITIES. THE CULTURE OF ASPARAGUS, SPINACH,  
AND BRUSSELS SPROUTS.

William D. Philbrick had been appointed to lead the discussion, and said that the Dandelion holds the first rank in the list of spring greens. Its earliness, the mild and pleasant bitterness of its flavor, its healthfulness as an article of food, the ease with which it is grown, and the certainty with which it produces a crop in our changeable climate combine to give it a first place in favor both with marketmen and consumers.

It is only recently that the dandelion has been much cultivated, and when the attempt was first made it caused considerable merriment. The first man who cultivated for Boston market was Deacon Corey, of Brookline, who began about 1836. The marketmen of that time used to call them "Deacon Corey's grafted dandelions." Now they are grown by the acre. The seed was at first obtained by selecting the largest of the wild dandelions; lately, however, the French dandelion has been generally used, being larger, and since its introduction it has been much improved in color and appearance.

The dandelion is always treated as an annual by the gardeners, who plough under the old roots as soon as the crop is taken, and use the land for melons or squashes, for the crop produced from old roots is much inferior to what is grown from young ones. The land suited to the crop is any good garden soil; sandy land will bring them early, but strong, rich land will bring a heavier crop. It is a gross feeder, and will take a large quantity of manure. It is desirable to have two pieces, one early, the other late, for late ones are often the most profitable, after the glut is over. They may be planted on a warm slope for an early crop, and on a cooler exposure for a later, or under the shade of apple trees for still later.

A good deal depends on the proper preparation of the soil for dandelions, for the seed is very small and delicate; if sown deeply it will fail to germinate, and if sown near the surface it will sometimes fail in dry weather. For this reason it should be sown as early as possible, and the land should be made very fine by fre-



quent rolling and ploughing. It is also very important to have good fresh seed; and many gardeners raise it themselves. In the field the cutting begins in April, before the plants are half-grown, as they bring a better price then; early in May they come in so freely as hardly to pay for marketing.

The dandelion is very easily forced under glass. The roots may be transplanted in September or October to a cold-frame, and set quite thickly. The glass can be put on in January, which will give a crop about the middle of March, when the glass can be placed upon another bed, and they will come before those grown out of doors. If it is desired to have dandelions in February they can be grown in a greenhouse by transplanting the roots; but they seldom produce so heavy a crop thus as can be grown in cold-frames.

The best land for Asparagus is a deep, sandy loam, free from stones or lumps, which cause the young tender shoots to come up crooked. The land is prepared by ploughing deeply and working in a heavy dressing of manure. It is then harrowed, and thrown into ridges four feet apart, with a large plough going three or four times in the same furrow. The furrow is then cleaned out with a shovel, and the plants are set a foot apart, with a little fine manure around them, in the bottom of the furrow. The object of this deep planting is to get the roots down so that a small plough can be run over them to kill weeds without injury to the crop. The third year from setting it will bear cutting. It should never be cut after the 20th of June, unless the market is very brisk, as late cutting injures it.

The bed should be manured every year; if this is done in the spring the manure should be fine and free from lumps; in the fall, lumps are of no consequence. The manure is spread and ploughed in, or worked in with a disc harrow. The land is worked again, after cutting is over, with a harrow or plough, and with a cultivator as the crop appears above ground. In early spring, or in autumn, before manuring, the tops are cut off and burned.

The plants extend in one direction, and it is important that they should be so placed that this shall be in the direction of the row; otherwise the row will spread out and become irregular. The chief difficulty with an old bed is that it becomes unprofitable by reason of spreading and crowding. It is not advisable to cut a bed more than ten or twelve years; after that time, it would pay better to plough it up and plant anew. The deeper the soil is worked the better; but for market it would not pay to trench it

deeply with the spade, though it might for amateurs, but the plough should be run twice in the same furrow, so as to stir the ground as deeply as possible. The speaker had used only horse manure and night-soil for asparagus. The horse manure is worked into the ground in the fall, and it will reach the roots some time. The night-soil is applied in summer after cutting has ceased. The plants will take any quantity of manure. If he were away from the city, where stable manure could not be obtained, he would try chemical fertilizers.

There is some difference of opinion among cultivators as to how much has been effected in the way of improving asparagus, by Messrs. Conover, Moore, and others. When Conover's Colossal was sent out, the speaker procured plants, which did not prove different from the common kind. He thought Mr. Moore had been more successful. In every field some plants will be found which throw up larger stalks than the majority; and Mr. Moore dug these up, and planted them by themselves, where they would be fertilized only by each other.

Spinach will rank as second in importance only to dandelions. It is found in the market nearly the whole year. There are two varieties, the spring and winter, the difference being like the difference between spring and winter rye or wheat. Spring spinach is sown as early as the land can be prepared in spring, and is much used as a "catch crop" between dandelions, onions, beets, horseradish, parsnips, or any other vegetables that are slow to start. The spinach can be cut in five or six weeks, and does little harm to the late crop. There is some demand for spinach during the summer, and, for the purpose of supplying this demand, seed is sown every ten days. The growth in summer, however, is apt to be small in dry weather, and the leaves are often infested by a maggot so as to be of little value, and the speaker has nearly given up its cultivation during summer. For fall and winter sale the seed is sown at any convenient time from the middle of August to the first of October. The portion sown in August is usually cut up in the fall for sale, or for storage in suitable pits; or it may be cut at any time in winter when the frost is out of the ground for an inch in depth. It will keep well in any pit when the temperature is not too high or changeable; a little frost will make it keep better if it continues frozen. It used to be the custom to house spinach. After cutting it up as late as possible in the fall, it was put in a well-ventilated cellar, on shelves about a foot apart, and six inches deep on the

shelves. It may also be kept in a frame or a pit, like celery. The great point is a low and uniform temperature.

The portion of the crop sown in September is commonly wintered in the field, and cut very early in the spring. It usually keeps better if lightly covered with salt-water sedge, or other similar covering, — just enough to shield it from the rays of the sun. This portion of the crop supplies the market in March and April, and until the spring-sown crop is large enough to cut. The market in winter and March is largely supplied from Norfolk, Va., where it is grown very largely, and can be grown cheaper than here.

Artificial fertilizers are excellent for spinach; sulphate of ammonia, or some other strong nitrogenous manure, may be applied as soon as the frost is out of the ground, and will cause a rapid growth. Much of the fall spinach did not come up last year until October, on account of the drought, and the speaker thought it would pay well to irrigate under such circumstances.

Brussels Sprouts have not been much grown here for market, indeed, Mr. Philbrick knew but one man who had grown them for market, and that only within a few years. They are a variety of cabbage, sending up a stem two or three feet high, with a tuft of large leaves at the top, and on the stalk buds like little cabbages, about as large as a walnut with the outer shell. These are the portion eaten, and are very delicate. They are grown exactly like fall cabbages or cauliflowers, sowing the seed late in May, transplanting in July, and harvesting in the fall, or placing them in pits like celery pits, for winter use. There is a limited demand for the sprouts at five or ten dollars per bushel, but the crop is a very uncertain one, often failing entirely in dry seasons. There are two varieties, the tall one being preferred. They are cooked and used just like cauliflowers.

Samuel Hartwell said that he has a bed of asparagus, of an acre and a quarter, which yielded four hundred dollars after paying commissions. He usually manures in spring, though fall might be preferable; but the spring is more convenient because he collects most of his manure in the winter. It will take all the manure you can afford, and the finer it is the better. The bed can only be ploughed shallow, on account of the danger of injuring the roots. He ploughs as early as the weather will permit, and harrows a week or fortnight later, and, as late as possible without injuring the shoots, goes over it with a bush harrow or leveller, to make the soil fine. He cuts from about the 20th of May to the 20th of June,

though some cut until the 4th of July. The time depends somewhat on how it sells ; but too late cutting will injure the roots. In an old bed the rows spread and make more work hand weeding. He weeds only once before ceasing to cut, and then goes over the bed with a Shares harrow. His bed was originally prepared with a common plough. He does not like to have seedling plants come up between the rows, but sees no effectual way to prevent it. Seed-bearing exhausts the ground, just as cucumbers allowed to go to seed exhaust the ground more than if cut for pickles. He used three or four barrels of fish salt on his bed, but could not say that it did any good.

William H. Hunt had raised dandelions under glass in a small way, and found it profitable. To be profitable they must be got into market when they bring a good price. The question of profit in regard to any crop may depend on the distance from market, and he is a little too far from market to compete with nearer farms or a dull market, especially in dandelions. Asparagus being less bulky than most crops, and requiring a good deal of land is well adapted to farms distant from market. Moreover, only one crop can be raised in a season ; and near Boston, where land is valuable, it must be devoted to such plants as will admit of two crops. At Concord land is cheaper, and there is much light soil, unsuitable for grass, but adapted to asparagus, and consequently it is extensively grown there, some cultivators having as much as eight or ten acres, and finding it a profitable crop. The rent of the land is not counted at all. He would plough as deeply as possible ; if the plough can be got down deep enough there is no necessity for using the spade.

The rows are placed four feet apart, and the plants from eighteen inches to two feet apart in the row. If a crop is wanted quickly they are set nearer ; but the bed would not then last so long. There is no insect enemy of any account ; the speaker had never seen the asparagus beetle, which is troublesome in some places. The crop is never very profitable, but, on the other hand, total failure is never known, though there is considerable difference in different seasons. In a warm season the time for cutting would be shorter than in a cooler one. The receipts are three hundred dollars, or more, per acre, somewhat in proportion to the quantity of manure applied, which is generally from eight to ten cords. Some fertilizers are used ; phosphates or nitrate of soda, or a mixture of them, may be applied once in three years. He had used

saltpetre waste from a powder factory, which contained a small amount of nitrogen. There is a difference of opinion in regard to the use of salt; the speaker thought that the same amount of money put into manure would do more good than if expended for salt. He did not know why asparagus could not be improved by selection, and believed it would be just as advantageous as with any crop. He thought that Mr. Moore had succeeded in improving it. Mr. Moore usually sorts his asparagus into two grades. The speaker could not say that the larger is any better than the smaller, but it brings a better price.

Benjamin G. Smith said that he has a bed fifty or sixty feet square, made thirty-three years ago, and then trenched from thirty to thirty-six inches deep, and it has never failed to furnish a supply for his family. He applies three inches of barn-yard manure annually, and salt to destroy weeds, and the bed is as good as when he bought the place twenty-eight years ago.

Hon. Marshall P. Wilder said that the discussion had established three things,—that an asparagus bed may be made to last twenty or thirty years; that the plants are never infested with insects here; and that the crop never fails. He did not believe expensive preparation of the bed by deep trenching to be good economy; it has been pretty well established that annual applications of manure are sufficient. The great secret in applying manure is to have it well decomposed and near the surface.

Mr. Philbrick said that in the market in New York city he saw two kinds of asparagus,—one white, except an inch at the top; the other like that grown here. The former is grown by running a plough between the rows, and throwing up ridges over them as soon as the shoots begin to appear. It is cut by thrusting a long knife into the ridges, which must be done two or three times a day. It brings double the price of the common.

Mr. Wilder said that the French get monstrous white asparagus by piling manure around the plants, adding more as the plants grow.

Mr. Hunt said that the asparagus which he saw in France was mostly white.

Mr. Wilder said that he cuts his asparagus even with the ground, instead of cutting an uneatable white piece several inches in length below the surface.

President Hayes spoke of eating most delicious white asparagus at the table of a gentleman who got it from Germany canned. He

raises a good many Brussels sprouts, and keeps them in a frame or pit until midwinter. They were not yet gone at the time of speaking. They are very delicious, and he is surprised that they are not more grown.

Mr. Hartwell said that large asparagus is not more than half as much work to cut and pack as small. He does not think the white asparagus as good as the green.

Mr. Wilder said that the late Samuel Walker would have corroborated Mr. Philbrick's view that there is only one variety of asparagus. The speaker believed with Mr. Walker that the reason some is larger than others is that it has more food.

The subject for the next Saturday was announced to be "Seed Growing as a Branch of Market Gardening," to be opened by W. W. Rawson.

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### BUSINESS MEETING.

SATURDAY, March 1, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

Mrs. T. L. NELSON, of Worcester, having been recommended by the Executive Committee, was, on ballot, duly elected a member of the Society.

Adjourned to Saturday, March 8.

### MEETING FOR DISCUSSION.

#### SEED GROWING AS A BRANCH OF MARKET GARDENING.

By WARREN W. RAWSON, Arlington.

As this subject is not a very broad one, but only a branch of another, I will not undertake to describe to you the business of seed growing or of market gardening, but will mention some of the peculiarities of seeds in connection with market gardening. It will be taken for granted that a market gardener must be a seed grower to some extent, because he cannot wholly depend on buying all of his seeds, and must raise the principal part of them.

In raising seeds the best is selected and left to mature, and the

remainder of the crop is sold. In this way only the first or second setting of the fruit is used by the grower, they generally being the best; but this is not the way most of the seeds are grown at the present day. Those who make a business of seed growing save the whole crop, and sell the seed; but it is not so with the market gardeners, for, as I have before said, the best only is selected by them. In this way we can make some calculations what our crop will be, as far as the seeds are concerned. It is not the practice of breeders to keep the whole of their stock for breeding purposes, either of cattle, horses, or swine; and the same rule will apply to seed growing. If the best were sold the stock would gradually run down; but the greatest care is taken in the selection of animals; and it is just as important that seeds should be managed in the same way.

The mixing of seed is a very important point in the management of seed growing, because every kind of the same nature will mix more or less if not kept at a proper distance from each other. This mixing is done by bees, and also by the wind. Two different kinds of squashes, tomatoes, cucumbers, beets, cabbages, or, in fact, any of the different vegetables of the same nature, will mix, and seed saved from them will not be pure.

But, while it is sometimes a disadvantage to have the seed mixed, in other cases it is a great benefit, because in this way many of our new kinds of vegetables are produced. In the business of market gardening the bee is a very useful insect not merely in the mixing of the seeds; in the growing of cucumbers it is almost indispensable. Those who grow cucumbers to any extent always have a number of swarms of bees; and in hot-houses you will always find them.

I have thought that about one mile apart was the proper distance to put seeds to be sure that they will not mix. Perhaps many of you have noticed that a seed grower almost always has two or more farms; and this is the reason. We are very favorably located in one respect for growing seeds, being farther north than most of the land where the larger part of the crops of the country is grown; and the call for northern seeds is always noticeable, because our seed taken south will do as well, if not better, where the weather is warmer and the season longer, than at home; but to bring them from the south to the north will not answer, the season being shorter and the weather cooler.

Another point is the age of seed. Some seeds are good only

one year ; we will except them, and say that all that are good for more than one year are better the second year, or perhaps when four or five years old. This is the case with most all vines, especially cucumber and squash. They will make less vine and more fruit from old seed than from new. Many do not believe this, and that is the very reason that I speak of it, for I know it from experience. Cabbages, also, will head up better from seed two or three years old than from new seed.

The Danvers onion is a very popular variety, and great care must be taken to keep the onions of the proper shape, which is quite round ; but, when carried to a different climate, it has a tendency to grow flat, and it is inclined to do so here, but, by selecting the onions that are perfectly shaped, the seed is kept true. So I might go on and mention something about nearly every kind of seed used by the market gardeners, but I will not take the time to do so now, having mentioned some of the principal ones, and wishing to give others who are here time to speak, as many of them are much older and more experienced than myself.

The business of market gardening is at the present time quite extensively carried on ; and so is the growing of seeds. The cares of one are somewhat similar to those of the other, and they can very easily be carried on together. Very few have attempted it, but I have made a beginning, and expect to make seed growing one of the principal branches of market gardening, and, I hope, one of the most profitable. The call for good seeds to-day is greater than ever, and I think that the prospect for a good, careful seed grower, is as good as in any branch of business that can be entered into.

In closing I will say that what I have stated has been my experience for the past twenty years, and I shall continue to follow out the lessons I have been taught,— although experience is sometimes a very dear teacher, — and continue selecting my seeds with the greatest of care because, by so doing, I shall be more successful as a market gardener, and also more reliable as a seed grower.

#### DISCUSSION.

Hon. James J. H. Gregory was called on as an extensive seed grower, and said that good seed is of the first importance ; it is at the bottom of all good farming. However well the ground may be manured and prepared, if the seed is poor there can be no success. The seed business should be carried on conscientiously : a



great responsibility rests on both grower and dealer to furnish only good seed. The farmer trusts his hope of a crop to the seedsman, and he who knowingly betrays his trust is an unworthy steward. Mistakes, however, will often occur at both ends; the seedsman is deceived in buying his supplies; the grower is sometimes disappointed by unfavorable seasons; and the farmer makes mistakes in planting too early or too late, or too deep or not deep enough, and lays the blame on the seed, when it belongs on his own shoulders.

Seed growing is not what it used to be, when the grower was unknown, and the farmer came in contact only with the retailer. The grower must be wide awake in regard to the introduction of new varieties. There is much want of judgment on this point; but it is the over-sanguine man who goes ahead and introduces vegetables that are new simply because they are such, without first having tested them to determine whether they are in any respects superior to sorts already established. If we threw away all that seedsmen have introduced we should lose a great deal. All the new potatoes, beginning with the Early Rose, have been introduced by seedsmen. The Hubbard Squash had been known in Marblehead for forty years, but nowhere else until the speaker disseminated it. When he first carried them to Boston market he was told that he could not sell them; but by giving them away he made the public aware of their excellent qualities. Besides selling seeds and introducing new varieties, another office of the seed grower is to test the new kinds offered. Sixty varieties of beans, thirty or forty of corn, and other vegetables in proportion, numbering hundreds in all, make up the annual tests in the trial grounds of any enterprising seedsman, and out of all these he is fortunate if conscience and experience allow him to send out half a dozen varieties as acquisitions to our vegetable gardens. An honest man will not send out poor things. It may sometimes be well for gardeners to raise seed; and the market gardeners around Boston have by selection got improved strains of many vegetables, but seed growing is an art which most gardeners cannot attend to. There are many difficulties in the way: the English sparrow is a nuisance of recent importation; many seeds ripen irregularly and must be carefully watched; some seeds do much better on certain soils than on others; for instance, onion seed grown on strong clay soil is heavier, and a larger proportion will vegetate, than if grown on light soil. The crop last year was the same from light as from heavy soils.

Market gardeners know that the quality of seed depends on careful selection of the stock from which it is raised. The old way was to plant the whole crop of cabbages, beets, onions, etc.; and the speaker had seen thousands of pounds of onion seed raised from small bulbs, whereas first-class stock only should be used. In a bad season for cabbages you cannot get a good crop, even from the best seed; but it will be poor, and of irregular appearance. The seedsman should be criticised fairly. It is well for seed buyers to count a small quantity of seed and see what proportion vegetates. Onion seed is tested by sinking it in water, or by winnowing; but this is not a certain test, for old seed may sink and yet be worthless. There is sometimes more than one normal form to vegetables, but they are sometimes criticised as if there was only one standard; in the Wakefield Cabbage, for instance, the conical and the flat forms are both normal. The tendency of improved vegetables is always to revert to the original type.

The handling of seed stock is a very important matter. Onions should be kept in a cool cellar, as near freezing as possible, and not in a mass, but in crates. To keep cabbages for seed the speaker would plough three furrows, and plant the cabbages in them in November, throwing on earth to the depth of from four to six inches, allowing this to freeze, and then covering with eel-grass or other litter so deeply that the ground will keep frozen down to the cabbages until spring. Beets and carrots are kept in pits; but those for carrots should be near the surface, as they tend to heat and rot. The onions are planted first in spring; then the cabbages, and then the beets. In cabbages the vital point is at the tip of the stump. If the heads are very solid they are sometimes cut across, to allow the young shoots to push out. The culture is the same as for other crops. Seed crops are generally harvested when two-thirds of the crop is ripe. Some are gathered in sails, and the seed is beaten out on them; others are teamed to the barn and threshed there. Some seeds, such as beets and carrots, require two or three cuttings. Cabbage and onion seed may be threshed by machines; but machine threshing breaks up the stalks of beets too much. Squashes should be stored and the seed taken out as they begin to decay, and the eatable portion marketed or fed to stock; and this is worth enough to pay for handling the seed. If packed in barrels, before it is sufficiently dry, squash seed will cake together. It should be so dry before it is packed away that it cannot be bent, but snaps.

William D. Philbrick said that he had raised only few varieties of seed, which he was unable to buy. As a general thing he preferred to buy seed, because it is a great deal of trouble to raise it. The chief difficulty in the seed business lies in the ignorance of the public, and their unwillingness to pay for really good seed what it is worth. The best seed of some sorts never sells for what it costs to grow it and therefore is seldom offered for sale. It is to be hoped that in the future a more discriminating demand will arise, and that really valuable seed will sell for what it is worth. The seedsman who has the name of furnishing such seed will, in time, be appreciated, for it is a business in which a good name is worth more than money. A farmer can well afford to pay ten times the common price for seed that is carefully grown rather than accept an inferior article free.

Mr. Rawson, in reply to an inquiry, mentioned beet, parsnip, onion, and dandelion seed as among those that must be used fresh, while cucumber and squash seeds are better when old. Cauliflower seed is one of the hardest to grow; he would rather pay fifty dollars a pound for it than to raise it.

P. B. Hovey said that people want to buy seeds cheap and the seedsmen have to cater for them. He agreed with what had been said about squash, cucumber, and melon seed being better when old; and it has been said that in England the effect of age has been produced by carrying the seed in the vest pocket. These seeds are undoubtedly better when from two to four years old than when fresh, and will grow at ten years. Most seeds are good when from two to five years old. Parsnip seed is not considered reliable after the first year, but the experience of the speaker is that it is good the second year if kept dry. Dandelion seed is better new, but endive is good for four or five years. Cabbage seed is good when three years old. Cauliflower seed is not so easily raised here as in France or England, but it can be got for half the price mentioned by Mr. Rawson.

Charles M. Hovey said that, while the members of the Society appreciate the importance of good seed, the public, generally, think that a seed is a seed, and one seed is as good as another. There are now sixty varieties of peas, and three or four are added every year, but many of the kinds offered as new are only fixed up by selection from old varieties. All improved seeds will run out unless kept up by careful selection. Carter's Extra Early, Dan O'Rourke, and other early peas are so much alike that it is not

worth while to grow more than one of them. If the seed is not carefully selected they will grow from three to five feet high, and be untrue to their kind. The superiority of old cucumber seed to new can be explained on scientific principles: when fresh they are fleshy, and contain pabulum which gives vigor to the young plant; but with age they get rid of the surplus food. Cucumbers and melons from old seed fruit a great deal better than from new: they are shorter jointed and flower at the third or fourth joint, while if the seed were fresh, they might not until the tenth joint. The seed of tuberous-rooted begonias drops easily, but by gathering it when green it can be saved, and by carrying in the vest pocket for four months it will dry gradually, and get rid of the surplus nourishment, and ripen. He had practised this for ten years. Many delicate seeds can be ripened in this way, and thereby get somewhat of the character imparted by age. The difficulty in raising cauliflower seed here is in keeping the plants over winter, and, on this account, it can be raised better in Europe, though they are sometimes killed there. Mr. Rawson is right in the belief that one whose time is valuable, and who has other things to attend to, would do better to leave the raising of seeds to those who make a business of it, rather than to attempt it himself. The speaker had tested seeds for many years, and at this time had a large number of pots under trial. Most seeds are not reliable when over one year old. Beet and parsnip seed will come when older, but he would rather have them fresh; they will come if the season is favorable, when they might not otherwise. Onion seed depends much on the manner of curing. Peas and some other large seeds will keep more than one year, but most seeds are not reliable more than one year. Oily seeds, like those of the Cucurbitaceæ, will keep ten years, and then be as good, if not better, than when fresh.

Mr. Gregory said that he had planted seed of the Symonds beet eight years old, and almost every seed grew. But there is a limit to the vitality of seed, and the question is, Where is the danger point? To test seed of the squash family, snap them in two, and, if they look dark and rancid, they will not grow, but if white they are good. He had enormous heads with only four leaves, of the Extra Early Erfurt cauliflower, from five hundred of which he got only a teaspoonful of seed; and another grower had the same experience; but in two succeeding years he got forty pounds from the same number of plants. Some plants insist on bearing seed and some refuse.

Mr. Rawson said that he sowed his cauliflower seed in December, and let the good ones go to seed when he could get fifty or sixty cents each for the heads. He got a quarter of a pound of seed from cauliflowers that would have brought fifty dollars. Some will yield a great quantity, but not of any value. Henderson's Improved Snowball is the best variety.

Hon. Marshall P. Wilder thought the subject under discussion one of the most important that had ever engaged the attention of the Society. Good seed lies at the foundation of all success in gardening. He was glad to hear Mr. Gregory speak of the responsibilities of seedsmen. He who sells bad seeds to poor men takes away the means whereby they live. Every vender of seeds should test them under his own supervision, and then he will become a benefactor to the gardener; but if he sells poor seeds he is a curse; for he cannot repay him for the loss of his crops. The speaker thought the responsibility for poor seed should rest on the seller. There are many honorable dealers in this city. Let us impress on dealers the responsibility that rests on them. The best seed is seldom sold, but is retained as the basis of further improvement. Seed growing requires great care and constant and watchful supervision. Mr. Wilder advised experimenting in the production of new varieties by hybridizing, carefully retaining everything until it is fully tested. Hybridizing is an art not generally understood until recently, but one which can be practised by all, and it is the great means of improvement in varieties. Mr. Rawson is right in regard to keeping seeds from intermixture.

Leander Wetherell said that he bought oats at a seed store in Boston, and it proved that mixed with them was charlock seed, which he had taken great pains to get out of his land, and it cost him a great deal to get rid of this second sowing. A neighbor bought clover seed, which proved to have Canada thistle seed mixed with it. He recommended examining seeds with a magnifying glass, to detect such mixtures.

John Fillebrown had sown seed of the yellow flat onion that he knew to be ten years old, and two-thirds of it came up. He sowed beet seed fifteen years old, which came up as well as fresh seed of his own raising.

Mr. Wilder said that if he were a seedsman he would never sell seed until he had tested it by sprouting.

C. M. Hovey said that seedsmen keep clover and other seed of two or three qualities and prices, for some buyers would think the

price of the best too high, and want some at a lower price, so the dealer must keep it. He thought that seedsmen ought not to bear all the blame of failure of seeds. Probably the trouble cannot be overcome until the public is educated to understand that the best seed is the cheapest in the end. They cannot judge of its quality by sight, as they can of a coat or a hat, and must rely on something else.

C. Terry said that a neighbor of his took special pains to get the best onion seed, and after waiting more than long enough for it to germinate, ploughed it up and sowed carrots, with the same result. There was nothing left for him to do but to sow turnips, which fortunately came up, but were of much less value than the onions would have been. Here there was not only loss of money, but of labor, and the use of the ground for the season.

Mr. Gregory mentioned an instance where onion seed sown before dinner vegetated well, but the same seed sown after dinner failed. The only difference was that a slight rain came at dinner-time and injured the ground for sowing. Seed should be kept in an even temperature and not exposed to the air.

C. M. Hovey would not put seed in an air-tight receptacle. A barrel or can is not so good as a bag, which allows a slight access of air.

The Committee on Discussion announced that the subject for the next Saturday would be "The Best Work for Horticultural Societies, and how Best Accomplished," and that the Ex-Presidents of the Society had been invited to take the lead in the discussion.

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## BUSINESS MEETING.

SATURDAY, March 8, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting, it adjourned to Saturday, March 15.

## MEETING FOR DISCUSSION.

## THE BEST WORK FOR HORTICULTURAL SOCIETIES AND HOW BEST ACCOMPLISHED.

The Ex-Presidents of the Society had been requested to speak on the subject, and William C. Strong was called on. Mr. Strong said that, in turning the subject over in his mind, a special point had occurred to him. All are agreed that the main work of horticultural societies is to diffuse information by means of exhibitions, the influence of which is felt not only among their own members but among the public generally. It is impossible to over-estimate what has been done by our own Society in this way for the improvement of horticulture all over the country by making known new varieties of fruits, flowers, and vegetables. But the special point to which he desired to call attention is, that it is now time to do a counter work, by warning the public against over-praised novelties. It is important that all good new varieties should be introduced speedily, but an immense injury has been done to horticulture and floriculture by the introduction of new varieties which have been over-praised by their introducers or disseminators. There is a natural craving in mankind for something new, and the catalogues of nurserymen and seedsmen always contain an attractive array of novelties in plants and seeds, few of which are worthy of a permanent place. The case is the same in Europe, but not to the same extent as here, where the evil is stimulated by the readiness to receive new varieties, and the consequence is frequent disappointment to cultivators. The speaker thought we ought however to be progressive, and not too conservative, but should encourage the production of good new varieties.

A proposition was lately made by an enterprising nurseryman, to offer prizes, to be awarded by this Society, for certain new things which he is sending out, and some thought it an opportunity which should not be neglected, to secure the exhibition of these novelties without indorsing them; but the speaker was of the opinion that it would have been impossible to accept the offer without indorsing the articles to a certain extent. The acceptance by the Society of such an offer would almost inevitably have created the necessity on the part of growers to purchase the articles, who would then have become interested and would not have been un-

prejudiced. When the Keiffer pear was introduced all nurserymen of any enterprise were forced to procure it, though they may have been doubtful of its value, and now they all have a stock, and it is for their interest to unload, and the result is that it is lauded as one of the most wonderful pears, and recommended far beyond its deserts; in the Northern States, at least.

The committees of the Society have only one duty, — to pass upon the character of the specimens on exhibition, — and are not at liberty to speak of anything further; and nurserymen cannot state in their catalogues every point in regard to the articles offered by them. It is the duty of the Society to protect its members and the public, so far as it can, against the vast amount of humbug abroad in our land. It should also endeavor to keep up with the times, and not neglect to give attention to new things, but should examine them carefully, and award its prizes and medals only to things of real merit.

The discussions held by the Society have been very useful, allowing experienced cultivators to give the results of their experience in a way they cannot do elsewhere. The speaker thought the discussions might be modified to some extent to advantage. He believed in carefully prepared essays, and would make them more brief and pointed, and would confine the discussions more strictly to the subject of the day, so as to have time for other subjects, such as might be suggested by the exhibitions. He was inclined to call on those holding prominent positions in the Society for comment on the articles exhibited, such as the roses shown to-day. Such comment would be of great assistance to the public.

Edward L. Beard, Chairman of the Committee of Arrangements, was called on, and said that eight years ago he knew as little of horticulture as the veriest neophyte, and his experience as a member of the Society was of no longer date. He was impressed with the importance of the Society as an educational institution. The Society should grow stronger as it grows older, and the secret of this is in filling up the ranks with young men. This is not always an easy matter, for in the pursuit of wealth and power the quiet tastes of the horticulturist are forgotten, and they are too frequently lacking in young men, who are more interested in their horses or in other pleasures.

We should foster the efforts of young men in horticulture, and bring the community more in sympathy with our efforts. Many persons admire flowers who are unwilling to go through the drudg-



ery of cultivation; they have not sufficient enthusiasm, and we should strive to increase the practical love of horticulture, and to bring into our exhibitions all who are susceptible to their influence. If a person has grown a flower or fruit successfully he almost always acquires an interest in horticulture, and the love grows upon him. The speaker thought the Society had taken a forward step in reducing the price of admission to the coming spring exhibition, and he believed that the result will be that many who have heretofore stayed away will now come. If the Society were strong enough, he would favor free admission to the exhibitions at certain hours for poor children.

John B. Moore said that the Society should be in every sense an educational institution; the exhibitions, the discussions, the publications, and the library, should all be directed to this end. By its sympathy with other institutions of similar nature it should strive to create a taste for horticulture. Many of our most eminent men and noblest patriots took more delight and pride in their farms than in public life, and have desired to return to rural life from their high stations. Washington, Jefferson, and Webster are instances. Mr. Strong had spoken of the disappointment experienced in importing new plants from Europe; but to a great extent this is unavoidable. The speaker, before sending for new roses and other plants, waits to see what medals or certificates of merit have been awarded to them. This should teach us to be careful in making awards for novelties, and not to cheapen our medals or certificates by too free distribution.

Our TRANSACTIONS will compare favorably with those of other societies. They should contain all the doings of the Society, and should give accounts of all the objects exhibited, and it is exceedingly desirable that the reports of the meetings for discussion should be ready in season to be used the same year. The publications of a horticultural society should not be devoted exclusively or mainly to setting forth the views of the secretary.

William D. Philbrick thought the influence the Society might exert upon children could not be overrated. He agreed with the Chairman of the Committee of Arrangements in regard to admitting children to the exhibitions free, and would go further and offer a special list of premiums for products grown and exhibited by children under fifteen years of age.

John G. Barker was impressed by Mr. Strong's remarks on the introduction of new things. In some cases the committees have

undoubtedly been hasty in awards to novelties, and there are instances of awards in past years to things which, in a short time, went out of existence. A horticultural society should be not only an educator but an indorser. People look to the awards of this Society to see what they shall grow. They come to the exhibitions of this Society from Lynn (where the speaker has his home) and base their purchases on what they see here, and inquire of him about the productions shown here; and the same is doubtless true in regard to visitors from other cities and towns in the vicinity. The TRANSACTIONS of the Society in the Lynn Public Library are much read. We should keep abreast of the times, but we should be careful about giving the indorsement of the Society to productions exhibited.

Mr. Barker wished that more could be done for the promotion of tasteful landscape gardening, and that the Hunnewell prizes, established for this purpose, might oftener be competed for. The Garden Committee also regret that they do not receive more invitations to visit small places, — from an eighth to a quarter of an acre. Sometimes such places are crowded with plants and shrubs almost thicker than they stood in the nursery rows. The speaker feared that this was too often prompted by nurserymen, who want to sell as much of their stock as possible, and do not understand that one good specimen plant will give that variety a better advertisement than half a dozen in a clump. A horticultural society should endeavor to educate both the nurserymen and the estate owners, and enlighten them in regard to true taste. Looked at merely from a pecuniary point of view a small expenditure for the tasteful planting of trees and shrubs, as well as for keeping the house neatly painted, will increase the value of the estate double or treble the cost of such improvements.

The admission of children to the Society's exhibitions was regarded by the speaker as a step in the right direction. He would send tickets to the North-End Mission and Children's Mission. When a boy, his father gave him plants and ground, on condition that they should be well cared for; and the impression made by the condition of the gift will last as long as he lives.

E. H. Hitchings thought we ought to interest ourselves more in the cultivation of native plants, some of which are handsomer than many of the foreign flowers that have been introduced to our gardens, such as the *Cypripedium spectabile*, *C. candidum*, *Calypso borealis*, *Arethusa bulbosa*, *Trillium grandiflorum*, *T. erythrocarpum*, and *Leucothöë racemosa*.

Ex-President Charles M. Hovey was pleased with Mr. Beard's views. The best work of horticultural societies is education in all the branches of cultivating the earth. He embodied his views on this subject in his annual addresses when president. But things have changed since then ; the older persons are going out and their places are not filled as rapidly as they should be. Mr. Hovey spoke of the Royal Horticultural Society of London, when such men as Sir Joseph Banks, Thomas Andrew Knight, and Richard Anthony Salisbury were, in a former generation, present at the meetings and contributed papers to the "Transactions," and exhibits were made by the nobility and other wealthy amateurs. Now there is scarcely a single plant from them, but they all come from nurserymen. Somewhat the same change has occurred here. We cannot count such gentlemen as John Lowell, Zebedee Cook, Jr., Samuel Downer, and Samuel G. Perkins among our members : they have turned to other subjects. The Society is still growing, but the speaker would like to see more gentlemen of wealth and leisure interested in it, and a less proportion of those who are engaged in cultivation for a living.

Mr. Hovey alluded to the remarks of the Secretary of the Worcester County Horticultural Society on the replies of some eminent fruit growers, to an inquiry in the "Country Gentleman," as to the six best raspberries. The answers, almost without exception, related the experience of market growers, and entirely ignored such varieties as the Orange, Fastolff, Franconia, Knevett, Hornet, and Northumberland ; but we did read of the Souhegan, Gregg, Ohio, Tyler, and Mammoth Cluster, and then "realized that the whole pother had been, after all, only about thimbleberries!" We must not govern ourselves wholly by the consideration of what is best for market, and it should not be the exclusive object of horticultural societies to recommend what will sell best in the market. There is no way in which such societies can accomplish so much as by the offer of liberal premiums, sufficient in amount to be regarded as of value, and to encourage laudable emulation among cultivators. When the speaker became president of the Society, the number of members was six hundred, and the premium list amounted to \$1,200 ; when he retired from office, there were a thousand members, and the premiums amounted to \$3,000. Probably the great majority of awards of premiums and certificates are just ; but sometimes a just award may be misleading. Visitors to an exhibition may think the roses which take the prizes the best for general

cultivation,—and they are the best for those who can give them the cultivation necessary to bring out their merits ; but not all of them are best for those who have not the means to do this. The liberal Prospective Prizes offered by the Society for new seedling fruits have been the means of bringing forward grapes, strawberries, and other fruits, which are now found in every garden. The Keiffer pear is of poor quality,—in New England not above third-rate. Landscape gardening in the vicinity of our large cities is not of as much importance as in past years, and the amount expended on suburban estates is not so much in proportion to other expenditures. A grass-plot is now about all that the average suburban villa owner cares to support. The old style of residence is going out ; the tendency is to the city in winter and to the sea-shore in summer ; and people do not have the practical taste for horticulture, and do not want the expense of keeping up a country residence.

The speaker thought that money was frittered away in trying to teach botany and the fine arts to children, while spelling was omitted. They might get some benefit from visiting horticultural exhibitions, but he would not carry the plan of admitting them free to any great extent.

Mrs. H. L. T. Wolcott was sorry to see the position of Mr. Hovey,—looking back and mourning over the past. We want the work of the young, and she believed in educating children to a taste for gardening. A few years ago an attempt was made to arouse the Society to its duty to children, to the beneficial effect of which the teachers of Sunday and mission schools, which were engaged in the movement, bore witness. The attempt was renewed last year, but too late in the season. Such a movement should be general, for rich and poor alike, and might reach a child whose father has a greenhouse full of flowers which the child has never been allowed to touch, as was the case in one instance which the speaker related. She hoped that florists and horticulturists would bring flowers and children to the exhibitions. The movement for the benefit of children should be in charge of a committee appointed for the special purpose, and having a warm sympathy with the object. She thought medals and diplomas had been depreciated by being awarded to those who had been out into the fields and gathered wild flowers, and hoped that in future such honors would be reserved for those who really deserved them. The Society's medals should mean something. She believes in the people always.

Mr. Hovey said that he did not object to the admission of children to the exhibitions.

Mr. Beard said that his own children are more delighted with a single plant of their own than with all his. One of his little girls has a calla in the greenhouse which she has taken care of for three years. The love of flowers exists, in every child's heart, as certainly as life; it may be latent, but it is there, and may be aroused to activity. How eagerly they watch the opening bud, and how they clap their hands at the full flower! The Society is confronted by one great difficulty in making its awards, which is the commercial value of flowers. At the time of the spring exhibition, roses command a high price, and it requires great effort and persistency to get cultivators to exhibit them. The committee are sometimes compelled to make certain awards for the sake of keeping up the exhibitions. We cannot always stand on that high ground which we should like to occupy, and judge a thing only on its merits. He hoped the Society would have it in its power to offer more and larger premiums in the future. The receipts from exhibitions were trebled last year, showing an increase of interest, and he believed that we should see more in years to come.

Mr. Strong said that all are agreed that premiums are the foundation of success in a horticultural society. But they are sometimes misleading. A large premium was last year offered by a nurseryman and awarded by this Society for a grape which he was engaged in disseminating, but which the speaker believed to be not worthy of cultivation here. He would have, after the reading of an essay, some brief remarks, and then brief, concise, remarks on such points as our shrewd Vice-President (Mr. Moore) had indicated and would avoid rambling discussions. A certificate of merit needs comment to show just what it means, and people who purchase things that they see have taken prizes will inevitably sometimes be disappointed in them.

President Hayes said that the object of the Society is to do the most for the advancement of horticulture and thereby to benefit the members and the public, and we should thoroughly study and discuss the best means to that end. We should all seek to get the best things, and not reject novelties, but be careful how we recommend them, — we should “prove all things and hold fast that which is good.” It seemed to him that in presiding at these meetings it was peculiarly proper for him to elicit information from all, for many of those who possess the most information are often most mod-

est in speaking. The president must have some discretion, and if we lay down any iron rules we shall find them an obstruction to the objects of the meeting. Experience has shown that two hours is not too much to discuss an important subject. He mentioned these points only to show how difficult it is to please all. The Society has been crippled in its means, but it is not meanly hoarding up, and he thought that it might now enlarge its premium list, and at the same time lay up something every year as a sinking-fund for the payment of its debt. It is well to look on the encouraging side, and he thought these meetings had never been so interesting as in the last few years, that the published reports had never conveyed so much information, and that the exhibitions had never been more attractive or instructive. We want the assistance of the Lowells, the Cooks, the Downers, and the Perkinses, and other wealthy amateurs of horticulture, but we want still more the people of humble means. And he was in favor of having the Society do all in its power to promote window-gardening among those who have little or no opportunity for any other.

The subject for the next Saturday was announced as "The Æsthetics of Horticulture," to be opened by H. Weld Fuller and O. B. Hadwen.

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#### BUSINESS MEETING.

SATURDAY, March 15, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

The Secretary read a letter from Hon. Prosper J. Berckmans, of Augusta, Georgia, acknowledging, with expression of his appreciation and thanks, the receipt of the resolutions passed by the Society in memory of his father, Dr. Louis Édouard Berckmans.

Adjourned to Saturday, March 22.

## MEETING FOR DISCUSSION.

## THE ÆSTHETICS OF HORTICULTURE.

By O. B. HADWEN, Worcester.

This subject would inspire almost any other than myself with words corresponding and giving expression to the harmony and beauty of the science of horticulture.

The long term of gray weather and thaw has removed the blanket of snow and ice from the fields and gardens; the ground fairly steams with dampness and evaporation; plants that have long been protected from the zero blast, and from the vicissitudes of winter, by the snowy covering, are now recognized in the aspect which they wore when nature kindly bestowed that covering on them.

We take our first walk among the trees and shrubs, inspecting wood and twigs of late growth; inquiring to what extent the cold has pinched and injured the cells of wood and bark, or even destroyed the bud containing the embryo flower, — the fond hope of spring and summer.

The crocus, hyacinth, and tulip already peep above the earth and through the litter spread over them for their winter protection. The buds of the flowering shrubs look plump and full, but it is yet too early to predict a profusion of bloom. Trees have been divested of dead limbs and twigs by the icy turn, and the ground is strewn with débris. Only a few leaves remain upon deciduous trees; and on the Tulip trees, the dried cups are all that is left to remind us of their last year's verdure and bloom. The grass on the lawn and terrace has not yet browned, and looks even greener than in drougthy autumn. A few short weeks, and the forces of nature will again be active; plants, after their prolonged winter's nap, will awake, like the healthy child, with a sweet smile, and soon be aglow with leaf and bloom.

Trees in immense variety, both indigenous and foreign, adding grace and dignity to the landscape, and whose long lives outlast generations of men, will soon begin to push bud and leaf, and each will put on its habitual luxuriance, and manifest the mysterious orderings of its annual growth beyond the scope of human mind to fully appreciate and enjoy.

But enough perhaps of preface. The paper opening our discussion should at least touch, even if but briefly, the subject of the hour, its sources and its extent. It has enraptured the lovers of nature in all ages, and is none the less fresh as time goes on, since new and suggestive lights are continually thrown upon it. The practice of horticulture has come down from the oldest countries and the earliest generations of men; and yet the mystery of even a single plant has never been solved, nor the study of its features and habits exhausted.

As we view the premonitions of the awakening of nature, we are impressed with God's goodness in creating the infinite variety of plants, flowers, and fruits indigenous to different countries and climates, each and all having form, size, shape, and color, distinct, and beyond comprehension, wonderful. We see the workings of the living principle contained in every seed, and directed by conditions that are beyond the power of the human mind to understand. We note the capacity of plants to extract from the earth and atmosphere food and nourishment, and to develop bud, leaf, flower, and fruit in constant succession, unvarying in type and variety, each true to its kind, — yielding, at maturity, food for man and beast, as well as for insects innumerable; and by decay, in a longer or shorter period of time, supplying food and nourishment to the life and growth of other plants in endless rotation.

We see the Divine wisdom in so forming and arranging the faculties of man that he is enabled to learn and appreciate the marvellous diversity in form and size, and the wonderful and happy blending of color in the tints and shades of a thousand flowers. What in nature is more refreshingly beautiful? Man can understand, to a certain extent, the organism of flowers, — the pistils, stamens, and petals, and their functions, and the microscopic pollen or fructifying particles of the flower, which the scientific horticulturist makes use of in cross-fertilizing or hybridizing, tending, under the guidance of experience and skill, to produce new and distinct varieties, — a process which, with intelligent guidance, seems destined to end only with creation itself. He sees the office of insects in conveying pollen from flower to flower, producing seeds containing germs in variety without number, yet keeping each variety distinct. In the apple and pear, no two seedlings, thus far, appear to be alike; there is but one Baldwin apple and but one Bartlett pear that have ever been produced from seed; and the same is true of the hundreds of varieties that are designated by name.



While horticultural science assures us of the germinal principle of seeds, we are as yet unlearned in the methods by which the qualities of flowers and fruits are transmitted from one to another through the pollen. This remains to be ascertained hereafter.

The study and practice of horticulture has a tendency to raise man to a higher level. It quickens and intensifies his senses of sight, smell, and taste, and increases his mental scope and his capacity for the enjoyment of life. How readily the eye of the horticulturist detects upon our tables a new flower, fruit, or vegetable! How quickly we scent a new fragrance and aroma! How fastidious and sensitive is the taste when a new fruit is brought to the test! How diplomatic yet emphatic is language if it is found deficient in any particular!

Horticulture has largely contributed to refinement and good taste in the embellishment of the grounds about dwellings. Through it the highways are made delightful with trees, gardens are tastefully laid out, forming a pleasure in themselves, and an element of beauty in the landscape. Wherever it touches it gives the impression of wealth and happiness in nature, which it skilfully enhances through contributions rich and unique, coming from different lands and contrasting climates.

The philosophy and science of horticulture seem to have been understood to some extent even in the remotest ages. They are mentioned by Confucius, who lived five hundred and fifty years before the Christian era. Among other things, he says: "Heaven in producing mankind gave them their various faculties and relations with their specific laws; these are invaluable rules of nature for all to hold." He speaks of seed planting thus: "Let it be sown and covered up, the ground being the same, and the time of sowing likewise the same. It grows rapidly up, and when the full time is come, it is all found to be ripe, although there may be inequalities of produce, that is owing to the difference of soil, as rich or poor, to the unequal nourishment afforded by the rains and dews, the different ways in which man has performed his business in reference to it." The Greeks, even back to the fifth century, were not strangers to horticulture; they speak of the details of its practice with as much intelligence, precision, and enthusiasm as do many of the present day; the same general principles seem to have been equally well understood and applied. Fruits were grown from seed, though probably not by artificial cross-fertilization, as now practised by the more intelligent. One of their poets gives a

description of his fruit garden in flowing verses, from which we copy :—

“The branch here bends beneath the weighty pear,  
And verdant olives flourish round the year ;  
The balmy spirit of the western gale  
Eternal breathes on fruits untaught to fail ;  
Each dropping pear a following pear supplies ;  
On apples, apples ; figs on figs arise ;  
The same mild season gives the blooms to blow,  
The buds to harden, and the fruits to grow.”

Thus have I briefly touched upon horticulture, not to elaborate any of its phases, not as a teacher in the culture of fruits or flowers, not even to attempt a solution of the wondrous sciences so intimately allied to it, but only as a student of the farm and garden, and in obedience to the call of the chairman of your committee.

#### DISCUSSION.

Rev. A. B. Muzzey was first called on, and said that the love of gardening is natural to every well-ordered mind. In the practice of horticulture in its highest branches three things are necessary : first, a practical knowledge of the subject ; and to supply this, these discussions are held and papers of a practical cast are read ; and the comments on these give us the experience of our best cultivators. Second, money is wanted, and, with a right spirit and culture, the more the better. He was glad to see men grow rich honestly and furnish the means for refining and elevating pursuits. But, third, comes the question, What is the ultimate object of these pursuits? Is it that men may raise beautiful flowers and form landscapes with beautiful views? Something beyond this is needed. The endeavor to produce marketable fruits and flowers is a most laudable one. Man has an inherent love of these beautiful things, and through them a deep and glorious part of human nature is ultimately reached. Some are content for a time with the practical view ; but sooner or later there comes a point where we must increase the taste for the beautiful. There is among the American people a great lack of culture and taste ; and if this Society does not assist in educating the taste of the community, it will, in part at least, have failed of its object. For every reason

we should cultivate the æsthetic view of horticulture. There is something wanting in any man, whatever his material wealth may be, who has no sense of the beautiful, and does not know what a magnificent world he lives in. The speaker did not wish to be understood as disparaging wealth or any material good; but these things are of the highest use only when that use is inspired by an enthusiastic love of beauty. Why has the great Artist so clothed the world in beauty, but that it may be appreciated and enjoyed by his children?

Edmund Hersey felt that the Society had before it a subject full of interest, and one which ought to engage the attention of all. The book of nature is the most important we can study; for it will lead us up to a higher level. The love of nature is one of the most important things we can possess; it is better than money, for, let a man imbued with it go where he will, he will have lessons of instruction and enjoyment. Money is necessary; but, with that alone, what does life amount to? We want something higher than bread and butter. An individual without a dollar can enjoy much of the beauties and glories of nature. This Society has done much to provide elevating entertainment and information for the public, and the speaker hoped that the discussion of this subject would lead us to something higher than material good, and to see in our fields something more than money.

E. W. Wood said that the refinement of a community may be accurately estimated by its taste in the cultivation of flowers. In the older countries of Europe this taste is far more general than here, but probably, as our country grows older and more mature, a love for flowers will become more general. An enthusiastic admirer of flowers once invited him to visit his flower garden at five o'clock in the afternoon, when it would appear to the greatest advantage. He accepted the invitation, and found a garden of about an acre, with the handsomest display of flowers he ever saw. The owner came out to meet his visitors, but when they inquired the names of his flowers, he hardly knew one, and was obliged to ask his wife, who was familiarly acquainted with them, and derived from them an enjoyment which he could not. The owner expressed deep regret that in his early days he had not acquired more knowledge of botany, for from want of it he was now deprived of much of the enjoyment which his garden would have afforded. Mr. Wood also related an anecdote of the late Joseph Breck, one of the presidents of this Society, who was riding in a horse-car with a

large bouquet in his hand, when a little girl kept passing back and forth before him, and evidently admiring the flowers so much that he took out some and gave her. Some time after, he was riding again, when a little girl, whom he did not recognize, kept passing before him and looking up at him, and on his asking her if she knew him, she replied, "Oh, yes! you are the gentleman who gave me the flowers." The good man turned to a friend who was with him, and with tears in his eyes, said, "We can afford to be at some pains to grow and distribute flowers if they give such happiness as that." The speaker thought that the greenhouse might be made one of the most valuable means of education; he considered it next to the school-house. The study of botany at school from text-books, without the illustration of living specimens, is dry, but with these it may be made exceedingly interesting. He regarded the man who raises flowers where none grew before, as a greater benefactor to the community than he who raises two blades of grass where but one grew before.

Charles M. Hovey was much pleased that the subject had come up, and said that the roses and other flowers in his greenhouse would speak for his love of flowers.

John G. Barker said that he had been much interested by the remarks of the gentlemen who had preceded him, and especially by those of Mr. Muzzey, which carried him back to his first acquaintance with that gentleman, growing out of a common love of the beautiful. They then spent a pleasant hour together, and the ties then formed had strengthened up to the present time. The love of flowers is something that brings us all together. We are all glad to visit the grounds of Mr. Hunnewell, Mr. Sargent, and the President of the Society, and others, and we feel grateful that their wealth is expended not to benefit themselves alone. Mr. Barker spoke particularly of the visit of a committee, of which he was one, to the late Alvin Adams, at Watertown, to solicit contributions to one of the Society's exhibitions, and of the courtesy and cordiality with which they were received, and said that when he remarked to Mr. Adams that he had one advantage over him, in enjoying his beautiful grounds and picture gallery without the expense and trouble of maintaining them, Mr. Adams replied that he had one advantage over Mr. Barker, in possessing the means to provide such enjoyments and welcome others to them, and that this was part of what he lived for. The same spirit actuates the other gentlemen referred to, whose grounds have been freely

opened, and have been a source of the highest and most refined enjoyment to thousands.

Our public parks and cemeteries have tried to do something in educating the taste of the people. The Public Garden, in Boston, has given rare enjoyment to multitudes who had not the time or the means to go elsewhere to see beautiful plants and flowers. Some of the arrangements may be open to criticism, but the speaker was not here to criticise. The adoption of the landscape plan in laying out cemeteries is both the result of improved taste and the cause of further improvement. It was first put in practice in Spring Grove Cemetery at Cincinnati, and in West Laurel Hill at Philadelphia; and now scores of new cemeteries are springing up which are all laid out on this plan. It should not be forgotten that this Society was the first to set the example, which has been followed in hundreds of towns and cities, of forming a cemetery where everything should be done to make the place one not to be dreaded, and it was the intention of the Society, expressed at the time, in anticipation of the instances above mentioned, that Mount Auburn should "ultimately offer an example of landscape or picturesque gardening." The speaker was glad that the plan tried last year, of opening Forest Hills Cemetery to all on Sunday, had proved so successful. The same had always been done at Pine Grove Cemetery, Lynn, of which he is superintendent, and no injury had resulted, but the effect on the visitors was excellent. Our Saviour drew most of the illustrations of his teachings from the flowers, and his words: "Consider the lilies of the field how they grow; they toil not, neither do they spin; and yet I say unto you that even Solomon in all his glory was not arrayed like one of these," justify us in doing all that we can to extend the love of trees and flowers.

William D. Philbrick remarked that he would like more simplicity of taste in gardening than is prevalent, and less of stiffness and conventionality, and fewer expensive and showy attempts at artificial effects. We should try to study what is beautiful in itself. He thought too much attention was given to expensive exotics, and too little to the more graceful and delicate native wild flowers of our own woods, many of which are easily domesticated. No flower of the garden gives him more delight than our wild columbine.

John B. Moore agreed with those who had spoken of the importance of being able to appreciate beauty. He desired to see a taste

for the beauties of nature cultivated to the fullest extent. He agreed with Mr. Wood, that those who possess a knowledge of botany have an enjoyment in flowers which others cannot have. Especially is such knowledge desirable for young men on farms, if they would enjoy rural life. He regretted that he had not himself understood its importance and given attention to it when young.

Nathaniel T. Kidder was very much pleased to hear Mr. Philbrick say something in praise of wild flowers. He is himself fond of making small effects; he had found them more satisfactory than large ones, — planting, for instance, a group of golden-rods in a sunny corner, or ferns in a shady one, to hide unsightly objects.

David W. Lothrop said he was surprised to find so many people who have very little idea of the beautiful. The love of it must, in a measure, be cultivated while we are young, to bring out our latent æsthetic tendencies. One of the greatest difficulties, however, in doing this is the absence of a standard of taste. Edmund Burke wrote on the Sublime and Beautiful, and in later life ridiculed his own propositions. There is some danger, the speaker thought, of overdoing this matter, and getting beyond the bounds of good sense. He related several anecdotes showing the inability of some people to readily perceive the beautiful; one of Dr. Lyman Beecher, who, on being shown a fine landscape painting embracing a man shooting game, simply exclaimed, "He's bagged three of them!"

There is a prevalent idea that the country is beautiful only in the summer; but the true lover of the country knows that it has its beauties in the winter as well. It is certainly cleaner and purer then. He advised the painting of country residences with warm, neutral tints, instead of white, which makes them look cold and cheerless, like snow-banks, and the planting of evergreens around them for shelter or beauty, which, when the limbs are borne down with snow, will look almost fairy-like. He thought it the duty of rich men to retire from business when they have made money enough, and to give beauty to the country as far as they have the ability.

Cemeteries are now made so beautiful that they seem to lessen our regret at death. Downing has been the oracle in landscape gardening, and the influence of his writings has, in the past, wrought a great change in landscape gardening and rural architecture, though these arts (as understood in his day) are now much changed, under the influence of new and fanciful ideas.

C. Terry said that the most beautiful objects in the fine arts

are but copies of the beauties of nature, and the artists who have done their best fall below nature. Those who enjoy beautiful natural scenery stand on a higher plane than those who do not. There is nothing more beautiful than the blossoms of fruit trees; and it is a striking fact that there is no fruit until after the flower, — beauty comes before reproduction. The study of the growth of plants is the study of the Creator himself, and we are never so near to him as when engaged in the study of his works. In this connection the speaker quoted Tennyson's lines: —

“Flower in the crannied wall,  
 I pluck you out of the crannies,  
 Hold you here, root and all, in my hand,  
 Little flower; but if I could understand  
 What you are, root and all, and all in all,  
 I should know what God and man is.”

It was announced that on the next Saturday William T. Brigham would give some account of his observations of vegetation in Central America.

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### BUSINESS MEETING.

SATURDAY, March 22, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

No business being brought before the meeting it adjourned to Saturday, March 29.

### MEETING FOR DISCUSSION.

#### THE GUATEMALAN FORESTS AND THEIR FUTURE.

By WILLIAM T. BRIGHAM, Boston.

For more than three centuries the forests of Central America have been pictured in the popular imagination as the chosen home of nature's most vigorous work, whether in the vegetable or the animal kingdom. Ever since Hernan Cortez forced his way through their mysterious recesses, in that wonderful march of his from Mexico to Honduras, those forests have been looked upon

as no fit home for man in his higher development. Trees of immense size and bizarre forms, palms, orchids, and ferns, covered the land and even encroached upon the beds of the rivers and lakes. Monkeys of many sorts lived on the topmost branches, and chattered defiance to the jaguars on the lower stages. Huge boa-constrictors hung by their tails and whipped up the unwary deer, whose companion had just fallen prey to the alligator, in the reeds by the drinking pool. Vegetable fences more annoying than the execrable barbed wire, armed with poison as well as thorns, barred every path to man, while giving free passage to serpents, alligators, jaguars, and a host of smaller annoyances. When man rested from his weary labor in cutting through these tough defences, centipedes and scorpions lurked in the fallen log on which he sat, or ants, more terrible than either, penetrated every crevice in his clothing; mosquitoes bit him, vampires sucked his blood, jiggers laid their eggs in his flesh, and the cries of birds, beasts, and insects drove sleep from his eyes. To these visible enemies came that terrible ally, invisible and dreadful as the "kenaima" of the Indians of Guiana, the "pestilent congregation of vapors" that engendered fevers and plagues.

It was not an attractive picture, and it is not strange that the crowded, starving denizens of our cities did not gird their rags about their loins and journey southward to that region of plenty—of plagues—"muchas plagas," as the Indian of today exclaims in his fruitless endeavor to escape fleas and flies. Were this a true picture it might well be left with its face turned to the wall of the Cordilleras, while busy man works and thinks over that part of God's earth that is at least easier to subdue and tamer when conquered. Popular imaginings generally have but a very small kernel of truth in them; even in a great and enlightened country the real truth is usually cherished by the constantly outvoted minority. In the matter of tropical forests the minority found out early in the seventeenth century that there were at least two things in the forests of Honduras and Yucatan worth braving all dangers for,—mahogany and logwood. Until recently, however, little else was known about these forests than that they were difficult of access, and, except to the naturalist or hunter, little attractive.

Some forty years ago notice was first taken in a trustworthy way of the remarkable remains of a former civilization that once lived and built cities, and carved monuments and altars, where



now are seemingly primeval forests. The hardy explorer, on felling some mighty tree, found himself face to face with a stone image of gigantic proportions, elaborately carved, and bearing on its sides long inscriptions in an unknown tongue. Further search brought to light many other remains, until now a score of cities has been unveiled and partly described in the dense forests of Central America. I refer to these remains, some of which I have myself seen, only to show you that these forests, so ancient in appearance, are subsequent to a time when man — highly civilized man — dwelt on the rich plains where now trees are uprooting and vines are pulling down his sole remaining monuments.

Let us first examine the forests of the shore region, which, with the exception of portions of Yucatan, extend from southern Mexico to the Isthmus of Panama and into South America; and they are not confined to the shore limits, but follow all the great rivers, as the Usumacinta, Polochic, and Motagua far inland, filling their broad valleys with an almost unbroken sea of vegetation. I have seen the forests from Aspinwall to Panama and along the Pacific coast of Central America; but my explorations have been limited to those of Guatemala, which I believe to be fairly typical of the whole.

Along the salt-water we may have simply groves of coconut or the dense and undesirable Mangrove (*Rhizophora Mangle*), which is excellent for posts, as the dark red wood is very hard and durable, but not straight; and beyond this shore belt, whether wide or narrow, the forest begins. As we enter, one point strikes us in which the forests of the tropics differ widely from those of the colder regions. In Europe, even more than in North America, forests are often composed almost exclusively of one kind of tree, — the oaks, the pines, the firs, the beeches. With us, we see Hackmatack clannishly gathering in one part of the country, while the Redwood (*Sequoia sempervirens*) meets all by itself in another; and if we find the oak, walnut and chestnut altogether in one woodlot, we have at least many of each species. In the tropics you may stand in almost any forest path and not see more than one tree of a kind, — there may not be a dozen of a kind to the square mile. It is like a vast collection of samples only. To this broad statement there are exceptions to be noted presently.

The sense of confusion is almost like that one feels in a strange city in the bustling market-place, where all is active eager life, and every face unknown. Trees we have known from a few withered

leaves are now unrecognized because they are living and not dead, and their tall stems put out of reach and almost out of sight the foliage, flower, and fruit. I have looked for many minutes before I could determine from which tree certain blossoms or nuts lying on the ground had fallen. It is not due to any especial crowding of the trees,—the virgin forest is not crowded,—for the huge patriarchs, like so many human chiefs, extinguish and crush out the younger race at their feet. Hence the forests are generally open except on the banks of rivers and near clearings. There is no sod, whether of grass, as in the Eastern States, or flowers, as in the West; only the bare earth close up to the tree.

When one is at last able to orient himself, and place in its relative importance the vegetation around him, another perplexity arises. Here, we are aware that an ordinary tree is a camping-ground for innumerable smaller plants, mostly lichens or mosses; but these are relatively so small that, except perhaps the *Usnea* of our spruce swamps, they attract no attention. Even the mistletoe is not important enough to make us lose sight of the oak on which it grows. In the tropics all is changed; one branch of a tree is loaded with attractive crimson blossoms, not unlike a *Bouvardia*, while another has the pale-green feathery flower of an *Acacia* or *Inga*, and it requires a careful examination to determine which is the interloper. Whatever may be the case with humanity in these regions, vegetable society is decidedly mixed; but the social element predominates to such an extent that an isolated tree—a vegetable bachelor—is a great rarity. Parasitism is fearfully prevalent. Seeds germinate high up on a branch where some bird may have left them; as they grow they cling to their foster parent, throwing their stem and branches high above her, crowding her out in the struggle for life until—poetic vengeance—her decaying trunk drags in its fall her murderous parasite to the dark shades of the under forest, where withering death awaits it. I have often seen branches so loaded with *Orchids*, *Peperomias*, or *Bromeliads* that the weight of these after a shower broke down the branch, throwing into the river beneath what would stock a hot-house.

Not less important than the ordinary parasites are the vines which hang from tree to tree, and play so large a part in the useful arts of the forest ranger. I have crossed a torrent more than a hundred feet wide on a scientifically constructed suspension bridge made wholly of these vines; I have lived in houses where every

post, and beam, and rafter, and all the palm-leaf thatch was bound together by the smaller vines. You may mend your bridle, catch your fish, tie your shoe, with these vegetable cords; and it is hardly necessary to say that their rough fibres block up the paths and require an almost constant use of the machete<sup>1</sup> to clear the way. While I do not know that these creepers bear any edible fruit, — indeed, I have seen the leaves of only three or four kinds besides the sarsaparilla, the long slim bodies bearing leaves only high up on the tree-tops, where the foliage is indistinguishable from that of the supporting tree, — and they give nothing to eat, one large kind, the *Vejuco de agua*, or *Vejuco de estrella*, is a most refreshing source of water, yielding, when cut in yard lengths, a cupful of clear, cool, tasteless water from each length, — a most refreshing beverage in the close, hot forests. It may be interesting to some of my hearers to know that the much sought sarsaparilla is a very troublesome vine, often as large as one's finger, bright green, and, like its northern kinsman, the "wait-a-bit" thorn (*Smilax*), is armed with large hooked spines. The portion used is the fibrous root, which is removed, and the docked stem replanted, with no worse result than a temporary suspension of growth. Another vine or liana (*Bauhinia*) is exceedingly curious, from its close resemblance to a chain when age has accentuated the different rates of growth between the middle and edges of its flat, ribbon-like stems.

If I have left the pillars of the forest until the last it is because I cannot describe them without covering the whole extent of arboreal forestry in the tropics. A picture of one conveys no idea of another, and I can only, in the confused way so natural to a tropical forest, describe here and there a specimen.

I know you will first expect to hear about the palms, which are perhaps the type of tropical vegetation. I need not describe the Coco palm, as it is not a forest but a shore tree, loving strongly the salt-water. Next to this comes the Cahoon (*Attalea cohune*), a tree of medium height, the stem covered with the butts of perished leaves, while from the base of the cluster of pinnate, feathery leaves which crown the trunk hang several large clusters of nuts of the size of a pullet's egg. These contain a valuable oil, but are so hard as to require peculiar machinery to crush the tough shell. Many tons could be gathered with little labor, and the supply extends all along the coast. When young the Cohune is called

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<sup>1</sup> A long, heavy-bladed, straight-edged knife.

Manàca ; when age has removed the leaf butts and left a smooth stem it is called Corosa. This palm grows only in the richest soil. The Manàca is stemless, but sends up a grand cluster of pinnate leaves, even thirty feet long ; which meet in graceful curves above the paths, in many places forming aisles and groined arches worthy of imitation in any Gothic temple. The leaves are the most important article used for thatching, lasting, under favorable circumstances, six or seven years. It is interesting to watch the building of a *champa*,<sup>1</sup> in which the palm leaves play a most important part. A half-a-dozen men select and clear the site in the forest, and then scatter in search of suitable trees for the frame. Soon the blows of their machetes are heard on all sides, mingled with the crash of falling branches. After a little while they meet again, each with his house-stick ; and I was always strongly reminded of the labor of the ants, for, while there seemed little or no foretalk or consultation, each brought suitable sticks ; two, the large aucones, or house-posts, others the braces and rafters and ridge-pole, mostly of the slim, durable Santa Maria tree. Perhaps half a day was consumed in gathering the materials, and the rest in tying the frame, skilfully planned, together with vines which shrink in drying, and bind the joints very firmly. Next day the manàca leaves are split in halves (the midrib being as large as a man's wrist) and tied to the frame of the roof, and the house is completed by a carpet of smaller palm leaves. Not a drop of the heavy tropical rains can find its way through this thatch.

There is a small, slender palm, whose buds are eaten as a vegetable. The Indian name is *pacaya* ; but I do not recognize the genus (*Chamædorea*?). The very common *Astrocarya*, its slender stem armed with spines, has also an edible but not very attractive fruit ; and the same remark applies to the *Desmoncus*.

Of the better known trees the Mahogany (*Swietenia Mahagoni*) is found in abundance, but so ponderous is its timber that only near streams can it be readily got out. Not only is this a most valuable timber, but as a tree it is preëminently majestic. I was impressed eighteen years ago with the rows of these grand trees cultivated in the Botanic Garden in Calcutta ; but in its native forest it far surpassed those feeble representatives. Towering nearly one hundred and fifty feet high, its thick head far above the dense foliage, and its stem sometimes twelve feet in diameter, it is

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<sup>1</sup>Corruption of camp.

not easily forgotten, and I should place it beyond the Sequoias of California in impressiveness. It is noteworthy that while the mahogany of Mexico is softer, and commands a higher price in this country, that of Guatemala and Yucatan is heavier and harder, and is of greater value in England. Mahogany land is valuable not merely for a single cutting, but in thirty years the tree has grown again to a size of two or three feet in diameter. The life of a mahogany cutter is not an easy one, for when the hunter of the gang has found the trees, — and the clumps may be miles apart, — roads have to be cleared to the nearest stream and everything made ready to move the heavy log rough-hewn, — it may be four feet square and thirty feet long, — as soon as the dry season has sufficiently hardened the soil. The logs are finally squared on the shore before shipment. In Guatemala benches, stools, paddles, wash-tubs, etc., are made of this fine wood; and I have seen the last carved from a single butt five feet in diameter.

A tree called a cedar, but not even a conifer, is much used for canoes; and I made a voyage of seven days in one fifty feet long and five and a half feet wide, of good model and strong. But it is not merely in size that the trees are remarkable. Owing to the looseness of the soil and the small extent of root required to nourish the tree in such extraordinarily rich land, some unusual support is necessary to steady the trunk, and large buttresses are thrown out twenty or thirty feet from the cylindrical stem on all sides, and, as in the case of the well-known Paddle tree of Guiana, these wings are thin and plank-like, and form recesses, one of which measured thirty-five feet across. This formation appears on at least a dozen different trees, including the Guava, a tree generally noted for the roundness of its smooth trunk when grown out of the forest. The Ceiba (*Eriodendron*) exceeds others in the number and extent of its buttresses, while the specimens I have seen isolated in court-yards or public places exhibited no such formation, although I measured one at Sacapulas forty feet in circumference. Not unfrequently these projections imitate the flying buttresses of the Gothic architects and become partly detached from the main trunk, splitting so as to form ladders by which one can climb to a considerable height.

As the economic as well as the picturesque features of the forest presented themselves to me I was puzzled to know how my Carib wood-cutters would fell such monsters in clearing the land. They built a stage high up at the point where the buttresses coalesced

with the trunk, cut the tree there, and left a stump some fifteen feet high, which the ants or other insects would remove in the course of another year.

Many of the trunks were white or gray, like birches and beeches, and on these the Vanilla plant was often found. The India-rubber of this region is not the favorite house plant, the Ficus, but a very different tree, *Castilloa elastica* (Urticaceæ), a rapid grower, and common in the forests and by the pathways. The improvident cutting of very young trees has now been stopped by the government, which also offers a bounty for the cultivation of this valuable plant, which has hitherto been left, as the sarsaparilla still is, to the Indian collector, who brings in the gum in flat masses weighing from one to three *arobas* (twenty-five to seventy-five pounds.) The Cacao comes next in importance, and I have found pods containing thirty-five nuts, of a quality finer than that of Caraccas, growing wild in the forests of the Chocon. The blossoms being on the trunk and not on the branches, give a peculiar appearance to the tree, which otherwise is not unlike a beech. I must pass by the acacias, rosewood, and sapotas, only mentioning that the last two are much used for posts and underpinning, as they do not readily decay nor are they eaten by insects.

Perhaps the two most characteristic forms of tropical vegetation are the Palm and Banana, and the latter in some forms appears in almost every forest view, the wild forms having tougher leaves and most curious inflorescence. The members of the ginger family look much like dwarf bananas, and some, as the *Alpinias* and *Hedychiums*, are very showy.

And what of the flowers in all this vegetation? First, I would place the wonderful Palo Cortez, a tree of considerable size, which was in December literally covered with blossoms of the color of the Judas tree (*Cercis Canadensis*), but of the size and shape of fox-gloves, and in clusters like rhododendrons. I never saw two trees together, but the brilliant spots or, rather, masses of color dotted the forests at intervals of a quarter of a mile. A leguminous deciduous tree is much more common than the Palo Cortez, and in February makes the mountain sides brilliant with its golden blossoms, which are produced in great profusion and precede the leaves. A tree that I believe to be an acacia, but whose beautiful feathery crowns of pale green flowers were inaccessible, was common along the rivers; and the orchids displayed most brilliant colors on the stems of otherwise flowerless trees, as did several

Bromeliads and Aroids. On the whole, the flowers are large, coarse, and destitute of odor — by no means florists' flowers — indeed one could hardly pick a nosegay in a day's journey through the best of these forests, while the botanist would revel in the rare and interesting forms.

Insects were not so common as might be expected, and the day mosquitoes were absent; the centipedes small and sluggish, and the butterflies, while resplendent, and often of great size, were almost solitary. The tracks of wild hogs and peccaries were common; and I have seen the spoor of the tigre (jaguar) and puma, but serpents were invisible, although once and again I was startled by the resemblance the great vines bore to the monstrous boas and pythons. One of my men, it is true, felt something unusual on his bare foot and found it was a *tamagousse*, a very poisonous snake, but he raised it on his foot and cut it in halves with his ever-ready machete.

The earth in most of these forests is of a deep chocolate color, and in one place where the men had cut into a bank I measured fourteen feet of this richest of soils. The temperature varies from 70° to 86° F., and the annual rainfall is about 88 inches.

The practical use of this land covered with what seems a primeval forest is at least as remarkable as its present covering, and I have been assured that it would be interesting to you to hear somewhat of the planters and how they treat this soil. And first the clearing. Carib mahogany cutters fell the trees during the months of January, February, and March, and during April and May the fallen timber dries and is burned, only the huge logs and stumps being left for the ants to remove. The field is then tolerably clear and ready for planting, which should be done before the rainy season begins in June. The crops best adapted for cultivation are in a measure indicated by the existence of wild specimens. Thus the cacao, which abounds wild, is a most desirable crop. Rows of bananas or plantains are set out fourteen or fifteen feet apart, to protect the young cacao trees until the *Erythrina* or madre-cacao (*Erythrina umbrosa* and *E. velutina*) are sufficiently grown, for the cacao is impatient of the direct sun.<sup>1</sup> Plants are raised from the seed, and begin to flower at three years, but do not bear a good crop until five years. There are two crops yearly, one in December and January and a larger one in May and June. In these forest lands the only culti-

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<sup>1</sup> A much better protection for the cacao is the India-rubber, and on my own plantation I have planted the *Castilloa* forty feet apart, or one tree between every third tree of cacao. The yield of a large rubber tree is eight gallons of milk, or sixteen pounds of rubber, each year.

vation required is to keep down the weeds. Floods or excessive rains rather benefit the trees. The average life of a cacao tree in these lands may be placed at forty years, and the yield at about a pound and a half annually. Formerly the Indians used the cacao nibs as coin. The pulp enclosing the seed, tastes like unripe watermelon.

Pineapples grow wild wherever there is a clearing, and the quality is far better than any we find in our markets. When planted three and a half feet between the rows and two and a half feet in the rows, an acre will contain 4,840 plants. The cultivation consists in cleaning the field five or six times a year, and the first crop is ready in sixteen to eighteen months after planting, when the lateral suckers are used for this purpose; the terminal sprouts require two years or even three, but thereafter ripen annually. The first crop may be computed at four thousand good pines per acre, which, at ten cents apiece, would bring a fair income. If the fruits are fully ripened and preserved there, a much finer flavor is obtained than when the green pines are shipped. I am assured that in these forest lands no replanting is necessary for many years, and it is only needed to thin out the plants yearly. The wild *Piña de azucar* averages five pounds in weight; but the Horse pine is more acid and highly flavored, and so better for preserving.

Nutmeg trees find here a most suitable soil and climate. This beautiful and interesting tree grows to a height of twenty feet, and is very long-lived. It begins to bear at the seventh year, and by the tenth the yield may attain to five thousand fruits, and the largest of these count sixty-five to the pound. Thus the return per acre, at sixty cents per pound, would be over three hundred dollars, besides seventy-eight pounds of mace, worth, in our market, forty dollars.

Coconut planting is perhaps one of the most profitable ventures, as, after the first two years, no care is required. At five years, they begin to bear, and two years later, the crop in these favored lands should average two hundred nuts a tree; and I have seen a tree in Livingston that averaged a ripe nut every day in the year; and this tree is not more than twenty years old.<sup>1</sup> Now 2,500 trees planted as a border or fence will, in seven years, yield 500,000 nuts annually, or, at twenty dollars per thousand, \$10,000. This is wholly neglecting the valuable fibre or coir, which is wasted in Guatemala.

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<sup>1</sup> On an average coconut spadix I counted 52 female and 5,950 male blossoms.



There is no especial season for coconuts; blossoms, buds, and fruit, in all stages, may be seen on the trees at once. The nut is eaten only in the green state, when the shell is so soft as to be cut easily with a knife. The cream is eaten with a spoon, and, so far as my own experience goes, is not indigestible; the milk is always cool when on the tree, and fresh as any water from a New England spring. Once, when travelling in the Hawaiian islands, I had, for ten days, no other drink.

Bananas are cultivated on all these bottom lands with great success; and it is well known that 1,607 square feet of land planted with bananas or plantains yield 4,000 pounds of nutritive food, or a support for fifty persons, while the same land planted with wheat will support only two. The number of fruit steamers plying between Guatemala and the ports of New Orleans and New York has greatly stimulated the production of these most valuable fruits, and, even at forty cents a bunch, delivered on the steamers, the cultivation is exceedingly profitable; so that a fruit company in Belize is now paying twenty-four per cent dividends, although only one-fourth of its capital has been called in.

Great mistakes have been made in the cultivation of the banana, especially in not giving the plant room enough, for, if crowded or shaded, the bunches, which may weigh ninety pounds, dwindle to twenty-five, and are no longer marketable. The plantains are much larger, often twelve to fifteen inches long, of firmer substance, and generally eaten cooked; and it is a matter of surprise and regret that we do not find this most excellent vegetable in our market. It commands a higher price than the banana all along the Central American coast. In the case both of the banana and plantain, when the fruit has arrived at maturity, the stem which bears it is cut and left to rot on the ground; but the fibre, although not so abundant or fine as that of the *Musa textilis*, is yet of considerable value, if only a suitable machine were at hand to put the fibre into a marketable condition. Dried bananas have been brought here, but have not proved popular, although they keep well, and are very nutritious. Dried plantains are much finer than figs, and it is to be hoped that they will soon be abundant in our markets.

I need not say much of the corn, the *maiz* of the Spaniard, but three crops grow in succession each year; and I have found corn on stalks so high that even on horseback I could not reach the ears (three to a stalk), and had to fell this corn tree to get the ears for my horse. Corn hulled and mashed is the principal breadstuff

of Spanish Americans, while the cassava bread is preferred by the Caribs of the shore.

India-rubber (*Castilloa elastica*) may be cultivated with great profit, although at present the supplies are drawn from the wild trees. Cotton grows here of as fine a staple as on the Sea islands, and is now being planted experimentally.

I have left to the last the two most important, coffee and sugar-cane, and I had almost forgotten the oranges, lemons, limes, citrons, pompelnoes, and shaddocks, which grow here as well as in any part of the world and yield abundant crops of most excellent fruit; figs, rose-apples, cherimolias, mammees, alligator-pears, sapotas, granadillas, and the host of fine fruits whose very names are strange to us. The bread-fruit of the islanders, the tamarind and papaya all grow here luxuriantly.

While most of the coffee for which Guatemala is so justly celebrated is grown in the department of Alta Verapaz, in the vicinity of Coban, and on the Pacific side of the high table-land of the interior, it has been found that the Liberian coffee flourishes on the Atlantic forest belt. I have visited coffee plantations in many parts of the world, but I have never seen the plant growing better or more carefully cultivated than at Coban, and, if we may judge from a few isolated experimental coffee trees at Livingston, and farther up the coast, the Liberian type will do better than the Arabian. Coffee, as is well known, requires shade, especially when young, and the seedlings must be carefully sheltered from the direct rays of the sun. Bananas are usually planted in alternate rows with coffee. The labor of picking, the care needed in drying, and the mechanical processes of hulling render this a more difficult crop to harvest than any I have hitherto mentioned, and where there is no great depth of soil the land is soon exhausted by coffee, but it is a very profitable crop notwithstanding.

And now a few words as to sugar, the crop to which these rich forest lands seem most admirably adapted. I have seen the Louisiana plantations on the lower Mississippi, and admired the careful cultivation, large and convenient mills, and thriving cane-fields, but when I inquired about the crops, I found that sugar-raising in Louisiana although profitable, thanks to the tariff protection, is evidently a forcing of nature. The planter has great difficulty in preserving his seed-cane through the winter, must plant early and cut late to get all the benefit of a short season, and he must cut and grind before frost comes, or his sugar is turned and

the proportion of molasses greatly increased. Hence he has to have an immense mill in proportion to his acreage, and must grind his entire crop in ten days or a fortnight, while his expensive mill is idle all the rest of the year. The yield seldom exceeds a ton to the acre, of the poorest sugar known in the Liverpool market.

In Guatemala a very different state of things prevails. Cultivation, as we understand it, is wholly wanting. The cleared land is not even ploughed, but a hoe scratches the furrow into which the seed-cane is laid in lengths of two feet or sometimes three if the variety of cane planted be a long-jointed one, and a few strokes of the hoe cover it again. Then commences the fight with weeds; as the planting is done in May before the June rains come on, the first weeding will be needed in June, and the young cane will be high enough by the end of July to get ahead of the weeds; twice at least thereafter the process of trashing goes on. This consists in passing down the rows and breaking off the dead lower leaves and trampling them under foot. This makes an excellent mulching and by the time the cane is in blossom, in December of the following year, the ground is completely carpeted by these leaves. In January the cutting begins, and as there is no frost it may continue three months, if necessary, and the yield averages four tons to the acre of the best refinery sugar. But the most remarkable contrast to the Louisiana sugar-raising is here. While on the often submerged plantations of the banks of the Mississippi the laborious planting must be done every year, in the bottom lands of Guatemala ratoon crops have been cut annually for sixteen years without perceptible diminution in the yield. The first ratoon crop, that is the one that springs up from the cut stalks, is better than the first cutting. Now the saving of labor is immense, and the cost of producing sugar proportionally lessened. Even in such an admirable sugar country as the Hawaiian islands, where the cultivation of cane has probably been carried to as great perfection as anywhere else in the world, the fields have to be ploughed up and replanted at least once in five years. I am familiar with the methods and processes used by the Hawaiian planters, most of whose plantations I have visited within a few years, and I believe that with some of their improvements Guatemalan fields would yield five or even six tons to the acre. And that this is not extravagant you will see if you consider that hitherto only the common wild cane has been cultivated, or rather planted, and the mills are of the rudest sort. Now it is well known that certain

choice varieties of cane, as the Tahitian, Salangore, and Elephant, yield one hundred per cent more sugar than others, and the processes of manufacture have been vastly improved; although even now we get only seventy-five per cent of the sugar out of the cane, on an average, by milling.

But suppose we are satisfied with the average yield of the cane on these lands with good mill and vacuum pan, at four cents per pound, a lower figure than sugar has ever reached there, we have eighty dollars per ton, or three hundred and twenty dollars per acre. The estimated cost where five or six hundred tons are manufactured is less than eight dollars per ton, leaving a reasonable profit after deducting all interest on the investment and expenses of marketing. With the removal of the duty on sugar, which must come before long, when this people awake to the unjust system of protected monopolies at present the law of the land, the cargoes which now go to Liverpool would find a good market in Boston or New York; and the wise legislators will have to devise not only new bounties, but new arrangements of nature to put the curious beet sugar industry in competition with the far better and cheaper cane sugar.

I began by describing in a general way lands in Guatemala, the richest I have found anywhere in the world, as they now exist, and then their possible transformation from the wild and wasteful profusion of natural forest growth, to the more prosaic nature of the farm and garden. I have followed the forest from its removal to the garnering of the crops which may succeed it, and I have not drawn upon my fancy, but upon facts that have actually existed, and processes that are now going on under an energetic and enlightened government, which can look to the natural prosperity of its domain instead of dissipating its revenues by the whims of disreputable congressmen.

I have passed by the vegetable productions of other parts of Guatemala, the potatoes, wheat, cassava, pita, cotton; and the marvellous abundance of flowers, the tree *Compositæ*, the acres of *Stevia*, *Bouvardia*, and *Agaves*; the *Achimenes* and scarlet *Lobelias* by the roadside, the *Begonias* and Ferns on the moist cliffs, the many *Convolvuluses* and *Ipomaeas* on the trees by the roadside, the *Callas* and spider lilies, the passion flowers and bambus by the river banks.

Even the grand pine forests of the mountains I must refer to but briefly. These grow at an elevation of from five thousand to nine

thousand feet, and attain a size I have never seen equalled except in the Sierras of Nevada. Eight feet in diameter and with straight trunks branchless to a great height, so that the grass grew all beneath these trees and afforded pasturage to large herds of cattle, was nothing uncommon. There were three species, one with needles fifteen inches long, and another that furnishes fat pine for the candles of half the republic; and there were spruces of nearly equal size. It was exasperating to a Yankee mind to see these grand trees cut down, split in halves, and two boards hewn out of the whole log! I have seen an Indian bringing down from the mountains planks five feet wide and not much longer, hewn to a thickness of less than an inch. There are no saw-mills within two hundred miles. I lodged in a house on one of President Barrios' fincas or plantations which was constructed of hewn pine planks, three inches thick, each representing a single tree. With no wagon roads through the mountain region and no probability of their construction in the immediate future, these mountain forests are safe for some time yet, and I certainly hope to see them again and contrast their rugged open simplicity with the dark and tangled mystery of the richer lowland woods.

The President remarked that the tropics had been brought before us in a delightful vision, and he wished to ask Mr. Brigham to explain more fully his object in exploring the forest lands of Guatemala. In reply Mr. Brigham explained briefly the objects of the Tropical Products Company, which had obtained twenty square miles of rich land on the Rio Chocon, and various concessions from the government; and stated that he had explored the entire republic that he might assure himself that the people were contented, and the government stable, and he then explained at some length, the nature of the country and people; the commercial resources and natural advantages as well as the salubrity of the climate; and, in answer to questions, he enlarged upon several topics mentioned in the essay read, the substance of his answers being incorporated in the paper as here printed. He expressed himself as fully convinced by his explorations that the Republic of Guatemala was eminently fitted, above all other tropical countries he had visited, for profitable agricultural enterprises, and that capital and pluck were alone needed to reap rich harvests.

## BUSINESS MEETING.

SATURDAY, March 29, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting it was dissolved.

## MEETING FOR DISCUSSION.

## FERTILIZERS.

No subject having been assigned for discussion, the President called on Leander Wetherell to speak of "Fertilizers." Mr. Wetherell said that subject included, in its broadest sense, everything used for the fertilization of the garden and farm. The first and best fertilizer, and the one always to be used when it can be got, is stable manure from animals fed on good hay and grain. It has been said by some that the manure from animals fed on linseed or cotton-seed meal is worth as much for fertilizing as the meal; but the speaker did not believe this, though he had been told that cotton-seed meal is used by manufacturers as an ingredient in their fertilizers, and he wondered that farmers did not use it directly. Stable manure, as well as chemical fertilizers, must be used with discretion. The latter can be used with good economy in connection with the former. When planting corn, for instance, it is a good plan, after stable manure has been spread and ploughed in, to put a little superphosphate in the hill, mixing it with the soil. Corn and potatoes started in this way ripened from ten to fourteen days earlier than that which had received the same treatment otherwise.

There is a great liability to fraud in the composition of artificial fertilizers. The analyses by Professor Johnson, of the Connecticut Agricultural Experiment Station, are of great value, giving the cost of the materials, the price at which the fertilizers are sold, and their value to the farmer, the real value being, in almost all cases, from six to eight dollars per ton less than the cost to the farmer. Professor Goessmann's analyses at the Massachusetts Agricultural College are developing similar facts. The materials used in artificial fertilizers are valuable, but the question for farmers is whether they can pay the prices asked for them and get

their money back. An interesting fact was developed by Professor Atwater, of the Connecticut Agricultural Experiment Station, who prepared several parcels of fertilizers, with greater or less quantities of the most costly material — nitrogen; and in many instances superphosphate without nitrogen produced better corn than when nitrogen was mixed with it. If you can use what you want and adapt it to your soil, without the expense of substances not needed, you have secured an important point. On the speaker's farm, plaster proved, by careful experiment, as good on corn as any of the fertilizers that cost much more, the ears and the fodder being weighed in every case. On his father's farm plaster worked wonderfully well, producing three tons of hay to the acre, but on an adjoining farm it was worthless, and there are many farms where it would be of no more value than sand. Professor Anderson, of the Highland Agricultural Society, says that no man understands the action of plaster. Generally, however, it seems most useful on hill land.

In applying commercial fertilizers, every one knows, or should know, better than the chemist, what his soil needs. Study your farm or garden and find out by experiment what it requires. The brains should work with the hands. The speaker had found by experience that his farm does not require potash. The reason why more commercial fertilizers are not used by farmers is that they get so little return from them. Farmers can buy the potash and other elements of artificial fertilizers in bulk, and mix them themselves, thus getting their fertilizers cheaper and purer. A friend of the speaker in Worcester has pursued this course to advantage, buying the elements and mixing them in his barn. Mr. Wetherell believed that market gardeners would buy and use more fertilizers if they knew what to buy and how to use them; but they are differently situated from farmers in the country, because they can buy all the stable manure they need. He tried the Stockbridge formula on two acres of corn on intervale land, and Bradley's superphosphate on another portion, with no other manure in either case. The growth was immense, but the soil was good to begin with. The corn and stover were weighed, and on the ground fertilized with superphosphate both exceeded that from the Stockbridge fertilizer, giving seventy bushels of shelled corn to the acre, and the stover made good feed for milch cows, with very little hay. Another field produced similar results. This was a piece of bound out grass land, turned over and top-dressed with the Stockbridge

formula for corn, and as in the preceding cases, the growth was very heavy. Without ploughing it was seeded to clover and timothy, and produced two heavy crops in each of two successive seasons.

The President said that while we were pleased to see young men at the meetings, we were also glad to greet the founders of the Society, and introduced to the meeting, Henry A. Breed, of Lynn, who, except John B. Russell, now of Newmarket, N.J., is the only survivor of the sixteen gentlemen who, on the 16th of February, 1829, met at the office of Zebedee Cook, jr., in Congress street, to form the Massachusetts Horticultural Society.

Mr. Breed thanked the Society for the compliment paid him, and said that he was eighty-seven years old, and that though he enjoyed good health he was not able to attend the meetings of the Society as often as he would like to. He had been sixty years in business, having been educated in one of the first mercantile houses in Charlestown, and was one of the California pioneers in 1849. He had been for fifty years a member of twelve societies.

Col. Henry W. Wilson was next called upon, and said that the topic before the meeting is the most useful branch of study for all cultivators. It is most interesting to see how nature fertilizes a soil by returning to it the material taken from it by the growth of plants. Plaster is not a fertilizer; a fertilizer is a substance which has in it the elements that have been taken from the soil. Plaster is a negative salt, composed of sulphuric acid and lime, the two cheapest substances of their respective natures, either of which alone would destroy any crop; and yet no person could exist a year but for the presence of sulphur in the soil. Some substances which increase the productiveness of the soil act in ways not easily explained or accounted for. Plaster is such a substance; it is not plant food, but acts upon some soils either to develop or to set free the plant food by its chemical action. Phosphorus, sulphur, and nitrogen, are perhaps the most active elements of animal and vegetable life. Nitrogen exists in five or six different forms, each of which is evolved from the other by the chemical action of other elements, in the same manner that alcohol is converted into sulphuric ether by distillation in the presence of sulphuric acid, without sensible change in the acid.

In the air we breathe, nitrogen is inert and worthless; in leather



nearly so ; and in animal refuse it is more or less valuable in proportion to the ease with which it is absorbed by plants. Four-fifths of the air that we draw in at every breath is nitrogen, and three per cent of all flesh is composed of the same element, in different forms, and it is also found in decomposing animal matter. When vegetables decay, the nitrogen that they contain immediately becomes suitable to support other vegetable life, but that from decaying animal substances is not fitted to support other animal life until it has been through certain organic changes, that are wrought by vegetable life. These changes require the presence of some alkaline salt, such as potash, soda, or lime. Lime is the cheapest, but some forms of potash would make better fertilizers with the nitrogen than lime or plaster. One object of these meetings is to encourage the study of these subjects, which lie at the foundation of all fertilizing, so as to render farmers independent of the manufacturers of fertilizers, each man making his own, and making them good. The actual value of commercial fertilizers is greatly less than the manufacturer's prices. Sulphate of ammonia can be obtained at the gas works for from three to four cents per pound, and is a cheap source of nitrogen, as is also nitrate of soda. The South Carolina phosphates furnish phosphoric acid at an exceedingly low price, and the German potash salts are cheap sources of potash ; and all these the farmer can get as cheap as the manufacturer. More diversity of scientific knowledge and a greater combination of gifts and experience are required in farming than in any other calling, and it pays for the farmer to acquire them. Hardly any knowledge can come amiss, except some of the modern *isms* ; but nothing is so important as " gumption ; " it is absolutely indispensable.

John B. Moore thought Mr. Wetherell was right in saying that the working of plaster on land is not understood. It requires a very large quantity of water to dissolve a small quantity of plaster, — ten thousand parts of water to one of plaster. A piece of land may show wonderful results from the application of plaster, but the effect will cease after a course of years.

Mr. Wetherell mentioned a farm in South Hadley where plaster had been applied for twenty successive years, and worked admirably all that time, without any indication of failure to produce a good result.

Mr. Moore said that it might last more than twenty years, but it would cease at some time. Plaster produces the best effect on

rocky, springy soils, though he had heard of its successful use on intervalles ; and it has little effect near the sea-shore. At his farm in Concord, the only benefit derived from it is in fixing the ammonia about manure heaps. He had been asked by dealers to take their fertilizers by the ton, on condition that he would give them certificates of the effects ; but, after sending him good fertilizers and getting the certificates, they would, on the strength of them, sell to his friends what would not give them crops. He had invariably refused to test fertilizers on such conditions, and he hoped that every one present would do the same, and let them stand or fall on their own merits. He believes in every farmer mixing fertilizers for himself. But there is a difficulty in dissolving bones in sulphuric acid ; a piece as large as a man's finger will not dissolve. But both bones and Carolina phosphate can be bought ground. It is necessary that farmers should understand the working of fertilizers better than they do. He has used large quantities of fertilizers, but makes but little provision to buy nitrogen, for he believes that by stirring the soil he can get it free of cost, and that the same is the case on most farms. Nitrogen produces a rank growth of leaves and stalks, but not seed ; for seed we must have potash and phosphoric acid. Nitrogen is not only the most expensive but is the most soluble and volatile part of manures. To obtain the best results it should be applied at several times during the growing season. Nitrate of soda applied in the fall is wasted, being all washed away. Mr. Moore uses large quantities of steamed bones, which he gets pretty cheap. You can rub a hard bone to powder between your fingers after it has been subjected to the action of steam under high pressure. You may get little benefit from these bones the first year unless they have been dissolved, but you will get it some time.

In farming there are three points to consider : first, the soil ; second, the crop ; and third, the material to put on. Dr. Goessmann has lately made the first analysis of asparagus, and to his astonishment, the ash of the stalks and roots shows fifty per cent of potash, which would lead to the conclusion that a crop of asparagus must have potash in the soil. But you can get a knowledge of what food your crops require only by actual experiment and the use of a good deal of brains. He had made a good many mistakes in such experiments, but had learned as much from them as from his successes. A market gardener told him that he put a ton of superphosphate on an acre of land, and it produced no effect whatever ; but

on inquiry it proved that he also put on thirty cords of manure ; and you cannot pack crops thickly enough on land to take out so much plant food. The reason that market gardeners find it profitable to buy so much stable manure is that they need its mechanical action on their soils, which they cultivate year after year, supplying no decomposing vegetable matter, as is done when grass is broken up, and therefore they must supply it in stable manure, which they get cheap, and use in a half-decomposed state. Nitrogenous manures may be necessary for market gardeners or for special crops, but the speaker thought they were not very essential in general farming.

E. W. Wood said that while all are interested in fertilizers, there is a great diversity of opinion in regard to them. Hardly any market gardeners use commercial fertilizers, though Peter Henderson recommends a partial use of them. Market gardeners want a sure thing, and they know from experience that they can depend on stable manure. There is no business in which so much fraud has been practised as in commercial fertilizers, in the last twenty-five years. These are most contemptible frauds. Professor Mapes analyzed a fertilizer which was sold for \$52.50 per ton, and proved to be worth \$57, but analysis in later years showed a gradual deterioration, until it was worth only seven or eight dollars, though the selling price remained the same as at first. Dr. Nichols had found not one pure sample in four, and recommended farmers to buy only broken bones. The speaker bought some super-phosphates, and laid out his rows so as to test them, and the first year they were satisfactory, especially with corn, but the next year his crops did as well without as with phosphates. A friend told him that he thought he could get a good fertilizer from a firm in Boston, who furnished materials which they knew to be good, and had them mixed in New York, and Mr. Wood bought a few barrels, and his friend bought three tons, at \$52.50 per ton, but neither found any benefit from its use. The Boston firm afterwards returned to the buyer of the three tons a check for the amount paid them, and informed him that they had ascertained that the mixers sold the good materials furnished them and substituted peat, adding something to make it smell like a fertilizer. Mr. Wood suggested that to avoid fraud the manufacture of fertilizers should be conducted under the care of the State. In the town of Sutton the farmers used commercial fertilizers one year with such good results that the next year they paid \$10,000 for them, with

no benefit. If the Agricultural College could manufacture fertilizers, or in some way assure their genuineness, it would be a great benefit to farmers.

John S. Martin said that he had used but one fertilizer, and that he gets better crops than the farmers who use only stable manure.

Mr. Wetherell said that when a fertilizer works well the first year but not afterwards, the season may have something to do with its success or failure: good brands sometimes fail to give a good crop in a bad season, and this adds to the risk of using them. It is a question whether farmers can continue to use commercial fertilizers for a series of years without stable manure. In Germany they think they can; but the speaker felt doubtful of it, and advised to use both if possible. The statement of Mr. Martin was a very interesting one. The land where Mr. Wetherell's father used plaster to so much advantage was high, springy land,—good corn land. He and Mr. Lothrop, of South Hadley, used it on the intervale of the Connecticut river; the latter on a pasture where twelve acres gave sufficient feed for twelve short-horn cows. It produces an action in the soil which neither ancient nor modern chemistry explains. He had heard one man speak of good action from sulphuric acid applied to the soil. He knows salt to be a fertilizer.

Col. Wilson suggested to those who buy large quantities of stable manure the question whether they get its whole value. It is subject to saturation with water, and to loss of the liquid portion, which is everywhere recognized as containing the greater part of the valuable elements. When the drainage of manure is used three times as great results have been realized as when only the solid portion was saved. An excellent way to apply it is by underground irrigation. Its use is common in Europe.

There is no household but accumulates some bones during the year, but, if we attempt to dissolve them, the fatty matter resists the action of acid, and they must be burnt; but in doing this they lose their nitrogen. If first moistened with water and then mixed with sulphuric acid diluted with four or five parts of water, burnt or ground bones can be dissolved, and form a soluble phosphate of lime. Commercial fertilizers should furnish all the elements of seeds; and these same elements enter into the composition of the brains, and flesh, and frame of man. But what would a plant be without stem and leaves? We want a perfect fertilizer to make not only seeds but leaves and trunk, just as much as we want vig-

orous lungs and limbs in man. Every cluster of grapes on a vine must have a leaf opposite to it in order to secure its perfect development. Nitrogen enters into the composition of seed, and into the cellular structure of plants, — every cell is enveloped in a tissue or husk composed of nitrogen; consequently, plants must be furnished with nitrogen, from some source, to perfect either the stem or seed. No fertilizer will work continuously and successfully unless all the elements are provided.

Mr. Moore thought that Col. Wilson had misunderstood him in regard to the necessity of supplying nitrogen to plants. The actual experience of a large number of the best farmers in the United States proves that if they furnish their plants with potash and phosphates they get better results than if they pay their money for nitrogen. Nothing makes a plant grow faster than nitrogen. Nitrate of soda applied to a lawn acts very quickly, and gives a peculiar green to it; but it must be applied when the grass is making a vigorous growth, or is about to. On a bare soil three tons were, supplied when seeded down in autumn, without producing any effect.

Col. Wilson spoke of the excellent effect of coal ashes in extracting nitrogen from filthy water. When used as a filter alternately the organic matter is retained and subjected to the beneficial action of the atmosphere. The nitrogen changes first into ammonia, then into nitric acid, and then into nitrates in combination with alkalies, which wash away. This explains the action of nitrate of soda, which, being perfectly soluble, will pass away in the ground waters, unless it can be at once absorbed by the living vegetable organism.

This being the last meeting for discussion, of the season, the President congratulated the Society on the admirable manner in which the Committee on Discussions had done their work, especially in arranging for papers and discussions on points which we know little about.

On motion of E. W. Wood, it was voted that the thanks of the Society be presented to the Committee on Discussions for their successful labors during the season.

The meeting then adjourned without day.



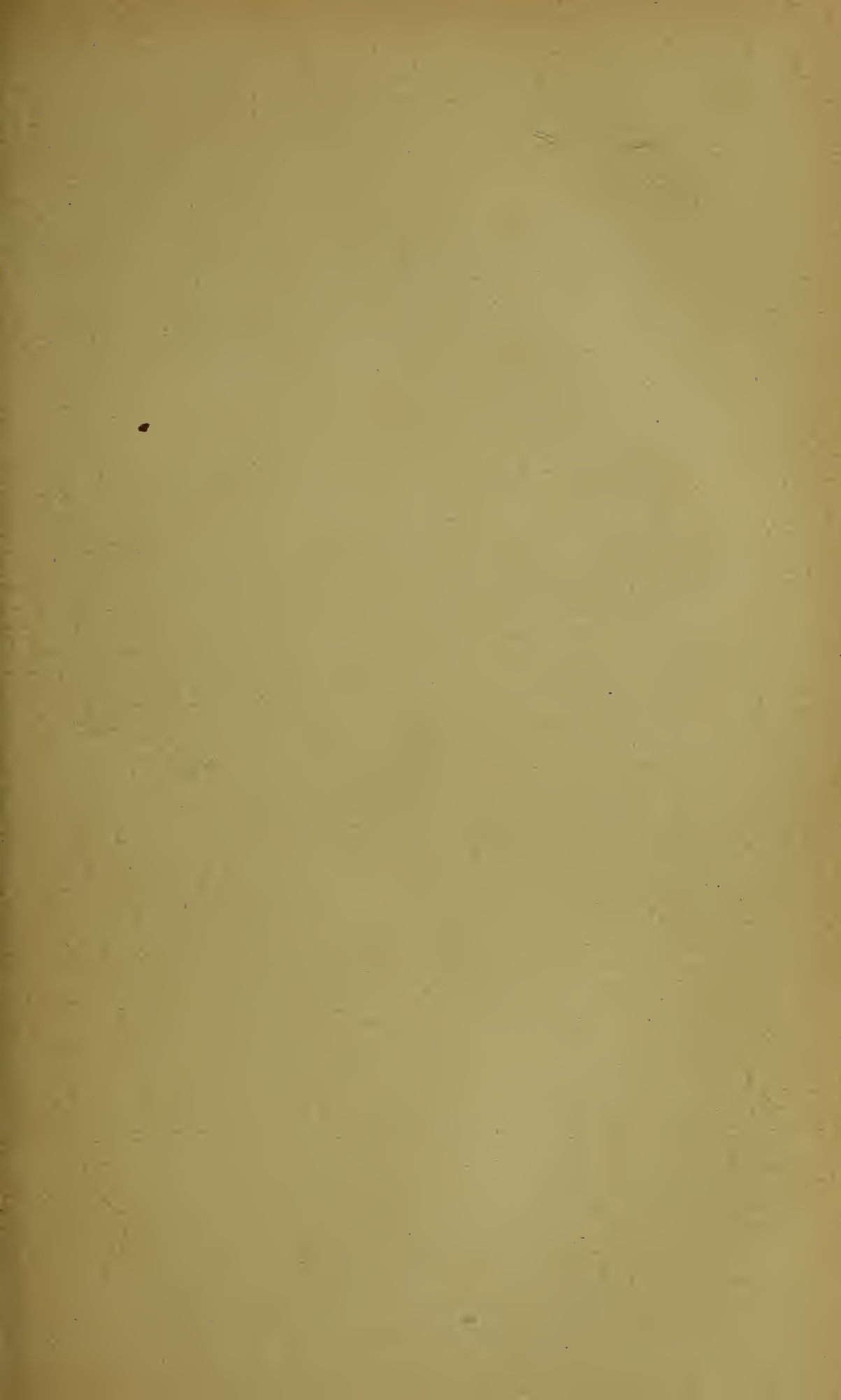
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# TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1884.

PART II.



BOSTON:  
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### BUSINESS MEETING.

SATURDAY, April 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Secretary presented circulars and tickets, received from the Imperial Russian Horticultural Society, for the members appointed on the 10th of February, 1883, as delegates to the International Horticultural Exposition, in commemoration of the twenty-fifth anniversary of that Society, at St. Petersburg, May 16-28.

Also a proclamation by the Governor of Nebraska, appointing Wednesday, the 16th instant, as "Arbor Day," for planting trees in that State.

Edward L. Beard, Chairman of the Committee of Arrangements, moved that the Rose and Strawberry Exhibition, appointed for June 24, be kept open for two days. The subject was referred to the Committee of Arrangements.

Mr. Beard also moved that the sum of \$125 be appropriated for additional gratuities at that exhibition, which motion was referred to the Executive Committee.

E. W. Wood, from the Committee appointed at the Meeting for Discussion, December 29, 1883, to report a list of the best hardy roses for general cultivation, presented the following report, which was accepted:—

LIST OF THE BEST HARDY ROSES AS CONTINUOUS BLOOMERS FOR OUT-  
DOOR CULTURE, AND OF THE BEST HARDY ROSES ADAPTED TO  
GENERAL CULTIVATION.

*Continuous Bloomers.*

Alfred Colomb,	Mons. E. Y. Teas,
Annie Wood,	Pierre Notting,
Boieldieu,	Rev. J. B. M. Camm,
Caroline de Sansal,	Xavier Olibo,
Fisher Holmes,	*Charles Darwin,
François Michelon,	*Countess of Oxford,
Gen. Jacqueminot,	*Dr. Sewell,
Marie Baumann,	*Marguerite de St. Amande,
Mme. Victor Verdier,	*President Thiers.

The last five (marked with stars) are fine, constant bloomers, but liable to mildew.

*Hardy Roses for General Cultivation.*

Alfred Colomb,	Marie Baumann,
Anna de Diesbach,	Marquise de Castellane,
Annie Wood,	Maurice Bernardin,
Baron de Bonstetten,	Mme. Gabriel Luizet,
Baroness Rothschild,	Mme. Hippolyte Jamain,
Charles Lefebvre,	Mme. Victor Verdier,
Duke of Edinburgh,	Mons. Boncenne,
Étienne Levet,	Mons. E. Y. Teas,
Fisher Holmes,	Paul Neyron,
François Michelon,	Rev. J. B. M. Camm,
Gen. Jacqueminot,	Thomas Mills,
John Hopper,	*Louis Van Houtte,
Jules Margottin,	*Mlle. Marie Rady,
La Rosière,	*Pierre Notting.

The last three (marked with stars) are difficult and uncertain, but so remarkably fine that the Committee could not refrain from mentioning them.

JOHN B. MOORE,  
*Chairman of Committee.*

Adjourned to Saturday, May 3.



## BUSINESS MEETING.

SATURDAY, May 3, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society appropriate \$150 for additional gratuities for roses at the Rose and Strawberry Exhibition in June. The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over to the meeting on the first Saturday in July.

A letter was read from ex-President Marshall P. Wilder presenting to the Society a set of the "Gardeners' Gazette," in five folio volumes, London, 1837-1841, and on motion of Leander Wetherell the thanks of the Society were voted to Mr. Wilder for this valuable gift to the library.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:—

THOMAS M. FERGUSON, of Philadelphia, Pa.  
 S. EDWIN TOBEY, of Malden.  
 J. P. B. HENSHAW, of Boston.  
 WILLIAM ALBERT MANDA, of Cambridge.  
 Miss CAROLINE WELLINGTON, of East Lexington.  
 LABAN PRATT, of Dorchester.  
 WARREN H. MANNING, of Reading.  
 DAVID FISHER, of Newport, R.I.  
 JAMES METIVIER, of Cambridge.  
 ALEXANDER MESTON, of Andover.  
 JOSEPH TILLINGHAST, of New Bedford.  
 CLARENCE F. BOYNTON, of Taunton.  
 CLIFTON H. PAIGE, of Dorchester.  
 CHARLES H. STEARNS, of Brookline.

Christopher Minot Weld, of Jamaica Plain, was proposed by C. M. Atkinson as a Life Member of the Society; and F. H. Temple, of Somerville, by J. H. Woodford, as an Annual Member.

Adjourned to Saturday, June 7.

## BUSINESS MEETING.

SATURDAY, June 7, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Edward L. Beard moved that an additional appropriation of \$25 be made for gratuities at the Rhododendron Show, which was referred to the Executive Committee.

The President congratulated the Society on having obtained a partial exemption of its property from taxation, and said that this was chiefly due to the efforts of William H. Spooner, without which he did not think the attempt would have met with any success.

The meeting was then dissolved.

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BUSINESS MEETING.

SATURDAY, July 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, President HAYES in the chair.

The recommendation of the Executive Committee, that \$150 be appropriated for additional gratuities at the Rose Show was taken from the table and unanimously confirmed by the Society.

The President inquired of the Chairman of the Committee of Arrangements the result of the Rose and Strawberry Show; and Mr. Beard replied that the receipts were \$415, against \$260 last year, and would doubtless have been considerably increased but for the unpleasant weather on the second day. The feasibility of holding the show two days was fully proved. A large number of tickets were distributed among school children, most of which were used, and the speaker was struck with the interest shown by them, and gratified by the prospect that the coming generation will be interested in horticulture. The show was admitted to be

the best ever made by the Society, and it was hoped that another year, with more favorable weather, it would be still better in every respect.

Adjourned to Saturday, July 12.

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### BUSINESS MEETING.

SATURDAY, July 12, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President BENJAMIN G. SMITH in the chair.

The Chairman presented, in the name of Hon. Marshall P. Wilder, President of the American Pomological Society, four copies of the "Proceedings" of that society at their session in Philadelphia, in September, 1883. On motion of Charles N. Brackett, the thanks of the Society were unanimously voted to Mr. Wilder for his donation.

Adjourned to Saturday, July 19.

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### BUSINESS MEETING.

SATURDAY, July 19, 1884.

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

The President, as Chairman of the Executive Committee, to which was referred the subject of contributing to the World's Fair at New Orleans, reported, recommending that this Society give public notice that it will receive contributions of horticultural and floricultural productions from any part of the State, to be forwarded at the expense of the Society; and that an appropriation of \$100 be made to cover such expense; also that a committee of three be appointed, whose duty it should be to receive, pack, and forward such products.

The report was accepted, and the President appointed, as the Committee therein provided for, E. W. Wood, William H. Spooner and Robert Manning.

The Secretary read a letter from Mons. A. Héron, president of the Société d'Horticulture du Département de la Seine-Inférieure, inviting this Society to send delegates and fruits to a Congress and Exposition of Fruits to be held at Rouen from the 2d to the 12th of October. It was voted to accept this invitation, and that the Committee on the New Orleans Exposition have charge of this also. Dr. Henry P. Walcott was appointed a delegate to the Congress, with power to appoint a substitute in case he should be unable to attend.

The President reported that the Executive Committee had approved the appropriation of \$100 for gratuities for plants and flowers during the winter months, and of \$25 for gratuities at the Rhododendron Show.

The Secretary presented, in behalf of Hon. Marshall P. Wilder, a photograph from an engraving of the great grape vine of Santa Barbara, Cal., for which the thanks of the Society were voted.

The following-named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society: —

CHRISTOPHER MINOT WELD, of Jamaica Plain.

STEPHEN N. GIFFORD, of Duxbury.

THEODORE M. CLARK, of Newtonville.

Adjourned to Saturday, August 2.

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### BUSINESS MEETING.

SATURDAY, August 2, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Agreeably to the Constitution and By-Laws, the President reported the following Committee to nominate suitable candidates for the various offices of the Society for the year 1885: William C. Strong, *Chairman*; Henry P. Walcott, William H. Spooner, George Hill, Charles N. Brackett, John G. Barker, Charles F. Curtis.

FELKER L. TEMPLE, of Somerville,

having been recommended by the Executive Committee, was, on ballot, duly elected a member of the Society.

Adjourned to Saturday, September 6.

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### BUSINESS MEETING.

SATURDAY, September 6, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

William C. Strong, Chairman of the Committee appointed at the last meeting to nominate candidates for officers and standing committees of the Society for the next year, reported a printed list, which was accepted and laid on the table. It was voted that the Committee be continued and requested to nominate candidates in place of any who might decline before the election.

The Librarian placed upon the table a work on the Culture of Cider Apples and the Manufacture of Cider, presented by Charles Joly, of Paris, a Corresponding Member of this Society, and the thanks of the Society were voted to M. Joly for this and many other donations to the library, and for his services in advancing the interests of the Society in other ways.

Adjourned to Saturday, September 13.

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### BUSINESS MEETING.

SATURDAY, September 13, 1884.

At the adjourned meeting to-day, Vice-President C. H. B. Breck was in the chair, but no quorum was present, and the meeting was dissolved.

## BUSINESS MEETING.

SATURDAY, September 20, 1884.

A special meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

The Chairman spoke of the great loss sustained by the Society in the death of the President, Hon. Francis B. Hayes, and said that this informal meeting was called to consider what action should be taken thereon.

On motion of Edward L. Beard, amended by Col. Henry W. Wilson, it was voted that the Flower Committee, William H. Spooner, Patrick Norton, F. L. Harris, James Cartwright, Edward L. Beard, Joseph H. Woodford, and David Allan, together with C. M. Atkinson, be appointed to decorate the chancel of King's Chapel on the occasion of the obsequies of Mr. Hayes.

On motion of Col. Wilson, seconded by Benjamin G. Smith, the following Committee was appointed to make other arrangements on the part of the Society in reference to the obsequies: William C. Strong, Col. Henry W. Wilson, Benjamin G. Smith, Leander Wetherell, and Robert Manning.

On motion of Benjamin G. Smith, the ex-Presidents, Hon. Marshall P. Wilder, Charles M. Hovey, James F. C. Hyde, William C. Strong, Francis Parkman, and William Gray, Jr., were appointed a Committee to prepare resolutions expressive of the sense of the Society on the death of President Hayes.

The Chairman spoke of the deep interest felt by President Hayes in the welfare of the Society, and said that, under his judicious and energetic management, its financial condition had been greatly improved and its prosperity increased. His last request was that he should be laid in the Cemetery of Mount Auburn, which was established by the Society.

At the stated meeting of the Society on the 4th of October, it was voted that the proceedings of this meeting be confirmed, and that the minutes thereof be entered with the records of the Society in their proper place.

Adjourned.

## BUSINESS MEETING.

SATURDAY, October 4, 1884.

A stated meeting of the Society, being the annual meeting for the choice of officers, was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

In the absence of the Recording Secretary, Col. Henry W. Wilson was chosen Recording Secretary *pro tem*.

On motion it was

*Voted*, That the proceedings of the Special Meeting of the Society which was held on Saturday, September 20, be confirmed, and that the minutes thereof be entered with the records of the Society in their proper place.

*Voted*, That the Committee appointed at that meeting to prepare resolutions in memory of our late President be requested to present their report before proceeding to other business.

Hon. Marshall P. Wilder then presented the report of the Committee, which was read by the Secretary, as follows:—

The Committee appointed to report resolutions on the death of the Hon. Francis B. Hayes, late President of the Society, respectfully submit the following:—

*Resolved*, That the members of this Society deeply deplore the afflictive providence which has removed the President of this institution, the Hon. Francis B. Hayes, in the full maturity of manhood, from the field of his useful and honorable labors in our behalf, and at a time when his services were so highly appreciated, and when his efforts for the prosperity and elevation of this Society were producing such beneficial and happy results.

*Resolved*, That the deceased, by his extensive collection of trees and plants, his large contributions to our exhibitions, his constant attendance at our meetings and discussions, his wise counsel in the administration of our financial affairs, and his lively interest in the promotion of rural adornment and the pleasures of rural life, will ever be gratefully remembered in the history and progress of our association.

*Resolved*, That in the sudden removal of our late President we recognize the hand of an overruling Providence, to which we

reverently bow, whose goodness in the past we gratefully acknowledge, and whose wisdom we cannot doubt, and we hereby tender our sympathies to his bereaved family in this hour of their affliction.

Col. Wilder made some impressive remarks on the reading of the report, and appropriate remarks were also made by ex-President Strong, Rev. A. B. Muzzey, Col. H. W. Wilson, and the Chairman of the meeting; and the resolutions were adopted by a rising vote.

The Chair announced that the requirements of the Constitution and By-Laws in regard to notice of this meeting had been complied with, and that the first regular business would be the balloting for officers of the Society for the ensuing year.

The chairman appointed O. B. Hadwen; J. H. Woodford, and George Hill a Committee to receive, assort, and count the votes given, and report the number. He also announced that a check-list containing the names of members qualified to vote had been prepared and would be used; also that all officers were to be voted for upon one ballot.

Upon request, Section XXIX. of the Constitution and By-Laws, relating to the discontinuance of membership in consequence of non-payment of dues, was read, and at twenty minutes before twelve o'clock A.M., the polls were declared to be open for the election of officers.

While the balloting was in progress, the following named persons were elected members of the Society, upon favorable report of the Executive Committee:—

Mrs. MARGARET PARKER, of Wakefield.  
 ROBERT T. JACKSON, of Dorchester.  
 ROBERT PETREMANT, of Roxbury.  
 ROBERT FARQUHAR, of Boston.  
 WILLIAM J. STEWART, of Boston.  
 FRANCIS BROWN HAYES, of Boston.  
 Miss MARY L. VINAL, of Somerville.

On recommendation of the Executive Committee, it was *Voted*, That an additional sum of \$100 be appropriated for the use of the Committee on Plants and Flowers.



*Voted*, That it be entered with the records of the Society that the agents of the Society, acting in its behalf, have suitably enclosed the lands of the Society on Bromfield and Bosworth streets, to prevent the acquisition by the public of any easement or right of way over the said premises.

On motion of Edward L. Beard it was *Voted*, That the Committee on Establishing Prizes, newly elected, be authorized to issue the Schedule of Prizes for Bulbs at once, in anticipation of the Spring Exhibition, for the information of those who may desire to compete for prizes.

On motion of Col. Wilson, it was *Voted*, That it would be gratifying to this Society if it should be stated upon the monumental tablet of our late President, Hon. Francis B. Hayes, that he was President of the Society for five consecutive years: from 1880 to 1884 inclusive. On motion of William C. Strong, it was *Voted*, That a committee of three be appointed to take such action as may be necessary to procure a portrait or bust of our late President. Mr. Strong requested that he might not be named as the chairman of the committee, and the Chair appointed Col. Henry W. Wilson, William C. Strong, and Edward L. Beard as the Committee.

The following proposals for membership were made: Lewis H. Farlow, of Newton, as Life Member, by Joseph H. Woodford; and John E. Blakemore, of Roslindale, as Annual Member, by William H. Spooner.

At twenty minutes before one o'clock P.M., all having voted who wished to, it was *Voted*, That the polls be now closed. The Committee retired, and, after counting the ballots, announced the result, as follows:—

Whole number of ballots . . . . .	109
Necessary for a choice . . . . .	55

And the persons having the number necessary for a choice were, agreeably to the Constitution and By-Laws, declared by the presiding officer to have a majority of votes, and to be elected Officers and Standing Committees of the Society for the year 1885.

Adjourned to Saturday, November 1.

## BUSINESS MEETING.

SATURDAY, November 1, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

The Secretary read a report from the Executive Committee recommending the following appropriations for the year 1885:—

For Prizes and Gratuities:—

For Plants and Flowers, . . . . .	\$2,500
“ Gratuities for the encouragement of the exhibition of flowers during the winter months, . . . . .	100
“ Fruits, . . . . .	1,500
“ Vegetables, . . . . .	800
“ Gardens, . . . . .	200
<hr/> Total, . . . . .	<hr/> \$5,100

The Executive Committee also recommended to the various committees to reserve a reasonable amount for awards for such new and worthy productions as are not covered by the Prize-List.

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid on the table until the first Saturday in January.

The Secretary read a letter from Benjamin G. Smith, declining the chairmanship of the Committee on Publication and Discussion for the year 1885, to which he had been elected, and one from William H. Spooner, declining the chairmanship of the Flower Committee for 1885. The Chairman of the meeting (being President-elect for 1885) also declined membership in the Committee on Publication and Discussion, and in the Committee for Establishing Prizes for the year 1885.

On motion of John C. Hovey, these resignations were accepted, and it was voted that a Committee of five be appointed to nominate candidates to fill the vacancies.

The Secretary stated that by the advice of the Executive Committee he had given the public notice required by the Constitution and By-Laws of a special election on Saturday, the 8th instant, at

11 o'clock, to fill the vacancy in the office of President for the remainder of the present year (caused by the death of the late President), and the vacancy in the office of Vice-President for the year 1885 (caused by the election of the same gentleman as President and Vice-President), at which all vacancies in the Standing Committees (including one in the Finance Committee for the remainder of the present year, caused by the death of Hon. Francis B. Hayes) could also be filled.

The Chair appointed the Committee to nominate candidates to fill vacancies as follows: John C. Hovey, O. B. Hadwen, Benjamin G. Smith, Francis H. Appleton, and Warren Heustis. It was *Voted*, That the names of all candidates be on one ballot.

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

HENRY C. HUNT, of Newton.

LEWIS H. FARLOW, of Newton.

JOHN E. BLAKEMORE, of Roslindale.

Adjourned to Saturday, November 8, at 11 o'clock.

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## BUSINESS MEETING.

SATURDAY, November 8, 1884.

A special election was holden to-day at 11 o'clock, for the purpose of filling vacancies in the Offices and Standing Committees of the Society for the remainder of the year 1884 and for the year 1885, Vice-President JOHN B. MOORE in the chair.

The Recording Secretary stated that the requirements of the Constitution and By-Laws in regard to public notice of the meeting had been complied with.

John C. Hovey, Chairman of the Committee appointed at the last meeting to nominate candidates to fill vacancies, reported a printed list, which was accepted.

The Chair appointed a Committee to receive, assort, and count the votes given, and report the number, as follows: Robert Manning, Samuel Hartwell, and J. Allen Crosby.

On motion, it was *Voted*, That the check-list be dispensed with. The polls were opened at ten minutes past eleven o'clock A.M.,

and closed at ten minutes past twelve P.M. The Committee to count the votes reported the whole number to be 40, necessary for a choice 21, and that the persons named on the ticket presented by the Nominating Committee had that number and were chosen.

The report of the Committee was accepted, and the persons so named were declared by the presiding officer to have a majority of votes, and to be elected to the respective positions for which they had been nominated for the remainder of the present year and for the year 1885.

The Chair announced that the Special List of Prizes for Spring Flowering Bulbs at the Rose and Azalea Exhibition in March, 1885, authorized at the meeting on the 4th of October, was upon the table, and ready for distribution.

Adjourned to Saturday, December 6.

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### BUSINESS MEETING.

SATURDAY, December 6, 1884.

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

The Annual Report of the Committee on Plants and Flowers was read by William H. Spooner, Chairman.

The Annual Report of the Committee on Fruits was read by E. W. Wood, Chairman.

The Annual Report of the Committee on Vegetables was read by Charles N. Brackett, Chairman.

The Annual Report of the Committee on the Library was read by William E. Endicott, Chairman.

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

The list of prizes for the year 1885, agreed on by the Committee for Establishing Prizes, was presented by the President as Chairman of the Executive Committee, with the approval of that Committee. On motion the list was laid on the table for one week, for examination by the members of the Society.

The President also reported from the Executive Committee a recommendation that the Society make the following appropriations for the year 1885 :—

For the Committee on the Library for the purchase of magazines and newspapers, binding of books, and incidental expenses of the Committee, . . . . .	\$300
For continuing the Card Catalogue of Plates, .	100
For the Committee on Publication and Discussion,	200
For the expenses of the Committee of Arrangements, . . . . .	300

Agreeably to the Constitution and By-Laws, this report was laid over until the first Saturday in January.

On motion, it was *Voted*, That the Committee for Establishing Prizes be authorized to accept any donations that may be made for special prizes, and to offer the same on the Schedule.

Edward L. Beard moved the following resolution :—

*Resolved*, That the Society views with regret the retirement of Mr. William H. Spooner from the chairmanship of the Flower Committee for the ensuing year. Mr. Spooner has for seven years filled this position, where his faithful attention to the exacting duties of the office has done much towards accomplishing the results attained by the Society during the time of his services, and where his courtesy and impartiality have been appreciated by exhibitors as well as by his associates. The Society also recognizes the valued assistance of Mr. Spooner in removing an onerous burden of taxation from its property. Though relinquishing his official position, the Society expresses the hope that its future interests may still have the practical assistance of Mr. Spooner's long experience and familiarity with its affairs.

Remarks were made by the President and P. B. Hovey, expressing their hearty concurrence in the resolutions, which were unanimously passed.

Adjourned to Saturday, December 13.

## BUSINESS MEETING.

SATURDAY, December 13, 1884.

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

The Annual Report of the Committee of Arrangements was read by Edward L. Beard, Chairman.

The Annual Report of the Committee on Publication and Discussion was read by Benjamin G. Smith, Chairman.

Robert Manning read his annual report as Secretary and Librarian.

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

The Schedule of Prizes for 1885, presented at the last meeting and then laid on the table for one week, came up for final action. On motion of William H. Spooner it was voted to add to the General Rules and Regulations the following:—

No premiums except those authorized by the Society shall be awarded at any exhibition.

Joseph H. Woodford moved to strike out the third special rule, adopted December 15, 1883. The motion was referred to the Committee of Arrangements, with full powers.

The Schedule of Prizes was then adopted and referred to the Committee on Publication, to be printed.

Adjourned to Saturday, December 20.

## BUSINESS MEETING.

SATURDAY, December 20, 1884.

The meeting was called to order by President MOORE, and the Recording Secretary being absent, the President appointed E. W. Wood Recording Secretary *pro tem*. No quorum being present, the meeting adjourned to Saturday, December 27.

## BUSINESS MEETING.

SATURDAY, December 27, 1884.

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

The following-named persons were proposed for membership in the Society: —

Robert McMillan, of Boston Highlands, as Annual Member, by C. M. Atkinson.

John L. Gardner, of Boston, as Life Member, by Charles S. Sargent.

Miss Annie C. Putnam, of Boston, as Annual Member, by Robert T. Jackson.

John G. Barker, Chairman of the Garden Committee, asked further time to prepare his report, which was granted.

The Committee on Publication and Discussion announced that the meetings for discussion would begin on the next Saturday, when John E. Russell, Secretary of the State Board of Agriculture, would speak on "Climate."

The meeting was then dissolved.

**REPORT**  
OF THE  
**COMMITTEE ON PLANTS AND FLOWERS,**  
FOR THE YEAR 1884.

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By WILLIAM H. SPOONER, CHAIRMAN.

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The year which is now closing has been one of unusual success in the Society. Its exhibitions have been of greatly increased extent and excellence, induced in large measure by the favorable conditions of weather, and perhaps partly by the additions to our prize-list, and largely by the exertions of the Committee of Arrangements.

The first of the principal exhibitions was the

**AZALEA AND ROSE SHOW.**

MARCH 20 AND 21.

This was of uncommon excellence, and much larger than for several years. The exhibitors of Azaleas were Hon. Marshall P. Wilder, Hovey & Co., Anthony McLaren, and Norton Brothers. The contributions of Hybrid Perpetual Roses were made by John B. Moore & Son, Hon. Francis B. Hayes, President of the Society, John L. Gardner, and William C. Strong. Tea Roses were shown by Thomas W. Dee and Mrs. E. M. Gill. C. B. Gardiner again contributed a collection of his fine Cyclamens, and President Hayes, a collection of Heaths. Cinerarias were very good from Mrs. Mary T. Goddard. Pansies came from W. A. Bock and James O'Brien. Hyacinths were shown by Hovey & Co., John L. Gardner, and Charles H. Hovey, in marked increase over former years. The general display of spring bulbs was excellent, John



L. Gardner and Hovey & Co. being the contributors. The exhibition of Camellias was, as usual, very fine, being made by Hovey & Co. and President Hayes. Woolson & Co., of Passaic, N.J., made a very large display of Narcissus, which formed a prominent feature of the exhibition, and gave an added proof that this flower is much more extensively cultivated among amateurs and commercial florists than formerly. Orchids of remarkable merit were shown by F. L. Ames, E. W. Gilmore, H. H. Hunnewell, and David Allan, gardener to R. M. Pratt.

### SPRING EXHIBITION.

MAY 10.

The display of Pelargoniums was very meagre. A few good Indian Azaleas were offered by Hovey & Co. and John L. Gardner. From the latter came also Tulips, and there were Pansies from Edward L. Beard and Mrs. E. M. Gill.

### RHODODENDRON SHOW.

JUNE 7.

The display of Rhododendrons was not very large. The competitors for prizes were President Hayes, John L. Gardner, Edwin Sheppard, and Benjamin G. Smith. German Iris of good quality was shown by E. Sheppard and J. W. Manning, and excellent Clematis by Joseph H. Woodford and E. Sheppard. Orchids were offered by E. Sheppard and James Cartwright. John L. Gardner exhibited fine Pelargoniums and Ericas; also a fine plant of *Azalea decora*. H. H. Hunnewell made his usual exhibition of Rhododendrons and Azaleas, which were not entered for competition. Good displays of cut flowers were made by John B. Moore & Son, B. G. Smith, Edwin Fewkes, J. W. Manning, C. M. Hovey, and Francis Parkman.

### ROSE AND STRAWBERRY EXHIBITION.

JUNE 24 AND 25.

The weather last winter was quite mild, and favorable to roses, and the plants showed the beneficial results in the spring and

early summer ; but after that time, July and August being very rainy, the rose, although generally fond of moisture, suffered from mildew, probably on account of the nights being unusually chilly. Although the time fixed for the show was late for some of the growers, the display was quite large and the general effect very fine. The chief exhibitors were John B. Moore & Son, John L. Gardner, John S. Richards, President Hayes, William Gray, Jr., and William H. Spooner. As no lists of the varieties shown were furnished, we are unable to give the names of those for which prizes were awarded. Special prizes of silver vases were again offered, and sharply competed for. John B. Moore & Son were, for the third time, awarded the Challenge Vase, which thereby became their property. J. S. Richards exhibited a new climbing rose, which was named by the Committee, "Boston Belle." It appears to be a hardy rose, a strong grower, and free bloomer ; color, rosy crimson. The exhibition was by agreement continued during two days ; but a serious objection to such an arrangement lies in the fact that many of the roses cut for the first day and kept either in cool air or on ice will not bear more than one day of exposure in the hall, and their places were consequently filled by other kinds on the second day, which would give to visitors examining them an unfair idea of the original standard of merit.

Very fine displays of Orchids were made by H. H. Hunnewell, F. L. Ames, E. W. Gilmore, and David Allan, gardener to R. M. Pratt. The last named also exhibited a very beautiful collection of Japanese Ferns. Mr. Hunnewell's exhibition of Pelargoniums was the best that has been made for many years. William C. Strong's collection of Maple foliage was very attractive.

## ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

The Annual Exhibition was the best and most successful for many years, the quality of the plants never having been equalled. The arrangement was similar to last year's, which was admirably adapted for the best effect. The greenhouse and stove plants of Messrs. Ames, Hunnewell, Pratt, Payson, and Hovey were of the choicest kinds, and most skilfully arranged. The displays of cut flowers for the prizes were remarkably good, and well kept during

the entire show. The contributions of miscellaneous flowers were much less than for several years, the dry weather of the preceding weeks no doubt affecting this display. E. D. Sturtevant, of Bordentown, N.J., was again an exhibitor of his very beautiful collection of Water Lilies, which was one of the most interesting features of the show.

William C. Strong displayed the following list of beautiful foliated deciduous trees and shrubs, which are hardy in New England:—

<p>LIGHT COLORS.</p> <p><i>Cornus Sibirica variegata</i>,</p> <p>“ “ <i>elegantissima</i>,</p> <p>“ <i>mascula variegata</i>,</p> <p><i>Salix regalis</i>,</p> <p>Variegated Woodbine,</p> <p>“ Sycamore Maple.</p> <p>GOLDEN COLORS.</p> <p><i>Ligustrum robustum margin-</i> <i>atum aureum</i>,</p> <p><i>Ulmus Wredei</i>,</p> <p><i>Sambucus nigra aurea</i>,</p> <p><i>Populus aurea Van Geerti</i>,</p> <p><i>Spiræa aurea</i>,</p> <p><i>Catalpa aurea</i>,</p> <p><i>Fraxinus aurea</i>,</p> <p><i>Lonicera aurea reticulata</i>,</p> <p><i>Acer marginatum aureum</i>.</p> <p>DARK COLORS.</p> <p><i>Prunus Pissardi</i>,</p> <p>Purple Barberry,</p> <p>“ Hazel,</p> <p>“ Beech,</p> <p>“ Birch,</p> <p>“ “ Poplar Leaved,</p> <p>Maple, Reitenbach's,</p> <p>“ Schweidler's,</p> <p>“ <i>atrosanguineum</i>,</p>	<p>Maple <i>Colchicum rubrum</i>,</p> <p>“ <i>dissectum</i>,</p> <p>“ Purple Sycamore.</p> <p>CRIMPED OR CUT LEAVED.</p> <p>Wier's Cut Leaved Maple.</p> <p><i>Alnus asplenifolia</i>,</p> <p><i>Fagus laciniata</i>,</p> <p><i>Rhus</i> “</p> <p><i>Betula</i> “</p> <p>FINE AND GRACEFUL.</p> <p><i>Tamarix plumosa</i>,</p> <p>“ <i>Germanica</i>,</p> <p>“ <i>Indica</i>,</p> <p><i>Glyptostrobus Sinensis pendula</i>,</p> <p><i>Cupressus distichum</i>,</p> <p><i>Spiræa Thunbergii</i>,</p> <p><i>Sophora Japonica</i>,</p> <p><i>Gleditschia triacanthos</i>,</p> <p><i>Salix Wisconsin pendula</i>,</p> <p>“ <i>vittellina Butz</i>.</p> <p>BROAD AND LUXURIANT.</p> <p><i>Phellodendron Amurense</i>,</p> <p><i>Rosa rugosa</i>,</p> <p><i>Juglans nigra</i>,</p> <p><i>Ailanthus glandulosa</i>,</p> <p><i>Mahonia aquifolia</i>,</p> <p><i>Kalmia latifolia</i>,</p> <p><i>Salisburia adiantifolia</i>,</p> <p><i>Salix laurifolia</i>.</p>
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The first and second Hunnewell Premiums for Evergreen Shrubs were awarded to W. C. Strong for the following: —

<i>Abies excelsa inverta</i> ,	<i>Retinospora pisifera aurea</i> ,
“ <i>excelsa Clanbrasiliana</i> ,	“ <i>squarrosa</i> ,
“ <i>cærulea</i> ,	“ “ <i>Veitchii</i> ,
“ <i>aurea</i> ,	“ <i>filifera</i> ,
“ <i>excelsa conica</i> ,	“ “ <i>aurea</i> ,
“ <i>Canadensis</i> ,	“ <i>obtusa nana</i> ,
“ <i>Baretti</i> ,	“ “ “ <i>varie-</i>
“ <i>Menziesii</i> ,	“ <i>gata</i> ,
“ <i>pyramidalis</i> ,	“ <i>lycopodioides</i> ,
<i>Picea pungens</i> ,	“ <i>ericoides</i> ,
“ <i>pectinata</i> ,	<i>Juniperus Hibernica</i> ,
“ <i>Nordmanniana</i> ,	“ <i>venusta</i> ,
<i>Pseudotsuga Douglasii</i> ,	<i>Thuja occidentalis variegata</i> ,
<i>Pinus Austriaca</i> ,	“ <i>Lobbii</i> ,
“ <i>Cembra</i> ,	“ <i>filifera</i> ,
“ <i>sylvestris</i> ,	“ <i>pyramidalis</i> ,
<i>Taxus baccata</i> ,	“ <i>compacta</i> ,
“ <i>elegantissima aurea</i> ,	“ <i>aurea</i> ,
<i>Retinospora plumosa</i> ,	“ <i>Sibirica</i> ,
“ “ <i>aurea</i> ,	“ <i>densa</i> .
“ <i>pisifera</i> ,	

STOVE AND GREENHOUSE PLANTS. — The first prize for twelve of different varieties was awarded to F. L. Ames, for

<i>Alocasia macrorhiza variegata</i> ,	<i>Dracæna Lindenii</i> ,
<i>Anthurium Veitchii</i> ,	<i>Kentia australis</i> ,
“ <i>Warocqueanum</i> ,	<i>Maranta Makoyana</i> ,
<i>Asparagus plumosus nanus</i> ,	“ <i>zebrina</i> ,
<i>Croton Queen Victoria</i> ,	<i>Phyllotænum Lindenii</i> ,
<i>Dieffenbachia Bausei</i> ,	<i>Sphærogyne latifolia</i> .

SPECIMEN FLOWERING PLANTS. — The first prize for six named varieties was awarded to David Allan, gardener to R. M. Pratt, for

<i>Clerodendron Balfourianum</i> ,	<i>Dipladenia profusa</i> ,
<i>Curcuma Roscoeana</i> ,	<i>Grevillea Preissii</i> ,
<i>Dipladenia Boliviensis</i> ,	<i>Nerine corusca</i> .

For a single named Specimen Flowering Plant, David Allan was also first with *Anthurium Andreanum*.

VARIEGATED LEAVED PLANTS. — The first prize for six was given to H. H. Hunnewell, for

<i>Alocasia Putzeysi</i> (new),	<i>Dieffenbachia Baraquiniana</i> ,
<i>Ananassa sativa fol. var.</i> ,	“ <i>magnifica</i> (new),
<i>Colocasia Neo-Guineensis</i> (new),	<i>Maranta fasciata</i> .

The first prize for a single specimen variegated leaved plant was given to David Allan, for Croton Queen Victoria.

CALADIUMS. — The first prize for six named varieties was awarded to David Allan, for

<i>Carnatum</i> ,	<i>Comtesse de Maillé</i> ,
<i>Mons. A. Hardy</i> ,	<i>Candidum</i> ,
<i>Albo-luteum</i> ,	<i>Teniers</i> .

And the second to the same for

<i>Cyphel</i> ,	<i>Reine de Portugal</i> ,
<i>Mad. Fritz Kœchlin</i> ,	<i>Sanchoniathon</i> ,
<i>Mad. Marjolin Scheffer</i> ,	<i>Sirius</i> .

ADIANTUMS. For six named varieties, the first prize was given to David Allan, for

<i>A. concinnum latum</i> ,	<i>A. formosum</i> ,
<i>A. cuneatum</i> ,	<i>A. gracillimum</i> ,
<i>A. Farleyense</i> ,	<i>A. trapeziforme</i> .

For a TREE FERN, David Allan was first with *Alsophila capensis*.

For LYCOPODS, four named varieties, the first prize was taken by David Allan with

<i>L. densum</i> ,	<i>L. variabilis</i> ,
<i>L. hæmatodes</i> ,	<i>L. Wildenovii</i> .

For DRACÆNAS, H. H. Hunnewell was first, but no list was furnished.

For CROTONS, six varieties, David Allan was first with

<i>C. Evansianus</i> ,	<i>C. aureo-maculatus</i> ,
<i>C. Mortii</i> ,	<i>C. Williamsii</i> ,
<i>C. nobilis</i> ,	<i>C. variegatum</i> .

For a PALM, single specimen, the first prize was given to David Allan, for *Areca lutescens*.

For *NEPENTHES*, three named plants, the first prize was taken by F. L. Ames with *N. Mastersiana*, *N. Chelsoni*, and *N. Rafflesiana*.

AGAVES. — Six distinct named varieties were shown by C. M. Hovey, and took the first prize, as follows:—

<i>A. appplanata</i> ,	<i>A. Gilbeyi</i> ,
<i>A. cyanea</i> ,	<i>A. filifera nana</i> ,
<i>A. Ghiesbreghtii</i> ,	<i>A. heteracantha caerulea</i> .

For ORCHIDS, three varieties in bloom, F. L. Ames took the first prize with *Cypripedium Dominii*, *Odontoglossum grande*, and *Dendrobium Dearei*; and the second with *Dendrobium formosum giganteum*, *Epidendrum prismatocarpum*, and *Pilumna fragrans*.

For a single plant in bloom, H. H. Hunnewell was first with *Cattleya Dowiana aurea*.

## CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

We considered last year's exhibit far in advance of any previous efforts of the Society in this department, but the display of this season was even better; in fact the Upper Hall was not large enough, although it was used exclusively for this purpose. The exhibitors of plants were John L. Gardner, Dr. H. P. Walcott, E. W. Wood, Hon. Marshall P. Wilder, James O'Brien, C. M. Hovey, Norton Brothers, and Delay & Meade. Cut flowers were shown by Edwin Fewkes, Dr. H. P. Walcott, E. W. Wood, E. Sheppard, Mrs. Francis B. Hayes, and P. Malley.

John L. Gardner was first with six Large Flowered specimens, as follows:—

Christine,	Pink of Pearl,
Golden Beverley,	Prince of Wales,
Mrs. Forsythe,	Progne.

Also for six Japanese with:

Bouquet Fait,	Grandiflorum,
E. G. Eguileor,	Hiver Fleuri,
Fair Maid of Guernsey,	Meteor.

For a specimen plant, Large Flowered, H. P. Walcott was first with Crimson King, and second with Golden Queen of England. E. W. Wood was third with John Salter.

For a specimen plant, Japanese, John L. Gardner was first with La Charmeuse. H. P. Walcott was second and third with President Parkman and Cossack.

For a specimen plant, Pompon, John L. Gardner was first with Amphilla, E. W. Wood second with Golden Circle, and Dr. Walcott third with Mr. Astie.

Edwin Fewkes contributed a very choice collection of cut Japanese Chrysanthemums of new kinds. He also showed the following named varieties:—

*Large Flowered or Chinese.*

Antonelli,	Lord Derby,
Barbara,	Lord Wolseley,
Baron Beust,	L'Orient,
Beethoven,	Mabel Ward,
Dr. Rozas,	Mrs. Dixon,
Duchess of Connaught,	Mrs. G. Rundle,
Empress of India,	Nil Desperandum,
Fingal,	Pink Perfection,
Guernsey Nugget,	Prince of Wales,
Jardin des Plantes,	Prince Victor,
John Salter,	Venus,
King of Crimsons,	White Eve.

*Pompons.*

Amphilla,	La Fiancée,
Anais,	May Hardwick,
Antonius,	Mlle. Marthe,
Brilliant,	Perfection,
Elegant,	Perle des Beautés,
Fanny,	Pet,
Gen. Canrobert,	Snowdrop,
Golden Cedo Nulli,	Stella.
Golden Circle,	

*Japanese.*

Abd el Kader,	Dr. Masters,
Beauté de Toulouse,	Elise,
Bend Or,	Fulton,
Bras Rouge,	Grandiflorum,
Cité des Fleurs,	Julius Scharff,

L'Incomparable,	Oracle,
Mandarin,	Père Délaux,
Margot,	Sol,
Mme. C. Audiguier,	Soleil Levant,
Mons. Lemoine,	Tokio.
Mrs. Charles Carey,	

Dr. Walcott showed a seedling *Chrysanthemum*, Nevada (1 — A 10); color, pure white; also seedling yellow varieties, John Thorpe and A 1. Excellent seedlings were also shown by Arthur H. Fewkes, viz.: Large Flowered, Nos. 1, 7, and 12; Anemone Flowered, No. 8; Japanese, Nos. 5, 13, and 14; 13 being a very good white. John Thorpe, of Queens, Long Island, also contributed some very good seedling *Chrysanthemums*. A First Class Certificate of Merit was awarded to him for the following named seedlings: Mrs. Gubbins, Dr. H. P. Walcott, Dr. Hogg, and John W. Chambers.

The fine collection of Orchids and other plants, filling a table, was an excellent adjunct to this beautiful display. They were contributed by E. W. Gilmore, H. H. Hunnewell, David Allan, and the Cambridge Botanic Garden.

#### MISCELLANEOUS EXHIBITS.

The weekly exhibitions have been of unusual interest, and better than for several years, the variety and quality of the flowers shown being remarkably fine, and the number of contributors larger than previously. President Francis B. Hayes presented during the winter months large collections of Camellias, and William C. Strong offered remarkably fine Hybrid Roses, among them that excellent new variety, Heinrich Schultheis, of a delicate pinkish-rose color, and sweet-scented. John B. Moore & Son also exhibited admirable Hybrids, including the beautiful new white, Merveille de Lyon, color pure white, sometimes shading into rose, of very large globular form, with petals of great substance. This rose appears to be the coming favorite, as we notice it in almost all the English exhibitions as one of the prize varieties. Messrs. Moore also exhibited the new White Baroness, a white sport from the Baroness Rothschild. From Jackson Dawson came three Hybrid Roses worked upon the Japan stock, in remarkable vigor of growth, and full of flowers, though the latter were not of very



large size. E. M. Wood & Co. again presented some of their wonderful blooms of Maréchal Niel roses.

From F. L. Ames, February 9th, came a beautiful collection of Orchids, among which was the *Dendrobium Ainsworthii*.

February 28th, President Hayes exhibited *Rhododendron Veitchianum*, color pure white; also *R. Veitchianum lævigatum*, pure white, with serrated petals, and very sweet.

April 19th, from N. S. Simpkins, came twelve blooms of the Cornelia Cook rose. These were truly splendid flowers and never before equalled in our halls.

May 3d, we had from David Allan seedling Auriculas; the first time so well shown.

July 12th, Francis Parkman brought seedlings from *Iris Kœmpferi*, which were the finest of these beautiful flowers that he has ever shown. From David Allan came the beautiful *Dendrobium Dearei*, color white, and one of the finest orchids of recent introduction. It is said that the flowers have been known to last three months.

July 26th, Hon. Marshall P. Wilder offered blooms of the new rose raised by Ellwanger & Barry, and named Marshall P. Wilder. We should judge it might be a seedling from François Michelon. It is a strong grower, hardy, and a very free bloomer, flower well-formed and fragrant, of a cherry-carmine color. C. M. Hovey presented *Statice Suworowi*.

HOLLYHOCKS. — The display, though large in numbers, has not been as good as in former years. The chief contributors were Edwin Fewkes, Miss E. M. Harris, John S. Richards, Mrs. E. M. Gill, and Mrs. A. D. Wood. From L. H. Farlow came a fine group of single varieties, and from Charles F. Curtis a remarkably good dark kind.

From Robert T. Jackson, August 2, came *Campanula cæspitosa*, from the Swiss Alps, which, he says, is "An Alpine species of great beauty. It grows abundantly on all the higher Alps of Switzerland, where it was collected August, 1883. It is remarkably free blooming, and it has a long season of bloom, some of the plants exhibited having had flowers on them since July 5. It will probably prove hardy here, as it is in England." Also, from the same, a beautiful collection of Ferns of New England and Old England, embracing fifty-three species and eleven varieties. Mr. Jackson said of them: "With the exception of the three dried specimens, all the fronds are cut from plants under

cultivation, and mostly in the open border. Some, however, require the protection of a cold-frame in winter time. The ferns are arranged in three divisions, according as they inhabit New England, England, or both places."

## NATIVES OF NEW ENGLAND.

<i>Adiantum pedatum</i> ,	<i>Cystopteris bulbifera</i> ,
<i>Aspidium acrostichoides</i> ,	<i>Dicksonia pilosiuscula</i> ,
“ “ var. <i>incisum</i> ,	<i>Lygodium palmatum</i> ,
“ <i>Boottii</i> ,	<i>Onoclea sensibilis</i> ,
“ <i>Goldianum</i> ,	“ <i>Struthiopteris</i> ,
“ <i>marginale</i> ,	<i>Osmunda cinnamomea</i> ,
“ <i>Noveboracense</i> ,	“ <i>Claytoniana</i> ,
<i>Asplenium angustifolium</i> ,	<i>Pellaea atropurpurea</i> ,
“ <i>ebeneum</i> ,	“ <i>gracilis</i> .
“ <i>montanum</i> (?)	<i>Phegopteris hexagonoptera</i> ,
“ <i>thelypteroides</i> ,	<i>Woodsia obtusa</i> ,
<i>Botrychium Virginicum</i> ,	<i>Woodwardia Virginica</i> .
<i>Camptosorus rhizophyllus</i> ,	

## NATIVES OF ENGLAND.

<i>Allosorus crispus</i> ,	<i>Asplenium septentrionale</i> ,
<i>Aspidium angulare</i> ,	<i>Ceterach officinarum</i> ,
“ “ two vars.	<i>Cystopteris montana</i> ,
“ <i>Lonchitis</i> ,	<i>Hymenophyllum Tunbridgense</i>
“ <i>rigidum</i> ,	(dried specimen),
<i>Asplenium Adiantum-nigrum</i>	<i>Lomaria spicant</i> ,
(dried specimen),	<i>Trichomanes radicans</i> (dried
<i>Asplenium fontanum</i> ,	specimen).

## NATIVES OF BOTH NEW ENGLAND AND ENGLAND.

<i>Aspidium aculeatum</i> ,	<i>Asplenium Trichomanes</i> ,
“ <i>cristatum</i> ,	“ <i>viride</i> ,
“ <i>Filix-mas</i> ,	<i>Cystopteris fragilis</i> ,
“ “ var.	<i>Osmunda regalis</i> ,
“ <i>spinulosum</i> ,	<i>Phegopteris Dryopteris</i> ,
“ “ var. <i>dila-</i>	“ <i>polypodioides</i> ,
<i>tatum</i> ,	<i>Polypodium vulgare</i> ,
<i>Aspidium Thelypteris</i> ,	<i>Pteris aquilina</i> ,
<i>Asplenium Felix-fœmina</i> ,	<i>Scolopendrium vulgare</i> ,
“ “ four vars.	“ “ two vars.
“ <i>Ruta-muraria</i> ,	<i>Woodsia Ilvensis</i> .

Edwin Fewkes exhibited the new *Tigridia pavonia alba*, color white.

NATIVE FLOWERS. — Large collections have been presented during the season by Mrs. P. D. Richards, whose exhibits have been well arranged under their botanical names, reflecting great credit on her industry and care as a collector. She has exhibited one hundred and forty-two different species, thirty-two of which were new, besides ferns. Among the rarities were

<i>Drosera filiformis</i> ,	<i>Solidago tenuifolia</i> ,
<i>Habenaria blephariglottis</i> ,	<i>Triglochin palustre</i> .
<i>Lycopodium inundatum</i> ,	

September 6th she presented a pretty specimen of the rare *Typha angustifolia*, or Small Cat-tail.

Large contributions have been made by Mrs. A. J. Dolbear under name; also by E. H. Hitchings, together with fine displays from R. B. Cummings. All these contributions have added interest and instruction to the weekly shows, and are deserving of increased encouragement.

D. Zirngiebel has several times shown his seedling White Aster, a cross between Aster Truffaut and A. Victoria, which appears to be a very good flower.

GLADIOLI. — The prizes brought out some remarkably good kinds. The exhibits of W. T. Merrifield and Mrs. T. L. Nelson and F. Bacheller were very choice. In Mr. Merrifield's collection were the following: —

Addison,	Norma,
Circe,	Princess Clotilde,
Giganteus,	Princess Mary of Cambridge,
John Bull,	Stella,
Leander,	Vesta,
Leda,	Victory,
Lord Byron,	Virginalis.

William E. Endicott exhibited seedling gladioli, crosses of *Gandavensis* and *purpurea*, which he names and describes as follows: —

*Condesa*. — Flower very large and open, nearly circular in out-

line; color rosy-purple, with a violet carmine stain on the lower petal.

*Corporal*. — Long spike; flowers closely set; color rosy-purple; the three lower divisions marked with oval crimson blotches, edged with bright yellow crescents.

August 23, Seedling *Gladiolus*, *Woebly*, was shown by James Cartwright; flower large; color a very bright cherry cardinal; the edges of the petals striped darker, the throat of the three lower divisions white with a pink stripe through the centre, a white line running through the upper divisions; a strong spike.

The *Perpetual Moss Rose*, *Salet*, was shown for several weeks in succession by W. H. Spooner, and has proved a true perpetual and a very desirable *Moss Rose*.

August 30th, Daniel Duffley exhibited a collection of *Amaryllis Belladonna* in pots, in full flower, showing wonderful skill in culture. Never have there been shown in our Halls such perfect specimens of this plant, which, though not new, is difficult of culture.

**DAHLIAS**. — The display of Dahlias through the season has been quite large and the quality of the flowers much better than for several years. Robert T. Jackson contributed two seedlings, of which he says, "They were raised by Mr. John Richardson of Dorchester; one is a fine garnet-red, perfectly double, and of good form; the other combines two shades of a maroon-crimson, and is of exceedingly perfect form as well as perfectly double."

Single dahlias were shown in quantities, and are rapidly taking their place among the most popular summer flowers. E. Sheppard, Mrs. E. M. Gill, Stillman S. Hovey, Benjamin G. Smith, and C. M. Hovey were the chief contributors.

September 6th, the new *Cannas* from C. M. Hovey were very choice, and the spotted flowered variety quite desirable. L. W. Goodell's collection of *Petunias* and *Dianthus* was very choice.

**HERBACEOUS PLANTS**. — The prizes for these proved much more popular this season than the previous year, thereby increasing the value of the weekly exhibits, and proving the experiment a success. J. W. Manning and Miss S. W. Story have presented named collections nearly every week, and A. McLaren has done so several times. The best continuous exhibits having been made by J. W. Manning, the Silver Medal was awarded to him.

Prizes have been awarded from the Hunnewell Fund to the amount of \$56. The special appropriation of \$100 for winter exhibits has all been awarded, and is included in the list of gratuities.

The amount of money prizes and gratuities awarded is \$2,065, out of the appropriation of \$2,125.

All of which is respectfully submitted.

WM. H. SPOONER, JAMES CARTWRIGHT, E. L. BEARD, J. H. WOODFORD, DAVID ALLAN,	}	<i>Committee                  on                  Plants and                  Flowers.</i>
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The following letter was appended to and presented with the Report: —

MR. PRESIDENT:— With this record my official duties in the Society are closed, and not without many pleasant recollections of the courtesy manifested by those with whom I have been associated, especially by yourself, Mr. President, in the friendly relations which have uniformly existed between us.

I hope I may claim the satisfaction of leaving the Society's affairs in my department in quite as good condition as I found them, having endeavored to apply a careful judgment and economy in promoting its interests wherever I had opportunity, either within these Halls, or elsewhere.

It will be very pleasant to watch its future successes in the able hands which will now carry on the work.

WILLIAM H. SPOONER.

PRIZES AND GRATUITIES AWARDED FOR PLANTS  
AND FLOWERS.

JANUARY 5.

*Gratuities : —*

John L. Gardner, Primulas, . . . . .	\$3 00
Francis B. Hayes, Camellias and Epacris, . . . . .	2 00
William C. Strong, Hybrid Perpetual Roses, . . . . .	2 00

JANUARY 12.

*Gratuities : —*

William C. Strong, Hybrid Perpetual Roses, . . . . .	2 00
Francis B. Hayes, Camellias, . . . . .	2 00
Edwin Sheppard, Primulas, . . . . .	1 00

JANUARY 19.

*Gratuities : —*

Francis B. Hayes, Camellias, . . . . .	2 00
William C. Strong, Hybrid Perpetual Roses, . . . . .	2 00
Mrs. E. M. Gill, Cut Flowers, . . . . .	1 00

JANUARY 26.

*Gratuities : —*

Francis B. Hayes, Camellias, . . . . .	3 00
John L. Gardner, <i>Cælogyne cristata</i> , . . . . .	3 00

FEBRUARY 2.

*Gratuities : —*

Francis B. Hayes, Camellias, . . . . .	2 00
Jackson Dawson, Hybrid Perpetual Roses, . . . . .	3 00
E. M. Wood & Co., Maréchal Niel Roses, . . . . .	3 00
Mrs. E. M. Gill, Cut Flowers, . . . . .	1 00
S. S. Hovey, " " . . . . .	1 00

FEBRUARY 9.

*Gratuities : —*

F. L. Ames, Orchids, . . . . .	10 00
Waldo O. Ross, <i>Lælia anceps alba</i> , . . . . .	2 00
Francis B. Hayes, Camellias, . . . . .	3 00
W. C. Strong, Hybrid Perpetual Roses, . . . . .	1 00
John L. Gardner, Epacris, . . . . .	3 00
Mrs. A. D. Wood, Vase of Flowers, . . . . .	1 00

FEBRUARY 16.

*Gratuities : —*

Francis B. Hayes, Camellias, . . . . .	3 00
Mrs. A. D. Wood, Vase of Flowers, . . . . .	1 00
E. Sheppard, Pansies and Clematis, . . . . .	1 00

FEBRUARY 23.

Gratuities : —

Francis B. Hayes, Camellias, . . . . .	\$3 00
“ “ Azalea Kaiser Augustus, . . . . .	1 00
Hovey & Co., Camellias, . . . . .	2 00
John B. Moore & Son, Hybrid Perpetual Roses, . . . . .	3 00
Mrs. A. D. Wood, <i>Freesia refracta alba odorata</i> , . . . . .	1 00

MARCH 1.

Gratuities : —

Francis B. Hayes, Camellias, . . . . .	3 00
John B. Moore & Son, Hybrid Perpetual Roses, . . . . .	3 00
Mrs. E. M. Gill, Cut Flowers, . . . . .	1 00
Mrs. A. D. Wood, “ “ . . . . .	1 00
B. G. Smith, Carnations, . . . . .	1 00
E. Sheppard, Clematis and Pansies, . . . . .	1 00

MARCH 8.

Gratuities : —

Hovey & Co., Camellias, . . . . .	2 00
John B. Moore & Son, Hybrid Perpetual Roses, . . . . .	2 00
Francis B. Hayes, Display of Flowers, . . . . .	2 00
Mrs. A. D. Wood, “ “ “ . . . . .	1 00

MARCH 13.

Gratuities : —

Hovey & Co., Camellias, . . . . .	2 00
Francis B. Hayes, Display of Flowers, . . . . .	2 00
Mrs. A. D. Wood, “ “ “ . . . . .	2 00

AZALEA AND ROSE SHOW.

MARCH 20 AND 21.

INDIAN AZALEAS. — Six named varieties in pots, Marshall P. Wilder, . . . . .	\$12 00
Two named varieties, in pots, Marshall P. Wilder, . . . . .	8 00
Specimen plant, named, in pot, Hovey & Co., Suzette, . . . . .	5 00
Four named varieties, in not exceeding ten-inch pots, Marshall P. Wilder, . . . . .	8 00
Second, Hovey & Co., . . . . .	6 00
Single plant, of any named variety, in not exceeding an eight-inch pot, Anthony McLaren, Borsig, . . . . .	3 00
Second, Marshall P. Wilder, Rosy Morn, . . . . .	2 00
HYBRID PERPETUAL ROSES. — Three plants, in not exceeding eight-inch pots, distinct named varieties, John B. Moore & Son, . . . . .	6 00
Second, Francis B. Hayes, . . . . .	5 00
Single plant, of any named variety, John L. Gardner, Pierre Seletzski, . . . . .	4 00

Second, John B. Moore & Son, John Hopper, . . . . .	\$3 00
Twelve cut blooms, of six distinct named varieties, two of each, John L. Gardner, . . . . .	6 00
Second, John B. Moore & Son, . . . . .	4 00
Six blooms, of four distinct named varieties, John B. Moore & Son, . . . . .	3 00
Single bloom, of any named variety, John B. Moore & Son, Mad. Gabriel Luizet, . . . . .	1 00
TENDER ROSES. — Twelve blooms of Catherine Mermet, Thomas W.	
Dee, . . . . .	4 00
Second, Thomas W. Dee, . . . . .	3 00
Twelve blooms of Niphetos, Mrs. E. M. Gill, . . . . .	4 00
Twelve blooms of Souvenir de la Malmaison, Mrs. E. M. Gill, . . . . .	4 00
ORCHIDS. — Three plants, in bloom, F. L. Ames, . . . . .	
Second, E. W. Gilmore, . . . . .	6 00
Single plant, in bloom, H. H. Hunnewell, <i>Calogyne cristata</i> , . . . . .	3 00
CYCLAMENS. — Six plants, in bloom, C. B. Gardiner, . . . . .	
Second, C. B. Gardiner, . . . . .	4 00
Three plants, in bloom, C. B. Gardiner, . . . . .	3 00
Second, C. B. Gardiner, . . . . .	2 00
Single plant in bloom, C. B. Gardiner, . . . . .	2 00
HEATH. — Single plant in bloom, Francis B. Hayes, . . . . .	
Second, Francis B. Hayes, . . . . .	2 00
PRIMROSES. — Three plants, Single Flowered, of distinct varieties, in bloom, John L. Gardner, . . . . .	
	2 00
CINERARIAS. — Four varieties, in not over nine-inch pots, in bloom,	
Mrs. M. T. Goddard, . . . . .	6 00
Second, Mrs. M. T. Goddard, . . . . .	4 00
Single plant in bloom, Mrs. M. T. Goddard, . . . . .	3 00
Second, Mrs. M. T. Goddard, . . . . .	2 00
PANSIES. — Six distinct varieties, in bloom, William A. Bock, . . . . .	
Fifty cut blooms, in the Society's flat fruit-dishes, W. A. Bock, . . . . .	3 00
Second, James O'Brien, . . . . .	2 00
HYACINTHS. — Twelve distinct named varieties, in pots, one in each pot, in bloom, Hovey & Co., . . . . .	
	8 00
Second, C. H. Hovey & Co., . . . . .	6 00
Third, John L. Gardner, . . . . .	4 00
Six distinct named varieties, in pots, one in each pot, in bloom, John L. Gardner, . . . . .	6 00
Second, Hovey & Co., . . . . .	4 00
Third, C. H. Hovey & Co., . . . . .	2 00
Three distinct named varieties, in pots, one in each pot, in bloom, John L. Gardner, . . . . .	3 00
Second, Hovey & Co., . . . . .	2 00
Third, C. H. Hovey & Co., . . . . .	1 00
Single named bulb in pot, in bloom, C. H. Hovey & Co., <i>Fabiola</i> , . . . . .	2 00
Second, John L. Gardner, <i>Hofdyk</i> , . . . . .	1 00
Two pans, ten bulbs of one variety in each pan, John L. Gardner, . . . . .	4 00



General Display of Spring Bulbs, all classes, John L. Gardner,	\$10 00
Second, Hovey & Co.,	8 00
LILIES. — Display in pots, in bloom, Hovey & Co.,	8 00
LILY OF THE VALLEY. — Six six-inch pots, in bloom, Hovey & Co.,	4 00
Second, Hovey & Co.,	3 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties,	
Hovey & Co.,	4 00
Second, Francis B. Hayes,	3 00
Six cut blooms, of not less than four named varieties, with foliage,	
Hovey & Co.,	3 00
CUT FLOWERS. — Display in the Society's glass vases, Francis B. Hayes,	6 00
Second, Mrs. A. D. Wood,	4 00
BASKET OF FLOWERS. — Best arranged, James O'Brien,	6 00
Fourth prize, Stillman S. Hovey,	3 00

*Gratuities : —*

Marshall P. Wilder, Azaleas,	6 00
Anthony McLaren, Collection of Azaleas,	5 00
Norton Brothers, Azalea,	3 00
Hovey & Co., Azaleas,	2 00
John B. Moore & Son, Vase of Roses,	3 00
William C. Strong, Hybrid Perpetual Roses,	3 00
F. L. Ames, Orchids,	10 00
“    “    Orchid Flowers,	5 00
H. H. Hunnewell, Orchid Flowers,	10 00
David Allan, gardener to R. M. Pratt, Orchids,	10 00
Woolson & Co., Collection of Narcissus and Herbaceous Plants,	25 00
Jackson Dawson, Primroses and Polyanthus,	3 00
David Allan, gardener to R. M. Pratt, <i>Cytisus Everestianum</i> ,	3 00
H. H. Hunnewell, <i>Glonera jasminiflora</i> ,	3 00
Hovey & Co., Palms,	2 00
M. B. Faxon, Crotons,	1 00
Claude W. Hutlen, Cactus,	1 00
Francis B. Hayes, Display of Plants,	6 00
H. H. Hunnewell, Collection of Plants,	5 00
Hovey & Co., Plants,	3 00
Edwin Sheppard, Display of Flowers,	3 00
Mrs. E. E. Gill, “ “ “	3 00
Miss S. W. Story, “ “ “	1 00
Miss A. C. Kenrick, Basket of Mahonia,	1 00

MARCH 29.

*Gratuities : —*

Francis B. Hayes, Rhododendrons and Azaleas,	5 00
Hovey & Co., Camellias,	2 00
John L. Gardner, Hyacinths,	3 00

Edwin Fewkes, Sarracenas, . . . . .	\$1 00
Francis B. Hayes, Cut Flowers, . . . . .	2 00
Mrs. A. D. Wood, " " . . . . .	1 00
Mrs. E. M. Gill, " " . . . . .	1 00
Stillman S. Hovey, " " . . . . .	1 00

## APRIL 5.

*Gratuities :—*

John L. Gardner, Plants, . . . . .	3 00
Marshall P. Wilder, Azaleas, . . . . .	2 00
Edward L. Beard, Hoop Petticoat Narcissus and New White Violet, Comte de Brazza, . . . . .	2 00
Hovey & Co., Camellias, . . . . .	1 00
Francis B. Hayes, Cut Flowers, . . . . .	2 00
Miss S. W. Story, " " . . . . .	1 00
Mrs. E. M. Gill, " " . . . . .	1 00

## APRIL 12.

*Gratuities :—*

Francis B. Hayes, Plants, . . . . .	5 00
W. H. Badlam, Primulas and Violets, . . . . .	1 00
W. C. Strong, Gen. Jacqueminot Roses, . . . . .	1 00

## APRIL 19.

*Gratuities :—*

W. C. Strong, Gen. Jacqueminot Roses, . . . . .	1 00
Sewell Fisher, Seedling Carnations, . . . . .	2 00
Francis B. Hayes, Azalea, Jules Verne, . . . . .	1 00
Mrs. E. M. Gill, Display of Flowers, . . . . .	1 00
Mrs. A. D. Wood, " " " . . . . .	1 00

## APRIL 26.

*Gratuities :—*

W. H. Badlam, Auriculas, . . . . .	2 00
Mrs. E. M. Gill, Pansies, . . . . .	1 00
G. W. Sanderson, " . . . . .	1 00
E. L. Beard, " . . . . .	1 00
C. W. Norton, " . . . . .	1 00
Mrs. E. M. Gill, Display of Flowers . . . . .	1 00
Mrs. A. D. Wood, " " " . . . . .	1 00
Miss S. W. Story, " " " . . . . .	1 00

## MAY 3.

*Gratuities :—*

John Mitchell, Primulas, . . . . .	1 00
Mrs. E. M. Gill, Display of Flowers, . . . . .	1 00
Miss S. W. Story, " " " . . . . .	1 00
E. L. Beard, " " " . . . . .	1 00

SPRING EXHIBITION.

MAY 10.

PELARGONIUMS.—Four named Zonale varieties, variegated, in bloom, Hovey & Co., . . . . .	\$3 00
Second, Hovey & Co., . . . . .	2 00
Six named Show or Fancy varieties, in bloom, Hovey & Co., . . . . .	4 00
INDIAN AZALEA.—Single plant, in pot, named, Hovey & Co., Baron de Lieburgh, . . . . .	6 00
Second, John L. Gardner, . . . . .	5 00
Third, Hovey & Co., <i>Delicatissima</i> , . . . . .	4 00
TULIPS.—Twenty-four blooms, distinct named varieties, John L. Gardner, . . . . .	4 00
Second, John L. Gardner, . . . . .	3 00
BASKET OF FLOWERS.—Miss S. W. Story, . . . . .	3 00
PANSIES.—Fifty cut blooms in the Society's flat fruit dishes, E. L. Beard, . . . . .	3 00
Second, Mrs. E. M. Gill, . . . . .	2 00
HERBACEOUS PLANTS.—J. W. Manning, . . . . .	2 00

*Gratuities : —*

John L. Gardner, Plants, . . . . .	5 00
B. R. Freeman, Violets, . . . . .	1 00
Mrs. E. M. Gill, Pansies, . . . . .	1 00
Benjamin G. Smith, <i>Andromeda floribunda</i> , . . . . .	1 00
George Seaverns, Hydrangeas, . . . . .	1 00
Edward L. Beard, Anemones and Primulas, . . . . .	1 00
W. K. Wood, Cut Flowers, . . . . .	2 00
E. Sheppard, " " . . . . .	2 00
Miss S. W. Story, " " . . . . .	1 00
Hovey & Co., " " . . . . .	1 00
Mrs. P. D. Richards, Native Flowers, . . . . .	1 00

MAY 17.

*Gratuities : —*

J. W. Manning, Herbaceous Plants, . . . . .	1 00
Stillman S. Hovey, Coreopsis, . . . . .	1 00
A. W. Crawford, Seedling Pelargoniums, . . . . .	1 00
Miss S. W. Story, Display of Flowers, . . . . .	1 00
Miss E. M. Harris, " " " . . . . .	1 00
Mrs. E. M. Gill, " " " . . . . .	1 00

MAY 24.

*Gratuities : —*

W. A. Manda, Display of Hardy Flowers, . . . . .	3 00
Benjamin G. Smith, Pansies, . . . . .	1 00
Miss S. W. Story, Display of Flowers, . . . . .	1 00
Mrs. E. M. Gill, " " " . . . . .	1 00
Hovey & Co., Plants and Flowers, . . . . .	2 00

## RHODODENDRON SHOW.

JUNE 7.

*Hunnewell Prizes.*

RHODODENDRONS. — To be exhibited in Rose Boxes. Twenty-four tender varieties, named, Francis B. Hayes, . . . . .	\$10 00
Six tender named varieties, “ “ “ . . . . .	3 00
Three tender named varieties, “ “ “ . . . . .	2 00
Single truss of any tender named variety; Francis B. Hayes, Lady Grenville, . . . . .	1 00
Ten hardy named varieties, John L. Gardner, . . . . .	6 00
Six “ “ “ Francis B. Hayes, . . . . .	3 00
Three “ “ “ John L. Gardner, . . . . .	2 00
Single truss of any hardy named variety, Francis B. Hayes, . . . . .	1 00
HARDY AZALEAS. — From any or all classes, fifteen named varieties, one truss of each, Edwin Sheppard, . . . . .	8 00
Six named varieties, one truss of each, Benjamin G. Smith, . . . . .	4 00
Cluster of trusses, of one variety, Benjamin G. Smith, . . . . .	2 00

*Society's Prizes.*

GERMAN IRIS. — Twelve distinct varieties, E. Sheppard, . . . . .	3 00
Second, J. W. Manning, . . . . .	2 00
CLEMATIS. — Early named varieties, display of cut blooms, J. H. Woodford, . . . . .	3 00
Second, Edwin Sheppard, . . . . .	2 00
HARDY FLOWERING SHRUBS. — Twelve named varieties, cut blooms, Benjamin G. Smith, . . . . .	3 00
CUT FLOWERS. — Display, filling one hundred bottles, W. K. Wood, . . . . .	4 00
Second, Mrs. E. M. Gill, . . . . .	3 00
TABLE DESIGN, other than a basket of flowers, Mrs. E. M. Gill, . . . . .	4 00
Second, Miss S. W. Story, . . . . .	3 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .	2 00

*Gratuities: —*

H. H. Hunnewell, Collection of Rhododendrons, . . . . .	5 00
“ “ “ Azaleas, . . . . .	5 00
Francis B. Hayes, Rhododendrons, . . . . .	3 00
Francis Parkman, Seedling Azaleas, . . . . .	2 00
C. M. Hovey, Display, . . . . .	5 00
John B. Moore & Son, Pæonies, Hybrid Perpetual Roses, and Gloxinias, . . . . .	3 00
Benjamin G. Smith, Clematis and Pansies, . . . . .	1 00
Edwin Fewkes, Roses and Azaleas, . . . . .	1 00
E. Sheppard, Orchids, . . . . .	4 00
James Cartwright, <i>Dendrobium densiflorum</i> , . . . . .	2 00
John L. Gardner, Pelargoniums, . . . . .	3 00
“ “ Ericas, . . . . .	2 00

PRIZES AND GRATUITIES FOR PLANTS AND FLOWERS. 225

J. W. Manning, Pyrethrums, . . . . .	\$1 00
Jackson Dawson, Shrubs, Azaleas, etc., . . . . .	5 00
Francis B. Hayes, Cut Flowers, . . . . .	2 00
Miss S. W. Story, " " . . . . .	1 00
E. Sheppard, Display, . . . . .	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 24 AND 25.

*Special Subscription Prizes.*

HYBRID PERPETUAL ROSES. — Twenty-four Roses, of different varieties, named, John L. Gardner, Silver Vase, value, . . . \$50 00

Second, William Gray, Jr., Silver Vase, value, . . . . . 30 00

Six Roses of different varieties, named, John S. Richards, Silver Vase, value, . . . . . 15 00

Twelve Roses of different varieties, named, William H. Spooner, Silver Vase, value, . . . . . 20 00

Eighteen Roses of different varieties, named, John L. Gardner, Silver Vase, value, . . . . . 25 00

Six Roses of any two varieties, three of each, named, Francis B. Hayes, Silver Vase, value, . . . . . 15 00

Eighteen Roses of six varieties, three of each, named, William H. Spooner, Silver Vase, value, . . . . . 25 00

Twenty-four varieties, three specimens of each, to John B. Moore & Son, to be held for three consecutive years, this being the third year of the award, Silver Challenge Vase, value, . . . 200 00

*Special Prize, offered by a member of the Society.*

HYBRID PERPETUAL ROSES. — For the best six blooms of any one variety, to be judged by *points*, William H. Spooner, Mme. Gabriel Luizet, Piece of Plate, value, . . . . . 10 00

*Society's Special Prizes.*

HYBRID PERPETUAL ROSES. — Six blooms of Alfred Colomb, John B. Moore & Son, . . . . . 4 00

Six blooms of Baroness Rothschild, John B. Moore & Son, . . . 4 00

Six blooms of Jean Liabaud, John B. Moore & Son, . . . . . 4 00

Six blooms of John Hopper, John B. Moore & Son, . . . . . 4 00

Six blooms of Marquise de Castellane, John B. Moore & Son, . . . 4 00

Six blooms of Mme. Gabriel Luizet, William H. Spooner, . . . . . 4 00

Six blooms of Mme. Victor Verdier, John B. Moore & Son, . . . . 4 00

Twelve blooms of any other variety, John B. Moore & Son, Mons. Boncenne, Harris's Treatise on Insects.

Single bloom of any variety, John B. Moore & Son, François Michelon, . . . . . 3 00

Second, John B. Moore & Son, Mme. Gabriel Luizet, . . . . . 2 00

Third, " " " " Alfred Colomb, . . . . . 1 00

*Regular Prizes.*

HYBRID PERPETUAL ROSES. — Twenty-four distinct named varieties,	
three of each, John B. Moore & Son, . . . . .	\$15 00
Twelve distinct named varieties, William H. Spooner, . . . . .	10 00
Second, John L. Gardner, . . . . .	8 00
Third, Francis B. Hayes, . . . . .	6 00
Six distinct named varieties, John L. Gardner, . . . . .	8 00
Second, John S. Richards, . . . . .	6 00
Third, John S. Richards, . . . . .	4 00
Three distinct named varieties, Francis B. Hayes, . . . . .	4 00
Second, John S. Richards, . . . . .	3 00
Third, John L. Gardner, . . . . .	2 00
MOSS ROSES. — Six named varieties, three clusters of each, William	
H. Spooner, . . . . .	4 00
Second, John B. Moore & Son, . . . . .	3 00
Three named varieties, three clusters of each, John B. Moore &	
Son, . . . . .	3 00
Second, William H. Spooner, . . . . .	2 00
General Display, of one hundred bottles of Hardy Roses, John B.	
Moore & Son, . . . . .	8 00
Second, Norton Brothers, . . . . .	7 00
Third, John S. Richards, . . . . .	6 00
Fourth, Francis B. Hayes, . . . . .	5 00
Fifth, William H. Spooner, . . . . .	4 00
STOVE AND GREENHOUSE FLOWERING PLANTS, no Orchid admis-	
sible. — Six named varieties, in bloom, H. H. Hunnewell, . . . . .	8 00
Second, John L. Gardner, . . . . .	6 00
SPECIMEN PLANT, in bloom, other than Orchid, regard being had to	
new or rare varieties, John L. Gardner, <i>Erica Bothwelliana</i> , . . . . .	4 00
Second, H. H. Hunnewell, <i>Rhynchospermum jasminoides</i> , . . . . .	2 00
SPECIMEN FOLIAGE PLANT. — For the best, named, H. H. Hunne-	
well, <i>Bertonia Van Houttei</i> , . . . . .	4 00
ORCHIDS. — Three named varieties, in bloom, F. L. Ames, . . . . .	
Second, E. W. Gilmore, . . . . .	4 00
Single plant, named, David Allan, <i>Cattleya Mossiæ</i> , . . . . .	3 00
Second, F. L. Ames, <i>Cypripedium Stonei</i> , . . . . .	2 00
HERBACEOUS PÆONIES. — Ten named varieties, Francis B. Hayes, . . . . .	
Second, C. M. Hovey, . . . . .	2 00
SWEET WILLIAMS. — Thirty trusses, not less than six distinct va-	
rieties, E. Sheppard, . . . . .	3 00
Second, C. M. Hovey, . . . . .	2 00
Third, J. W. Manning, . . . . .	1 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass	
vases, Mrs. E. M. Gill, . . . . .	4 00
Second, James O'Brien, . . . . .	3 00
Third, Miss S. W. Story, . . . . .	2 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .	
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities : —*

John S. Richards, Collection of Roses,	\$3 00
Benjamin G. Smith, " " "	3 00
John B. Moore & Son, " " "	3 00
William H. Spooner, " " "	3 00
Norton Brothers, " " "	3 00
Mrs. E. M. Gill, " " "	3 00
Francis B. Hayes, " " "	3 00
Warren Heustis, " " "	2 00
John B. Moore & Son, " " "	2 00
John S. Richards, " " "	1 00
David Allan, gardener to R. M. Pratt, Orchids,	10 00
F. L. Ames, " " "	10 00
" " " Cut Flowers,	3 00
H. H. Hunnewell, Orchids,	15 00
John L. Gardner, " " "	5 00
F. Becker, Palms,	15 00
W. C. Strong, Evergreens,	10 00
Edward W. Breed, Collection of Pinks,	2 00
W. C. Strong, Collection of Maple foliage,	2 00
Francis B. Hayes, Kalmia, etc.,	2 00
" " " Clematis,	1 00
C. O. Saunders, " " "	1 00
John C. Hovey, Richardson's Seedling Pæonies, etc.,	1 00
Joseph Tailby, Pinks,	1 00
L. H. Farlow, Gloxinias,	1 00
John L. Gardner, Canterbury Bells, etc.,	1 00
C. M. Hovey, Lilies,	1 00
Benjamin G. Smith, Delphiniums,	1 00
Mrs. A. D. Wood, Stand of Flowers,	2 00
E. Sheppard, Collection of Flowers,	3 00
Mrs. E. M. Gill, Greenhouse Flowers,	1 00
" " " " Cut Flowers,	1 00
E. H. Hitchings, Kalmia, etc.,	2 00

JUNE 28.

*Gratuity : —*

Miss S. W. Story, Cut Flowers,	1 00
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JULY 5.

HYBRID PERPETUAL ROSES. — Twenty-four blooms, of twenty-four distinct named varieties, in vases, John B. Moore & Son,		4 00
Second, William H. Spooner,		3 00
DELPHINIUMS. — Six named varieties, Henry P. Walcott,		3 00
Second, Benjamin G. Smith,		2 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill,		4 00
Second, W. K. Wood,		3 00

HERBACEOUS PLANTS.—J. W. Manning, . . . . .	\$2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities : —*

William H. Spooner, Hybrid Perpetual Roses, . . . . .	2 00
“ “ “ Moss Roses, . . . . .	1 00
John B. Moore & Son, Hybrid Perpetual Roses, . . . . .	1 00
B. G. Smith, Delphiniums, . . . . .	2 00
“ “ “ Lilies and Single Dahlias, . . . . .	1 00
C. M. Hovey, Rhododendrons, . . . . .	2 00
E. Sheppard, Sweet Williams, . . . . .	1 00
“ “ Drummond Phlox, . . . . .	1 00
Francis Parkman, <i>Iris Kæmpferi</i> , . . . . .	2 00
Miss S. W. Story, Display, . . . . .	1 00
Mrs. P. D. Richards, Native Flowers, . . . . .	2 00
E. H. Hitchings, “ “ . . . . .	2 00

## JULY 12.

JAPAN IRIS.—(Varieties of <i>Iris Kæmpferi</i> ), Display, Francis Parkman, . . . . .	3 00
Second, John L. Gardner, . . . . .	2 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill, . . . . .	3 00
Second, Mrs. A. D. Wood, . . . . .	2 00
HERBACEOUS PLANTS.—J. W. Manning, . . . . .	2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities : —*

Mrs. E. M. Gill, Gloxinias and Hollyhocks, . . . . .	1 00
Robert T. Jackson, Lilies and Herbaceous Plants, . . . . .	1 00
Miss E. M. Harris, Lilies, . . . . .	1 00
“ “ “ Hollyhocks, . . . . .	1 00
E. Sheppard, “ . . . . .	1 00
Mrs. E. S. Joyce, “ . . . . .	1 00
“ “ “ “ Display of Flowers, . . . . .	1 00
John L. Gardner, Ericas, . . . . .	5 00
C. M. Hovey, Orchids, . . . . .	3 00
David Allan, “ . . . . .	3 00
Miss S. W. Story, Display, . . . . .	1 00

## JULY 19.

HOLLYHOCKS.—Twelve blooms, of twelve distinct colors, Edwin Fewkes, . . . . .	4 00
Second, Miss E. M. Harris, . . . . .	3 00
Six blooms, of six distinct colors, John S. Richards, . . . . .	2 00
Second, Mrs. E. M. Gill, . . . . .	1 00
Three blooms, of three distinct colors, Mrs. A. D. Wood, . . . . .	1 00
CUT FLOWERS.—Display, filling one hundred bottles, Mrs. E. M. Gill, . . . . .	4 00
Second, W. K. Wood, . . . . .	3 00



PRIZES AND GRATUITIES FOR PLANTS AND FLOWERS. 229

HERBACEOUS PLANTS. — J. W. Manning, . . . . .	\$2 00
Second, Miss S. W. Story, . . . . .	1 00

Gratuities : —

Charles F. Curtis, Hollyhocks, . . . . .	\$1 00
Mrs. E. S. Joyce, " . . . . .	1 00
Miss E. M. Harris, " . . . . .	3 00
Edwin Sheppard, " . . . . .	2 00
Mrs. E. M. Gill, Lilies and Hollyhocks, . . . . .	2 00
Mrs. E. S. Joyce, Display, . . . . .	2 00
Miss S. W. Story, " . . . . .	2 00
E. H. Hitchings, Native Flowers, . . . . .	2 00
Mrs. P. D. Richards, " . . . . .	2 00
R. B. Cummings, Bouquet of Native Flowers, . . . . .	1 00

JULY 26.

PELARGONIUMS. — Six double and six single varieties, named, one truss of each, Edwin Sheppard, . . . . .	2 00
PERENNIAL PHLOXES. — Six named varieties, Edwin Sheppard, . . . . .	3 00
Second, J. W. Manning, . . . . .	2 00
VERBENAS. — Thirty bottles, one truss in each, Edwin Sheppard, . . . . .	3 00
Second, C. M. Hovey, . . . . .	2 00
Third, Mrs. E. M. Gill, . . . . .	1 00
SWEET PEAS. — Display, filling twenty-five bottles, Mrs. A. D. Wood, . . . . .	3 00
Third prize to Benjamin G. Smith, . . . . .	1 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .	2 00
Second, Miss S. W. Story, . . . . .	1 00

Gratuities : —

E. Sheppard, Hollyhocks, Pelargoniums, and Fuchsias, . . . . .	2 00
Mrs. E. M. Gill, Pelargoniums, . . . . .	1 00
Joseph H. Woodford, Sweet Peas, . . . . .	1 00
Miss Davis, Sweet Peas, . . . . .	1 00
John C. Hovey, <i>Convolvulus leptophyllus</i> , from New Mexico, . . . . .	1 00
Joseph Tailby, <i>Brassia verrucosa</i> , . . . . .	2 00
Charles F. Curtis, Dark Hollyhocks, . . . . .	1 00
Edwin Fewkes, Dahlias, . . . . .	1 00
Mrs. Margaret Parker, <i>Limnocharis Humboldtii</i> and <i>Nelumbium speciosum</i> , . . . . .	1 00
Miss S. W. Story, Display, . . . . .	2 00
Mrs. E. S. Joyce, Display of Flowers, . . . . .	1 00
Mrs. E. M. Gill, Collection of Flowers, . . . . .	1 00
Mrs. A. D. Wood, Vase of Flowers, . . . . .	2 00
Mrs. P. D. Richards, Native Flowers, . . . . .	3 00

AUGUST 2.

STOCKS. — Six varieties, one cut plant of each, Edwin Sheppard, . . . . .	2 00
BALSAMS. — Twelve spikes, not less than eight varieties, the second prize to John Parker, . . . . .	1 00

CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, . . . . .		\$4 00
Second, W. K. Wood, . . . . .		3 00
NATIVE FERNS. — Best display, Mrs. A. J. Dolbear, . . . . .		3 00
Second, Mrs. P. D. Richards, . . . . .		2 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .		2 00
Second, Miss S. W. Story, . . . . .		1 00
<i>Gratuities: —</i>		
Edwin Fewkes, Dahlias, . . . . .		2 00
John Parker, " . . . . .		1 00
W. H. Spooner, Salet Moss Roses, . . . . .		2 00
Miss S. W. Story, Cut Flowers, . . . . .		2 00
E. Sheppard, " " . . . . .		2 00
E. H. Hitchings, Native Flowers, . . . . .		2 00

## AUGUST 9.

PERENNIAL PHLOXES. — Ten distinct named varieties, one spike of each, E. Sheppard, . . . . .		3 00
PETUNIAS. — Collection, filling thirty bottles, one spray in each, John Parker, . . . . .		3 00
Second, Mrs. E. M. Gill, . . . . .		2 00
Third, " " . . . . .		1 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, . . . . .		4 00
Second, C. M. Hovey, . . . . .		3 00
Third, W. K. Wood, . . . . .		2 00
NATIVE FLOWERS. — Collection, Mrs. P. D. Richards, . . . . .		3 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .		2 00
Second, Miss S. W. Story, . . . . .		1 00
<i>Gratuities: —</i>		

E. Sheppard, Phloxes and Delphiniums, . . . . .		2 00
W. H. Spooner, Salet Moss Roses, . . . . .		2 00
John B. Moore & Son, Hybrid Perpetual Roses, . . . . .		2 00
B. G. Smith, Single Dahlias, . . . . .		1 00
John Parker, Dahlias, . . . . .		1 00
C. M. Hovey, Seedling Lilies, . . . . .		2 00
Miss S. W. Story, Display of Flowers, . . . . .		2 00
Edwin Fewkes, " " " . . . . .		2 00
W. H. Badlam, <i>Sabbatia chloroides</i> , . . . . .		1 00
R. B. Cummings, Native Flowers, . . . . .		1 00

## AUGUST 16.

GLADIOLI. — Twenty named varieties, in spikes, William T. Merri- field, . . . . .		8 00
Second, Mrs. T. L. Nelson, . . . . .		6 00
Ten named varieties, in spikes, F. Bacheller, . . . . .		4 00
Second, Mrs. T. L. Nelson, . . . . .		3 00
Six named varieties, in spikes, F. Bacheller, . . . . .		3 00

PRIZES AND GRATUITIES FOR PLANTS AND FLOWERS. 231

Display of named and unnamed varieties, filling one hundred bottles, James Cartwright, . . . . .	\$6 00
PHLOX DRUMMONDI. — Fifty bottles, not less than six varieties, Mrs. T. L. Nelson, . . . . .	2 00
Second, C. M. Hovey, . . . . .	1 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .	2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities: —*

George S. Tuttle, Pompon Dahlias, . . . . .	1 00
John Parker, Dahlias, . . . . .	1 00
Mrs. Mary Starkes Whiton, Dahlias, . . . . .	1 00
Macey Randall, Dahlias, . . . . .	2 00
John B. Moore & Son, Phloxes, . . . . .	2 00
A. A. Hixon, Petunias and Sweet Peas, . . . . .	1 00
Mrs. E. M. Gill, Display, . . . . .	2 00
E. Sheppard, " . . . . .	2 00
Miss S. W. Story, " . . . . .	1 00
Mrs. A. D. Wood, " . . . . .	1 00
Mrs. C. N. S. Horner, Natives, . . . . .	2 00
R. B. Cummings, " . . . . .	1 00

AUGUST 23.

ASTERS. — Truffaut's Pæony Flowered, thirty blooms, not less than ten varieties, E. Sheppard, . . . . .	4 00
Second, C. M. Hovey, . . . . .	3 00
Third, W. K. Wood, . . . . .	2 00
Victoria Flowered, thirty blooms, not less than eight varieties, John L. Gardner, . . . . .	4 00
Second, E. Sheppard, . . . . .	3 00
Third, C. M. Hovey, . . . . .	2 00
Pompon, thirty sprays, not less than six varieties, one spray in each bottle, C. M. Hovey, . . . . .	3 00
Second, John L. Gardner, . . . . .	2 00
Third, Stillman S. Hovey, . . . . .	1 00
HERBACEOUS PLANTS. — J. W. Manning, . . . . .	2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities: —*

Franklin Bacheller, named, Gladioli, . . . . .	2 00
James Cartwright, Seedling Gladiolus, Woebly, . . . . .	5 00
J. Warren Clark, Seedling Gladioli, . . . . .	1 00
George S. Tuttle, Pompon Dahlias, . . . . .	1 00
John Parker, Dahlias, . . . . .	1 00
Edwin Fewkes, Dahlias and Cannas, named, . . . . .	2 00
W. K. Wood, Display of Flowers, . . . . .	2 00
D. Zirngiebel, Aster, Boston Market, . . . . .	1 00
Mrs. E. S. Joyce, Display of Flowers, . . . . .	1 00

Miss S. W. Story, Display of Flowers, . . . . .	\$1 00
Mrs. E. M. Gill, " " " . . . . .	1 00
Mrs. P. D. Richards, Natives, . . . . .	1 00
R. B. Cummings, " . . . . .	1 00

## AUGUST 30.

LILIUM LANCIFOLIUM. — Twelve spikes, A. McLaren, . . . . .	3 00
Second, Miss S. W. Story, . . . . .	2 00
TROPÆOLUMS. — Display, filling twenty-five bottles, A. A. Hixon, . . . . .	3 00
Second, Mrs. A. D. Wood, . . . . .	2 00
Third, Mrs. E. M. Gill, . . . . .	1 00
MARIGOLDS. — Twenty bottles, three flowers in each, A. A. Hixon, . . . . .	3 00
Second, Mrs. E. M. Gill, . . . . .	2 00
Third, James O'Brien, . . . . .	1 00
SINGLE DAHLIAS. — Twenty-four bottles, one spray in each, E. Sheppard, . . . . .	3 00
Second, Mrs. E. M. Gill, . . . . .	2 00
Third, S. S. Hovey, . . . . .	1 00
HERBACEOUS PLANTS. — Anthony McLaren, . . . . .	2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities :—*

B. G. Smith, Seedling Single Dahlias and <i>Lilium lancifolium</i> , . . . . .	2 00
D. Zirngiebel, Scabiosa and New Golden Marigold, . . . . .	1 00
F. Bacheller, Gladioli, . . . . .	1 00
James Cartwright, Gladioli, . . . . .	4 00
George S. Tuttle, Pompon Dahlias, . . . . .	1 00
John Parker, Dahlias, . . . . .	1 00
John L. Gardner, Asters, . . . . .	1 00
J. H. Woodford, Calendulas, . . . . .	1 00
Miss S. W. Story, Display, . . . . .	2 00
Mrs. E. M. Gill, " . . . . .	1 00
W. K. Wood, " . . . . .	2 00
Mrs. A. J. Dolbear, Natives, . . . . .	1 00
R. B. Cummings, " . . . . .	1 00
Mrs. P. D. Richards, " . . . . .	1 00

## SEPTEMBER 6.

DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties, . . . . .	
A. A. Hixon, . . . . .	3 00
Second, E. Sheppard, . . . . .	2 00
Third, Anthony McLaren, . . . . .	1 00
DIANTHUS, Annual and Biennial varieties. — Collection, filling fifty bottles, single trusses, L. W. Goodell, . . . . .	3 00
Second, E. Sheppard, . . . . .	2 00
Third, A. A. Hixon, . . . . .	1 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, . . . . .	4 00
Second, W. K. Wood, . . . . .	3 00
Third, C. M. Hovey, . . . . .	2 00

PRIZES AND GRATUITIES FOR PLANTS AND FLOWERS. 233

HERBACEOUS PLANTS. — Anthony McLaren, . . . . .	\$2 00
Second, Miss S. W. Story, . . . . .	1 00

*Gratuities: —*

E. Sheppard, Dahlias and Dianthus, . . . . .	1 00
L. W. Goodell, Petunias and Dianthus, . . . . .	3 00
James Cartwright, Gladioli, . . . . .	3 00
B. G. Smith, Single Dahlias and Lilies, . . . . .	2 00
C. M. Hovey, New Cannas, . . . . .	1 00
A. A. Hixon, Scabiosas and Verbenas, . . . . .	1 00
Miss S. W. Story, Display, . . . . .	2 00
Mrs. E. S. Joyce, " . . . . .	2 00
Green Brothers, " . . . . .	1 00
R. B. Cummings, Natives, . . . . .	2 00
Mrs. A. J. Dolbear, " . . . . .	2 00
Mrs. P. D. Richards, " . . . . .	2 00

SEPTEMBER 13.

*Gratuity: —*

N. S. Simpkins, Water Lilies, . . . . .	2 00
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ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

*Hunnewell Premiums.*

EVERGREEN TREES AND SHRUBS. — Display, in pots, of other than Native Evergreens of New England, named, W. C. Strong, . . . . .	\$8 00
Second, W. C. Strong, . . . . .	6 00

*Society's Prizes.*

GREENHOUSE PLANTS. — Twelve Greenhouse and Stove Plants, of different varieties, one <i>Dracæna</i> and one <i>Croton</i> admissible, F. L. Ames, . . . . .	30 00
Second, H. H. Hunnewell, . . . . .	25 00
Third, C. M. Hovey, . . . . .	20 00
SPECIMEN FLOWERING PLANTS. — Six named varieties in bloom, David Allan, . . . . .	10 00
Single named specimen, David Allan, <i>Anthurium Andreanum</i> , . . . . .	5 00
Second, David Allan, <i>Ixora Colei</i> , . . . . .	4 00
VARIEGATED LEAVED PLANTS. — Six named varieties, not offered in the collection of Greenhouse Plants, <i>Crotons</i> and <i>Dracænas</i> not admissible, H. H. Hunnewell, . . . . .	12 00
Second, C. M. Hovey, . . . . .	10 00
Single specimen, named, not offered in any collection, David Allan, <i>Croton Queen Victoria</i> , . . . . .	5 00
Second, H. H. Hunnewell, <i>Croton nobilis</i> , . . . . .	4 00

CALADIUMS. — Six named varieties, David Allan, . . . . .	\$5 00
Second, David Allan, . . . . .	4 00
FERNS. — Six named varieties, no Adiantums admissible, F. L. Ames, . . . . .	6 00
Second, David Allan, . . . . .	4 00
ADIANTUMS. — Six named varieties, David Allan, . . . . .	5 00
TREE FERN. — Single specimen, named, David Allan, <i>Alsophila capensis</i> , . . . . .	6 00
Second, C. M. Hovey, <i>Dicksonia antarctica</i> , . . . . .	4 00
LYCOPODS. — Four named varieties, David Allan, . . . . .	3 00
DRACÆNAS. — Six named varieties, H. H. Hunnewell, . . . . .	6 00
Second, David Allan, . . . . .	5 00
CROTONS. — Six named varieties, in not exceeding six-inch pots, David Allan, . . . . .	4 00
Second, H. H. Hunnewell, . . . . .	3 00
PALM. — Single specimen, named, David Allan, <i>Areca lutescens</i> , . . . . .	5 00
Second, C. M. Hovey, <i>Phoenix reclinata</i> , . . . . .	4 00
NEPENTHES. — Three plants, named, F. L. Ames, . . . . .	5 00
AGAVES. — Six distinct named varieties, C. M. Hovey, . . . . .	5 00
SUCCULENTS. — Collection (other than Agaves and Yuccas), of twelve named species and varieties, C. M. Hovey, . . . . .	5 00
BEGONIAS. — Tuberos rooted, six seedling varieties, E. Sheppard, . . . . .	4 00
ORCHIDS. — Three varieties, in bloom, F. L. Ames, . . . . .	6 00
Second, F. L. Ames, . . . . .	4 00
Single plant in bloom, H. H. Hunnewell, <i>Cattleya Dowiana aurea</i> , . . . . .	3 00
Second, David Allan, <i>Cypripedium Sedeni</i> , . . . . .	2 00
GLADIOLI. — Best display and best kept, of named or unnamed varieties, filling one hundred bottles, the second prize to H. B. Watts, . . . . .	6 00
Third, E. Sheppard, . . . . .	4 00
DAHLIAS. — Twelve named varieties, J. L. Willey, . . . . .	5 00
Second, E. Sheppard, . . . . .	4 00
Six named varieties, John Parker, . . . . .	3 00
Second, E. Sheppard, . . . . .	2 00
Single named flower, fancy or self, E. Sheppard, . . . . .	2 00
LILIPUTIAN DAHLIAS. — General display, filling twenty-five bottles, J. L. Willey, . . . . .	3 00
Second, George S. Tuttle, . . . . .	2 00
CUT FLOWERS. — Best display and best kept during the exhibition, filling one hundred and fifty bottles, Mrs. E. M. Gill, . . . . .	16 00
Second, C. M. Hovey, . . . . .	14 00
Third, W. K. Wood, . . . . .	12 00
BASKET OF FLOWERS. — Best arranged and best kept through the exhibition, the second prize to Miss S. W. Story, . . . . .	4 00

*Gratuities : —*

W. C. Strong, Evergreens, . . . . .	15 00
E. D. Sturtevant, Nymphæas and Nelumbiums, . . . . .	50 00

F. L. Ames, Plants and Flowers, . . . . .	\$5 00
John L. Gardner, Plants, . . . . .	5 00
Robert T. Jackson, Marigolds, . . . . .	3 00
John Mitchell, Lilies and Zinnias, . . . . .	1 00
B. G. Smith, Marigolds and Zinnias, . . . . .	1 00
E. Sheppard, Single Dahlias, Clematis, and Delphiniums, . . . . .	2 00
B. G. Smith, " " . . . . .	1 00
Macey Randall, Dahlias (Dwarfs and Liliputians), . . . . .	3 00
John Parker, Dahlias, . . . . .	1 00
E. Sheppard, " . . . . .	1 00
John B. Moore & Son, <i>Anemone Japonica alba</i> , . . . . .	1 00
B. G. Smith, Eulalias, Lilies, and Pinks, . . . . .	2 00
Robert T. Jackson, Colchicums, . . . . .	1 00
W. C. Strong, Fifty varieties of Deciduous Foliage, of recent introduction, . . . . .	3 00
Henry Ross, Cactus, . . . . .	2 00
Francis B. Hayes, Display, . . . . .	2 00
Mrs. Stillman S. Hovey, Basket of Dried Flowers, . . . . .	2 00
R. B. Cummings, Natives, . . . . .	3 00
Mrs. C. N. S. Horner, " . . . . .	3 00
Mrs. P. D. Richards, " . . . . .	3 00

CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

CHRYSANTHEMUMS. — Six Large Flowered, or Chinese, distinct named varieties, one in each pot, John L. Gardner, . . . . . \$8 00

Second, H. P. Walcott, . . . . .	6 00
Third, E. W. Wood, . . . . .	4 00
Six Japanese, distinct named varieties, John L. Gardner, . . . . .	8 00
Second, H. P. Walcott, . . . . .	6 00
Third, E. W. Wood, . . . . .	4 00
Four Pompons, distinct named varieties, E. W. Wood, . . . . .	5 00
Second, H. P. Walcott, . . . . .	4 00
Specimen Plant, Large Flowered, or Chinese, named, H. P. Walcott, Crimson King, . . . . .	4 00
Second, H. P. Walcott, Golden Queen of England, . . . . .	3 00
Third, E. W. Wood, John Salter, . . . . .	2 00
Specimen Plant, Japanese, named, John L. Gardner, La Charmeuse, . . . . .	4 00
Second, H. P. Walcott, President Parkman, . . . . .	3 00
Third, H. P. Walcott, Cossack, . . . . .	2 00
Specimen Plant, Pompon, named, John L. Gardner, Amphilla, . . . . .	4 00
Second, E. W. Wood, Golden Circle, . . . . .	3 00
Third, H. P. Walcott, Golden Circle, . . . . .	2 00
Best display of named plants, in pots, all classes, not less than ten varieties, H. P. Walcott, . . . . .	20 00

Second, E. W. Wood, . . . . .	\$16 00
Third, Marshall P. Wilder, . . . . .	12 00
Fourth, James O'Brien, . . . . .	10 00
Fifth, C. M. Hovey, . . . . .	8 00
Twelve cut blooms, Large Flowered, or Chinese, named, H. P. Walcott, . . . . .	4 00
Second, Edwin Fewkes, . . . . .	3 00
Six cut blooms, Large Flowered, or Chinese, named, E. W. Wood, . . . . .	3 00
Display of twenty-four sprays, not less than twelve varieties, Large Flowered, or Chinese, in vases, Edwin Fewkes, . . . . .	4 00
Second, E. W. Wood, . . . . .	3 00
Display of twenty-four sprays, not less than twelve varieties, Japanese, in vases, Edwin Fewkes, . . . . .	4 00
Second, E. W. Wood, . . . . .	3 00
Third, E. Sheppard, . . . . .	2 00
Display of twenty-four sprays, not less than twelve varieties, Pommpons, in vases, Edwin Fewkes, . . . . .	3 00
Second, E. W. Wood, . . . . .	2 00
ORCHIDS. — Three varieties in bloom, E. W. Gilmore, . . . . .	8 00
Second, H. H. Hunnewell, . . . . .	6 00
Third, E. W. Gilmore, . . . . .	4 00
Single plant in bloom, E. W. Gilmore, <i>Dendrobium formosum giganteum</i> , . . . . .	4 00
Second, H. H. Hunnewell, <i>Cattleya Oxoniensis</i> , . . . . .	3 00

*Gratuities* : —

Norton Brothers, Collection of Chrysanthemums, . . . . .	8 00
Delay & Meade, " " . . . . .	8 00
E. W. Wood, Chrysanthemum plants, . . . . .	2 00
Delay & Meade, Cut Flowers of Chrysanthemums, . . . . .	2 00
P. Malley, " " " . . . . .	2 00
E. Sheppard, " " " . . . . .	2 00
Edwin Fewkes, " " " . . . . .	2 00
John Thorpe, " " " . . . . .	3 00
W. S. Ward, " " " . . . . .	1 00
Mrs. E. M. Gill, " " " . . . . .	3 00
Edwin Fewkes, Cut Flowers of New Japanese Chrysanthemums, . . . . .	3 00
Mrs. A. D. Wood, Basket of Chrysanthemums, . . . . .	2 00
E. Sheppard, named Pelargoniums, . . . . .	2 00
W. A. Bock, Pansies, . . . . .	1 00
W. A. Manda, Bouquet of Grass, . . . . .	2 00
David Allan, Cut Flowers, . . . . .	3 00
Mrs. Francis B. Hayes, Cut Flowers, . . . . .	3 00
Miss S. W. Story, Basket of Flowers, . . . . .	2 00
Mrs. P. D. Richards, Natives, . . . . .	2 00

## DECEMBER 6.

*Gratuities* : —

Mrs. Francis B. Hayes, Cut Flowers, . . . . .	2 00
Mrs. A. D. Wood, " " . . . . .	1 00



DECEMBER 13.

Gratuities : —

David Allan, gardener to R. M. Pratt, <i>Cattleya labiata Percivaliana</i> ,	\$3 00
Mrs. A. D. Wood, Basket of Chrysanthemums,	1 00

BRONZE MEDALS.

- Spring Exhibition, May 10. David Allan, gardener to R. M. Pratt, *Odontoglossum Edwardsii*.  
 Chrysanthemum Show, November 6 and 7. W. A. Manda, gardener of Cambridge Botanic Garden, Plants.

SILVER MEDALS.

- February 9. F. L. Ames, *Dendrobium Ainsworthii*.  
 Azalea and Rose Show, March 20 and 21. Woolson & Co., Narcissus.  
 " " " " " F. L. Ames, *Phalænopsis Stuartiana*.  
 " " " " " H. H. Hunnewell, *Cypripedium Dayanum*.  
 " " " " " David Allan, Orchid Flowers.  
 " " " " " E. W. Gilmore, *Phaius tuberculatus*.  
 " " " " " Hovey & Co., *Dracæna Lindenii*.  
 April 19. N. S. Simpkins, twelve blooms Cornelia Cook Rose.  
 " F. L. Ames, *Cypripedium ciliare*.  
 May 3. David Allan, Seedling Auriculas.  
 June 7. John L. Gardner, *Azalea decora*.  
 Rose and Strawberry Show, June 24 and 25. John S. Richards, Climbing Rose, Boston Belle.  
 " " " " " David Allan, New Japan Ferns.  
 " " " " " H. H. Hunnewell, *Cattleya Mossiæ*.  
 " " " " " " " Pelargoniums.  
 July 12. David Allan, *Dendrobium Dearei*.  
 August 2. Robert T. Jackson, Collection of Ferns.  
 " 30. Daniel Duffley, *Amaryllis Belladonna*.  
 Annual Exhibition, September 16-19. H. H. Hunnewell, *Licuala grandis*.  
 " " " " S. R. Payson, Collection of Plants.  
 " " " " " " *Alocasia Thibautiana*.  
 " " " " F. L. Ames, *Nepenthes Amesiana*.  
 " " " " " " *Pritchardia grandis*.  
 Chrysanthemum Show, November 6 and 7. H. P. Walcott, Seedling Chrysanthemums.  
 " " " " E. W. Gilmore, Display of Orchids.  
 December 6. Jacob W. Manning, Exhibits of Herbaceous Plants.

## FIRST CLASS CERTIFICATES OF MERIT.

- April 26. David Allan, *Bomarea conferta*.  
 " " " " *Bomarea frondea*.  
 July 12. C. M. Hovey, *Statice Suworrowi*.  
 " 26. John C. Hovey, *Amaryllis coccinea flore-pleno*.  
 " 26. Marshall P. Wilder, New Rose, Marshall P. Wilder.  
 August 2. Robert T. Jackson, *Campanula cæspitosa*.  
 " 2. Edwin Fewkes, *Tigridia pavonia alba*.  
 " 9. Denys Zirngiebel, Improved White Seedling Aster.  
 " 16. William E. Endicott, Seedling Gladioli.  
 Annual Exhibition, September 16-19. Robert T. Jackson, Seedling Dahlias.  
 " " " " F. L. Ames, *Platyserium Hilli*.  
 " " " " David Allan, *Gleichenia dicarpa longipinnata*.  
 Chrysanthemum Show, November 6 and 7. Henry P. Walcott, Seedling Chrysanthemums.  
 " " " " John Thorpe, Seedling Chrysanthemums.  
 " " " " Arthur H. Fewkes, Seedling Chrysanthemums.  
 " " " " David Allan, *Cypripedium Fair-icanum*.  
 " " " " J. M. Ward, Seedling Bouvardias.

REPORT  
OF THE  
COMMITTEE ON FRUITS,  
FOR THE YEAR 1884.

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BY E. W. WOOD, CHAIRMAN.

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The past season has been more than usually favorable for the various fruits grown in this vicinity. In the early spring every variety of fruit gave promise of an abundant crop, with the exception of peaches, the fruit buds of which were killed during the winter, except in certain locations protected from the west winds, indicating that the cold winds rather than extremely low temperature caused the injury.

The strawberries were injured to a limited extent in some parts of the State by late frosts, but the favorable weather during the season of growth and ripening more than offset any previous unfavorable conditions, and the crop was above the average. The frequent rains until the ripening of the small fruits were favorable to all except the cherry, which, in many places, owing to wet weather, proved almost an entire failure.

STRAWBERRIES. — At the special exhibition of this fruit, June 24 and 25, we had a good representation of the different varieties. The first prize for any variety was again awarded to the Sharpless, and the second prize to the seedling Belmont, grown and exhibited by Warren Heustis, which seems to be a new variety, of more than ordinary merit. The Committee visited Mr. Heustis's grounds June 21, and saw the fruit upon the vines. The plants were of unusually strong growth and were bearing an exceedingly heavy crop of fruit.

The berries are of large size, good form and color, quality very much like the Sharpless; and its firm flesh and exceptionally good keeping qualities must make it desirable as a market variety, while its attractive appearance and quality will insure it a place in the private garden. Of the other varieties of recent introduction the Mount Vernon and Warren seem the most deserving of notice. The former was shown in a collection from Providence, R.I., and was of large size, regular in form, dark color, good quality, and it was said by the exhibitor to be productive. The Warren is a handsome fruit, above medium in size, and of superior quality.

The plan of showing twenty-four and forty-eight berries instead of two and four quarts seemed to prove satisfactory, and the change is especially desirable if the exhibitions are to be continued two days instead of one as formerly, as it seems an unnecessary waste of fruit to show in larger quantity than is requisite for accurate judgment, for the fruit is of little worth at the close of a two days' exhibition.

CURRENTS were shown in more than the usual quantity. For the first time Fay's Prolific was shown in competition with the other red varieties; in size it is inferior to the Versailles. The Transparent, a French variety, took the prize over Dana's Transparent as a white currant.

CHERRIES were shown in less quantity than for several years, owing to wet weather at the time of ripening. The frequent loss from this cause of some of the best varieties of the cherry renders them less reliable than most of the small fruits.

RASPBERRIES were shown in larger quantity than the average. The Franconia and Cuthbert were the leading varieties, and the prizes were divided about equally between them.

BLACKBERRIES.—There was very little competition with this fruit, though one exhibitor showed fine specimens of the Dorchester at seven successive Saturday exhibitions.

GOOSEBERRIES were shown in about the usual quantity. The prizes for natives were taken by the Downing, and for foreign varieties, the first prize was awarded to Bang-Up, and the second to Whitesmith.

PLUMS.—The display of this fruit has steadily increased for several years, and has become an interesting feature of our exhibitions, and there have been added several new and desirable varieties. While perhaps none excel the old and well-known Green Gage in quality, most of them are larger and finer in appearance.

PEACHES. — Between that fatal disease, the yellows, and the killing of the fruit buds in winter, the peach has become very unreliable in this vicinity; but the trees are so quickly and easily grown, and the fruit is so desirable when we can pick it in eating condition from the tree, that an occasional crop pays for the trouble and expense, and the demand for nursery trees has been increasing for several years.

GRAPES. — The early part of the season was unfavorable for this fruit, being too cold and wet, causing mildew very generally; but the late season was clear and dry, and the more hardy varieties ripened fairly well. The fruit shown was hardly a fair average with previous years.

Of FOREIGN GRAPES the show was the best for several years. The Special Prize offered for the last six years "for the heaviest and best-ripened bunch of any Foreign Black Grape not less than five pounds" was awarded this year, for the first time, to David Allan for a bunch of Black Hamburg, well colored, and weighing five and one-fourth pounds.

PEARS have been shown filling the list at every exhibition when prizes have been offered. At the Annual Exhibition sixty-four prizes were offered, every one of which was awarded, and among the leading varieties the competition was strong and close. There have been no new varieties shown the past season, the effort of growers appearing to be directed mainly to the best of the well-known kinds. Prizes have been offered at every exhibition, in addition to those for special varieties, for "any other variety," and frequently the Committee have felt obliged to award the prizes to those kinds for which special prizes were offered on other Saturdays, they being so decidedly superior to those shown outside the list.

APPLES have been abundant and of superior quality. The insect pests have not been as numerous as in past years, and the fruit has been unusually smooth and fair. The large exhibits of the Gravenstein and Baldwin would indicate that growers find them the most profitable varieties for market.

The Missouri State Horticultural Society forwarded to ex-President Wilder a collection of between thirty and forty varieties of apples, which he placed upon our tables. The collection was very interesting as affording an opportunity to see the popular apples of the South and West, which are seldom shown here, and the Society is much indebted to Mr. Wilder therefor. Among the handsomest specimens were the Rome Beauty, Gano, Winter Sweet Paradise,

Ben Davis, White Winter Pearmain, Wagener, Lady's Sweet, Esopus Spitzenberg, Yellow Bellflower, Fall Wine, Gen. Lyon, Jonathan, Winesap, Monmouth Pippin, and Fameuse. Several of the varieties were cultivated by William Coxe in New Jersey, and described by him in 1818, and long since tested here, but most of them proved to be adapted only to a more southern climate. The collection was placed on our tables January 31, having been shown at Kansas City from the 22d to the 26th of the same month. The specimens were undoubtedly, when first exhibited, very fine, but had necessarily lost their freshness and consequently their beauty, and still more their flavor, when brought to the notice of the Committee.

Of the fruits previously entered for the Prospective Prizes, the Hayes grape was the only one to which the attention of the Committee was called during the year. Mr. Heustis has entered his seedling strawberry, the Belmont, for the Prospective Prize.

Of the \$1,000 placed at the disposal of the Committee for prizes and gratuities, they have awarded \$942, leaving a balance of \$48. With the increased appropriation, which the Society has voted for next year, the Committee have increased the prizes to one-half more than they were last year, and confidently anticipate a corresponding increase in the exhibits.

Fruit growers have reason to take encouragement from the results of the year. The small fruits have sold at a fair profit. Pears of the desirable varieties have sold readily, at good prices, and the export trade in apples has relieved the market of the superabundance, and made the crop fairly remunerative, so that, beside furnishing their own families with one of the most enjoyable luxuries of the season, orchardists have contributed to the health and enjoyment of those who have favored them with their patronage.

E. W. WOOD,	}	<i>Committee on Fruits.</i>
P. B. HOVEY,		
JACOB W. MANNING,		
WARREN FENNO,		
CHARLES F. CURTIS,		

## PRIZES AND GRATUITIES AWARDED FOR FRUITS.

### MARCH 20.

WINTER APPLES.— John Cummings, Baldwin, . . . . .	\$3 00
Second, C. W. Grant, " . . . . .	2 00
WINTER PEARS.— Warren Fenno, Duchess of Bordeaux, . . . . .	3 00
Second, Warren Fenno, Easter Beurre, . . . . .	2 00

*Gratuities :—*

Warren Fenno, Pears, . . . . .	1 00
B. G. Smith, " . . . . .	1 00
A. S. McIntosh, Pears and Apples, . . . . .	1 00

### APRIL 5.

*Gratuity :—*

Benjamin P. Ware, Apples, . . . . .	1 00
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### MAY 10.

*Gratuity :—*

C. W. Grant, Baldwin Apples, . . . . .	1 00
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### JUNE 14.

*Gratuity :—*

William Doran & Son, Crescent Strawberries, . . . . .	1 00
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### JUNE 21.

*Gratuity :—*

Aaron D. Capen, Strawberries, . . . . .	1 00
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## ROSE AND STRAWBERRY SHOW.

### JUNE 24 AND 25.

#### *Special Prizes.*

STRAWBERRIES.— Four quarts of any variety, George Hill, Sharpless,	
Silver Cup, value, . . . . .	\$20 00
Second, Warren Heustis, Belmont, . . . . .	15 00
Third, John L. Gardner, Sharpless, . . . . .	10 00

#### *Regular Prizes.*

STRAWBERRIES.— Forty-eight berries of Bidwell, Francis B. Hayes,	3 00
Second, L. W. Weston, . . . . .	2 00
Third, Marshall P. Wilder, . . . . .	1 00
Cumberland, William H. Hunt, . . . . .	3 00
Second, Joseph D. Fitts, . . . . .	2 00
Third, Benjamin G. Smith, . . . . .	1 00

Charles Downing, E. W. Wood, . . . . .	\$3 00
Second, John L. Gardner, . . . . .	2 00
Third, William Doran & Son, . . . . .	1 00
Hervey Davis, John B. Moore & Son, . . . . .	3 00
Second, Francis B. Hayes, . . . . .	2 00
Third, Joseph D. Fitts, . . . . .	1 00
Jucunda, John L. Gardner, . . . . .	3 00
Miner's Great Prolific, Joseph D. Fitts, . . . . .	3 00
Second, Benjamin G. Smith, . . . . .	2 00
Seth Boyden, Marshall P. Wilder, . . . . .	3 00
Sharpless, George Hill, . . . . .	3 00
Second, Francis Parkman, . . . . .	2 00
Third, B. Judkins, . . . . .	1 00
Wilder, Horace Eaton, . . . . .	3 00
Second, W. C. Winter, . . . . .	2 00
Twenty-four berries of Bidwell, B. G. Smith, . . . . .	2 00
Second, Hovey & Co., . . . . .	1 00
Brighton, Warren Fenno, . . . . .	2 00
Champion, J. D. Fitts, . . . . .	2 00
Second, Marshall P. Wilder, . . . . .	1 00
Crescent, L. W. Weston, . . . . .	2 00
Cumberland, Marshall P. Wilder, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Charles Downing, E. W. Wood, . . . . .	2 00
Second, Hovey & Co., . . . . .	1 00
Hervey Davis, Marshall P. Wilder, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Hovey, Hovey & Co., . . . . .	2 00
Jersey Queen, J. D. Fitts, . . . . .	2 00
Second, James Kimball, . . . . .	1 00
Jucunda, J. D. Fitts, . . . . .	2 00
La Constante, John L. Gardner, . . . . .	2 00
Manchester, Warren Heustis, . . . . .	2 00
Second, John L. Gardner, . . . . .	1 00
Miner's Great Prolific, B. G. Smith, . . . . .	2 00
Seth Boyden, the second prize to J. D. Fitts, . . . . .	1 00
Sharpless, George Hill, . . . . .	2 00
Second, Warren Heustis, . . . . .	1 00
Wilder, Horace Eaton, . . . . .	2 00
Second, Marshall P. Wilder, . . . . .	1 00
Wilson, Hovey & Co., . . . . .	2 00
Second, J. D. Fitts, . . . . .	1 00
Any other variety, Warren Heustis, Belmont, . . . . .	2 00
Second, J. D. Fitts, Mount Vernon, . . . . .	1 00
Collection of six varieties, J. D. Fitts, . . . . .	4 00
Second, Marshall P. Wilder, . . . . .	3 00
One quart of any new variety not previously exhibited, J. D. Fitts,	
Old Iron Clad, . . . . .	3 00
Second, J. D. Fitts, Daniel Boone, . . . . .	2 00



CHERRIES. — Two quarts of any variety, Horace W. Killam, White Heart, . . . . .	\$2 00
FOREIGN GRAPES. — Francis B. Hayes, Black Hamburg, . . . . .	5 00
Second, Francis B. Hayes, Victoria Hamburg, . . . . .	4 00

*Gratuities : —*

William C. Strong, Strawberries, . . . . .	2 00
William H. Hunt, Seedling Strawberry, . . . . .	1 00
John B. Moore & Son, Hervey Davis Strawberries, . . . . .	1 00
E. W. Wood, Charles Downing Strawberries, . . . . .	1 00

JUNE 28.

*Gratuity : —*

S. Lockwood, Jr., Cherries, . . . . .	1 00
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JULY 5.

STRAWBERRIES. — Twenty-four berries of any variety, Warren Heustis, Belmont, . . . . .	2 00
Second, B. Judkins, Bidwell, . . . . .	1 00
CHERRIES. — Two quarts of Black Tartarian, Horace Partridge, . . . . .	2 00
Coe's Transparent, S. Lockwood, Jr., . . . . .	2 00
Any other variety, C. N. Brackett, Black Bigarreau, . . . . .	2 00
Second, M. W. Chadbourne, White Heart, . . . . .	1 00

JULY 12.

CHERRIES. — Two quarts of any variety, Samuel Lockwood, Jr., Downer's Late, . . . . .	2 00
Second, Warren Fenno, Norfolk, . . . . .	1 00
RASPBERRIES. — Two quarts of any variety, William Doran & Son, Franconia, . . . . .	2 00
Second, C. E. Grant, Herstine, . . . . .	1 00
CURRANTS. — Forty-eight bunches of any Red variety, W. K. Wood, Versaillaise, . . . . .	3 00
Second, William Doran & Son, Versaillaise, . . . . .	2 00
Third, B. G. Smith, Versaillaise, . . . . .	1 00
Any White variety, B. G. Smith, Transparent, . . . . .	3 00
Second, B. G. Smith, Dana, . . . . .	2 00

*Gratuities : —*

M. W. Chadbourne, Cherries and Currants, . . . . .	1 00
C. N. Brackett, Seedling Cherries, . . . . .	1 00
Horace Partridge, Cherries, . . . . .	1 00

JULY 19.

RASPBERRIES. — Collection of not less than four varieties, William Doran & Son, . . . . .	4 00
Two quarts of any variety, William Doran & Son, Franconia, . . . . .	2 00
Second, B. Judkins, Cuthbert, . . . . .	1 00

CURRENTS. — Twenty-four bunches of Dana, B. G. Smith, . . . . .	\$2 00
Second, Mrs. E. M. Gill, . . . . .	1 00
Versaillaise, B. G. Smith, . . . . .	2 00
Second, William Doran & Son, . . . . .	1 00
Any other variety, R. Manning, White Gondouin, . . . . .	2 00
Second, R. Manning, Red Dutch, . . . . .	1 00

*Gratuities: —*

B. G. Smith, Collection, . . . . .	1 00
S. Lamson, Currants, . . . . .	1 00
Warren Fenno, Gooseberries, . . . . .	1 00

## JULY 26.

CURRENTS. — Twenty-four bunches of any Red variety, B. G. Smith, . . . . .	2 00
Second, Mrs. E. M. Gill, Red Dutch, . . . . .	1 00
Any White variety, B. G. Smith, Transparent, . . . . .	2 00
Second, B. G. Smith, Dana, . . . . .	1 00
BLACKBERRIES. — Two quarts of any variety, A. S. McIntosh, Dorchester . . . . .	2 00
GOOSEBERRIES. — Two quarts of any Native variety, Warren Fenno, . . . . .	2 00
Second, M. W. Chadbourne, . . . . .	1 00

*Gratuities: —*

Mrs. E. M. Gill, Gooseberries, . . . . .	1 00
B. Judkins, Black Cap Raspberries, . . . . .	1 00
R. Manning, Pears and Currants, . . . . .	1 00

## AUGUST 2.

BLACKBERRIES. — Two quarts of any variety, A. S. McIntosh, . . . . .	2 00
Second, C. E. Grant, . . . . .	1 00
GOOSEBERRIES. — Two quarts of Foreign, B. G. Smith, Bang-Up, . . . . .	2 00
Second, B. G. Smith, Whitesmith, . . . . .	1 00
PEARS. — Summer Doyenne, Horace Eaton, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Any other variety, C. Terry, Madeleine, . . . . .	2 00
Second, Warren Fenno, Madeleine, . . . . .	1 00

*Gratuity: —*

Warren Fenno, Gooseberries, . . . . .	1 00
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## AUGUST 9.

APPLES. — Early Harvest, Horace Eaton, . . . . .	2 00
Sweet Bough, Warren Heustis, . . . . .	2 00
Second, Joseph G. Coolidge, . . . . .	1 00
Any other variety, C. N. Brackett, Early Margaret, . . . . .	2 00
Second, C. F. Curtis, Red Astrachan, . . . . .	1 00

PEARS. — Giffard, John Fillebrown, . . . . .	\$2 00
Second, Mrs. Mary Langmaid, . . . . .	1 00
Any other variety, George Frost, Quimper, . . . . .	2 00
Second, Horace Eaton, Desportes, . . . . .	1 00

*Gratuities : —*

B. G. Smith, Apples, . . . . .	1 00
Warren Heustis, Apples and Pears, . . . . .	1 00
A. S. McIntosh, Blackberries, . . . . .	1 00

AUGUST 16.

APPLES. — Red Astrachan, S. H. Record, . . . . .	2 00
Second, Horace Eaton, . . . . .	1 00
Williams, Charles F. Curtis, . . . . .	2 00
Second, C. W. Grant, . . . . .	1 00
PEARS. — Clapp's Favorite, C. S. Hosmer, . . . . .	2 00
Second, John S. Bird, . . . . .	1 00
Elizabeth, Mary Langmaid, . . . . .	2 00
Second, Alexander Dickinson, . . . . .	1 00
Any other variety, John Fillebrown, Giffard, . . . . .	2 00
Second, C. N. Brackett, Brandywine, . . . . .	1 00
FOREIGN GRAPES. — Two bunches of any variety, David Allan, Black Hamburg, . . . . .	5 00
Second, Winter Brothers, Muscat of Alexandria, . . . . .	4 00

*Gratuities : —*

John B. Moore & Son, Blackberries, . . . . .	1 00
A. S. McIntosh, " . . . . .	1 00
Warren Heustis, Apples and Pears, . . . . .	1 00
Warren Fenno, " " . . . . .	1 00
B. G. Smith, " " . . . . .	1 00
M. W. Chadbourne, " " . . . . .	1 00
S. Hartwell, Peaches, . . . . .	2 00

AUGUST 23.

PEARS. — Bartlett, W. S. Janvrin, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Rostiezer, C. N. Brackett, . . . . .	2 00
Second, George Frost, . . . . .	1 00
Tyson, Warren Fenno, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Any other variety, B. C. Vose, Clapp's Favorite, . . . . .	2 00
Second, George Frost, Quimper, . . . . .	1 00
PEACHES. — Any variety, George V. Fletcher, Hale's Early, . . . . .	2 00
Second, Joseph G. Coolidge, Early Canada, . . . . .	1 00

*Gratuities : —*

C. W. Grant, Apples, . . . . .	1 00
B. G. Smith, Apples, Pears, and Grapes, . . . . .	2 00

R. Manning, Dearborn's Seedling Pears, . . . . .	\$1 00
John L. Bird, Pears, . . . . .	1 00
M. W. Chadbourne, Pears and Apples, . . . . .	1 00
A. S. McIntosh, Pears and Blackberries, . . . . .	1 00
F. J. Dutcher, Plums, . . . . .	1 00
Horace Partridge, Grapes and Plums, . . . . .	1 00
Samuel Hartwell, Collection, . . . . .	2 00

## AUGUST 30.

APPLES. — Any variety, A. A. Hixon, Somerset, . . . . .	2 00
Second, B. G. Smith, Garden Royal, . . . . .	1 00
PEARS. — Bartlett, George S. Harwood, . . . . .	2 00
Second, W. S. Janvrin, . . . . .	1 00
Any other variety, Warren Fenno, Muskingum, . . . . .	2 00
Second, Warren Fenno, Tyson, . . . . .	1 00
PEACHES. — Any variety, George V. Fletcher, Hale's Early, . . . . .	3 00
PLUMS. — Any variety, John B. Moore & Son, Washington, . . . . .	2 00
Second, Horace Eaton, Bradshaw, . . . . .	1 00
NATIVE GRAPES. — Six bunches of any variety, the Second Prize to B. G. Smith, Champion, . . . . .	1 00

*Gratuities —*

William Richardson, Apples, . . . . .	1 00
S. Hartwell, " . . . . .	1 00
Warren Fenno, Apples and Pears, . . . . .	1 00
C. N. Brackett, " " . . . . .	1 00
A. S. McIntosh, Pears and Blackberries, . . . . .	1 00
William McKee, Grapes, . . . . .	1 00
Horace Partridge, Grapes and Plums, . . . . .	1 00

## SEPTEMBER 6.

APPLES. — Foundling, B. G. Smith, . . . . .	2 00
Gravenstein, John B. Moore & Son, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Porter, C. N. Brackett, . . . . .	2 00
Second, L. W. Weston, . . . . .	1 00
Any other variety, John C. Park, Alexander, . . . . .	2 00
Second, S. Hartwell, Pumpkin Sweet, . . . . .	1 00
PEARS, — Andrews, B. G. Smith, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Boussock, C. N. Brackett, . . . . .	2 00
Second, George S. Harwood, . . . . .	1 00
Any other variety, C. F. Curtis, Souvenir du Congrès, . . . . .	2 00
Second, Warren Fenno, Esperine, . . . . .	1 00
PLUMS, — Not less than four varieties, Horace Eaton, . . . . .	3 00
Second, John B. Moore & Son, . . . . .	2 00
Any other variety, Horace Eaton, Washington, . . . . .	2 00
Second, John B. Moore & Son, Washington, . . . . .	1 00

NATIVE GRAPES. — Six bunches of Moore's Early, John B. Moore & Son, . . . . . \$2 00  
 Second, B. G. Smith, . . . . . 1 00  
 Any other variety, J. W. Talbot, Cottage, . . . . . 2 00

*Gratuities:—*

M. W. Chadbourne, Apples and Pears, . . . . . 1 00  
 B. Judkins, Crab Apples, . . . . . 1 00  
 A. S. McIntosh, Pears and Blackberries, . . . . . 1 00  
 G. V. Fletcher, Peaches, . . . . . 1 00  
 S. Hartwell, Plums, . . . . . 1 00  
 Horace Partridge, Grapes, . . . . . 1 00

ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

*Special Prizes.*

Twelve Gravenstein Apples, Samuel Hartwell, . . . . . \$5 00  
 Twelve Bartlett Pears, Charles F. Curtis, . . . . . 5 00  
 Twelve bunches of Native Grapes, John B. Moore & Son, Moore's Early, . . . . . 5 00  
 For the heaviest and best ripened bunch of any Foreign Black Grape not less than five pounds, David Allan, Black Hamburg (five and one-fourth pounds), . . . . . 8 00

*Regular Prizes.*

APPLES. — Baldwin, C. W. Grant, . . . . . 3 00  
 Second, William A. Morse, . . . . . 2 00  
 Third, Benjamin G. Smith, . . . . . 1 00  
 Danvers Sweet, Charles N. Brackett, . . . . . 2 00  
 Second, Warren Fenno, . . . . . 1 00  
 Dutch Codlin, B. G. Smith, . . . . . 2 00  
 Second, Horace Partridge, . . . . . 1 00  
 Fall Orange or Holden, Asa Clement, . . . . . 2 00  
 Second, Edward Sumner, . . . . . 1 00  
 Fameuse, B. G. Smith, . . . . . 2 00  
 Second, George V. Fletcher, . . . . . 1 00  
 Foundling, Asa Clement, . . . . . 3 00  
 Second, B. G. Smith, . . . . . 2 00  
 Third, O. B. Hadwen, . . . . . 1 00  
 Golden Russet, L. W. Weston, . . . . . 2 00  
 Second, Warren Fenno, . . . . . 1 00  
 Gravenstein, Samuel Hartwell, . . . . . 3 00  
 Second, John B. Moore & Son, . . . . . 2 00  
 Third, Asa Clement, . . . . . 1 00  
 Hubbardston, Austin Ward, . . . . . 3 00

Second, Samuel Hartwell, . . . . .	\$2 00
Third, M. W. Chadbourne, . . . . .	1 00
Hunt Russet, William H. Hunt, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Lady's Sweet, Asa Clement, . . . . .	2 00
Leicester, O. B. Hadwen, . . . . .	2 00
Second, A. A. Hixon, . . . . .	1 00
Lyscom, A. A. Hixon, . . . . .	2 00
Second, O. B. Hadwen, . . . . .	1 00
Maiden's Blush, Warren Fenno, . . . . .	2 00
Second, Horace Eaton, . . . . .	1 00
Mother, E. W. Wood, . . . . .	2 00
Second, Asa Clement, . . . . .	1 00
Northern Spy, George C. Rice, . . . . .	3 00
Second, William C. Eustis, . . . . .	2 00
Third, John B. Moore & Son, . . . . .	1 00
Porter, C. N. Brackett, . . . . .	2 00
Second, C. W. Grant, . . . . .	1 00
Pumpkin Sweet, B. G. Smith, . . . . .	2 00
Second, Asa Clement, . . . . .	1 00
Rhode Island Greening, Horace Eaton, . . . . .	3 00
Second, C. N. Brackett, . . . . .	2 00
Third, E. W. Wood, . . . . .	1 00
Roxbury Russet, Mrs. M. T. Goddard, . . . . .	3 00
Second, John L. D'Wolf, . . . . .	2 00
Third, B. G. Smith, . . . . .	1 00
Tolman's Sweet, Josiah Crosby, . . . . .	3 00
Second, Asa Clement, . . . . .	2 00
Third, J. T. Foster, . . . . .	1 00
Tompkins King, George C. Rice, . . . . .	2 00
Second, William A. Morse, . . . . .	1 00
Washington Royal or Palmer, O. B. Hadwen, . . . . .	2 00
Second, Josiah Crosby, . . . . .	1 00
Washington Strawberry, George C. Rice, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Any other variety, John B. Moore & Son, Sparhawk, . . . . .	2 00
Second, George C. Rice, Oldenburg, . . . . .	1 00
CRAB APPLES. — Hyslop, M. W. Chadbourne, . . . . .	2 00
Second, B. Judkins, . . . . .	1 00
Oblong, M. W. Chadbourne, . . . . .	2 00
Second, Horace Partridge, . . . . .	1 00
Transcendent, Cephas H. Brackett, . . . . .	2 00
Second, Mrs. D. H. Brown, . . . . .	1 00
PEARS. — Angouleme, W. S. Janvrin, . . . . .	3 00
Second, John McClure, . . . . .	2 00
Third, Charles F. Curtis, . . . . .	1 00
Anjou, Mrs. Mary Langmaid, . . . . .	3 00
Second, H. Barker, . . . . .	2 00

Third, Charles F. Curtis, . . . . .	\$1 00
Bartlett, W. S. Janvrin, . . . . .	3 00
Second, William Richardson, . . . . .	2 00
Third, Charles F. Curtis, . . . . .	1 00
Belle Lucrative, Horace Eaton, . . . . .	2 00
Second, B. C. Vose, . . . . .	1 00
Bosc, George S. Harwood, . . . . .	3 00
Second, William Richardson, . . . . .	2 00
Third, Charles F. Curtis, . . . . .	1 00
Boussock, George S. Harwood, . . . . .	2 00
Second, O. B. Hadwen, . . . . .	1 00
Clairgeau, W. P. Plimpton, . . . . .	3 00
Second, John L. D'Wolf, . . . . .	2 00
Third, William T. Hall, . . . . .	1 00
Comice, George S. Harwood, . . . . .	2 00
Second, W. P. Walker, . . . . .	1 00
Dana's Hovey, John L. D'Wolf, . . . . .	3 00
Second, E. W. Wood, . . . . .	2 00
Third, George Frost, . . . . .	1 00
Diel, John L. D'Wolf, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Goodale, O. B. Hadwen, . . . . .	2 00
Second, Marshall P. Wilder, . . . . .	1 00
Hardy, Charles F. Curtis, . . . . .	2 00
Second, C. M. Hovey, . . . . .	1 00
Howell, W. S. Janvrin, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Lawrence, William T. Hall, . . . . .	2 00
Second, John Fillebrown, . . . . .	1 00
Louise Bonne of Jersey, Charles L. Fowle, . . . . .	2 00
Second, Mrs. Mary Langmaid, . . . . .	1 00
Marie Louise, Walker & Co., . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Merriam, Charles F. Curtis, . . . . .	2 00
Second, John L. D'Wolf, . . . . .	1 00
Onondaga, W. P. Walker, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Paradise, C. M. Hovey, . . . . .	2 00
Second, William A. Crafts, . . . . .	1 00
Seckel, George S. Harwood, . . . . .	3 00
Second, H. Barker, . . . . .	2 00
Third, William H. Hunt, . . . . .	1 00
Sheldon, George S. Harwood, . . . . .	3 00
Second, Charles F. Curtis, . . . . .	2 00
Third, John L. D'Wolf, . . . . .	1 00
Souvenir du Congrès, William Everett, . . . . .	2 00
Second, William T. Hall, . . . . .	1 00
St. Michael Archangel, Jesse Haley, . . . . .	2 00

Second, T. M. Davis, . . . . .	\$1 00
Superfin, E. W. Wood, . . . . .	2 00
Second, J. C. Park, . . . . .	1 00
Urbaniste, Warren Fenno, . . . . .	2 00
Second, Horace Partridge, . . . . .	1 00
Vicar, Warren Fenno, . . . . .	2 00
Second, A. S. McIntosh, . . . . .	1 00
Winter Nelis, T. M. Davis, . . . . .	2 00
Second, W. P. Walker, . . . . .	1 00
Any other variety, Warren Fenno, Adams, . . . . .	2 00
Second, Marshall P. Wilder, Clapp's Favorite, . . . . .	1 00
PEACHES.—Any variety, A. S. McIntosh, Highland Seedling, . . . . .	2 00
NECTARINES.—Any variety, Warren Fenno, Revere, . . . . .	2 00
PLUMS.—Not less than four varieties, John B. Moore & Son, . . . . .	4 00
Second, Horace Eaton, . . . . .	3 00
Third, Samuel Hartwell, . . . . .	2 00
Any one variety, John B. Moore & Son, Duane's Purple, . . . . .	2 00
Second, John B. Moore & Son, Pond's Seedling, . . . . .	1 00
NATIVE GRAPES. — Brighton, Joseph S. Chase, . . . . .	2 00
Concord, William Doran & Son, . . . . .	2 00
Delaware, John B. Moore & Son, . . . . .	2 00
Second, Cephas H. Brackett, . . . . .	1 00
Massasoit, Joseph S. Chase, . . . . .	2 00
Second, John B. Moore & Son, . . . . .	1 00
Moore's Early, John B. Moore & Son, . . . . .	2 00
Second, Charles P. Williams, . . . . .	1 00
Wilder, John B. Moore & Son, . . . . .	2 00
Second, Marshall P. Wilder, . . . . .	1 00
Worden, G. W. Jameson, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Any other variety, B. G. Smith, Ives's Seedling, . . . . .	2 00
Second, B. G. Smith, Hartford, . . . . .	1 00
FOREIGN GRAPES. — Four varieties, two bunches each, David Allan, . . . . .	8 00
Second, John S. Farlow, . . . . .	6 00
Third, E. H. Luke, . . . . .	4 00
Two bunches of Black Hamburg, David Allan, . . . . .	4 00
Second, George Higginson, . . . . .	3 00
Third, John S. Farlow, . . . . .	2 00
Two bunches of Wilmot's Hamburg, George Higginson, . . . . .	4 00
Second, John S. Farlow, . . . . .	3 00
Third, David Allan, . . . . .	2 00
Two bunches of Muscat of Alexandria, David Allan, . . . . .	5 00
Second, John S. Farlow, . . . . .	4 00
Two bunches of any other variety, David Allan, Cannon Hall, . . . . .	5 00
Second, George Higginson, Wilmot's No. 16, . . . . .	4 00
Third, John S. Farlow, Pope's Hamburg, . . . . .	3 00
CRANBERRIES. — Half-peck, C. W. Grant, . . . . .	2 00



*Gratuities :—*

C. W. Grant, Apples, . . . . .	\$2 00
Frederic Lamson, Apples, . . . . .	1 00
M. W. Chadbourne, Apples and Pears, . . . . .	3 00
B. G. Smith, " " . . . . .	3 00
Warren Fenno, " " . . . . .	3 00
William A. Morse, " " . . . . .	1 00
William A. Crafts, " " . . . . .	1 00
Marshall P. Wilder, Pears, . . . . .	3 00
I. D. White, " . . . . .	2 00
C. N. Brackett, " . . . . .	2 00
John L. Bird, " . . . . .	1 00
C. M. Hovey & Co., " . . . . .	2 00
Mrs. A. M. Winn, " . . . . .	2 00
Mrs. Moses Darling, " . . . . .	1 00
N. D. Harrington, Peaches and Pears, . . . . .	3 00
Horace Partridge, Pears and Grapes, . . . . .	2 00
J. S. Farlow, Foreign Grapes, . . . . .	3 00
H. L. Barnes, Osage Oranges, . . . . .	1 00

SEPTEMBER 27.

*Gratuities :—*

John B. Moore & Son, Hayes Grapes, . . . . .	1 00
N. D. Harrington, Peaches, . . . . .	2 00
D. W. Lothrop, Seedling Pears, . . . . .	1 00

OCTOBER 4.

APPLES. — Fall Orange or Holden, Samuel Hartwell, . . . . .	2 00
Second, C. E. Grant, . . . . .	1 00
Gravenstein, Samuel Hartwell, . . . . .	2 00
Second, John B. Moore & Son, . . . . .	1 00
Mother, Warren Fenno, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Porter, A. S. McIntosh, . . . . .	2 00
Second S. G. Damon, . . . . .	1 00
Any other variety, S. Story, Washington Strawberry, . . . . .	2 00
Second, M. W. Chadbourne, Hubbardston, . . . . .	1 00
PEARS, Angouleme, John McClure, . . . . .	2 00
Second, S. G. Damon, . . . . .	1 00
Bosc, George S. Harwood, . . . . .	2 00
Second, William Richardson, . . . . .	1 00
Clairgeau, W. P. Plimpton, . . . . .	2 00
Second, S. G. Damon, . . . . .	1 00
Comice, Horace Eaton, . . . . .	2 00
Second, A. T. Brown, . . . . .	1 00
Louise Bonne of Jersey, T. M. Davis, . . . . .	2 00
Second, William Richardson, . . . . .	1 00

Seckel, the second prize to George S. Harwood, . . . . .	\$1 00
Sheldon, George S. Harwood, . . . . .	2 00
Second, S. G. Damon, . . . . .	1 00
Superfin, S. G. Damon, . . . . .	2 00
Urbaniste, S. G. Damon, . . . . .	2 00
Second, A. T. Brown, . . . . .	1 00
Any other variety, J. W. Talbot, President Clark, . . . . .	2 00
Second, T. M. Davis, St. Michael Archangel, . . . . .	1 00
NATIVE GRAPES. — Brighton, B. G. Smith, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Concord, William H. Hunt, . . . . .	2 00
Second, William Doran & Son, . . . . .	1 00
Delaware, B. G. Smith, . . . . .	2 00
Second, Joseph S. Chase, . . . . .	1 00
Iona, S. G. Damon, . . . . .	2 00
Second, John B. Moore & Son, . . . . .	1 00
Isabella, J. V. Wellington, . . . . .	2 00
Second, George W. Jameson, . . . . .	1 00
Massasoit, Joseph S. Chase, . . . . .	2 00
Second, John B. Moore & Son, . . . . .	1 00
Moore's Early, John B. Moore & Son, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Prentiss, Joseph S. Chase, . . . . .	2 00
Wilder, John B. Moore & Son, . . . . .	2 00
Second, Joseph S. Chase, . . . . .	1 00
Any other variety, A. M. Chandler, King, . . . . .	2 00
Second, B. G. Smith, Eumelan, . . . . .	1 00
FOREIGN GRAPES. — Two bunches of any variety, Horace Partridge, . . . . .	3 00
Second, Horace Partridge, Red Chasselas, . . . . .	2 00

*Gratuities : —*

Edward Sumner, Apples, . . . . .	2 00
J. C. McNeil, " . . . . .	1 00
C. N. Brackett, Apples and Pears, . . . . .	1 00
C. E. Grant, " " . . . . .	1 00
A. S. McIntosh, " " . . . . .	1 00
S. G. Damon, Pears, . . . . .	1 00
Marshall P. Wilder, twenty-five varieties of Grapes, . . . . .	3 00
John B. Moore & Son, Collection, . . . . .	1 00
M. W. Chadbourne, Collection, . . . . .	1 00
Warren Fenno, Collection, . . . . .	1 00
A. D. Capen, Pears, . . . . .	1 00
A. T. Brown, " . . . . .	2 00

OCTOBER 11.

*Gratuity : —*

A. McDermott, Pears, . . . . .	1 00
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OCTOBER 25.

*Gratuities : —*

N. D. Harrington, Pears, . . . . .	\$1 00
Horace Partridge, Foreign Grapes, . . . . .	1 00
S. G. Stone, Isabella Grapes, . . . . .	1 00

## CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

*French Premiums.*

APPLES. — Baldwin, B. G. Smith, . . . . .	\$2 00
Second, C. W. Grant, . . . . .	1 00
Danvers Sweet, C. N. Brackett, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00
Hubbardston, George C. Rice, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Hunt Russet, James Garty, . . . . .	2 00
Second, William H. Hunt, . . . . .	1 00
Northern Spy, George C. Rice, . . . . .	2 00
Second, W. C. Eustis, . . . . .	1 00
Rhode Island Greening, W. P. Plimpton, . . . . .	2 00
Second, C. N. Brackett, . . . . .	1 00
Roxbury Russet, Edward Sumner, . . . . .	2 00
Second, Mrs. M. T. Goddard, . . . . .	1 00
Tolman's Sweet, George C. Rice, . . . . .	2 00
Second, Josiah Crosby, . . . . .	1 00
Tompkins King, George C. Rice, . . . . .	2 00
Second, John Parker, . . . . .	1 00

*Society's Prizes.*

PEARS. — Angouleme, S. G. Damon, . . . . .	2 00
Second, N. D. Harrington, . . . . .	1 00
Anjou, A. S. McIntosh, . . . . .	2 00
Second, S. G. Damon, . . . . .	1 00
Comice, Warren Fenno, . . . . .	2 00
Second, W. P. Walker, . . . . .	1 00
Dana's Hovey, Jesse Haley, . . . . .	2 00
Second, S. G. Damon, . . . . .	1 00
Glout Morceau, Edwin A. Hall, . . . . .	2 00
Second, A. S. McIntosh, . . . . .	1 00
Josephine of Malines, Warren Fenno, . . . . .	2 00
Second, B. G. Smith, . . . . .	1 00
Langelier, Warren Fenno, . . . . .	2 00
Second, A. S. McIntosh, . . . . .	1 00
Lawrence, A. McDermott, . . . . .	2 00
Second, Warren Fenno, . . . . .	1 00

Vicar, W. P. Walker, . . . . .	\$2 00
Second, Walker & Co., . . . . .	1 00
Winter Nelis, A. McDermott, . . . . .	2 00
Second, T. M. Davis, . . . . .	1 00
Any other variety, George H. Dickerman, Sheldon, . . . . .	2 00
Second, M. W. Chadbourne, Bosc, . . . . .	1 00

*Gratuities : —*

Warren Fenno, Apples and Pears, . . . . .	1 00
S. G. Damon, Pears, . . . . .	1 00
John B. Moore & Son, Grapes, . . . . .	1 00
David Allan, Foreign Grapes, . . . . .	2 00
M. W. Chadbourne, Collection, . . . . .	1 00
C. W. Grant, " . . . . .	1 00
B. G. Smith, " . . . . .	1 00

REPORT  
OF THE  
COMMITTEE ON VEGETABLES,  
FOR THE YEAR 1884.

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BY CHARLES N. BRACKETT, CHAIRMAN.

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The spring of 1884 opened unfavorably for the work of the farm and garden. During the earlier portion of the season the frequent rain rendered the soil cold, wet, and backward, thereby causing the cultivator considerable trouble and delay in the preparation of the ground and subsequent sowing of seeds.

The Schedule of Prizes having been arranged to conform to average seasons, many of our early exhibitions were perhaps not as good as they would have been had the prizes at some of them been a week or two later. Such vegetables as Peas, Beans, Tomatoes, and Sweet Corn were at least from one to two weeks later than last season. The first exhibition of Peas was made by Samuel Hartwell and M. W. Chadbourne, on the 21st of June. Sweet Corn did not make its appearance on our table until July 26, and the first specimens of Tomatoes of out-door growth were not shown until the fourth Saturday in July, which was about two weeks later for them than the previous year.

The exhibitions during the year, taken as a whole, have, however, been very satisfactory, and, we think, up to the average of previous years in quality if not in quantity. Many of the prizes have been more largely competed for than in previous years, and a good degree of interest has been manifested by contributors to this department throughout the year.

Forced specimens of Cucumbers, Lettuce, Radishes, Mushrooms,

Dandelions, and Tomatoes assisted to make the shows quite interesting during the winter and early spring months. For these contributions we are mainly indebted to Josiah Crosby, Cephas H. Brackett, Warren Heustis, Walter Russell, and George F. Stone. In the Schedule of Prizes for the coming year we are pleased to be able to state that, owing to an increase in our appropriation, arrangements have been made for a list of prizes for forced vegetables on the first Saturdays of January and February respectively. This is a new departure, no prizes having before been offered for these objects previous to the opening or Spring Exhibition, which occurs on the 19th and 20th of March. It is hoped that these premiums will have a tendency to create a more lively competition and bring out a larger and much more interesting exhibit of the various articles for which these prizes are offered than has heretofore been shown under the old system of gratuities only. We have among our members quite a large number who are successfully engaged in the growing of vegetables under glass, and we trust, now that some encouragement is offered in the way of prizes, that they may be induced to exhibit specimens of their skill the coming season, and by so doing add increased interest to this branch of our exhibitions, which has already been too long neglected.

The numerous attempts at improvement by raising new varieties of Peas which have recently been made have resulted in some instances in eminent success. Bliss's American Wonder, for example, is a decided acquisition, and, up to the present time, stands unrivalled in point of flavor, quality, and productiveness, and is, without exception, the earliest wrinkled pea in cultivation. Bliss's Abundance and Bliss's Everbearing are two new varieties, exhibited here for the first time the past season, by B. K. Bliss & Sons, of New York, July 26. The specimens consisted of a single vine of each variety, as taken from the field, with its entire crop. The stalk of Everbearing had on it seventy-five and the Abundance seventy-one pods by actual count, the product in each case of a single pea. It will thus be seen that both are remarkably productive. The vine of the Everbearing was filled from top to bottom with good sized pods in all stages of growth, from small pods just formed up to those containing peas which were fully ripe. This pea will undoubtedly prove of more value to the amateur than the market gardener, on account of its habit of continuing so long in bearing. At the Rose and Strawberry Show, June

24, the first, second, and third prizes were all awarded for Bliss's American Wonder.

Considerable attention is still being paid to the improvement of the Potato, and many new varieties have been lately introduced, some of which are great improvements on many of the older sorts. During the past year the attention of the Committee has been called for the first time to the Pearl of Savoy, as one of the finest and best of the varieties of recent introduction, and we think it deserving of special mention, on account of its earliness, superior quality, and great productiveness. It has been grown quite extensively the past season by a large number of our contributors, all of whom speak of its good qualities in terms of the highest praise. Further trial however is recommended before coming to any decision as to the rank it should ultimately occupy.

At the weekly exhibitions, as before remarked, the number of exhibitors during the earlier part of the season was perhaps somewhat less than at the shows of the same period in the previous year; while later in the season any deficiency in this respect was entirely overcome. In the quality of the specimens, however, there was not at any time any falling off, many of them being particularly fine. The display of Tomatoes at the Annual Show was never surpassed at any previous exhibition of the Society, and has rarely, if ever, been equalled. Of the upwards of eighty different dishes on our tables at this show, it was a somewhat remarkable fact that not a single dish of poor specimens was to be found in the entire collection. The leading varieties were Acme, Emery, and Paragon.

At the Annual Exhibition the collection of Potatoes numbered sixty dishes. The quantity was not so large as at the same exhibition of the previous year, but in quality they have not often been surpassed. Among the newer kinds, the Advance and Pearl of Savoy already take high rank as to quality and yield. The first prize for the best four varieties was awarded to Mrs. M. T. Goddard. The first prizes for the best single dishes of Clark, Hebron, and Rose were all taken by C. B. Lancaster.

The Special Prize for the best collection of Seedling Potatoes was awarded to J. J. H. Gregory.

Cauliflowers unfortunately afford little opportunity for remark. The only specimens shown were those by W. W. Rawson, which were hardly up to the usual standard.

The amount appropriated for vegetables for the past year, including the income of the Whitcomb fund, was \$580. The Committee

have awarded in prizes and gratuities \$550, leaving an unexpended balance of \$30.

With the annexed list of awards, made by your Committee the past year, they respectfully submit this report as containing a full account of their doings.

C. N. BRACKETT, *Chairman.*



PRIZES AND GRATUITIES AWARDED FOR  
VEGETABLES.

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JANUARY 19.

*Gratuity* :—

Josiah Crosby, Celery, . . . . .	\$2 00
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JANUARY 26.

*Gratuity* :—

Josiah Crosby, Celery, . . . . .	2 00
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FEBRUARY 2.

*Gratuity* :—

Warren Heustis, Celery, . . . . .	1 00
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FEBRUARY 9.

*Gratuity* :—

I. E. Coburn, Rhubarb, . . . . .	1 00
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FEBRUARY 16.

*Gratuities* :—

C. H. Brackett, Mushrooms and Rhubarb, . . . . .	2 00
Walter Russell, Radishes, . . . . .	1 00

FEBRUARY 23.

*Gratuities* :—

George F. Stone, Dandelions and Radishes, . . . . .	1 00
C. H. Brackett, Mushrooms and Rhubarb, . . . . .	1 00

MARCH 1.

*Gratuity* :—

C. H. Brackett, Mushrooms, . . . . .	1 00
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MARCH 8.

*Gratuities* :—

Josiah Crosby, Lettuce and Radishes, . . . . .	2 00
C. H. Brackett, Mushrooms and Cucumbers, . . . . .	2 00

MARCH 15.

*Gratuities* :—

C. H. Brackett, Cucumbers, . . . . .	1 00
Josiah Crosby, Radishes and Lettuces, . . . . .	2 00

## AZALEA AND ROSE EXHIBITION.

MARCH 20.

RADISHES. — Four bunches of Turnip Rooted, William D. Philbrick,	\$3 00
Second, Josiah Crosby, . . . . .	2 00
Third, George F. Stone, . . . . .	1 00
Long Scarlet, George Hill, . . . . .	3 00
Second, W. D. Philbrick, . . . . .	2 00
CUCUMBERS. — Pair of White Spine, C. H. Brackett,	3 00
LETTUCE. — Four heads of Tennisball, Josiah Crosby, . . . . .	3 00
Second, George Hill, . . . . .	2 00
Third, W. D. Philbrick, . . . . .	1 00
DANDELIONS. — Peck, George F. Stone, . . . . .	2 00
PARSLEY. — Two quarts, W. D. Philbrick, . . . . .	2 00
Second, C. H. Brackett, . . . . .	1 00

*Gratuities: —*

C. H. Brackett, Cucumbers, . . . . .	1 00
Francis B. Hayes, Mushrooms, . . . . .	1 00
A. S. McIntosh, Artichokes, . . . . .	1 00

MARCH 29.

*Gratuity: —*

C. H. Brackett, Cucumbers, Tomatoes, and Mushrooms, . . . . .	2 00
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APRIL 5.

*Gratuity: —*

C. H. Brackett, Cucumbers, . . . . .	1 00
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APRIL 19.

*Gratuity: —*

C. H. Brackett, Collection, . . . . .	2 00
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MAY 3.

*Gratuity: —*

C. H. Brackett, Cucumbers, . . . . .	1 00
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MAY 10.

ASPARAGUS. — Four bunches, twelve stalks each, John B. Moore, . . . . .	2 00
RHUBARB. — Twelve stalks, Aaron D. Capen, . . . . .	2 00
Second, Mrs. E. M. Gill, . . . . .	1 00
CUCUMBERS. — Pair, C. H. Brackett, Brighton, . . . . .	2 00
Second, C. H. Brackett, White Spine, . . . . .	1 00

*Gratuities: —*

C. H. Brackett, Tomatoes, . . . . .	1 00
Samuel Hartwell, Asparagus, . . . . .	1 00
Warren Heustis, Dandelions, . . . . .	1 00

MAY 17.

*Gratuities : —*

Samuel Hartwell, Asparagus, . . . . .	\$1 00
Warren Heustis, Spinach, . . . . .	1 00
M. W. Chadbourne, Rhubarb, . . . . .	1 00

MAY 24.

*Gratuities : —*

Josiah Crosby, Collection, . . . . .	3 00
C. H. Brackett, " . . . . .	2 00
John B. Moore & Son, Asparagus, . . . . .	2 00
Samuel Hartwell, " . . . . .	1 00
Warren Heustis, Spinach, . . . . .	1 00

JUNE 7.

CARROTS. — Twelve Short Scarlet, J. Crosby, . . . . .	2 00
RADISHES. — Four bunches of Turnip Rooted, J. Crosby, . . . . .	2 00
ASPARAGUS. — Four bunches, twelve stalks each, John B. Moore & Son, . . . . .	2 00
Second, L. W. Weston, . . . . .	1 00
RHUBARB. — Twelve stalks, C. H. Brackett, . . . . .	2 00
Second, M. W. Chadbourne, . . . . .	1 00
CUCUMBERS. — Pair, E. W. Wood, . . . . .	2 00
Second, Josiah Crosby, . . . . .	1 00
LETTUCE. — Four heads, Josiah Crosby, . . . . .	2 00
Second, Warren Heustis, . . . . .	1 00

*Gratuities : —*

C. H. Brackett, Tomatoes, . . . . .	1 00
Josiah Crosby, Lettuce, . . . . .	1 00
Warren Heustis, Onions, . . . . .	1 00
Samuel Hartwell, Asparagus, . . . . .	1 00

JUNE 21.

*Gratuities : —*

Samuel Hartwell, Peas, . . . . .	1 00
M. W. Chadbourne, Breck's Excelsior Peas, . . . . .	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 24.

*Whitcomb Prizes.*

BEETS. — Twelve specimens of Turnip Rooted, Warren Heustis, . . . . .	\$2 00
Second, John Fillebrown, . . . . .	1 00
Egyptian, J. Crosby, . . . . .	2 00
Second, Warren Heustis, . . . . .	1 00
CARROTS. — Twelve Intermediate, Josiah Crosby, . . . . .	2 00

ONIONS. — Twelve specimens, Josiah Crosby, . . . . .	\$2 00
Second, John Fillebrown, . . . . .	1 00
CUCUMBERS. — Pair of White Spine, James Baird, . . . . .	2 00
Second, Josiah Crosby, . . . . .	1 00
LETTUCE. — Four heads, Josiah Crosby, . . . . .	2 00
Second, Warren Heustis, . . . . .	1 00
PEAS. — Half-peck, John L. Gardner, American Wonder, . . . . .	3 00
Second, S. G. Stone, " " . . . . .	2 00
Third, E. W. Wood, " " . . . . .	1 00

*Gratuities:—*

Lewis H. Farlow, Lettuce, . . . . .	1 00
E. W. Wood, Tomatoes, . . . . .	2 00
C. H. Brackett, Tomatoes and Rhubarb, . . . . .	2 00
M. W. Chadbourne, Collection of Peas, . . . . .	1 00
W. G. Prescott, Peas, . . . . .	1 00
W. Heustis, Radishes, . . . . .	1 00

## JULY 5.

ONIONS, — Twelve specimens, Josiah Crosby, . . . . .	2 00
Second, Warren Heustis, . . . . .	1 00
SQUASHES. — Four Long Warded, Warren Heustis, . . . . .	2 00
CABBAGES. — Four, Warren Heustis, Henderson's, . . . . .	2 00
BEANS. — Half-peck of String, Samuel G. Stone, Marblehead, . . . . .	2 00
PEAS. — Half-peck, S. G. Stone, Advancer, . . . . .	2 00
Second, M. B. Faxon, American Wonder, . . . . .	1 00

*Gratuity:—*

Josiah Crosby, Summer Squashes, . . . . .	1 00
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## JULY 12.

POTATOES. — Twelve specimens, C. N. Brackett, Clark, . . . . .	3 00
Second, C. Terry, Clark, . . . . .	2 00
Third, M. W. Chadbourne, Weetomac, . . . . .	1 00

*Gratuities:—*

John L. Gardner, Collection of Peas, . . . . .	2 00
C. N. Brackett, Bliss's Abundance Peas, . . . . .	1 00
M. W. Chadbourne, Wax Beans, . . . . .	1 00

## JULY 19.

CABBAGES. — Four Drumhead, Warren Heustis, . . . . .	3 00
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*Gratuities:—*

C. H. Brackett, Potatoes and Cabbages, . . . . .	2 00
C. N. Brackett, Clark Potatoes, . . . . .	1 00
Warren Heustis, Peas and Beans, . . . . .	1 00
Samuel G. Stone, two varieties of Beans, . . . . .	1 00
J. L. Gardner, Cauliflowers, . . . . .	1 00

## JULY 26.

SQUASHES. — Four Marrow, Josiah Crosby, . . . . .	\$3 00
SWEET CORN. — Twelve ears, Samuel G. Stone, Peerless, . . . . .	3 00
Second, Samuel Hartwell, Marblehead, . . . . .	2 00
Third, C. N. Brackett, " . . . . .	1 00

*Gratuities : —*

C. H. Brackett, Potatoes and Cabbages, . . . . .	2 00
C. N. Brackett, Cranberry Beans, . . . . .	1 00
B. K. Bliss & Sons, for new varieties of Peas, Bliss's Abundance and Bliss's Everbearing, Silver Medal.	

## AUGUST 2.

SQUASHES. — Four Marrow, Josiah Crosby, . . . . .	2 00
SWEET CORN. — Twelve ears, L. W. Weston, Weston's Early Sweet, . . . . .	2 00
Second, Samuel Hartwell, Marblehead, . . . . .	1 00
TOMATOES. — Twelve specimens, George Hill, Emery, . . . . .	3 00
Second, C. N. Brackett, Acme, . . . . .	2 00

*Gratuities : —*

Samuel Hartwell, Hebron Potatoes, . . . . .	1 00
C. H. Brackett, Mushrooms, . . . . .	1 00
M. W. Chadbourne, Corn, . . . . .	1 00
C. N. Brackett, Marblehead Corn, . . . . .	1 00

## AUGUST 9.

GREENFLESH MELONS. — Four specimens, H. C. Woods, . . . . .	3 00
TOMATOES. — Twelve Acme, C. N. Brackett, . . . . .	2 00
Emery, C. N. Brackett, . . . . .	2 00
Any other variety, C. N. Brackett, Perfection, . . . . .	2 00
EGG PLANTS. — Four Round Purple, J. G. Coolidge, . . . . .	3 00

*Gratuities : —*

S. G. Stone, Collection, . . . . .	2 00
Samuel Hartwell, Tomatoes and Corn, . . . . .	1 00
Horace Eaton, Bell Peppers, . . . . .	1 00
M. W. Chadbourne, Crosby Corn, . . . . .	1 00

## AUGUST 16.

EGG PLANTS. — Four Round Purple, J. G. Coolidge, . . . . .	2 00
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*Gratuities : —*

C. N. Brackett, Three varieties of Tomatoes, . . . . .	2 00
Mrs. W. Houseman, Kohl Rabi and Beans, . . . . .	1 00
Samuel Hartwell, Corn and Tomatoes, . . . . .	1 00
H. S. Messenger, Cucumbers, . . . . .	1 00
John L. Bird, Tomatoes, . . . . .	1 00

## AUGUST 23.

POTATOES. — Twelve specimens, Samuel Hartwell, Hebron, . . . . .	\$2 00
Second, L. W. Weston, Pearl of Savoy, . . . . .	1 00
BEANS. — Two quarts of Large Lima, Benjamin G. Smith, . . . . .	2 00
PEPPERS. — Twelve specimens, J. G. Coolidge, . . . . .	2 00
Second, C. N. Brackett, . . . . .	1 00

*Gratuities: —*

George Hill, Greenflesh Melons, . . . . .	1 00
Samuel Hartwell, Cauliflowers and Tomatoes, . . . . .	2 00
C. N. Brackett, Tomatoes and Peppers, . . . . .	1 00

## AUGUST 30.

WATERMELONS. — Pair, Samuel Hartwell, Cuban Queen, . . . . .	3 00
GREENFLESH MELONS. — Four, Samuel Hartwell, . . . . .	3 00
Second, C. E. Grant, . . . . .	2 00

*Gratuities: —*

Samuel Hartwell, Collection, . . . . .	3 00
C. E. Grant, " . . . . .	2 00
James Claffy, Rose Potatoes, . . . . .	1 00
C. N. Brackett, Tomatoes and Peppers, . . . . .	1 00

## SEPTEMBER 6.

CAULIFLOWERS. — Four specimens, Samuel Hartwell, . . . . .	3 00
CELERY. — Four roots, George D. Moore, . . . . .	3 00
Second, Josiah Crosby, . . . . .	2 00

*Gratuities: —*

Samuel Hartwell, Collection, . . . . .	4 00
Samuel G. Stone, " . . . . .	2 00
C. E. Grant, " . . . . .	2 00
C. N. Brackett, " . . . . .	2 00
John B. Moore & Son, Perfection Tomatoes, . . . . .	1 00
Aaron D. Capen, " " . . . . .	1 00

## ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

*Special Prizes.*

POTATOES. — Best Collection of New Seedling varieties, J. J. H. Gregory, Harris's Treatise on Insects.	
CAULIFLOWERS. — Best four specimens, and best kept during the exhibition, W. W. Rawson, . . . . .	\$5 00
CELERY. — Best four specimens, and best kept during the exhibition, W. W. Rawson, . . . . .	5 00

*Regular Prizes.*

BEETS. — Twelve Turnip Rooted, W. W. Rawson, . . . . .	\$3 00
Second, Walter Russell, . . . . .	2 00
Third, John Fillebrown, . . . . .	1 00
CARROTS. — Twelve Long Orange, W. W. Rawson, . . . . .	3 00
Second, John L. D'Wolf, . . . . .	2 00
Intermediate, George Hill, . . . . .	3 00
Second, George F. Stone, . . . . .	2 00
Third, Walter Russell, . . . . .	1 00
PARSNIPS. — Twelve Long, John L. D'Wolf, . . . . .	3 00
Second, John Fillebrown, . . . . .	2 00
Third, George D. Moore, . . . . .	1 00
POTATOES. — Four varieties, twelve specimens each, Mrs. M. T.	
Goddard, . . . . .	4 00
Second, C. N. Brackett, . . . . .	3 00
Third, Samuel Hartwell, . . . . .	2 00
Clark, C. B. Lancaster, . . . . .	3 00
Second, Mrs. M. T. Goddard, . . . . .	2 00
Third, Samuel Hartwell, . . . . .	1 00
Hebron, C. B. Lancaster, . . . . .	3 00
Second, Mrs. M. T. Goddard, . . . . .	2 00
Third, S. A. Merrill, . . . . .	1 00
Rose, C. B. Lancaster, . . . . .	3 00
Second, Mrs. M. T. Goddard, . . . . .	2 00
Third, L. W. Weston, . . . . .	1 00
Any other variety, J. J. H. Gregory, Early Maine, . . . . .	3 00
Second, H. C. Bowers, Pearl of Savoy, . . . . .	2 00
Third, C. N. Brackett, Advance, . . . . .	1 00
SALSIFY. — Twelve specimens, Charles F. Curtis, . . . . .	3 00
Second, George Hill, . . . . .	2 00
Third, John L. D'Wolf, . . . . .	1 00
TURNIPS. — Twelve Flat, Walter Russell, . . . . .	3 00
Second, George F. Stone, . . . . .	2 00
Third, George H. Rich, . . . . .	1 00
Swedish, Mrs. M. T. Goddard, . . . . .	3 00
Second, George F. Stone, . . . . .	2 00
ONIONS. — Twelve Danvers, George D. Moore, . . . . .	3 00
Second, George Hill, . . . . .	2 00
Third, Walter Russell, . . . . .	1 00
Portugal, Walter Russell, . . . . .	3 00
Second, Josiah Crosby, . . . . .	2 00
Red, Walter Russell, . . . . .	3 00
Second, J. J. H. Gregory, . . . . .	2 00
GREENFLESH MELONS. — Four specimens, George W. Pierce, . . . . .	3 00
Second, Warren Heustis, . . . . .	2 00
Third, Samuel Hartwell, . . . . .	1 00
MUSKMELONS. — Four specimens, M. W. Chadbourne, . . . . .	3 00
WATERMELONS. — Two specimens, Samuel Hartwell, . . . . .	3 00

SQUASHES. — Four Canada, Josiah Pratt, . . . . .	\$3 00
Second, Warren Fenno, . . . . .	2 00
Third, Mrs. M. T. Goddard, . . . . .	1 00
Hubbard, George Hill, . . . . .	3 00
Second, W. W. Rawson, . . . . .	2 00
Third, Samuel Hartwell, . . . . .	1 00
Marrow, George Hill, . . . . .	3 00
Second, W. W. Rawson, . . . . .	2 00
Third, Warren Heustis, . . . . .	1 00
Marblehead, J. J. H. Gregory, . . . . .	3 00
Second, Walter Russell, . . . . .	2 00
Perfect Gem, Mrs. M. T. Goddard, . . . . .	3 00
Second, M. W. Chadbourne, . . . . .	2 00
Turban, Samuel Hartwell, . . . . .	3 00
Second, W. W. Rawson, . . . . .	2 00
Third, Walter Russell, . . . . .	1 00
CABBAGES. — Three Drumhead, C. B. Lancaster, . . . . .	3 00
Second, Samuel Hartwell, . . . . .	2 00
Third, George F. Stone, . . . . .	1 00
Red, Samuel Hartwell, . . . . .	3 00
Savoy, Samuel Hartwell, . . . . .	3 00
Second, C. B. Lancaster, . . . . .	2 00
Third, W. D. Philbrick, . . . . .	1 00
CAULIFLOWERS. — Four specimens, W. W. Rawson, . . . . .	3 00
CELERY. — Four roots, best kept during the exhibition, W. D. Phil-	
brick, . . . . .	3 00
Second, George D. Moore, . . . . .	2 00
Third, W. W. Rawson, . . . . .	1 00
ENDIVE. — Four specimens, George W. Pierce, . . . . .	2 00
Second, Stillman S. Hovey, . . . . .	1 00
HORSE RADISH. — Six roots, Walter Russell, . . . . .	3 00
Second, John Fillebrown, . . . . .	2 00
Third, W. W. Rawson, . . . . .	1 00
BEANS. — Two quarts Large Lima, Samuel G. Stone, . . . . .	3 00
Second, Benjamin G. Smith, . . . . .	2 00
Third, George Hill, . . . . .	1 00
CORN. — Twelve ears of Sweet, S. A. Merrill, . . . . .	3 00
Second, L. W. Weston, . . . . .	2 00
Third, Samuel Hartwell, . . . . .	1 00
Yellow or Field, twenty-five ears traced, Mrs. M. T. Goddard, . . . . .	3 00
Second, Horace Eaton, . . . . .	2 00
EGG PLANTS. — Four Round Purple, J. G. Coolidge, . . . . .	3 00
Second, George D. Moore, . . . . .	2 00
Third, Walter Russell, . . . . .	1 00
TOMATOES. — Three varieties, twelve specimens each, C. E. Grant, . . . . .	4 00
Second, George H. Rich, . . . . .	3 00
Third, C. N. Brackett, . . . . .	2 00
Acme, Twelve specimens, C. N. Brackett, . . . . .	2 00



Second, Samuel Hartwell, . . . . .	\$1 00
Emery, George Hill, . . . . .	2 00
Second, G. W. Pierce, . . . . .	1 00
Paragon, Walter Russell, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Perfection, George W. Pierce, . . . . .	2 00
Second, Walter Russell, . . . . .	1 00
Any other variety, C. F. Curtis, Livingston's, . . . . .	2 00
Second, A. D. Capen, Mountain Rose, . . . . .	1 00
MARTYNIAS. — Twenty-four specimens, M. W. Chadbourne, . . . . .	2 00
Second, Starkes Whiton, . . . . .	1 00
OKRA. — Twenty-four specimens, Mrs. M. T. Goddard, . . . . .	2 00
PEPPERS. — Twenty-four specimens, C. N. Brackett, . . . . .	3 00
Second, J. Fillebrown, . . . . .	2 00
Third, George F. Stone, . . . . .	1 00

*Gratuities : —*

J. J. H. Gregory, Collection, . . . . .	10 00
G. W. Pierce, " . . . . .	1 00
Walter Russell, " . . . . .	1 00
Walter Russell, Banana Melons, . . . . .	1 00
G. W. Pierce, " " . . . . .	1 00
C. M. Hovey, Melons, . . . . .	2 00
Warren Heustis, Squashes and Lettuce, . . . . .	2 00

OCTOBER 4.

SALSIFY. — Twelve specimens, George Hill, . . . . .	2 00
BRUSSELS SPROUTS. — Half peck, Mrs. Mary T. Goddard, . . . . .	2 00
CABBAGES. — Drumhead, three specimens, C. B. Lancaster, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
Red, Samuel Hartwell, . . . . .	2 00
Second, C. B. Lancaster, . . . . .	1 00
Savoy, C. B. Lancaster, . . . . .	2 00
Second, Samuel Hartwell, . . . . .	1 00
CELERY. — Four roots, Warren Heustis, . . . . .	2 00
Second, George D. Moore, . . . . .	1 00

*Gratuities : —*

C. N. Brackett, Collection, . . . . .	2 00
Samuel G. Stone, " . . . . .	2 00
Benjamin G. Smith, Lima Beans, . . . . .	1 00
J. H. Woodford, Parsley, . . . . .	1 00
B. Judkins, Turnips, . . . . .	1 00
Samuel Hartwell, Watermelons, . . . . .	1 00

OCTOBER 25.

*Gratuities : —*

C. H. Brackett, Cucumbers, . . . . .	1 00
Samuel G. Stone, Collection, . . . . .	2 00

NOVEMBER 8.

*Gratuity* : —

C. H. Brackett, Cucumbers, . . . . .	\$1 00
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## CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

CELERY. — Four roots, Warren Heustis, . . . . .	\$2 00
Second, Warren W. Rawson, . . . . .	1 00

*Gratuities* : —

Samuel G. Stone, Lima Beans, . . . . .	1 00
C. H. Brackett, Cucumbers, . . . . .	1 00
George W. Pierce, Endive and Brussels Sprouts, . . . . .	2 00
Samuel Hartwell, Tomatoes, . . . . .	2 00
A. S. McIntosh, Artichokes, . . . . .	1 00

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 \$550 00

REPORT  
OF THE  
COMMITTEE ON GARDENS,  
FOR THE YEAR 1884.

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BY JOHN G. BARKER, CHAIRMAN.

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The Committee on Gardens feel much pleasure in being able to report that during the past season they have visited seven places ; a greater number than their attention has been called to for several years. Without further preface, beyond the expression of the hope that this gratifying improvement may continue and increase in future years, they proceed to give an account of these visits : —

PINE HILL, THE RESIDENCE OF HON. FRANCIS B. HAYES.

The first visit of the season was to the grounds of our late President at Lexington. The day was very stormy, and our inspection of the different parts of the grounds was between the showers, as best we could effect it. Little perhaps can be added to the reports already made of frequent visits to this place. The new and enlarged Rhododendron Tent, near the new mansion house, was the special object of attraction ; it had been thoroughly rearranged since last season, and everything was in excellent order, except that the plants were perhaps suffering somewhat from too great a supply of water, owing to the unusually wet weather. The large standard specimens mentioned in our previous reports were particularly noticeable, being in fine foliage and bloom. Many new varieties had been added to the collection, among which that named Francis B. Hayes, sent out by Waterer, a very bright and attractive variety, was especially noticeable. The tent contained more than a

hundred and fifty varieties, and, with a few more years' growth on some of the smaller plants, this collection of rhododendrons will be the pride of the place. With the great variety of the colors of the flowers,—from pure white to deep purple,—combined with elegant habit and foliage of the finest and deepest green, they are indispensable alike in the conservatory, flower garden, or shrubbery, and never fail to elicit admiration, whether planted out as single specimens, in groups, or in masses with other plants.

On every hand the results of Mr. Hayes's enthusiasm were visible. His plans for the future development of his large estate were broad and liberal; and little did we think, when on this visit, that it would be the last time we should meet our honored and respected President there, and we feel sure that we utter the sentiment of all who knew him when we express our deep regret that in the full maturity of a life of great usefulness and unfinished work he was so suddenly taken from our midst. Not only our Society but Horticulture generally has lost one of its most energetic and useful promoters.

#### THE WAVERLY OAKS.

On the 28th of June, the Committee, with other gentlemen, visited the Waverly Oaks, and spent an hour or two in examining those grand old trees. The afternoon was fine, and what might have been of little interest to many persons was much enjoyed by all, especially by some who have early recollections of very fine trees in Europe. It may not be out of place to copy a few lines from "Harper's Monthly" for January, 1881, vol. 62, page 262. Alluding to Beaver brook, it says: "Not far below is a pasture in which are the well-known Waverly Oaks, the only group of aboriginal trees, probably, standing on the Massachusetts coast. If a bull be permitted, the largest of the oaks is an elm, now unhappily dying at the roots. This tree has a straight outspread of one hundred and twenty feet — sixty feet each way — from the giant trunk. The oaks are seven or eight in number, as like as so many stout brothers, planted on sloping dunes west of the brook. They have a human resolute air. Their great arms look as if ready to 'hit out from the shoulder.' Elms have their graceful ways, willows their pensive attitudes, firs their loneliness, but the aboriginal oaks express the strength and the rugged endurance of nature." This extract gives a good idea of what the trees are, but, instead of seven

or eight, there are twelve or fourteen. A few measurements will give an idea of their size. At three feet from the ground one was nineteen feet in circumference; one, at two feet from the ground, seventeen feet in circumference, and the same tree, at six feet from the ground, thirteen and one half feet. There was also evidence that one which had been at some time cut down, the stump being left, had a circumference of twenty-five feet at three feet from the ground. The species seems to be the white oak (*Quercus alba*). They are located on either side of a somewhat abrupt slope, in a large pasture, and are of easy access from the Waverly Station, on the Fitchburg Railroad. Some of the trees are surrounded by an undergrowth of shrubs; others have only a pasture sward beneath, and present a fine park-like appearance.

Dr. George B. Emerson, in his report on the "Trees and Shrubs Growing Naturally in Massachusetts," says that a white oak which he measured in Greenfield in 1838 was seventeen feet and five inches in circumference just above the root, and fifteen feet and three inches at three feet. A white oak standing nearly opposite Deacon Nurse's, in Bolton, measured in 1840 nineteen feet just above the roots, and fourteen feet at three feet from the ground. Dr. Emerson seems however to have been entirely unacquainted with this remarkable group of trees, since he makes no mention whatever of them.

We cannot close our brief notice of these trees, without expressing the hope that these grand old sentinels, which have been signalized for these many years as perhaps the finest oaks in Massachusetts, if not in the New England States, may be spared from the ruthless woodman's axe, and that the coming generations may enjoy their shade and grandeur, as some of the rising generation were doing at the time of our visit, when we saw little groups here and there with their luncheon spread beneath the shade of these noble trees.

The Committee would acknowledge their obligations to Mr. Elisha N. Pierce, a resident in the vicinity, for guidance and information and other courtesies.

#### NEWTON CEMETERY.

The Committee, by invitation of Henry Ross, Superintendent, and his assistant, Charles W. Ross, visited these grounds on the 12th of July, and although we were greeted with a very heavy

rain-storm, lasting all day, the barge ride was much enjoyed. Previously to visiting the grounds we found ourselves after a short drive opposite the Newton Public Library, which is beautifully located, being set back a good distance from the street, with a nicely kept lawn in front, and the building itself being covered with the Virginia creeper (*Ampelopsis quinquefolia*), the whole presenting a picturesque and attractive appearance. As we traversed Centre and Franklin streets, many beautiful estates were noticed, among which were the grounds of George C. Lord, which we passed through, and where the fine trees and high keeping fully attested the skill and good taste of the owner. We then entered the grounds of John S. Farlow, who, by his munificent gift to the city of Newton of a tract of ground for a public park, and later of a beautiful chapel and conservatory to Newton Cemetery, has set a worthy example to gentlemen of means in other cities for so using some of the abundance of their possessions as, while living, to see the results of such actions in blessing and benefiting mankind. On the estate of Mr. Farlow is a fine collection of forest trees, — perhaps the best in Newton. The Norway spruces are, we believe, the first that were imported in this vicinity, and they, as well as many other specimens of trees, such as magnolias, beeches, oaks, and many others at which we only got a glance, were planted by our respected and beloved friend, William Kenrick, and stand as noble witnesses of his skill and devotion to the beautiful art of Horticulture. Newton has certainly done a good thing in naming one of its parks Kenrick Park, and we hope that all its adornments may do honor to the name of one who loved all that was beautiful, and whose memory we all cherish. Following along the winding avenues, objects of interest attracted us at every turn; and when we reached the edge of the farm grounds we noticed the crops in a luxuriant condition. Driving to the conservatories, we alighted, and found ourselves at once in a place where neatness and order were the rule. There were many good specimens of choice plants, while the graperies on either side showed the results of good cultivation. A stroll through the gardens, quickly taken, gave additional evidence that neither labor nor expense had been spared to produce the best results. There was a good variety of flowering shrubs, a fine collection of Hybrid Perpetual roses, and many beds of summer decorative plants. We feel that this brief mention hardly does justice to one of the most beautiful suburban places it has been our good fortune to visit. Again on the road, we passed delightful residences on

Sargeant street and Highland avenue ; thence through Newtonville, to West Newton, all the way along taste and beauty were displayed, while the delightful views could not be equalled. In passing down Prospect and Washington streets to Auburndale the rain came down in such torrents that it required nearly all our attention to keep ourselves dry, but Mr. Ross called our attention to objects of interest all along. Our next stopping-place was at the elegant residence of E. B. Haskell, which certainly is beautiful for situation, commanding in all directions most magnificent views. The location is a high eminence which, a few years ago, one would hardly have thought could be converted into a place of such combined simplicity and beauty. The well-kept slopes and belts of native trees added much to the beauty of the place, while the hospitality of the host, which was amply tested, added no little to the pleasure of the visit. Once more on the road, through vales and over hills, we soon found ourselves approaching the Cemetery, our attention being first of all drawn to a raised bed composed of succulents and other low-growing plants arranged in geometrical style in excellent taste. A description of the arrangement is impossible, but it was very attractive through the entire season, and seen from a distance, through a vista in approaching the grounds, the effect was charming. It is only justice to say that the rain still prevented us from walking through the grounds, as we had hoped to do, but, under the guidance of Mr. Ross, the objects of interest were pointed out as we passed along. The general improvement of the grounds was very noticeable, great attention being given to retaining all the native trees possible, while many new and rare varieties were being introduced. Those which attracted our attention as being most desirable for ornamental purposes, were

*Viburnum aurea.*

*Aralia Mandshurica.*

*Cratægus Crus-galli pyracanthifolia pendula*, a weeping thorn with small, bright, glossy foliage.

*Hydrangea quercifolia*, a fine massive shrub.

*Sambucus laciniata.*

*Rhus glabra laciniata*, a grand plant for the centre of a sub-tropical bed.

*Philadelphus foliis aureis*, a grand plant for grouping with other shrubs. The foliage is very striking.

*Calluna vulgaris.*

*Rosa rugosa alba.*

*Prunus Pissardi.*

*Spiræa Japonica* var. *sempiflorens.*

*Exochorda grandiflora.*

Red or River Birch.

European White Birch.

*Betula alba elegans pendula*, one of the best of the weeping trees.

*Betula glandulosa nana.*

New Weeping Japan Cherry.

*Picea pungens.*

*Abies alba aurea* (Maxwell's Glory of the Spruces).

*Abies cærulea.*

*Cupressus orientalis.*

*Biota orientalis.*

*Pinus ponderosa.*

*Retinospira filifera.*

*Retinospira vireana.*

Descriptions of the above can be found in most catalogues. In a few years the trees and shrubs that we have named will become fine specimens, and greatly adorn these grounds; and it is a pleasure to notice that so much attention is being given to introducing trees, shrubs, and plants that will add to the permanent beauty of the Cemetery. We feel it a duty to mention that all through the grounds were many beds of choice plants, that added much to the attractions, and undoubtedly were pleasing in no small degree to very many, yet, when we consider the great amount of care they demand, and the comparatively short season during which we get any benefit from plants that require the protection of the greenhouse for winter, we are glad to note the growing tendency to the cultivation of hardy plants in preference to depending on so many thousands of tender ones for such purposes, and we feel sure that we shall not look in vain to Newton Cemetery for some fine examples. The flowering of a plant of *Agave Verschaffeltii* has been quite an attraction; the flower-stalk, at the time of our visit, had attained a height of six feet, and Mr. Haskell remarked that in Mexico he had seen them twenty feet high. This is the only one that has flowered in this part of the country, as far as known, and, although not beautiful, it is quite rare and interesting. It would be impossible to even mention the many rare plants which are used in the Cemetery. The commodious greenhouses are taxed to their utmost capacity to meet the large demands for plants.



Later in the season we noticed that the changes necessary for the new chapel and conservatory were being pushed rapidly forward by the removal of the old receiving tomb. This place, which is next to Mr. Farlow's lot, has been chosen as a site for the chapel, which will have a conservatory attached, the design being to divide the two by three large arches in the side, with sliding doors, so that the chapel and conservatory may be thrown together, and form one room, when occasion may require. On account of these improvements, much new grading is necessary about the immediate surroundings, which when finished will much improve the grounds.

The Committee were greatly pleased with their visit, and feel that the citizens of Newton are to be congratulated on the possession of one of the most beautiful rural cemeteries in this vicinity; and to the Messrs. Ross we desire to express our thanks for their untiring efforts, which made the visit so pleasant, and we trust that Newton may long enjoy their valuable services.

#### GARDEN OF ROBERT T. JACKSON.

Our next visit was to the garden of Robert T. Jackson, of Dorchester, which contains one of the best collections of Hardy Plants in this vicinity. The short time spent in examining the collection was of great profit as well as pleasure. At our request Mr. Jackson has given a written statement for publication in the TRANSACTIONS, which we are sure will be read with much profit. Particular attention is called to his system of labelling, which is the best we have ever seen. Keeping the names of plants with accuracy is one of the most important and difficult cares of a large collection; but Mr. Jackson has surmounted it effectually. It is rare to see so much in so small a place, with such admirable system, and certainly the fact that it does not require a large place to possess an interesting collection of plants has been thoroughly demonstrated, and the wonder is that more have not gone and done likewise. We are glad to introduce Mr. Jackson to the Society through this report.

Mr. Jackson's description of his garden is as follows:—

The garden is an old-fashioned one in its arrangement, and has been in cultivation for upwards of thirty years. There are about fifty-one hundred square feet, as an outside measure, devoted to the cultivation of plants, exclusive of walks, etc.

In order to be able to locate in a catalogue the position in the garden of fixed plants, such as hardy perennials, it is laid out on the principle of latitude and longitude. The fence posts bordering the garden on one side are numbered, and those on the adjoining side, which lies at a right angle with the first, are lettered. Then with a pencil is noted in the margin of the catalogue that such or such a plant is at B 5 or D 3, etc., as for example—B 13, *Lilium Philadelphicum*, with space for remarks. With this system a plant can be easily sought out and renamed if the label is lost. The catalogue is written in pencil so that if a plant is moved the record can easily be changed.

All the hardy perennials and many other plants are labelled with zinc tallies, attached to galvanized iron rods eighteen inches long by a copper or galvanized-iron wire. The names are written with chemical ink on bright zinc (zinc is best made bright by rubbing it with a cloth wet with muriatic acid), or with a soft pencil on oxidized zinc.

The advantages of this means of marking are, durability, immovability, inconspicuousness, and cheapness. The zinc labels can be bought cheap, or made from bits of old or new metal. The rods are used to secure wire netting around croquet grounds, and can be purchased for a dollar and a half per hundred.

This kind of label is particularly convenient for gladioli and similar bulbs, as when taken up in autumn the labels are untwisted from the rods (copper wire should be used here for attaching them), and put in cloth or paper bags with the bulbs.

The garden soil is a deep, rich, natural loam, and is enriched by manure, or has leaf-mould or peat added to it according to the requirements of the plant.

Most Alpine plants and many of the rarest ferns are grown in pots, which are kept in a pit in winter, and in summer are sunk in sand or ashes in partial shade.

The garden contains only plants worth growing from a horticultural point of view, hardy ferns being the only plants with which any attempt at a botanical collection has been made.

There are six hundred and sixty-eight catalogued species and varieties of plants. Besides the catalogued plants there are many others of which written account is not kept, such as annuals, pansies, daisies, seedling primroses, perennials still in the seed beds, etc.

A comparatively brief summary of the collection is as follows:—

Twenty-eight varieties of Geraniums, Agaves, etc., which are wintered in a cellar.

Twenty varieties of Chrysanthemums.

Sixty-six varieties of Gladioli, mostly imported, besides unnamed seedlings.

Nine kinds of tender summer bulbs, such as Vallotas, Tigridias, Ismenes, etc.

Nineteen varieties of Dahlias, mostly remarkably fine seedlings, raised by Mr. John Richardson of Dorchester.

Ten species of Hollies, Yews, *Melianthus major*, etc.

Eight distinct varieties of Mr. John Richardson's very beautiful seedling Pæonies.

Fifty varieties of Hybrid, Perpetual and Tea roses. The latter are kept in a pit in winter, and flowered in the open ground in summer.

The rest of the collection is composed of hardy herbaceous plants and bulbs, Alpine plants (many of which are perfectly hardy, as proven, and probably most will be), shrubs, etc.

The names of the rarer and more interesting plants are given in a list below, together with a complete list of the ferns, which form one of the best parts of the collection : —

*Acantholinum glumaceum*.

*Adonis vernalis*.

*Aquilegia atrata*. — An Alpine species.

“ *chrysantha*.

“ *glandulosa*. — Perhaps the finest species of the genus.

*Arctostaphylos Uva-ursi*.

*Auricula*. — A fine blue and white variety has proved perfectly hardy for more than six years.

*Calluna vulgaris*. — The type and several varieties are all hardy.

*Campanula cæspitosa*. — This beautiful species, which grows on the higher Alps of Switzerland, where it was collected in August, 1883, will doubtless prove a great acquisition to gardens. It grows only five inches high, is a great and continuous bloomer, and will probably be perfectly hardy. A First Class Certificate of Merit was awarded for it by the Society on the 2d of August, 1884.

*Campanula grandiflora*. — First rate.

“ “ *alba*.

“ *isophylla*.

“ *muralis*. — A beautiful species.

*Campanula persicæfolia.*

“ *Portenschlagiana.*

“ *rotundifolia.*

“ “ *alba.*— Rare. Collected in the State of New York.

*Campanula turbinata.*

*Cassia Marilandica.*

*Clematis alpina.*

“ Five named varieties, among which Mad. Van Houtte is especially noteworthy. It is large, fine, pure white.

*Colchicum alpinum,*

“ *autumnale,*

“ *Byzantium,*

“ *variegatum,*

} All very satisfactory plants to cultivate.

*Cornus florida.*

*Crocus vernus.*— The true Alpine form.

“ “ Garden varieties.

*Cypripedium Calceolus.*

“ *pubescens.*

*Cytisus scoparius.*— Not quite hardy.

*Deutzia Sieboldii crenata flore pleno.*— A perfectly double pure white seedling of great merit, raised by Mr. John Richardson.

*Dianthus cæsius,*

“ *glaucus,*

“ *versicolor,*

“ *viscidus,*

“ garden hybrids.

} All Alpine species.

*Digitalis purpurea,* and the variety *alba.*

*Dioscorea batatas.*

*Dodecatheon Meadia.*

*Epigæa repens.*— I have had this growing for three years in the open ground, and it is doing finely. It flowered this spring and has new shoots five inches long. It was collected in the woods.

*Erica scoparia.*

“ *tetralix.*

*Erythræa diffusa.*— A very beautiful dwarf European plant.

*Equisetum hyemale.*

*Eupatorium ageratoides.*— Good for cutting.

*Fritillaria meleagris,* and varieties.

*Gentiana acaulis.*— Grows and blooms finely in pot culture.

“ *Andrewsii.*— A native species, which succeeds admirably; first rate for general cultivation.

*Gentiana asclepiadea*. — An Alpine species, which also does finely in cultivation. Three plants have now (August 2) an aggregate of two hundred and sixty-six buds on them just ready to open. The plants were collected in Switzerland in 1880. They are perfectly hardy, as proved by the experience of the last two winters in the open ground, and if they can be introduced into general cultivation will prove a very valuable acquisition to our gardens.

*Gentiana cruciata*.

“ *lutea*. — The medicinal gentian.

“ *verna*. — A most beautiful species. The last two species are not in good condition and very likely will not succeed here.

*Gnaphalium Leontopodium*. — The Edelweiss of the Swiss. A small plant raised from seed. Its success is not yet assured, though it is now in good condition.

*Helleborus niger*. — The Christmas Rose, succeeds admirably, generally blooming freely.

*Hepatica acutiloba*,

“ *triloba*,

“ “ var. *alba*,

} All grow and bloom finely in cultivation.

*Hesperis matronalis flore pleno*. — A fine, rare, old garden plant. It bears freely, fine pyramidal clusters of white, and highly fragrant flowers.

*Hyacinthus candicans*. — Proved perfectly hardy in the last three winters.

*Hypericum prolificum*.

*Iberis sempervirens*. — A choice seedling, considerably better than those generally grown.

*Iris Anglica*. Two varieties. — This fine species, in its numerous varieties of rich golden-brown, blue, purple, etc., as grown in England, can hardly be overpraised.

*Iris cristata*. — A charming species.

“ *fulva*.

“ *Florentina*.

“ *Germanica*, varieties.

“ *Kœmpferi*.

“ *Pseud-acorus*.

“ *setosa*.

“ *Sibirica*.

“ *Virginiana*, and others.

*Kalmia latifolia*.

*Leucojum vernum.*

*Lilium callosum.*

“ *Canadense.*

“ “ *var. rubrum.*

“ *chalcedonicum.*

“ *elegans.*

“ “ *var. cruentum.* — A very beautiful and distinct variety. It grows only eighteen inches high, and bears a large, deep blood-red flower. It received a First Class Certificate of Merit from the Royal Horticultural Society, July, 1882.

*Lilium cordifolium var. giganteum.* — A superb, tall-growing lily, from the Himalayas.

*Lilium Harrisii.*

“ *lanceifolium rubrum* and *album.* — One hundred plants.

“ *longiflorum.*

“ *martagon var. album.* — A rare variety.

“ “ “ *Dalmaticum.* — A rare, deep blood-red, or almost blackish variety.

*Lilium Philadelphicum.* — These have been three years in cultivation, and have borne superb flowers, in heads of one to four flowers, this summer. Some peat is mixed with the soil, and they are grown in full sunlight, for the most part. Fifty plants.

*Lilium pomponium.*

“ *pulchellum.*

“ *superbum.*

“ *tenuifolium.* — Beautiful.

“ *testaceum.*

*Liparis liliifolia.* — A rare native orchid.

*Lobelia cardinalis.* — Fine in cultivation.

*Lychnis Chalcedonica flore pleno.*

“ *Haageana.*

*Magnolia Soulangeana.* — A great bloomer.

*Menziesia polifolia.*

*Mertensia Virginica.* — A fine, rare, old plant.

*Mitchella repens.* — Very pretty for rock-work.

*Muscari botryoides.*

“ *racemosum.*

*Narcissus bicolor var. Horsfieldi,*

“ “ “ *Emperor,*

“ “ “ *Empress,*

} All are superb.

*Narcissus Bulbocodium*, and many other species and varieties.

*Nertera depressa*. — A choice little plant from the Andes. It bears scarlet berries on moss-like tufts of leaves, and grows well with pit culture in winter and plunging the pots in sand in summer.

*Oenothera fruticosa*.

*Opuntia vulgaris*.

“ *Missouriensis*.

*Orchis*. — Several fine species from Central Europe, which succeed perfectly in cultivation. Thirty plants. Also several species of European, British, and native orchids.

*Parnassia palustris*.

*Phlox amoena*. — A fine species.

*Phloxes*. — Many fine seedlings of Mr. John Richardson's, and named varieties.

*Primroses*. — The Polyanthuses, and some of the more vigorous species, are planted out in the open ground in summer, and mostly lifted and potted for a pit, or put in a cold-frame for the winter. The more delicate and rarer species are kept in pots continuously, and, being wintered in a pit, are sunk in sand or ashes in summer, in a partially shady place. For the Polyanthuses, etc., a moderate share of sun in summer is best, as, if too shady, the plants are not as strong as with more sun; they should have abundant water however. They are all a class of plants which should be more widely cultivated, as most of them are very easy to manage, and when in bloom they are exceedingly attractive.

*Polyanthuses*. — Many seedlings. Several plants left out during the past winter proved perfectly hardy, and flowered finely in the spring.

*Primula acaulis lutea flore pleno*.

“ “ *platypetala flore pleno*.

“ “ *purpurea flore pleno*.

“ “ *rubra flore pleno*. — All the above double varieties are beautiful in color and form.

*Primula auricula*. — The type species from which the auriculas come. Native of the Alps, etc.

*Primula capitata*, } Both very beautiful.

“ *Cashmeriana*, }

“ *Clusiana*. — Native of the Alps.

“ *cortusoides*. — A fine species, a native of Siberia, and generally hardy; but an extra hard winter will kill it.

*Primula denticulata*. — A fine species, native of the Himalayas.

*Primula elatior*. — Native of England and other parts of Europe.

“ *farinosa*. — A pretty, small species, native of all Europe and this country.

*Primula Japonica*.

“ *Mistassinica*. — A dwarf species, native of this country.

“ *purpurea*. — A superb, strong growing species, with fine head of lilac flowers. One of the most desirable. A native of the Himalayas.

*Primula rosea*. — A fine species, native of the Himalayas.

“ *spectabile*. — An Alpine species.

“ *verticillata*. — A fine species, with bright yellow flowers.

“ *viscosa*. — An *exquisite* species; native of the Alps.

“ “ *nivalis*. — Also very beautiful and very rare. It is a white variety of the preceding.

*Polygonatum giganteum*. — Fine for effective foliage.

*Ramondia Pyrenaica*.

*Retinosporas*, and other dwarf evergreens. Several species and varieties.

*Rhododendron ferrugineum*. — The Alpine Rose.

*Rosa multiflora*.

“ *rugosa*, and several other species.

*Rose*. — Dwarf Scotch; double white. A first rate plant.

*Sanguinaria Canadensis*. — Fine in cultivation.

*Saxifraga palmata*.

“ *Maderensis*.

“ *bryoides*, and other species.

*Scilla nonscripta* and varieties. — First rate.

*Silene maritima*. — A beautiful little plant.

*Spiræa Filipendula* var. *flore pleno*.

“ *palmata*, and others.

*Stellaria holostea*. — A first-rate plant.

*Taxus baccata* var. *Canadensis*. — A fine, low, shrubby, native evergreen, which should be more generally grown.

*Taxus baccata* var. *fastigiata*.

*Thalictrum anemonoides*. A most charming plant in cultivation.

*Trillium erectum*.

“ *erythrocarpum*. — Beautiful.

“ *grandiflorum*. — Should be in *every* garden.

“ *sessile*. — All these Trilliums do well in cultivation.

*Veronica amethystina*.

*Viola cucullata*.



*Viola cucullata*, var. *alba*.

“ “ var. *variegata*.

“ *lanceolata*.

“ *pedata*. — Grows and flowers well.

“ “ var. *bicolor*.

“ *rotundifolia*.

“ *saggitata*. The above species of violets, although not all rare, well repay cultivation.

The ferns form one of the principal features of the garden, being scattered singly or in clumps in every available shady spot. Many of them have been in their present position for from six to ten or more years, and have formed fine specimen plants, producing as good fronds as those usually found in the wild state, and often better.

Most species of ferns are of the easiest possible culture, requiring only moderate shade and moisture; although some of the finest clumps in the garden are exposed to nearly full sunlight. Many of the choicer kinds need leaf-mould and peat added to the soil, and in fact these are beneficial to all species.

Broken limestone and other rocks come into good service, both for the benefit to the plants and for the pleasing effect produced by them. Most of the plants in the following list of cultivated species are perfectly hardy, and are grown in the open ground without other protection than that which ordinary hardy plants receive. Choice dwarf kinds, however, as is shown by experience, do better when kept in pots, and wintered in a pit; others, because their hardiness is questioned, or for some other reason, receive the benefit of a cold-frame in winter, which is set over the bed in which they are growing. Where the protection of a frame or pots is used it is indicated in the list; an interrogation mark being added if it is likely to prove unnecessary. All the species, with one exception, are natives of the Northern United States, or of Great Britain and Northern Europe. As descriptions and figures of them can be easily found, none are inserted here.

*Adiantum pedatum*.

*Allosorus crispus*; pot.

*Aspidium acrostichoides*.

“ “ var. *incisum*.

“ *aculeatum*; protection?

- Aspidium angulare*,  
 “ “ var. *lineare*,  
 “ “ “ *proliferum*,  
 “ “ “ *polydactylum*; } protection?  
 “ *Boottii*.  
 “ *cristatum*.  
 “ *Filix-mas*, and two varieties.  
 “ *Goldianum*.  
 “ *Lonchitis*; protection?  
 “ *marginale*.  
 “ *Noveboracense*.  
 “ *rigidum*; protection?  
 “ *spinulosum*.  
 “ “ var. *dilatatum*.  
 “ *Thelypteris*.  
 “ *munitum*.  
 “ *Nevadense*; protection?  
*Asplenium adiantum-nigrum*; protection.  
 “ *angustifolium*.  
 “ *ebeneum*.  
 “ *Filix-fœmina*.  
 “ “ var. *Fieldii*; protection?  
 “ “ “ *plumosum*.  
 “ “ “ *Rylsyae*.  
 “ “ three other varieties.  
 “ *fontanum*; pot.  
 “ *Ruta-muraria*; pot.  
 “ “ var.; pot.  
 “ *Niponicum*, native of Japan.  
 “ *septentrionale*; pot.  
 “ *Trichomanes*; pot.  
 “ *thelypteroides*.  
 “ *viride*; pot.  
*Botrychium ternatum* var. *dissectum*.  
 “ *Virginianum*.  
*Camptosorus rhizophyllus*; pot.  
*Ceterach officinarum*; pot.  
*Cystopteris bulbifera*.  
 “ *fragilis*.  
 “ *montana*; protection?  
*Dicksonia pilosiuscula*.

- Lomaria alpina*; pot.  
 “ *crenulata*; pot.  
 “ *spicant*; protection?  
*Lygodium palmatum*.  
*Onoclea sensibilis*.  
 “ *Struthiopteris*.  
*Osmunda cinnamomea*.  
 “ *Claytoniana*.  
*Osmunda regalis*.  
*Pellaea atropurpurea*, pot.  
 “ *gracilis*, pot.  
*Phegopteris calcarea*; protection?  
 “ *Dryopteris*.  
 “ *hexagonoptera*.  
 “ *polypodioides*.  
*Polypodium vulgare*.  
*Pteris aquilina*.  
*Scolopendrium vulgare*,  
 “ “ var. *Kelwayi*,  
 “ “ “ *marginatum*, } protection.  
 “ “ “ *scopulatum*; }  
 and others.  
*Woodsia Ilvensis*.  
 “ *obtusa*.  
*Woodwardia Virginica*.

#### GROUNDS OF J. W. MANNING.

Our next visit was to Reading, for the purpose of inspecting J. W. Manning's collection of Hardy Herbaceous and Perennial plants. We were met by Mr. Warren H. Manning, who conducted us through the grounds, and informed us that in their collection were some five hundred species of hardy plants, including many that grew in old-fashioned gardens years ago and have proved their value by long years of cultivation. They have also a good variety of native plants, which have been sent them from Oregon, California, Dakota, and States nearer home. Among them were some valuable garden flowers, while many proved of little value. Phloxes, Pyrethrums, German Iris, and Pæonies formed prominent features of the collection. We also noticed a Variegated Leaved *Hibiscus militaris*, which will be of value if the variegation is retained.

The flowers are pretty, and it is a good grower. A purple-flowered *Thalictrum Cornuti* was noticed. It is a native seedling, with very pretty clusters of flowers, having purple anthers, and when growing among tall plants it has a peculiar misty appearance. An interesting feature of the collection was some twenty-five named species of *Sempervivums* and about as many more unnamed species, which are all valuable for rock-work, as they will grow with little or no soil, in the smallest crevices, where their roots will penetrate, and form very interesting tufts and rosettes of plants.

The Sedums, such as *Sieboldii*, and its variegated variety, *speciosum*, *pulchellum*, *acre*, and *monstrosum* may also be mentioned as eligible for similar positions. All these are pretty, both in habit and foliage; and there are many other species, both creeping and upright, equally well adapted for rock-work as those named. *Erysimum pulchellum* is also a beautiful little rock plant, with mats and tufts of dark green foliage and bright yellow flowers in spring. *Festuca glauca* and *Aira variegata* are dwarf and very ornamental grasses for rock-work, and for a dwarf evergreen shrub *Daphne Cneorum* cannot be excelled.

We have mentioned a few plants that most attracted our attention. Mr. Manning has a large collection and plenty of room to grow them. The cultivation of hardy herbaceous plants has grown upon him beyond his expectation, and as it is his intention to entirely rearrange his garden, we shall be pleased at some future time to notice more fully the result of his skill and perseverance with a class of plants that are fast increasing in popularity for permanent ornamental and decorative purposes.

#### PINE GROVE CEMETERY, LYNN.<sup>1</sup>

One delightful day in August, by the invitation of our worthy Chairman, who is Superintendent of the Cemetery, a visit was made to this beautiful place. As we stepped from the cars, in that great city of shoes and strikes, we were met by our genial host who, with his usual thoughtfulness, had provided carriages, which soon brought us to the entrance of the quiet, peaceful city of the dead, where we were met by the President and Board of Commissioners who have control of its affairs. After an introduction to them, and a cordial welcome from them, we were again invited to

<sup>1</sup> The account of the visit to Pine Grove Cemetery is by Henry Ross, of the Committee.

take the carriages for a visit of inspection through the grounds ; but a large portion of the Committee preferred to walk. The first point of attraction was the bedding display, a short distance from the gate, inside the grounds. The central design was in the form of a cross, and it was the unanimous opinion of the Committee that the exquisite skill displayed in the arrangement and care surpassed any that they had ever seen elsewhere. As we passed on, leaving the greenhouses on our left, and wending our way up the hill, we were again brought to a stop to look down upon the ornamental garden on our right, and below us the planting-out of shrubs, perennials, and herbaceous plants around the basement of the superintendent's house ; the large, circular, sub-tropical beds ; the clumps of *Eulalia Japonica var.*, and the rockery, planted with rhododendrons, kalmias, and other flowering shrubs. Beautiful specimen evergreen and deciduous trees scattered here and there showed that the master hand of the landscape artist had been at work. We passed on through winding avenues and paths, stopping to look at the elegant display of tropical plants arranged around the entrance to the receiving tomb. But what was most noticeable was the good taste displayed in planting out of large numbers of hardy shrubs and perennials, beds of which were to be seen in every direction, and more particularly around the new Soldiers' Lot. It is very gratifying to see the change in the taste of the community in favor of planting more hardy shrubs and herbaceous plants and less of ribbon and carpet bedding. Both are beautiful in their place, but we feel that ornamental foliage planting has usurped too large a share of attention. We are also glad to see that another great improvement in laying out, grading, and planting of the grounds is being introduced here, and that is what is called the landscape, lawn, or natural plan ; which does away in a great measure with straight avenues and paths, and stiff and formal terraces, substituting gentle slopes and curving, winding avenues and paths, in fact, leaving the landscape more as nature made it. But we are still moving upward, when suddenly there bursts upon our sight one of the most beautiful of panoramic views, standing, as we now do, upon the top of Mount Dearborn, with the busy city of Lynn beneath us, the broad ocean stretching away to the east and south, and dotted over with a great variety of vessels, from the graceful yacht to the great ocean steamer ; to the south-west, in the far distance, the city of Boston, and for a background, the rocky range of hills which extends along the north-

ern shore of Massachusetts Bay. In some respects Nature has been very lavish in the bestowment of her favors in this place, especially in the immense supply of rocks that are scattered over the land. The Committee would especially commend, in the management of the grounds, the successful removal of these surplus rocks, the correct landscape principle which has been displayed in laying out and grading the newer part of the grounds, the artistic skill in blending of colors in the flower planting, and the exceedingly good judgment in the selection and planting of trees and shrubs. The great neatness and cleanliness of all the avenues and lots give to the whole a most pleasing and satisfactory effect. There are no piles of rubbish left scattered about on the avenues and lots, no flower beds left weedy and unkept, no dead trees and shrubs left standing. We speak more especially of this because that in many places which have been tastefully laid out, and where large sums of money have been spent, the pleasing effects have been almost lost, from a lack of neatness and care.

After leaving Mount Dearborn your Committee were led through beautiful winding paths and avenues, past the greenhouses, which of course at this time of the year were nearly empty, back to the house, where the wants of the inner man were most amply supplied, and after a very pleasant interchange of views and social converse, we again took the cars to return, feeling it to have been not only a pleasant but a profitable visit.

#### VINEYARD OF JOHN B. MOORE & SON.

On the 11th of September we visited the grounds of John B. Moore & Son, for the especial purpose of inspecting one acre of his vineyard, and as a written statement has been prepared to accompany this report, we shall, after asking your careful perusal of it, say no more, except that the expectations of your Committee were more than realized in this visit. Although going for a special purpose, we feel that it is only justice to the Messrs. Moore to say that all through their grounds the high standard of cultivation for which they are so well known is fully maintained. Neatness and order are the rule and not the exception. All the crops showed that they were well cared for; and this was especially noticeable on the roses, which had made a splendid growth of well-ripened wood. The influence of a cultivator who has set for his standard nothing

short of the best cannot but have an influence for good, in arousing others to attain to that which, by patience, hard work, and perseverance, he has gained. We certainly have in our President a thorough, practical horticulturist, and there is no doubt that we shall in the future enjoy the benefit of his practical labors, as we have done in the past.

The following is the statement of Messrs. Moore:—

JOHN G. BARKER, *Chairman of the Committee on Gardens, Massachusetts Horticultural Society*:—

DEAR SIR,— In accordance with your request, we submit for the consideration of your Committee the following statement in regard to one acre of our vineyard, planted with Moore's Early grape vines, which you examined last September.

We selected that part of our vineyard on which our oldest vines were planted, now ten or twelve years ago, and also the next adjoining sixteen rows, which were planted four and five years later. This selection was made, not for the purpose of a more favorable showing to your Committee, as you may well know from viewing the entire vineyard, but to show the condition of vines subjected to different methods of pruning for a number of years.

The lot of land upon which these vines are grown is nearly level, and located on the top of a range of hills extending in a direction nearly east and west from the centre of Concord towards Lexington, one and one-half miles, and is about seventy-five feet above the level of the brook in the valley south of the hill.

The soil is a rather thin, gravelly loam, and in some parts of the piece full of small cobble-stones; the subsoil is a red, gravelly material, and this is underlaid with a hard gravel, full of stones as large as are commonly used for paving streets and gutters.

This land had been used for various crops previous to its being planted to grape vines, and did not receive any special preparation for vineyard purposes, and since the planting of the vines no stable or other manure has been applied to it, except an annual dressing, early in the spring of the year, of five hundred pounds of crude undissolved ground bone and two hundred pounds of high-grade (eighty-three per cent) muriate of potash, or its equivalent in unleached wood ashes, per acre. This amount of dressing has always produced a fair crop of fruit and a reasonable growth of well-ripened wood.

All the vines were planted early in the spring of the year, but not from any preference for that season, as we consider the fall just as favorable a time to plant.

The oldest vines are trained on large stakes, and planted in rows running north and south, nine feet between the rows and eight feet apart in the rows. We think that they might have been planted seven feet apart in the rows without any detriment.

The other sixteen rows are trained to a wire trellis, the rows being the same distance apart as those on the stakes, with the vines seven feet from each other, and we think six feet in the row would have been fully as favorable a distance as seven.

The distance of nine feet between the rows was arranged as a matter of convenience for the passage of wagons or carts.

The cultivation has been done by plowing about four inches deep, early in the spring, between the rows, turning the furrows towards the vines, and afterwards by stirring between the rows with a common steel-tooth cultivator often enough to keep down all weeds between the rows, and also by hoeing out between the vines a few times during the season.

This frequent stirring of the soil we find very beneficial, and it has a similar effect upon this, which would be called rather dry land, to that of mulching; that is, it prevents evaporation, at the same time avoiding the sometimes injurious effects of mulching, which often encourages the growth of new roots so near to the surface of the land as to allow the sudden changes in the weather to materially injure the plants; it also leaves the soil in that loose and friable condition which enables it to absorb the rain from a sudden shower, for the benefit of the crop, instead of allowing the water to flow over a hard baked surface to the nearest brook.

A part of these vines have been trained to stakes; two stakes to a vine, in line with the rows of vines, standing eighteen inches on each side of the vine, and set in the ground two and one half feet deep, standing out of the ground six feet. One cane from each vine is trained spirally around each stake and fastened securely at the top, and finally, as the vine grows larger, is spur pruned from top to bottom. With this method the shoots do not require any further tying during the season.

The objections to this method are the greater liability to the breaking of the tender shoots early in the season, and of rubbing off the bloom from the fruit when ripening, by the action of the



wind and violent storms. This, however, is somewhat obviated in a sheltered location.

There is one great advantage in favor of the stakes in the cultivation, and that is, that the horse and cultivator can pass through both ways, which saves some hand work.

In the spur pruning of hardy grape vines the spur itself becomes too long after a few years. This can be remedied by a more careful pruning of the vine.

The rest of the vines — sixteen rows — are trained to a wire trellis, consisting of four wires stretched horizontally from post to post, the bottom wire twenty inches from the ground, the second wire fourteen inches above the first one, the third wire twelve inches above the second, and the top wire fourteen inches above the third, which makes the top wire just five feet from the ground. This method of training is a modification of that practised by Dr. Fisher, of Fitchburg, and known by his name.

These vines are fruited from new arms grown the previous year, and are trained as follows: the arms or canes on every other vine are tied with cotton twine to the lower wire on the trellis, and those on the alternate vines to the third wire. This is all done early in the spring before the vines start, to prevent any breaking out of the buds. In June the new fruiting shoots, having become of sufficient length, are all tied with twine to the wire above the arm from which they grow. This method requires considerable time to tie up the numerous shoots, but when tied it keeps them safely from breaking, and from injury to the looks or bloom of the berries to any great extent, by winds and storms when ripening.

Not having kept any separate account of the product of this part of the vineyard we are unable to state the number of pounds gathered from it. A few of the old vines had from twenty-five to thirty pounds of well-ripened fruit on each vine. The bunches, particularly on the old vines, were quite large, a few of them weighing over twenty-four ounces each.

We have stated our methods of pruning and cultivation, such as we think adapted to our soil and climate, as fully as the time and space will admit. You have seen the results of those methods.

Very respectfully yours,

JOHN B. MOORE & SON.

CONCORD, MASS., October 1, 1884.

## AWARDS.

The following awards have been made:—

For the best collection of Hardy Biennial and Perennial Herbaceous plants, to Robert T. Jackson, . . .	\$20 00
Second prize to J. W. Manning, . . . . .	10 00
For the best vineyard of one acre, to John B. Moore & Son for one acre of Moore's Early Grape, . . .	30 00
To Henry Ross, Superintendent of Newton Cemetery, for well kept grounds and improvements in bedding out and permanent ornamentation by introducing new trees, shrubs, and hardy herbaceous plants, a Gratuity of . . . . .	20 00
To John G. Barker, Superintendent of Pine Grove Ceme- tery, Lynn, for the energy shown in subduing the extreme natural roughness of the grounds, and the taste and skill displayed in laying out the grounds, and in the ornamental planting of both hardy and tender plants, a Gratuity of . . . . .	20 00

JOHN G. BARKER,	} <i>Committee</i>	
WILLIAM H. SPOONER,		
E. W. WOOD,		
CHARLES N. BRACKETT,		} <i>on Gardens.</i>
CHARLES W. ROSS,		

R E P O R T  
OF THE  
COMMITTEE OF ARRANGEMENTS,  
FOR THE YEAR 1884.

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The Committee of Arrangements, reviewing the exhibitions of the Society during the year now closing, can with natural satisfaction pronounce them the most successful, so far as the quality, beauty, and extent of exhibits are considered, which have taken place for many years at least, and possibly they exceed in these respects any in the history of the Society. The interest of the large private exhibitors, upon whose coöperation the Society so much relies, has increased rather than diminished, and the Committee willingly testify to the great value of this aid, without which it would be difficult to maintain the beauty and brilliancy of their larger exhibitions during the year, which have become famous in all quarters where Horticulture has friends. Neither can the Committee ignore the practical services of the gardeners in charge of these private establishments, whose unflagging interest, often attended with great personal inconvenience and effort, has been one of the strongest factors in the Society's success. It is to be hoped that these services will have some more practical recognition in future exhibitions than has been the case in past years. Private gardeners are, as a rule, debarred from personal competition for prizes; but certainly nothing would conduce more to strengthen the close personal interest of the gardening profession in the future growth and success of the Society than to establish certain prizes to be competed for by gardeners within consistent limitations. Our great strength, however, rests with those who may properly be denominated amateurs, and to this enthusiastic class the Society is under heavy indebtedness; and we may express a hope that the

product of the amateur's skill and labor in all branches of culture may take even more prominent position in future exhibitions than in the past.

The record indicates no such remarkable revival of popular interest in the exhibitions as has taken place in 1884. The paid admissions for this year have been greater than the total for the five years combined previous to 1881 (when the Pomological Society held its annual meeting in Boston), having amounted to \$2,815 05. The paid admissions to the Annual Exhibition in 1884 were about equal to the total admissions to all the large exhibitions of the Society in 1883. Much of this increase is due to the extension of time during which the Spring, Rose, and Chrysanthemum Exhibitions were held; but it also indicates that the public are quick to appreciate our efforts, and we may reasonably hope for still further encouragement in 1885.

The Committee would suggest as a means for the increase of paid admissions some limitation of the use of the family tickets issued by the Society, whose liberal privileges accorded to members ought not to be abused. The Committee are cognizant of instances where from seven to twelve persons claimed admission to one exhibition at various times on one member's ticket, and there are many instances where these tickets are loaned to outside persons having no claim upon the Society, and who use them to the great detriment of its interests. This is an injury which warrants a summary suppression.

In connection with the allusion to increased receipts the Committee can state that they have not been accompanied by increased expense, and it is probable that some comparative decrease may be shown. The increase in the number of days on which the Spring, Rose, and Chrysanthemum Exhibitions were held having had so much to do with our favorable report, it is proposed for the ensuing year to keep each of these shows open for two days instead of one. The Spring Show in March, which is of comparatively recent origin, promises to become one of the most prominent of the Society's exhibitions, and provision has been made in the Prize Schedule to insure this result if possible. The exhibitions of fruit and vegetables have been noteworthy, and show the same favorable advance indicated in the floral department. These are more fully covered by the reports of the respective committees.

Some increased facilities for carrying plants to the upper hall are greatly needed, and it is suggested that the present elevator,

worked by hand power, is inadequate to handle the immense number of plants which are taken into the upper hall each year, many of which are of large size and great value. These are greatly damaged by reason of the small size of the elevator. We need an elevator double the size of the present one, and worked by steam, which we believe is feasible, the Society having steam power at its command. Such an elevator would make the upper hall more accessible, and could be fitted during exhibitions to carry many old and infirm people, hundreds of whom are at present debarred from attendance on account of the long flight of stairs. We urge that such alterations be taken under consideration, and, if it can be done without unreasonable expense, that they be carried out, confident that they will result in great material advantage to the Society.

The Committee, in closing, would express the hope that at a time not distant the Society will be able, at least occasionally, to hold some of its larger exhibitions upon the ground floor of a spacious hall or enclosure in the city where easy access for the public and exhibitors can be had, and where the arrangement of plants and flowers can be more naturally and beautifully accomplished than in the narrow limits of the present building of the Society, which, while ordinarily ample for our purposes, is likely to be dwarfed and overrun at times by the increasing bulk of the exhibits.

This has already led to overcrowding in the arrangement and has detracted in a measure from the beauty and effectiveness of displays. With ample accommodation and intelligent action there is no reason why the larger exhibitions of the Society should not become so popular that, for hundreds of visitors, in their place we should have thousands, and the scope and influence of the Society as an educator of the tastes not only of this community but of the whole country should thereby become greatly enlarged.

E. L. BEARD,

*Chairman of Committee of Arrangements.*

# REPORT

OF THE

## COMMITTEE ON PUBLICATION AND DISCUSSION,

FOR THE YEAR 1884.

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The discussions the past season have been maintained with spirit and success. There can be no doubt of the value of the free interchange of opinions and experiences by the intelligent and practical cultivators of this Society. The labors of the Secretary have largely increased. The demands upon his time and interruptions in his editorial and other work are constant. Your Committee recommend assistance be given, that he may be able to issue the *TRANSACTIONS* more promptly. It is the aim of the Secretary to have the discussions when they do appear as nearly perfect as possible, and to this end the remarks of each speaker have been, as far as possible, submitted to him for examination and revision; and although this requires considerable time and involves additional labor, it is believed that this is repaid by the greater correctness of the report, and the Committee trust that all will coöperate with the Secretary in making these revisions as prompt as possible.

As a majority of the Committee retire this year, they feel at liberty to say that the work of providing a paper or leader for a discussion which should be both interesting and instructive every week for four months has not been an easy but a difficult task. While the Committee believe that their efforts have been reasonably successful, the meetings have not come up to their ideal, and they trust that their successors may give to the Society a series of better meetings than we have yet had. To this end the present Committee bespeak for their successors the hearty coöperation of all who desire the advancement of Horticulture, without which the best efforts of the Committee must be in vain.

Copies of our TRANSACTIONS are regularly sent by the Secretary to all the prominent Agricultural and Horticultural Societies and Journals in the United States and Europe. We notice copious extracts, and they are frequently referred to in terms of high commendation. As heretofore, the discussions of the current year have already been widely distributed in the form of extra copies of the reports made by the Secretary for the "Evening Transcript." The discussions at the commencement of the past year have also been published in Part II. of the TRANSACTIONS for 1883, and the remainder will soon follow in Part I. for 1884, under the careful editorial supervision of the Secretary. Therefore a more extended report is unnecessary.

Respectfully submitted,

BENJ. G. SMITH, } *Committee on*  
JOHN B. MOORE, } *Publication and*  
WM. H. HUNT, } *Discussion.*

REPORT  
OF THE  
COMMITTEE ON THE LIBRARY,  
FOR THE YEAR 1885.

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The Committee on the Library has but little to report as to the trust committed to it. The Library affairs have been, on the whole, as prosperous and progressive as in the average of years past. The income of the Stickney Fund has been duly expended for works on Horticulture and allied subjects, in accordance with the conditions imposed by the generous donor; while the Society's appropriation has paid, as heretofore, for the various periodical publications to which we subscribe and for binding.

The list of purchases, which will be printed in connection with this report, will show a goodly array of books of great value and interest, the most important acquisition of the year being the first ninety-two parts of the "Flora Brasiliensis," now in progress of publication under the patronage of Dom Pedro II., the Emperor of Brazil. This truly magnificent work, which, when complete, is to contain a description of every plant known to inhabit the Empire of Brazil, with excellent plates of many, will be worthy to take rank with the "Flora Danica" and the "Flora Græca" of Dr. Sibthorpe, works which would adorn the grandest libraries of the world, yet which, by Mr. Stickney's liberality, we can count among our treasures.

Remembering that this Society is not a botanical but a horticultural society, we have endeavored to keep watch of notices of new publications, so that nothing bearing upon the practice of gardening and kindred topics should escape our notice. We have bought everything of the kind which has appeared, and shall continue to do so, but the supply is by no means as abundant as we



wish, and of those we buy from year to year by far the larger part suit European conditions, not American. We earnestly request members who desire the purchase of any book to enter the name of it in the blank-book kept for the purpose at the Librarian's desk. Any book so asked for will be bought, and this Committee will be thankful for the suggestion of it.

The progress of the Card Catalogue of Plates has been very gratifying, and all we could expect, though we found ourselves obliged to put the work into other hands early in the year. The number of cards written so far is about thirty-nine thousand; that is, we can now turn with quickness and certainty to thirty-nine thousand figures, which before we could only stumble upon by accident. It will take several years more to complete the work so far that no special writer will have to be employed; but the expense, being spread over so long a period, will not be found a burden.

We are compelled to repeat this year what we have said in almost every report for a long time past. In the report for 1876 we find the following: "The want of room for the Library is seriously felt. . . . It cannot be many years before a reconstruction of the Library-room will be imperatively demanded." These words no doubt have a very familiar sound, yet we are obliged to say that, notwithstanding the additional cases which have been constructed within these eight years, the condition of things is worse today than it was then.

Many of our books are packed in the upper part of the Librarian's room, not to be reached except by the long and inconvenient ladder. Of the shelves lower down, there is hardly one that has not a second row of books behind the visible one. Other books are in the case at the head of the stairs leading to the upper hall, — an unsafe place, as last year's report shows; others in the closet at the head of the southern stairway; and others still (all other available space being crammed and packed) are in the attic of this building, — as much out of the way as if in San Francisco.

There is a remedy for this: a gallery around this room would give us almost double space. Something of this kind should be done, and done soon, unless we are prepared to say that we will buy no more books, but will allow the fund to slip from our hands, thus relinquishing an income of \$11,200, which will be ours before our use of the principal must be given up.

The death of our late President, the Hon. Francis B. Hayes, will be especially felt by this Committee. His knowledge of books and

his own choice collection of them gave him, at the very beginning of his presidency of the Society, a hearty appreciation of the value of our Library. All our efforts for the improvement and increase of the collection have had his cordial coöperation, and we are confident that to his active help we owe many conveniences here which we otherwise might have waited years to obtain.

For the Committee,

WILLIAM E. ENDICOTT, *Chairman.*

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#### PERIODICALS PURCHASED.

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 Gardeners' Magazine.  
 Journal of Horticulture and Cottage Gardener.  
 The Garden.  
 Gardening Illustrated.  
 Curtis's Botanical Magazine.  
 Florist and Pomologist.  
 Journal of Botany.  
 Journal of Forestry.  
 Woods and Forests.

- FRENCH. — Revue Horticole.  
 Revue des Eaux et Forêts.  
 Journal des Roses.
- BELGIAN. — Illustration Horticole.  
 Belgique Horticole.  
 Revue de l'Horticulture, Belge et Étrangère.
- GERMAN. — Botanische Zeitung.  
 Gartenflora.
- AMERICAN. — Country Gentleman.  
 American Naturalist.

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PERIODICALS RECEIVED IN EXCHANGE.

Gardener's Monthly.  
 Canadian Horticulturist.  
 Ladies' Floral Cabinet.  
 Rural Californian.  
 American Garden.  
 Vick's Illustrated Monthly Magazine.  
 Green's Fruit Grower.  
 Seed Time and Harvest.  
 Botanical Gazette.  
 Maine Farmer.  
 The Home Farm.  
 Mirror and Farmer.  
 New England Farmer.  
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 American Rural Home.  
 Fruit Recorder.  
 Maryland Farmer.  
 Florida Dispatch.  
 Prairie Farmer.  
 The Industrialist.  
 Boston Daily Advertiser.  
 Boston Morning Journal.  
 Boston Post.  
 Boston Daily Globe.  
 Boston Evening Transcript.  
 Daily Evening Traveller.  
 The Cottage Hearth.

REPORT  
OF THE  
SECRETARY AND LIBRARIAN,  
FOR THE YEAR 1884.

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The duties of the Secretary and Librarian are so varied that it is extremely difficult, in the report which is expected annually, to convey any just idea of what has been accomplished during the year,—indeed this could hardly be done without keeping a journal, which would require too much time. The difficulty of making a report is increased when, as in the present case, it comes after those of the Committee on Publication and Discussion and the Committee on the Library, which have already so fully covered the ground. I may say, as in past years, that the work has continued to increase at every point. The correspondence, which suddenly doubled in amount about four years ago, has since steadily increased, and some days the mails bring in books, magazines, pamphlets, etc., for the Library almost as fast as I can record them and otherwise properly dispose of them. The list of persons and societies to whom copies of the “*Transcript*” reports of our Discussions are weekly sent is this year larger than it was last year. The number of days devoted to exhibitions has increased in the past year, and has by so much lessened the time applicable to work on the *TRANSACTIONS*, etc. I do not wish to be understood that a great amount of time has been occupied in any one of the ways just mentioned, but I speak of them as instances of the increase of work in many directions, consuming in the aggregate a great deal of time.

The movement by the two leading horticultural societies of this State to obtain exemption from taxation reminded us of the fact that in many States not only are horticultural societies exempted from taxation but they receive positive aid from the State. This

was so strong an argument for at least relieving the property of the Society from the heavy burden of taxation to which it had been subjected in years past that I took pains to ascertain the extent to which aid had been given elsewhere. This required a careful examination of about a hundred volumes of reports of horticultural societies, at the expense of considerable time, which was thought to be justified by the importance of the end in view. It may be of interest to state as the result of these investigations that eleven States, — Ohio, Indiana, Illinois, Michigan, Iowa, Wisconsin, Minnesota, Kansas, Nebraska, Missouri, and Rhode Island, were found to have received aid from the State, either in the form of appropriations of money from the treasury, or by having their reports printed at the expense of the State, or in both these ways. The largest appropriation of money was in Kansas, which, commencing with a few hundred dollars, was gradually increased to \$4,500 in 1882. In Wisconsin 12,000 copies of the Transactions of the State Horticultural Society are printed at the expense of the State, and in Ohio 18,000 copies are printed in connection with the report of the State Board of Agriculture, besides a separate edition for the use of the Horticultural Society.

Specimens of fruit have continued to be presented for name, and many of those not at once recognized are left for study, or to be named by experts, and generally we are successful in ascertaining the names, but a large part of those thus left are never inquired after again, and it is to be regretted that my time and that of others should be taken up in identifying fruits for those who do not feel sufficient interest in them to inquire whether the names have been ascertained.

Every book in the Library is annually taken from the shelf, and the books and shelves are carefully dusted, thus making sure that not more than one year's dust shall accumulate, even on the books most seldom used. Advantage was taken of this cleaning time last summer to make a careful count of all the books and pamphlets in the Library, which has not been done since 1878, when a count was made for the purpose of recording the result in the history of the Society. There were then, in round numbers, 3,400 books and 600 pamphlets. The count of this year (including those added to the present time) shows 4,800 books and 1,350 pamphlets, an increase of 1,400 books and 750 pamphlets since 1878, the number of pamphlets added during the last six years being greater than those accumulated in all the previous fifty years of the Society's

existence. The numbers here given do not include nursery and seed catalogues, of which the greater part has been acquired within the last four years. It will be seen that the increase in books alone in the last six years is more than forty per cent, while the increase in bookcases, which six years ago were crowded, is much less, and consequently the bookcases are now more crowded than ever, and I have been obliged during the past year, for want of any better place, to begin storing books in the attic. Although only such books were placed there as are seldom consulted, this course was entered on with regret. The crowded state of the bookcases and the scattering of the books through the building not only lessens the usefulness of the Library, but adds greatly to the labors of the Librarian when books are added to the Library; or when from any cause he has occasion to examine them, which is frequently the case, as well as when members desire to take them out or to consult them here.

ROBERT MANNING,  
*Secretary and Librarian.*

# TREASURER'S REPORT,

FOR THE YEAR 1884.

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## RECEIPTS.

Cash on hand, as per last report, . . . . .	\$4,142 51
Rent of Halls, . . . . .	8,883 82
Rent of Stores, . . . . .	12,825 27
Admissions and Assessments, . . . . .	1,170 00
Library — Sale of Books, . . . . .	2 50
Sale of History, . . . . .	2 50
Sale of Transactions, . . . . .	6 00
Mount Auburn Cemetery, . . . . .	3,522 20
Annual Exhibitions, . . . . .	2,039 50
	<hr/>
	\$32,594 30
	<hr/> <hr/>

## EXPENDITURES.

Labor, . . . . .	\$1,175 87
Salaries, . . . . .	2,275 00
Incidentals, . . . . .	209 27
Interest, . . . . .	2,703 11
Taxes, . . . . .	1,700 00
Repairs on Building, . . . . .	409 95
Heating and Water, (less paid by Ten- ants), . . . . .	650 44
Lighting, . . . . .	1,071 77
Furniture and Fixtures, . . . . .	287 80
Prizes, . . . . .	3,019 25
Committee of Arrangements, . . . . .	302 00
Garden Committee, . . . . .	26 60
New Orleans Exposition, . . . . .	5 60
	<hr/>
<i>Carried forward,</i> . . . . .	\$13,836,66

<i>Brought forward</i> . . . . .	\$13,836 66	
Stationery, Postage, and Printing, . . . . .	781 17	
Stickney Fund, . . . . .	689 05	
Library, . . . . .	300 64	
Card Catalogue, . . . . .	100 00	
Balance Floating Debt, . . . . .	3,000 00	
Sinking-Fund, . . . . .	6,900 00	
Expenses connected with the Funeral of the President, . . . . .	191 00	
Cash on hand December 31, 1884, . . . . .	6,795 78	
	<hr/>	\$32,594 30
		<hr/> <hr/>

ASSETS.

Real Estate, Furniture, and Exhibition Ware, . . . . .	\$256,585 56	
Library, last year, . . . . .	\$22,646 12	
Added this year, . . . . .	1,000 00	
	<hr/>	23,646 12
Bonds, C. B. & Q. R. R., at par, . . . . .		1,500 00
Eight Bonds Burlington & Missouri R. R., . . . . .		6,900 00
Stereotype Plates and Copies of History, . . . . .		391 50
Cash on hand December 31, 1884, . . . . .		6,795 78
		<hr/> <hr/>
		\$295,818 96

LIABILITIES.

Mortgage Debt, bearing interest at $4\frac{1}{4}$ per cent, per annum, due October 1, 1888, \$60,000 00		
Loan, without Interest, payable to Har- vard College in 1899, . . . . .	12,000 00	
	<hr/>	72,000 00
Surplus, . . . . .		\$223,818 96
		<hr/> <hr/>

MEMBERS.

Number of Life Members, per last report, . . . . .	588	
Added during the year, . . . . .	15	
Commuted, . . . . .	3	
	<hr/>	18
		<hr/>
		606
Deceased, . . . . .		10
		<hr/>
		596

Annual Members, per last report, . . . . .	284		
Added during the year, . . . . .	24		
	<hr/>	308	
Deceased during the year, . . . . .	5		
Discontinued, . . . . .	7		
Commuted, . . . . .	3		
	<hr/>	15	
		<hr/>	293
			<hr/>
			889

## INCOME FROM MEMBERSHIP.

15 Life Members, . . . . .	\$450 00	
24 Annual Members, . . . . .	240 00	
210 Assessments, . . . . .	420 00	
3 Commutations, . . . . .	60 00	
	<hr/>	\$1,170 00

The Finance Committee, having audited the accounts of the undersigned, made and have subscribed to, on a book kept for that purpose, the following report:—

*The Massachusetts Horticultural Society*

In account with GEORGE W. FOWLE, *Treasurer.*

*Credit.*

By balance in treasury, December 31, 1883, . . . . .	\$4,142 51
“ total income, as per receipt book, . . . . .	28,451 79
	<hr/>
	<u>\$32,594 30</u>

*Contra Debit.*

To cash paid out, as per disbursement book, . . . . .	\$25,798 52
“ balance to new account, . . . . .	6,795 78
	<hr/>
	<u>\$32,594 30</u>

BOSTON, Feb. 2, 1885.

We have examined the above account and find it correct, and the balance of cash on hand, sixty-seven hundred and ninety-five  $\frac{78}{100}$  dollars, as stated.

(Signed)

H. H. HUNNEWELL,  
 FREDERICK L. AMES,  
 JOHN B. MOORE,  
*Finance Committee.*



The income of the Society for 1884 shows an increase over the previous year of \$4,500 ; the balance of the floating debt of \$3,000 has been paid ; the sum of \$6,900 of the surplus funds has been invested in railroad bonds, as a sinking-fund for the reduction of the mortgage debt.

The increase of the revenue has enabled the Society to make an additional appropriation of fifteen hundred dollars for prizes for the coming year, that the committees may more fully carry out the intentions of the founders of the Society.

GEORGE W. FOWLE,  
*Treasurer.*

BOSTON, Feb. 7, 1885.

**Tr.** *Massachusetts Horticultural Society, in account with the Proprietors of the Cemetery of Mt. Auburn. Cr.*

For Sales and Improvements within the Cemetery for the year ending December 31, 1884.

To cost of filling up and improving land at Mt. Auburn, for the year ending December 31, 1884; the Massachusetts Horticultural Society being charged with their proportion of the same:—

Ivy Path, . . . . .	\$238 00
Stone Farm, . . . . .	1,640 62
Chant Lot, . . . . .	3,064 25
	<u>\$4,942 87</u>
One-quarter of \$4,942.87 is, . . . . .	\$1,235 72
Balance due Massachusetts Horticultural Society, . . . . .	<u>3,522 20</u>

By Sales in January, . . . . .	\$75 00
" " February, . . . . .	1,585 00
" " March, . . . . .	195 00
" " April, . . . . .	972 00
" " May, . . . . .	3,710 75
" " June, . . . . .	3,227 33
" " July, . . . . .	1,537 50
" " August, . . . . .	685 00
" " September, . . . . .	1,519 25
" " October, . . . . .	3,536 62
" " November, . . . . .	1,237 50
" " December, . . . . .	1,549 75
Net amount of receipts from Receiving Tomb, . . . . .	631 00
	<u>\$20,461 70</u>
Less graves repurchased, . . . . .	30 00
	<u>\$20,431 70</u>
Deduct for Annual Expenses, . . . . .	1,400 00
	<u>\$19,031 70</u>
Mass. Horticultural Society's one-quarter part of \$19,031.70 is, . . . . .	\$4,757 92

\$4,757 92

E. & O. E.

December 31, 1884.

H. B. MACKINTOSH, *Treasurer.*

## 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 1884:—

<i>Ivy Path.</i>		
119 days, men, . . . . .	\$238 00	
	_____	\$238 00
<i>Stone Farm.</i>		
Eagle and Birch Avenues:—		
484½ days, men, . . . . .	\$969 50	
191½ “ man and horse, . . . . .	671 12	
	_____	1,640 62
<i>Chant Lot.</i>		
Vesper Avenue:—		
686 days, men, . . . . .	\$1,372 00	
483½ “ man and horse, . . . . .	1,692 00	
	_____	3,064 25
		\$4,942 87
One-fourth part of \$4,942.87 is, . . . . .		\$.1,235 72

J. W. LOVERING,  
*Superintendent.*

MOUNT AUBURN, Dec. 31, 1884.

I certify the foregoing to be a true copy of improvements for the year 1884, rendered by the Superintendent.

H. B. MACKINTOSH,  
*Treasurer.*

# Massachusetts Horticultural Society.

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## OFFICERS AND STANDING COMMITTEES FOR 1885.

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### President.

JOHN B. MOORE, of Concord.

### Vice-Presidents.

JOHN CUMMINGS, of Woburn.

CHARLES H. B. BRECK, of Boston.

BENJAMIN G. SMITH, of Cambridge.

GEORGE S. HARWOOD, of Newton.

### Treasurer and Superintendent of the Building.

GEORGE W. FOWLE, of Boston.

### Secretary and Librarian.

ROBERT MANNING, of Salem.\*

### Recording Secretary.

ROBERT MANNING, of Salem.

### Professor of Botany and Vegetable Physiology.

JOHN ROBINSON, of Salem.

### Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

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## Standing Committees.

### Executive.

THE PRESIDENT, JOHN B. MOORE, CHAIRMAN.

THE EX-PRESIDENTS, MARSHALL P. WILDER, CHARLES M. HOVEY, JAMES

F. C. HYDE, WILLIAM C. STRONG, FRANCIS PARKMAN, WILLIAM

GRAY, JR.; CHAIRMAN OF FINANCE COMMITTEE, H. H. HUNNE-

WELL; F. L. AMES, CHARLES H. B. BRECK, JOHN C.

HOVEY, HENRY P. WALCOTT.

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\* Communications for the Secretary, on the business of the Society, should be addressed to him, at Horticultural Hall, Boston.

**Finance.**

H. HOLLIS HUNNEWELL, CHAIRMAN.

JOHN B. MOORE.

F. L. AMES.

**Publication and Discussion.**

O. B. HADWEN, CHAIRMAN.

FRANCIS H. APPLETON.

WILLIAM H. HUNT.

**Establishing Prizes.**

CHAIRMAN OF COMMITTEE ON FRUITS, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FLOWERS, VEGETABLES, AND GARDENS,  
*EX OFFICIIS*; C. M. ATKINSON, P. BROWN HOVEY, O. B. HADWEN.**Library.**

WILLIAM E. ENDICOTT, CHAIRMAN.

THE PROFESSOR OF BOTANY AND VEGETABLE PHYSIOLOGY  
AND THE PROFESSOR OF ENTOMOLOGY, *EX OFFICIIS*;

HENRY P. WALCOTT.

FRANCIS H. APPLETON

J. D. W. FRENCH.

E. P. RICHARDSON.

**Gardens.**

JOHN G. BARKER, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FRUITS, FLOWERS, AND VEGETABLES,  
*EX OFFICIIS*;

CHARLES W. ROSS, BENJAMIN G. SMITH, HENRY W. WILSON.

**Fruit.**

E. W. WOOD, CHAIRMAN.

P. BROWN HOVEY.

CHARLES F. CURTIS.

O. B. HADWEN.

BENJAMIN G. SMITH.

J. W. MANNING.

WARREN FENNO.

**Plants and Flowers.**

EDWARD L. BEARD, CHAIRMAN.

PATRICK NORTON.

JAMES CARTWRIGHT.

J. H. WOODFORD.

F. L. HARRIS.

DAVID ALLAN.

EDWIN FEWKES.

**Vegetables.**

CHARLES N. BRACKETT, CHAIRMAN.

JOSIAH CROSBY.

GEORGE W. PIERCE.

WARREN HEUSTIS.

SAMUEL HARTWELL.

CEPHAS H. BRACKETT.

GEORGE HILL.

**Committee of Arrangements.**

EDWARD L. BEARD, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FRUITS, FLOWERS, VEGETABLES, AND  
GARDENS, *EX OFFICIIS*;

JOHN C. HOVEY.

C. M. ATKINSON.

JAMES COMLEY.

CHARLES F. CURTIS.

JOSEPH H. WOODFORD.

WARREN HEUSTIS.

NATHANIEL T. KIDDER.

CHARLES L. FOWLE.

## MEMBERS FOR LIFE.

Change of residence, or any inaccuracies, should be promptly reported to the Secretary.

Adams, George E., Medford.	Bates, Amos, Hingham.
Albro, Charles, Taunton.	Bates, Caleb, Kingston.
Alger, R. F., Becket.	Bayley, John P., Boston.
Allan, David, Mount Auburn.	Beal, Alexander, Dorchester.
Ames, Frank M., Canton.	Beckford, D. R., Jr., Dedham.
Ames, Frederick L., North Easton.	Bell, Joseph H., Quincy.
Ames, George, Boston.	Bemis, Emery, Grantville.
Ames, P. Adams, Hingham.	Berry, James, Brookline.
Amory, Charles, Boston.	Bickford, Weare D., Allston.
Amory, Frederick, Brookline.	Birchard, Charles, Framingham.
Amory, James S., Boston.	Black, James W., Boston.
Anderson, Alex., Hingham.	Blagg, Samuel, Newbern, N. C.
Andrews, Chas. L., Swampscott.	Blakemore, John E., Roslindale.
Andrews, Frank W., Boston.	Blanchard, J. W., Boston.
Andros, Milton, Brookline.	Blaney, Henry, Brookline.
Appleton, Edward, Reading.	Blinn, Richard D., Chicago, Ill.
Appleton, F. H., Peabody.	Bliss, William, Springfield.
Appleton, Wm. S., Boston.	Bocher, Ferdinand, Boston.
Atkins, Elisha, Belmont.	Bochus, Charles E., Dorchester.
Avery, Edward, Boston.	Bond, George W., Boston.
Ayer, Adams, “	Borland, John N., New London, Ct.
Ayling, Isaac, “	Botume, John, Stoneham.
Bacon, George, Brookline.	Bouvé, Thomas T., Boston.
Bailey, Edwin C., Concord, N. H.	Bowditch, Azell C., Somerville.
Baker, William E., Boston.	Bowditch, J. I., Boston.
Bancroft, John C., Milton.	Bowditch, Wm. E., “
Banfield, Francis L., Boston.	Bowker, William H., “
Barnard, James M., “	Brackett, C. H., Brighton.
Barnard, Robert M., Everett.	Brackett, Chas. N., Newton.
Barnes, Walter S., Somerville.	Bradish, Levi J., Boston.
Barnes, William H., Boston.	Bragg, S. A. B., Mattapan.
Barney, Levi C., “	Breed, Henry A., Lynn.
Barratt, James, Cambridgeport.	Bresee, Albert, Hubbardton, Vt.
Barrett, Edwin S., Concord.	Brewer, John Reed, Boston.
Barrows, Thomas, Dedham.	Brewer, Otis, “
Bartlett, Edmund, Newburyport.	Brigham, Wm. T., “
	Brimmer, Martin, “

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|-----------------------|------------------|----------------------|----------------|
| Brintnall, Benjamin,  | Boston.          | Clapp, E. W.,        | Walpole.       |
| Brooks, Francis,      | Medford.         | Clapp, James H.,     | Dorchester.    |
| Brown, Alfred S.,     | Jamaica Plain.   | Clapp, William C.,   | "              |
| Brown, Charles E.,    | Yarmouth, N. S.  | Clark, B. C.,        | Boston.        |
| Brown, Edward J.,     | Brookline.       | Clark, Orus,         | Worcester.     |
| Brown, G. Barnard,    | Boston.          | Clark, William S.,   | Amherst.       |
| Brown, George B.,     | Framingham.      | Clark, W. L.,        | Neponset.      |
| Brown, Jacob,         | Woburn.          | Clarke, Miss C. H.,  | Jamaica Plain. |
| Brownell, E. S.,      | Essex Junc., Vt. | Clay, Henry,         | Dorchester.    |
| Bruce, Nathaniel F.,  | Stoneham.        | Cleary, Lawrence,    | West Roxbury.  |
| Bullard, John R.,     | Dedham.          | Clement, Asa,        | Dracut.        |
| Bullard, Wm. S.,      | Boston.          | Cleveland, Ira,      | Dedham.        |
| Burnett, Joseph,      | Southborough.    | Cobb, Albert A.,     | Brookline.     |
| Burnham, T. O. H. P., | Boston.          | Coburn, Isaac E.,    | Everett.       |
| Burr, Fearing,        | Hingham.         | Codman, James M.,    | Brookline.     |
| Burr, Matthew H.,     | "                | Codman, Ogden,       | Lincoln.       |
| Buswell, Edwin W.,    | New York, N. Y.  | Coffin, G. Winthrop, | West Roxbury.  |
| Buswell, Frank E.,    | " " "            | Coffin, William E.   | Boston.        |
| Butler, Aaron,        | Wakefield.       | Converse, E. S.      | Malden.        |
| Butler, Edward K.,    | Jamaica Plain.   | Converse, P. L.,     | Woburn.        |
| Butterfield, Wm. P.,  | Arlington.       | Coolidge, Joshua,    | Watertown.     |
|                       |                  | Copeland, Franklin,  | West Dedham.   |
| Cadness, John,        | Flushing, N. Y.  | Cox, George P.,      | Malden.        |
| Cains, William,       | South Boston.    | Coy, Samuel I.,      | Boston.        |
| Calder, Augustus P.,  | Boston.          | Crocker, George O.,  | New Bedford.   |
| Capen, John,          | "                | Crocker, Uriel,      | Boston.        |
| Carlton, Samuel A.,   | Somerville.      | Crosby, Josiah,      | Arlington.     |
| Carruth, Charles,     | Boston.          | Crowell, Philander,  | Chelsea.       |
| Carruth, Nathan,      | Dorchester.      | Crowell, Randall H., | "              |
| Carter, Miss Sabra,   | Wilmington.      | Cummings, John,      | Woburn.        |
| Chadbourne, M. W.,    | Watertown.       | Curtis, Charles F.,  | Jamaica Plain. |
| Chamberlain, C. W.,   | Arlington.       | Curtis, George S.,   | " "            |
| Chapin, N. G.,        | Brookline.       | Cushing, Robert M.,  | Boston.        |
| Chapman, Edward,      | Arlington.       |                      |                |
| Chase, A. J.,         | Lynn.            | Daggett, Henry C.,   | Boston.        |
| Chase, Daniel E.,     | Somerville.      | Damon, Samuel G.,    | Arlington.     |
| Chase, Hezekiah S.,   | Boston.          | Dana, Charles B.,    | Brookline.     |
| Chase, William M.,    | Baltimore, Md.   | Darling, Charles K., | Boston.        |
| Cheney, Benj. P.,     | Boston.          | Davenport, Edward,   | Dorchester.    |
| Child, Francis J.,    | Cambridge.       | Davenport, Geo. E.,  | Boston.        |
| Child, William C.,    | Medford.         | Davenport, Henry,    | "              |
| Childs, Francis,      | Charlestown.     | Davis, Curtis,       | Cambridge.     |
| Childs, N. R.         | Dorchester.      | Davis, Hervey,       | Cambridgeport. |
| Choate, Charles F.,   | Cambridge.       | Dawson, Jackson,     | Jamaica Plain. |
| Clafin, Henry,        | Brighton.        | Deblois, Stephen G., | Boston.        |
| Clafin, William,      | Newton.          | Dee, Thomas W.,      | Mount Auburn.  |
| Clapp, Edward B.,     | Dorchester.      | Denny, Clarence H.,  | Boston.        |

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|----------------------|------------------|----------------------|------------------|
| Denny, R. S.,        | Dorchester.      | Flynt, William N.,   | Monson.          |
| Denton, Eben,        | Braintree.       | Foster, Francis C.,  | Cambridge.       |
| Dewson, Francis A.,  | Boston.          | Foster, John H.,     | Boston.          |
| Dexter, F. Gordon,   | "                | Fowle, William B.,   | Auburndale.      |
| Dickerman, Geo. H.,  | Somerville.      | Freeland, Chas. W.,  | Boston.          |
| Dickinson, Alex.,    | Cambridgeport.   | Freeman, Abraham,    | Dorchester.      |
| Dike, Charles C.,    | Stoneham.        | French, Jonathan,    | Boston.          |
| Dinsmore, Wm. B.,    | New York, N.Y.   | French, J. D. W.,    | "                |
| Dix, Joseph,         | Boston.          | Fuller, Henry Weld,  | "                |
| Dorr, George,        | Dorchester.      |                      |                  |
| Dove, Geo. W. W.,    | Andover.         | Galvin, John,        | West Roxbury.    |
| Durant, William,     | Boston.          | Gardner, Henry N.,   | Belmont.         |
| Durfee, Mrs. F. B.,  | Fall River.      | Gardner, John L.,    | Brookline.       |
| Durfee, George B.,   | " "              | Gibbs, Wolcott,      | Cambridge.       |
| Dutcher, F. J.,      | Hopedale.        | Gillard, William,    | Boston.          |
| D'Wolf, John L.,     | Boston.          | Gilson, F. Howard,   | Reading.         |
|                      |                  | Glover, Albert,      | Boston.          |
| Eaton, Horace,       | Quincy.          | Glover, Joseph B.,   | "                |
| Eldridge, Azariah,   | Yarmouthport.    | Goddard, A. Warren,  | Brookline.       |
| Eldridge, E. H.,     | Boston.          | Goddard, Mrs. M. T., | Newton.          |
| Ellicott, J. P.,     | Jamaica Plain.   | Gorham, James L.,    | Jamaica Plain.   |
| Endicott, Wm. E.,    | Canton.          | Gould, Francis,      | Arlington.       |
| Eustis, William C.,  | Hyde Park.       | Gould, Samuel,       | Boston.          |
| Everett, George,     | Concord.         | Gray, James,         | Wellesley.       |
| Everett, Otis,       | Boston.          | Gregory, J. J. H.,   | Marblehead.      |
| Everett, William,    | "                | Greig, George,       | Newton.          |
|                      |                  | Grinnell, Joseph,    | New Bedford.     |
| Fairchild, Charles,  | Belmont.         | Groom, Thomas,       | Dorchester.      |
| Falconer, William,   | Glencove, N. Y.  | Grundel, Hermann,    | "                |
| Farlow, John S.,     | Newton.          | Guild, J. Anson,     | Brookline.       |
| Farlow, Lewis H.,    | "                |                      |                  |
| Faxon, John,         | Quincy.          | Hadwen, Obadiah B.,  | Worcester.       |
| Fay, Mrs. R. L.,     | Chelsea.         | Hall, Edwin A.,      | Cambridgeport.   |
| Fenno, J. B.,        | Boston.          | Hall, George A.,     | Chelsea.         |
| Fewkes, Arthur H.,   | Newton Highl'ds. | Hall, George R.,     | Ft. George, Fla. |
| Fewkes, Edwin,       | " "              | Hall, John R.,       | Boston.          |
| Fillebrown, John,    | Arlington.       | Hall, Lewis,         | Cambridge.       |
| Fisher, David,       | Newport, R. I.   | Hall, Stephen A.,    | Revere.          |
| Fisher, James,       | Boston.          | Hall, William F.,    | Brookline.       |
| Fisher, Warren,      | "                | Halliday, Wm. H.,    | Boston.          |
| Flagg, Augustus,     | "                | Hammond, Gard. G.,   | "                |
| Fleming, Edwin,      | West Newton.     | Hammond, Samuel,     | "                |
| Fletcher, George V., | Belmont.         | Hanson, P. G.,       | Woburn.          |
| Fletcher, John W.,   | Chelsea.         | Harding, C. L.,      | Cambridge.       |
| Fletcher, J. Henry,  | Belmont.         | Harding, Geo. W.,    | Dorchester.      |
| Flint, Charles L.,   | Boston.          | Harding, Lewis B.,   | Boston.          |
| Flint, David B.,     | Watertown.       | Harding, W. C.,      | "                |



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|----------------------|-------------------|-----------------------|-----------------|
| Hardy, F. D., Jr.,   | Cambridgeport.    | Hunt, William H.,     | Concord.        |
| Harrington, L. B.,   | Salem.            | Hyde, James F. C.,    | Newton.         |
| Harris, Charles,     | Cambridge.        | Inches, Herman B.,    | Boston.         |
| Hart, Wm. T.,        | Boston.           | Jackson, Abraham,     | Boston.         |
| Hastings, Edm. T.,   | "                 | Jackson, Robert T.,   | Dorchester.     |
| Hastings, Levi W.,   | Brookline.        | Janvrin, William S.,  | Revere.         |
| Hathaway, Seth W.,   | Marblehead.       | Jeffries, John, Jr.,  | Boston.         |
| Haughton, James,     | Boston.           | Jenks, Charles W.,    | "               |
| Hayes, Daniel F.,    | Exeter, N. H.     | Joyce, Mrs. E. S.,    | Medford.        |
| Haven, Alfred W.,    | Portsmouth, N. H. | Kakas, Edward,        | Medford.        |
| Hayes, Francis B.,   | Boston.           | Kendall, D. S.,       | Woodstock, Ont. |
| Hayward, Daniel H.,  | No. Cambridge.    | Kendall, Edward,      | Cambridgeport.  |
| Hazeltine, Hazen,    | Boston.           | Kendall, Joseph R.,   | Oakland, Cal.   |
| Head, Charles D.,    | Brookline.        | Kendrick, Mrs. H.P.,  | Allston.        |
| Henshaw, J. P. B.,   | Boston.           | Kennard, Chas. W.,    | Boston.         |
| Hilbourn, A. J.,     | Chelsea.          | Kennedy, George G.,   | "               |
| Hill, George,        | Arlington.        | Kent, John,           | Charlestown.    |
| Hill, John,          | Stoneham.         | Keyes, E. W.,         | Denver, Col.    |
| Hilton, William,     | Boston.           | Keyes, George,        | Concord.        |
| Hitchings, E. H.,    | "                 | Kidder, Henry P.,     | Boston.         |
| Hodgkins, John E.,   | Chelsea.          | Kidder, Nathaniel T., | "               |
| Hollis, George M.,   | Grantville.       | Kimball, A. P.,       | "               |
| Hollis, John W.,     | Brighton.         | King, Franklin,       | Dorchester.     |
| Holt, Mrs. S. A.,    | Winchester.       | Kingman, Abner A.,    | Brookline.      |
| Hooper, Robert C.,   | Boston.           | Kingman, C. D.,       | Middleborough.  |
| Hooper, Thomas,      | Bridgewater.      | Kinney, John M.,      | Roxbury.        |
| Horner, Mrs. C.N.S., | Georgetown.       | Kinsley, Lyman,       | Cambridgeport.  |
| Hovey, Charles H.,   | Cambridgeport.    | Kittredge, E. A.,     | Boston.         |
| Hovey, Charles M.,   | "                 | Lamb, Thomas,         | Boston.         |
| Hovey, John C.,      | "                 | Lancaster, Chas. B.,  | Newton.         |
| Hovey, P. Brown,     | "                 | Lane, John,           | E. Bridgewater. |
| Hovey, Stillman S.,  | Woburn.           | Lawrence, Amos A.,    | Brookline.      |
| Howe, George,        | Boston.           | Lawrence, Edward,     | Charlestown.    |
| Howland, John, Jr.,  | New Bedford.      | Lawrence, James,      | Groton.         |
| Hubbard, Chas. T.,   | Boston.           | Lawrence, John,       | Boston.         |
| Hubbard, G. G.,      | Cambridge.        | Lee, Henry,           | "               |
| Hubbard, J. C.,      | Boston.           | Leeson, Joseph R.,    | Newton Centre.  |
| Hubbard, Wm. J.,     | "                 | Lemme, Frederick,     | Arlington.      |
| Huckins, J. W.,      | "                 | Leuchars, R. B.,      | Boston.         |
| Humphrey, F. J.,     | Dorchester.       | Lewis, A. S.,         | Framingham.     |
| Humphrey, G. W.,     | Dedham.           | Lewis, William G.,    | "               |
| Hunneman, Jos. H.,   | Boston.           | Lincoln, George,      | Hingham.        |
| Hunnewell, Arthur,   | Wellesley.        | Locke, William H.,    | Belmont.        |
| Hunnewell, H. H.,    | "                 | Lockwood, Rhodes,     | Charlestown.    |
| Hunnewell, Walter,   | "                 |                       |                 |
| Hunt, Franklin,      | Boston.           |                       |                 |
| Hunt, Moses,         | "                 |                       |                 |

Lodge, Giles H.,	Swampscott.	Needham, Daniel,	Groton.
Loftus, John P.,	North Easton.	Newhall, George,	Dorchester.
Loomis, Jason B.,	Chelsea.	Newman, J. R.,	Winchester.
Lord, George C.,	Newton.	Newton, Rev. W. W.,	Boston.
Loring, Alfred,	South Hingham.	Nickerson, A. W.,	Dedham.
Loring, Caleb W.,	Boston.	Norton, Charles W.,	Allston.
Loring, George B.,	Salem.	Nourse, Benj. F.,	Boston.
Lovett, George L.,	Boston.	Nourse, Benj. F.,	Cambridgeport.
Low, Ariel,	"		
Lowder, John,	Watertown.	Oakman, Hiram A.,	No. Marshfield.
Lowell, Augustus,	Boston.	Osgood, Jas. Ripley,	Boston.
Luke, Elijah H.,	Cambridgeport.	Otis, Theodore C.,	"
Lumb, William,	Boston.	Oxnard, George D.,	"
Lunt, Charles H.,	Jamaica Plain.		
Lyman, Theodore,	Brookline.	Packer, Charles H.,	Boston.
Lyon, Henry,	Charlestown.	Page, Thomas,	Boston.
		Paine, Robert T.,	"
Mahoney, John,	Boston.	Parker, Augustus,	"
Mann, James F.,	Cambridge.	Parker, Mrs. M.,	Wakefield.
Mann, Jonathan,	"	Parkman, Francis,	Jamaica Plain.
Manning, Jacob W.,	Reading.	Partridge, Henry,	Dunkirk, N. Y.
Manning, Mrs. L. B.,	Reading.	Partridge, Horace,	Somerville.
Manning, Robert,	Salem.	Paul, Alfred W.,	Dighton.
Manning, W. H.,	Reading.	Peabody, John E.,	Salem.
Marshall, Fred'k,	Everett.	Pearce, John,	West Roxbury.
Martin, Darius A.,	Chelsea.	Peck, O. H.,	Denver, Col.
Martin, John S.,	Boston.	Peck, W. G.,	Arlington.
Matthews, Nathan,	"	Peirce, Silas,	Boston.
McCarty, Timothy,	Providence, R. I.	Penniman, A. P.,	Waltham.
McClure, John,	Revere.	Perkins, Augustus T.,	Boston.
Merriam, Herbert,	Weston.	Perkins, Edward N.,	Brookline.
Merriam, M. H.,	Lexington.	Perkins, William P.,	Wayland.
Merrifield, W. T.,	Worcester.	Perry, George W.,	Malden.
Metivier, James,	Cambridge.	Philbrick, Wm. D.,	Newton Centre.
Mills, Charles H.,	Boston.	Phillips, John C.,	Boston.
Minton, James,	Dorchester.	Pierce, Dean,	Brookline.
Mixter, Charles,	Boston.	Pierce, George W.,	Everett.
Moore, John B.,	Concord.	Pierce, Henry L.,	Dorchester.
Moore, John H.,	"	Pierce, Samuel B.,	"
Morrill, Joseph, Jr.,	Boston.	Poole, Benjamin C.,	Chelsea.
Morse, Samuel F.,	"	Poor, John R.,	Somerville.
Morse, Sidney B.,	"	Potter, Joseph S.,	Arlington.
Morse, William A.,	"	Prang, Louis,	Boston.
Motley, Thomas,	West Roxbury.	Pratt, Laban,	Dorchester.
Mudge, George A.,	Portsm'th, N. H.	Pratt, Lucius G.,	West Newton.
Mudge, George W.,	Lynn.	Pratt, Robert M.,	Boston.
Munroe, Otis,	Boston.	Pratt, William,	Winchester.

- Pray, Mark W., Malden.  
 Prescott, C. H., Cornwallis, N.S.  
 Prescott, Eben C., Boston.  
 Prescott, W. G., "  
 Prescott, Wm. G., Quincy.  
 Preston, George H., Boston.  
 Preston, John, Dorchester.  
 Pringle, Cyrus G., Charlotte, Vt.  
 Proctor, Thomas P., West Roxbury.  
 Prouty, Gardner, Littleton.  
 Putnam, Joshua H., Brookline.  
  
 Ramsay, A. H., Cambridge.  
 Rand, Miss E. L., Newton Highl'ds.  
 Rand, Oliver J., Cambridgeport.  
 Rawson, W. W., Arlington.  
 Ray, James F., Franklin.  
 Ray, James P., "  
 Ray, Joseph G., "  
 Reed, George W., Boston.  
 Richards, John J., "  
 Richards, Wm. B., "  
 Richardson, C. E., Cambridge.  
 Richardson, Geo. C., "  
 Rinn, J. Ph., Boston.  
 Robbins, I. Gilbert, "  
 Robbins, Nathan, Arlington.  
 Robeson, W. R., Boston.  
 Robinson, John, Salem.  
 Rogers, John H., Boston.  
 Ross, Henry, Newton.  
 Ross, M. Denman, Boston.  
 Ross, Waldo O., "  
 Ruddick, Dr. W. H., South Boston.  
 Russell, George, Woburn.  
 Russell, John E., Leicester.  
 Russell, Walter, Arlington.  
  
 Sampson, George R., New York, N. Y.  
 Sanborn, Amos C., Cambridgeport.  
 Sanford, O. S., Hyde Park.  
 Sargent, Charles S., Brookline.  
 Saville, Richard L., "  
 Sawtelle, Eli A., Boston.  
 Sawyer, Timothy T., Charlestown.  
 Scott, Charles, Newton.  
 Scudder, C. W., Brookline.  
  
 Sears, J. Montg'y, Boston.  
 Seaver, Nathaniel, East Boston.  
 Seaver, Robert, Jamaica Plain.  
 Shaw, C. C., Milford, N. H.  
 Shaw, S. P., Cambridge.  
 Sheafe, Charles C., Boston.  
 Sheafe, William, Brookline.  
 Sheldon, Oliver S., Milton.  
 Shimmin, Charles F., Boston.  
 Shorey, John L., Lynn.  
 Skinner, Francis, Boston.  
 Slack, Charles W., "  
 Smith, Benjamin G., Cambridge.  
 Smith, Calvin W., Grantville.  
 Smith, Charles H., Jamaica Plain.  
 Smith, Chauncey, Cambridge.  
 Smith, Edward N., San Francisco.  
 Smith, George O., Boston.  
 Smith, James H., Needham.  
 Smith, W. B., Boston.  
 Snow, Eben, Cambridge.  
 Snow, Miss S. H., Brunswick, Me.  
 Sparhawk, Edw'd C., Brighton.  
 Spaulding, Edward, Jamaica Plain.  
 Spaulding, M. D., Boston.  
 Speare, Alden, Newton Centre.  
 Spencer, Alfred M., Dorchester.  
 Springall, George, Malden.  
 Springer, John, Sterling.  
 Stetson, Nahum, Bridgewater.  
 Stickney, Rufus B., Somerville.  
 Stimpson, George, New York, N. Y.  
 Stimpson, H. H., Cambridge.  
 Stone, Amos, Everett.  
 Stone, George F., Newton.  
 Stone, Phineas J., Charlestown.  
 Story, E. Augustus, Brighton.  
 Strong, William C., Newton Highl'ds.  
 Sturgis, John H., Boston.  
 Sturgis, Russell, Jr., "  
 Sturtevant, E. Lewis, Geneva, N. Y.  
 Sumner, Edward, Dedham.  
 Surette, Louis A., Concord.  
 Swain, Charles D., Roxbury.  
  
 Taft, John B., Boston.  
 Tappan, Charles, "

- Taylor, Horace B., Boston.  
 Thacher, Alfred C., Dorchester.  
 Thayer, Henry, No. Cambridge.  
 Thayer, Nathaniel, Boston.  
 Thurlow, Thos. C., Newburyport.  
 Tidd, Marshall M., Woburn.  
 Tilton, Stephen W., Boston.  
 Todd, John, Hingham.  
 Tolman, Benjamin, Concord.  
 Tolman, Miss H. S., Boston.  
 Torrey, Everett, Charlestown.  
 Turner, John M., Dorchester.  
 Turner, Roswell W., Boston.  
 Turner, Royal W., Randolph.  
  
 Underwood, Guy C., Boston.  
 Underwood, Wm. J., Belmont.  
 Upham, Henry, Brookline.  
  
 Vass, William J., Brookline.  
 Vose, Benjamin C., Hyde Park.  
  
 Wainwright, Wm. L., Braintree.  
 Wakefield, E. H., Chelsea.  
 Walcott, Edward, Pawtucket.  
 Walcott, Henry P., Cambridge.  
 Wales, George O., Braintree.  
 Walker, Edw. C. R., Dedham.  
 Walker, Samuel A., "  
 Walker, T. W., Waltham.  
 Walley, Mrs. W. P., Boston.  
 Ward, John, Newton.  
 Wardwell, W. H., Newton Centre.  
 Ware, Benjamin P., Beach Bluff.  
 Warren, George W., Boston.  
 Washburn, Andrew, Hyde Park.  
 Wason, Elbridge, Brookline.  
 Waters, Edwin F., Newton Centre.  
 Waters, George F., Boston.  
 Watson, Thomas A., East Braintree.  
 Watts, Isaac, Newton.  
 Webber, Aaron D., Belmont.  
 Weld, Aaron D., Boston.
- Weld, George W., Newport, R. I.  
 Weld, Dr. Moses W., West Roxbury.  
 Weld, Richard H., Boston.  
 Weld, William G., "  
 West, Mrs. Maria L., Brookline.  
 Weston, Leonard W., Lincoln.  
 Weston, Seth, Revere.  
 Wetherell, Leander, Boston.  
 Wheelwright, A. C., Boston.  
 Whipple, John A., "  
 Whitcomb, Wm. B., Medford.  
 White, Benjamin C., Boston.  
 White, Edward A., "  
 White, Francis A., Brookline.  
 Whitely, Edward, Cambridge.  
 Whiting, Nathaniel, Brookline.  
 Whitmore, C. O., Boston.  
 Whittle, Geo. W., Somerville.  
 Whytal, Thos. G., New York, N.Y.  
 Wilbur, G. B., Watertown.  
 Wilcutt, Levi L., West Roxbury.  
 Wilder, Edw. Baker, Dorchester.  
 Wilder, Henry A., Boston.  
 Wilder, Marshall P., Dorchester.  
 Willard, E. W., Newport, R.I.  
 Williams, Aaron D., Boston.  
 Williams, Benj. B., "  
 Williams, Philander, Taunton.  
 Willis, George W., Chelsea.  
 Willis, J. C., Boston.  
 Wilson, Henry W., Boston.  
 Wilson, Wm. Power, "  
 Woerd, Charles V., Waltham.  
 Woerd, C. V., Jr., "  
 Wood, Luke H., Marlborough.  
 Wood, R. W., Jamaica Plain.  
 Wood, William K., West Newton.  
 Woods, Henry, Dorchester.  
 Woodward, Royal, Brookline.  
 Wright, George C., West Acton.  
 Wrisley, Frank, New York, N.Y.

## ANNUAL MEMBERS.

---

Abbott, S. L., M.D., Boston.	Brown, Joseph T., Boston.
Adams, C. S., Framingham.	Bullard, George B., Hingham.
Allen, Andrew F., Arlington.	Burley, Edward, Beverly.
Allen, Calvin, Boston.	Butler, Edward, Wellesley.
Allen, C. L., GardenCity, N.Y.	
Ames, R. W., Boston.	Capen, Aaron D., Mattapan.
Anderson, Chas. J., Longwood.	Carter, Maria E., Woburn.
Atkinson, Chas. M., Brookline.	Cartwright, James, Wellesley.
Atkinson, Edward, “	Chaffin, John C., Newton.
Atkinson, W. B., Newburyport.	Chapin, Gardner S., Arlington.
	Chase, Joseph S., Malden.
Bacon, Augustus, Boston.	Cheney, Amos P., South Natick.
Bacon, William, “	Clark, James W., Framingham.
Badlam, Wm. H., Dorchester.	Clark, Joseph, Manchester.
Bard, James, Framingham.	Clark, Joseph W., Dedham.
Barker, John G., Lynn.	Clark, Theodore M., Newtonville.
Batchelder, G. W., Dorchester.	Cobb, Jonathan H., Dedham.
Beard, Edward L., Cambridge.	Coe, Henry F., West Roxbury.
Beebe, J. Arthur, Boston.	Collins, Frank S., Malden.
Beer, Carl, Groton.	Comley, James, Lexington.
Bird, John L., Dorchester.	Cox, James F., Abington.
Bliss, B. K., New York.	Crafts, William A., Boston.
Bock, William A., No. Cambridge.	Crosby, J. Allen, Jamaica Plain.
Bolles, Matthew, Boston.	Cruickshanks, J. T., Natick.
Bolles, William P., “	Curtis, Daniel T., Boston.
Bolton, John B., Somerville.	Curtis, Joseph H., “
Boott, William, Boston.	
Bottomly, Robert, Belmont.	Davenport, A. M., Watertown.
Bowditch, E. F., Framingham.	Davis, Frederick, Newton.
Bowditch, Jas. H., Brookline.	Davis, Thomas M., Cambridgeport.
Boyden, Clarence F., Taunton.	DeMar, John A., Lexington.
Bradlee, John T., Boston.	Dolbear, Mrs. A. J., Somerville.
Breck, Charles H., Brighton.	Doogue, William, Boston.
Breck, Chas. H. B., “	Doyle, William E., East Cambridge.
Brooks, George, Brookline.	Duffley, Daniel, Brookline.
Brown, Atherton T., Boston.	Dunn, Thomas, Newport, R. I.
Brown, Benj. F., Charlestown.	Dupee, James A., Brookline.
Brown, Jona., Jr., Somerville.	

- |                      |                   |                         |                 |
|----------------------|-------------------|-------------------------|-----------------|
| Eaton, Jacob,        | Cambridgeport.    | Harris, Frederick L.,   | South Natick.   |
| Edgar, William,      | Newtonville.      | Hartwell, Samuel,       | Lincoln.        |
| Falconer, John,      | Rochester.        | Harwood, Geo. S.,       | Newton.         |
| Farquhar, Robert,    | Boston.           | Hatch, Samuel,          | Boston.         |
| Farrier, Mrs. C.,    | Stoneliham.       | Hayes, John L.,         | Cambridge.      |
| Faxon, Edwin,        | Jamaica Plain.    | Hazelton, H. L.,        | Boston.         |
| Faxon, M. B.,        | Melrose.          | Hersey, Alfred H.,      | Hingham.        |
| Felton, Arthur W.,   | West Newton.      | Hersey, Edmund,         | "               |
| Fenno, Warren,       | Revere.           | Heustis, Warren,        | Belmont.        |
| Fergusson, T. M.,    | Philadelphia, Pa. | Hewins, James,          | Medfield.       |
| Fisher, Sewall,      | Framingham.       | Hews, Albert H.,        | No. Cambridge.  |
| Fletcher, Edwin,     | Acton.            | Hill, Benjamin D.,      | Peabody.        |
| Foster, Joshua T.,   | Medford.          | Hill, J. Willard,       | Belmont.        |
| Fowle, Charles L.,   | Dorchester.       | Hill, Miss Katie A.,    | Lowell.         |
| Fowle, George W.,    | Jamaica Plain.    | Hinckley, Mrs. D. F.,   | Chelsea.        |
| French, William E.,  | Boston.           | Howe, Rufus,            | Marlborough.    |
| Frohock, Roscoe R.,  | Malden.           | Hunt, Henry C.,         | Newton.         |
| Frost, George,       | West Newton.      | Ireland, George W.,     | Somerville.     |
| Frost, Stiles,       | Boston.           | Jameson, G. W.,         | East Lexington. |
| Fuller, T. Otis,     | Needham.          | Jones, Moses,           | Brookline.      |
| Gane, Henry A.,      | West Newton.      | Jordan, Samuel,         | Yarmouth.       |
| Gardiner, Claud. B., | Newburyport.      | Judkins, Rev. B.,       | West Dedham.    |
| Gardner, John,       | Boston.           | Kelley, George B.,      | Jamaica Plain.  |
| Garfield, Charles,   | Medford.          | Kelsey, Fred W.,        | Waverly, N. Y.  |
| Gifford, Stephen N., | Duxbury.          | Kendall, Jonas,         | Framingham.     |
| Gilbert, John,       | Boston.           | Kenrick, Miss A. C.,    | Newton.         |
| Gilbert, Samuel,     | "                 | Lamprell, Simon,        | Marblehead.     |
| Gilbert, W. A.,      | Neponset.         | Lang, John H. B.,       | Dorchester.     |
| Gill, Mrs. E. M.,    | Medford.          | Langmaid, Mrs. M.,      | Somerville.     |
| Gleason, Herbert,    | Malden.           | Langworthy, Rev. I. P., | Chelsea.        |
| Godbold, G. A.,      | Chelsea.          | Lee, Charles J.,        | Dorchester.     |
| Goddard, Thomas,     | Boston.           | Lee, Francis H.,        | Salem.          |
| Goodwin, Lester,     | Brighton.         | Livermore, Miss M.,     | Mount Auburn.   |
| Gould, William P.,   | Jamaica Plain.    | Loring, Charles G.,     | Boston.         |
| Grant, Charles E.,   | Concord.          | Loring, John A.,        | "               |
| Gray, Howard,        | Dorchester.       | Lothrop, David W.,      | West Medford.   |
| Gray, William, Jr.,  | "                 | Lothrop, H. A.,         | Sharon.         |
| Gray, William, 3d,   | "                 | Lothrop, T. K.,         | Boston.         |
| Greene, Malcolm C.,  | "                 | Lowell, John,           | Newton.         |
| Grew, Henry,         | Hyde Park.        | Manda, William A.,      | Cambridge.      |
| Grover, William O.,  | Boston.           | Marcou, Mrs. J.,        | "               |
| Guerineau, Louis,    | Cambridge.        | Markoe, G. F. H.,       | Boston.         |
| Hall, William T.,    | Revere.           |                         |                 |
| Hamlin, Delwin A.,   | South Boston.     |                         |                 |
| Harris, Miss E. M.,  | Jamaica Plain.    |                         |                 |

- May, F. W. G., Boston.  
 McDermott, Andrew, "  
 McIntosh, A. S., "  
 McLaren, Anthony, Forest Hills.  
 Mellen, George M., Brookline.  
 Meriam, Dr. H. C., Salem.  
 Merrill, J. Warren, Cambridgeport.  
 Merrill, S. A., Wollaston.  
 Meston, Alexander, Andover.  
 Mills, William, Somerville.  
 Minton, Peter J., Forest Hills,  
 Morandi, Francis, Malden.  
 Morandi, Francis W., "  
 Morton, James H., Boston.  
 Murray, Daniel D., Brookline.  
 Muzzey, Rev. A. B., Cambridge.  
  
 Nelson, Mrs. T. L., Worcester.  
 Nightingale, C., Dorchester.  
 Norton, Michael H., Boston.  
 Norton, Patrick, "  
  
 O'Brien, James, Jamaica Plain.  
  
 Paige, Clifton H., Mattapan.  
 Park, William D., Boston.  
 Parker, John, "  
 Parsons, William, "  
 Patterson, James, Cambridge.  
 Payson, Samuel R., Boston.  
 Petremant, Robert, Roxbury.  
 Phillips, Nathaniel, Dorchester.  
 Pickering, Mrs. E. C., Cambridge.  
 Pierce, Samuel H., Lincoln.  
 Plimpton, W. P., West Newton.  
 Power, Charles J., S. Framingham.  
 Pratt, Mrs. Mary L., Hingham.  
 Prince, Thomas, Boston.  
 Purdie, George A., Wellesley Hills.  
 Putnam, Charles A., Salem.  
 Putnam, Henry W., "  
  
 Randall, Macey, Sharon.  
 Richards, John S., Brookline.  
 Richardson, E. P., Lawrence.  
 Richardson, Horace, Framingham.  
 Richardson, S. W., Boston.  
  
 Ridler, Charles E., Boston.  
 Roberts, Edward, Hyde Park.  
 Robinson, William, North Easton.  
 Rogers, John F., Cambridge.  
 Ross, Charles W., Newtonville.  
  
 Safford, Nath. F., Milton.  
 Saunders, Miss M. T., Salem.  
 Saville, George, Quincy.  
 Sawtell, J. M., Fitchburg.  
 Schmitt, George A., Wellesley.  
 Scott, A. E., Lexington.  
 Scott, George H., Allston.  
 Scudder, Samuel H., Cambridge.  
 Shattuck, F. R., Boston.  
 Shedd, Abraham B., Lexington.  
 Shedd, Arthur B., Chicago, Ill.  
 Sheppard, Edwin, Lowell.  
 Sheppard, S. A. D., Newton.  
 Snow, Eugene A., Melrose.  
 Southworth, Edw., Quincy.  
 Spooner, Wm. H., Jamaica Plain.  
 Sprague, Charles J., Boston.  
 Squire, John P., Arlington.  
 Starbird, Louis D., Malden.  
 Stearns, Charles H., Brookline.  
 Stevenson, H., Woburn.  
 Stone, Eliphalet, Dedham.  
 Stone, Samuel G., Charlestown.  
 Storer, Charles, Natick.  
 Story, Miss S. W., Brighton.  
 Strahan, Thos., Jr., Chelsea.  
 Sullivan, J. L. D., Somerville.  
 Swan, Charles W., Boston.  
  
 Tailby, Joseph, Wellesley.  
 Talbot, Josiah W., Norwood.  
 Tapper, Thomas, Canton.  
 Temple, Felker L., Somerville.  
 Terwilliger, S. F., Saratoga, N. Y.  
 Tillinghast, Joseph, New Bedford.  
 Tobey, Miss M. B., Brookline.  
 Tobey, S. Edwin, Malden.  
 Torrey, Bradford, Boston.  
 Trautman, Martin, "  
 Turner, Nathaniel W., "

Van der Veur, P. W., New York, N. Y.	Whitney, Joel, Winchester.
Vaughan, J. C., Chicago, Ill.	Whiton, Starkes, Hingham Centre.
Vinal, Miss Mary L., Somerville.	Wilde, Hiram, Randolph.
Walker, Charles H., Chelsea.	Wilmarth, Henry D., Jamaica Plain.
Walker, Joseph T., Boston.	Wilson, B. Osgood, Watertown.
Walker, Wm. P., Somerville.	Wilson, George W., Malden.
Waterer, Hosea, South Natick.	Wiswall, Henry M., Watertown.
Webster, John, Salem.	Withington, H. H., Jamaica Plain.
Weld, Chris. Minot, Jamaica Plain.	Wolcott, Mrs. H. L. T., Boston.
Weld, Francis M., " "	Wood, Mrs. A. D., West Newton.
Wellington, Miss C., East Lexington.	Wood, E. W., " "
Wells, Benj. T., Boston.	Woodford, Jos. H., Newton.
Weston, Mrs. L. P., Danvers.	Woolson, Geo. C., Passaic, N. J.
Wheatland, Henry, Salem.	Worthington, R., Boston.
Wheeler, Miss A. C., Cambridgeport.	Wright, Daniel, Lowell.
Wheildon, Wm. W., Concord.	Zirngiebel, Denys, Needham.
White, Nelson B., Norwood.	

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## EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

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### SECTION XXVI. — LIFE MEMBERS.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments; and any member having once paid an admission fee may become a Life Member by the payment of twenty dollars in addition thereto.

### SECTION XXVII. — ADMISSION FEE AND ANNUAL ASSESSMENT.

Every subscription 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 XXIX. — DISCONTINUANCE OF MEMBERSHIP.

Any member who shall neglect for the space of two years to pay his annual assessment shall cease to be a member of the Society, and the Treasurer shall erase his name from the List of Members.

*The attention of Annual Members is particularly called to Section XXIX.*



## HONORARY MEMBERS.

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A \* denotes the member deceased. Correspondents of the Society and others will confer a favor by communicating to the Secretary information of the decease, change of residence, etc., of Honorary or Corresponding Members.

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