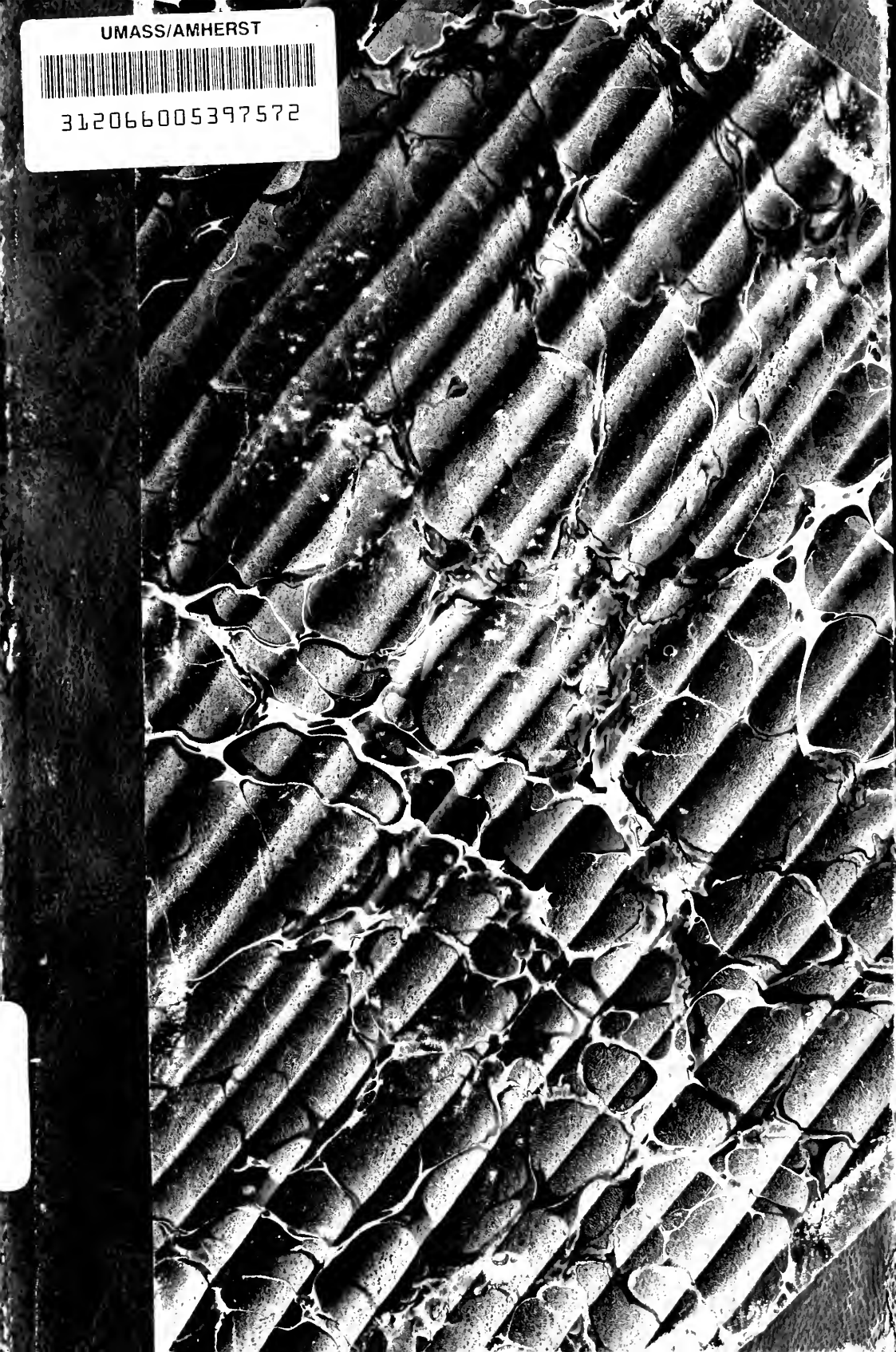

TRANSACTIONS

OF THE

WORCESTER COUNTY

HORTICULTURAL SOCIETY.

FOR THE YEAR 1890–91.

Worcester, Mass.
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WORCESTER COUNTY
HORTICULTURAL SOCIETY.

A. D. 1890.

ANNUAL REPORT OF THE SECRETARY.

To the Members of the

WORCESTER COUNTY HORTICULTURAL SOCIETY:

At the annual meeting of the Society, A. D. 1889, it was

Voted: To "memorialize or petition the General Court for such further legislation as will more effectually protect fruit-growers from the depredations of juvenile trespassers or thieves."

Pursuant to that vote application for relief from existing, crying evils was duly made. It was not granted as a matter of course, because asked. It was not granted as a matter of proper concession to the statement of facts, and testimony, submitted by your committee and other parties in a common interest. To illustrate, in some measure, the character and gravity of the evil complained of, your *Secretary* recites a letter which he submitted as a summary of evidence that he could not give, in person:

FEBRUARY 21, A. D. 1890.

Hon. Henry L. Parker, Chairman Judiciary Committee.

MY DEAR SIR:

As I have explained to you personally, it will be out of my power to attend the "hearing" appointed for the 26th, upon the petition of this Society, *et als.*, in the matter of Juvenile Trespass and Theft. But I would like to impress upon the Committee the

increasing gravity of the offence. Sunday is especially selected as offering a favorable opportunity to steal flowers and fruit; householders being presumed to be absent at church.

The worst feature of the case, in my judgment, is the fact that so many of the offenders are young girls—the female sex being largely predominant in such form of trespass. In one instance, upon my own premises, there was a party of five (5) girls and two (2) boys busy picking and eating half-formed clusters of green grapes. At another time, passing the estate of Mr. Charles L. Pierce, on William Street, at an hour when he was away at his business, I found another gang (!) of seven (7) girls and three (3) boys busy as bees filling large baskets with apples and pears from Mr. Pierce's trees. In neither instance did there appear to be a child older than twelve (12) years.

This evil is rapidly developing, as our city grows in population, with a portion of whom it would seem to be an accepted theory that there can be no private property in flowers or fruits. Their cultivation will have to be abandoned, however reluctantly, unless juvenile trespass and theft can be effectually arrested.

Sincerely,

EDWARD WINSLOW LINCOLN,
Secretary and Member of Committee.

Reference to the next General Court was finally ordered, in sheer inability or reluctance to decide what would be most advisable to do in the premises. It is doubtless your settled opinion that some measures should be devised and enforced for juvenile restraint or reformation. That parents are much at fault cannot be disputed. Nor can they well plead in excuse for their shortcomings, that our hillsides are so thoroughly stripped of birch that there can no longer be satisfactory application to the wayward child. Birch enough can be found by those who seek, and, even if not, there is the weighty authority of the late Henry Ward Beecher that a judicious selection from young quince twigs will conduce to the just collocation of saplings. Meanwhile, what is the parochial school doing to abate the nuisance, or, putting it more emphatically, wanton mischief? If the common schools are godless! and therefore exercise no moral restraint, the same plea cannot be urged in defence or mitigation of peccadilloes by students at institutions whose inculcation of the moral law is the sole reason for existence!

There has been less fruit to steal, although as many flowers, since the General Court uprose with the freshets of June. Yet it was an average year for thieves. Indeed, the very scarcity of apples may be assumed to have put a keener edge upon that especial foe of industry which, unlike the razor, needs no protection! Appetite points the way; and your Secretary may be allowed to ask why its satiation might not approve itself a most effectual cure for all but hardened sinners? Why not administer homœopathic remedies? Why not permit the youthful offender to shorten his stay in the reformatory by conforming to a specific diet? Feed to him, for breakfast, twenty-four transcendant Crabs; let him gorge, at noon, upon a half-dozen mealy Boussock; supper bringing the culmination of his punishment, in that he will be required to devour, with what relish may be, a half-dozen Gloria Mundi or Duchesse. To please sentimentalists, this regimen might be varied; Clairgeau being substituted when Duchesse grew tiresome, and Red Bietigheimer taking the place of Gloria Mundi if S. F. P. C. T. animate creation felt its bowels yearn over the sufferings of *Juventus*. This suggestion may not be appreciated, at its true worth, by the Committee on Agriculture. Was one ever? But it has at least the merit of costing nothing in the proposal; and not much more in the application.

The Finance Committee were authorized at the Annual Meeting of the Society, A. D. 1889,

To procure plans and estimates for such alterations of the upper stories of Horticultural Hall as shall provide for a banquet or supper room adequate to entertain a large company, without impairing the beauty, symmetry, or light, of the Hall of Pomona:

Reporting the same, in their discretion, to a special meeting of the Society.

Little has been accomplished under that authorization, the sketches that were drawn by architects being prepared, apparently, in a partial misconception of the intent of the Committee within the scope of their powers. There was no need for hurry in the premises, since any considerable alteration of our Hall is to be esteemed a serious matter; to be undertaken, if needed, and

always to be deferred until the change can be shown a gain beyond peradventure. The Committee can therefore merely report progress, and ask that your trust be extended. An element that should enter into the consideration of the matter—perhaps control its decision—must be the determination by the Society of its policy for future years. If our resources and time are to be surrendered to exhibitions, as now; virtually compelling a reliance upon the same, or augmented, sources of income; why then we must take effectual measures to set competition at defiance. We must simply improve and augment the conveniences that we would lease, so as to put them above and beyond successful rivalry. Concede a pleasant nomenclature to Colonial, or Ideal, Halls! But the colonies have become States and the practical in rush and whirl of existence succeeds the ideal. Or, if there is aught in a name? Where will you find a more felicitous designation than is supplied by Ceres, Flora or Pomona? If, however, we adopt the conclusion that the science and practice of Horticulture are better advanced and improved in other ways than those that we have followed so undeviatingly for a half-century, then our present accommodations may appear all-sufficient for every legitimate use. As students in the various branches of our favorite pursuit, we can find now, if we will, every desirable facility for freshman or senior. Suppliants for popular patronage, we must conform to, preferably, anticipate the public wants. Masters of our own aims and intentions, and content with our actual resources, we have only to assure ourselves that they are applied in such manner that we cannot be reproached with burying our talent in a napkin or wasting it upon our own perverted and selfish cravings.

It was also

Voted, on motion of Charles E. Parker, that "so much of the Secretary's report as relates to taxation of Horticultural Hall be referred to the Finance Committee, with power to act."

The contention of your Secretary, as you will doubtless recall to mind, having been that this Society ought not to rest satisfied with the law that governs the assessment of its property for public purposes: the very property being held and administered in

trust for public purposes and yet, in practice, being subjected to an invidious discrimination. For the bounty of the Commonwealth is lavished upon the Worcester Agricultural Society, which holds a large and valuable tract of land wholly exempt from taxation; which uses that land for but a single week of the entire year, at other times sub-letting for all sorts of performances and antics, any diversion other than agricultural, in fact, from which revenue can be derived; capping the climax by engaging, as co-partner with that queer simulacrum—the New England Agricultural Society, in the invasion of our especial province, inviting a rival horticultural exhibition, of egregious size and inconspicuous excellence. Our appeal for redress would have been made to the General Court but for an unofficial suggestion from the Massachusetts Horticultural Society that it was not prepared, as formerly, to co-operate with this Society; intimating, in fact, apprehension lest, by seeking further relief, it might lose present benefit. The cases are not parallel; no Society receiving State bounty for pretending to exhibitions of "Horticulture, Floriculture and Vegetables!" on Tremont Street. Nevertheless, under the circumstances, your Committee felt that comity, if no other consideration, required that the sense of the Society should be taken, before prosecuting any definite action or policy, under the formal vote.

"What shall it profit me?" exclaimed the cynical Shah of Persia, when urged to attend the "Derby." "It is already known to me that one horse can run faster than another!"

For well-nigh upon fifty years this Society has been placing successive footfalls in the same continuous rut. We have learned pretty thoroughly, in that course of time, that, other things being equal, specimens of fruit from a young and thrifty orchard will excel such as may be gleaned from one spent by age, overproduction, or neglect. We have been taught; or we might have been, had we availed ourselves of the lesson apt to direct observation; that the ravages of insects are irreparable; that injury or disease are waste and consequent destruction; that the mischief which we were too careless or indolent to arrest, at its first intention, is ever active and malignant, sapping that vitality to which, under whatsoever name,—bacillus, bacteria, fungus, blight, or

rot, are omnipresent if insidious foes. Competitive trial has determined that twelve Bartlett Pears may turn the scales at a certain unprecedented weight: a fact of possible value, if any one could tell wherein, or to what degree! We have also found out that one woman can arrange flowers more tastefully than her rivals in like pretty competition; likely enough being endowed by nature with a nicer discrimination and a more exact judgment of the proper collocation of colors. We assume, with good reason, that there are vicissitudes of climate, extremes of temperature; natural causes in short, whereof the character and origin are alike inexplicable; perhaps because we do not investigate them, busy as we are in the award of fifty-cent gratuities! and when these do occur, bow our heads in all the fatuity of fatalism, beneath the dispensation of Providence! Might we not better take heed, as we look upon orchards defoliated by the canker-worm; upon our highways tolerant of white birch and wild cherry—convenient breeding places for the caterpillar; as we recall the wanton extermination of the game birds that held our insect foes in check and the senseless introduction of varieties that have become a greater plague than chrysalis or larva; that we cast not our burdens upon the Lord; but rather see that our own work is not left undone! The plague of insects is ever with us. Is it more aggravated this year than last? Wherein, if at all, do the unnatural, abnormal winters contribute to multiply and disperse the pests, whose unchecked development bids fair to put a speedy end to Horticulture—whether actual or tentative. We accept, as inevitable, canker-worm, caterpillar and codlin-moth; and take no active or efficient measures to suppress their ravages; submitting supinely to their invasion. Is eternal vigilance the price of liberty? What think you of sixty (60) cents per peck as the price of Gravensteins when brought, in pristine beauty and perfection, last September, to challenge the pomologists of Worcester? Shall we therefore cry out for protection to home indolence, that would not safeguard its own opportunities? Or shall we try to deserve, and therefore earn, success by our own unremitting diligence? Shall we first learn, and thereafter, instruct others?

Have exhibitions, purely, as such, and not replete with meri-

tricious lures, grown monotonous and therefore unattractive? Our older Members are rapidly passing away: is there promise that their vacancies will be filled? Certainly there can be no hope of it from the County which, save in title, has ceased to maintain any distinctive connection with the Society. Since my last report, Ward and Hapgood of Shrewsbury; Banister, Hill, Tainter,* and, but yesterday as it were, Newton, of Worcester, have gone to pluck the apples of the Hesperides, wherefrom, if they extract celestial juice, it may be hoped that they will not subject themselves to the espionage of angelic spotters! Their successors may appear; but will their places be filled? is the question that should concern a Society that has the reputation of our own,—a position in Horticulture which is so much easier to lose than acquire.

Cultivation recedes from us, repelled by the expansion of the City. The suburban farmer sells his orchard or flower garden for house lots, and cuts coupons in the eight hours that constitute a modern working day. Green-houses are built, it is true: but mammon presides at the laying of their corner-stones and dictates their management. The professional florist may adorn his own windows: he cannot sacrifice his stock in trade to make a display in our Hall. It speaks well for us, so far, that we have been able to achieve so much. But, looking straight ahead, what reasonable prospect is there of keeping up—let alone advancing—the position and repute of the Society in Floriculture!

Who introduces novelties of promise or evident merit? A peach-pit is thrown away; and thereafter, it may be, a choice seedling is brought to our Hall. It is a result of chance, in which design had no place, however slight. It gets a more or less appreciative notice, at the moment; and disappears,—out of sight, out of mind. No one secures buds, since that would involve the taking of a few steps and some trouble. And so it is that, in a latitude and longitude which favored the origin of Cooledge and Crawfords, it has come to be a sort of accepted creed among the faint-hearted, in whose elbow is little power, that the peach is a

* Mrs. Daniel Tainter, a rosarian in especial.

hopeless crop in Massachusetts! Can anything be grown by a people that wastes hours of daylight swinging in a tropical hammock?

> Who toils eight hours at best,
> Sleeps other eight with zest,
> Letting Satan have the rest,

may be sure that disease and insects will combine to get in their perfect work, and can compute as certainly in June as in October what shall be the harvest!

And except there are novelties,—if there is to be no advance,—*cui bono?* Who comes, or wishes, to see, save possibly at the "Hoss-Trot for the Acceleration of Agriculture," the same stale stallion, or effete gelding, year after year, notwithstanding the "Hi-ya's!" may be more vociferous! Having brought to your notice my share of the newer varieties in all the diversified branches of Horticulture, I claim the right to call attention to the radical deficiency of the Society, as a whole, in this particular. For, even if novelties of prospective or manifest value are produced at home, or imported, what can we know of their intrinsic merits under the prevalent theory and practice whereby the money premium has become the Horticultural Alpha and Omega!

What in good sooth do we accomplish? We meet weekly: and thereafter some of our Members are richer, pecuniarily, by a few dollars or cents. Doubtless, as a method of dispensing our income, the money is well disposed. In some cases it is of material assistance, enabling its recipient to procure the newer seeds or plants that would have been unattainable otherwise. The returns from Garden or Farm,—*Hortus, Agerque*,—are not so bounteous as to entice the modern syndicate, that harpy omnivorous of every ample harvest. For the Trust of these latter days, pet infant of legislation, Potatoes or Corn have no charm. In the endless pages of the cotemporary statute, as we are assured upon the highest authority, there occurs nowhere a line that will provide a market for another bushel of wheat—another barrel of pork! Does fruit fare better? To him that hath shall be given! And is it not re-enacted at Washington,—the law that was graven

upon the tables of old,—from him that hath not shall be taken away even that which he hath. Can we sell to him of whom we will not buy?

Nevertheless, this Society was not founded for a bank of discount or a savings institution. Its purpose was definite and specific unders: tood clearly at the date of its organization, and which ought not to be left out of sight now that a half-century draws to its close. Thanks to the munificence, foresight and self-denial of the generation that preceded us, we have the good fortune to possess an inheritance that supplies abundant means for our legitimate uses. We may claim, with entire justice, that we have suffered no waste of that talent. But,—has its value increased, in our keeping; or have we applied the increment to our individual account? Have we added to the store of knowledge heretofore accumulated; or are we ignobly, content to profit by the hardly-won experience that puts it in our power to make an exhibit from the results of other men's diligence and skill?

Simply resolved into a Society for the consideration of questions of high public policy; and to whom is their proper decision of greater moment than to the tillers of the soil; might we perchance hope to determine whether a thing is undesirable merely because it is cheap! I have known the year when a barrel of Baldwin Apples could be had in exchange for an empty barrel; and again, when that quantity commanded but seventy-five cents in open market. Was the fruit therefore worthless? The children did not think so, at the time. I can remember when a suit of "Vermont Mixed" was as honest as the animal from whose fleece it was woven; and would hold a boy in safe suspense even if the ladder or limb did give way! Yet our modern shoddy is higher-priced. Does it concern us, in Horticulture, to learn if out-go enriches any one,—no matter whether it is denominated tax or exaction, unless an income can be plainly shown to counterbalance it! Do we care whether barter, developed into commerce, is necessarily a loss to those who engage in it; or mayhap involves reciprocal benefit to either party, enabling the one in want to obtain that which the other has in superfluity? Is it a fact, or simply a bald, partisan assumption that, if we ship a barrel of apples to an Englishman beyond the seas, we lose our

own soul; whereas a sale of just as many Hubbardstons to John Bull, who has become naturalized, and votes our especial ticket, is net gain to us of the whole world! It might then be pertinent to inquire why Medes and Parthians, Elamites and Paphlagonians, draw our wire, and stitch our shoes, while honorable tillage is scorned and none of those choice breeds of the human animal will hire out for the cultivation of the earth, so long as they can sweat, beg or steal, in the crowded town! Possibly there are good and sufficient reasons, if one is smart enough to discover them; or fat-witted enough to accept them supplied to order; why Hungarian or Polack should delve in the mines of Pennsylvania; while Armenians and Pamphylians throng the shops of Worcester; so-called American Labor fattening upon Home Industry, forsooth! for the support of all which shiftless tribes the Terræculturist is—taxed? Oh, no! only required to pay tribute unto Cæsar! There may be valid arguments, adapted to the comprehension of the coward in politics, why, for the sake of such breechless, illiterate bulwarks of our Republic, we should repel the Chinese or Japanese, cleanly and educated; whose proficiency in Horticulture is alike a marvel, and a continual reproach to us in our arrogant conceit; whose patient labor is precisely what American impatience needs in this very emergency that we are just beginning to recognize, now that we are throttled by its gripe; whom we might well and wisely hire for that intensive culture whereof they are such masters, if they are willing to take service; and whose right to enter the country should be as unrestricted and perfect as that of the filthy Slovack, or those dwellers in Cappadocia who left the land of their nativity for its manifest good and our palpable detriment.

But, recurring from this digression, if it is such,—do our Members appreciate, for its true worth, the palm of excellence whereat we formerly set our mark, and have hitherto upheld it? Do they fully realize how easy it is to forfeit that prime rank in Horticulture, maintained in the very fore-front of kindred associations? If aye,—why that eagerness to compete at "Shows" of an inferior grade! offered for money, by Societies that are confessedly "on the make?" At which confusion worse confounded is the dominant rule; Floriculture, Horticulture, and the growth of

Vegetables being set into classes alike separate and unique; constituting a distinction so rare as to be known nowhere else on earth. Whereat our especial purists, who were so zealous to purge our own entries from all taint, or even suspicion, of wrong-doing, are eager to engage, with lamblike innocence, in unreserved competition with the very scapegoats! There can be no accession of dignity derived from thus stepping outside of our beaten tracks: since Governors and Judges illustrate our roll, and the cotemporary Senator, whether Federal or State, may well challenge precedence with the Minister to Liliput. Moreover, all such participation in side-shows, although supplying room for our *exuviæ*, operates by way of condonation of a gross public wrong. Since we are not alone subject to taxation upon our property that is devoted to the purposes of Horticulture, while our mimics are not; but the bounty of the Commonwealth is lavished in their behalf, to our significant and invidious exclusion.

In a social point of view, our exhibitions were eminently useful; an advantage that is not wholly lost, at present. But the field, once exclusively relinquished to us, is now invaded by others; whose efforts to pervert our members from their old-time allegiance are not wholly fruitless. In this particular,—we are compelled to recognize the Grange as a formidable competitor; affording as it does those attractions of pleasant intercourse so irresistible to the young, and which have not actually palled upon maturer fancies. Our sessions are brief: long enough for their avowed object, but holding out no especial fascination in the way of cheerful amusement. This may not count for much; but it must needs have its due weight in an exact estimate of the precise value of our operations. We run together in haste,—to disperse even more rapidly. It may be the best that we can do: but—*is it?* Of yore,—the hopes and illusions of a twelvemonth culminated in the Cattle Show Ball; in which extreme of revelry, the energies, rigidly restricted for a year, burst their bonds and found safe dissipation and outlet. Masonry, with its rites, and regalia; its pomp of procession and luxury of banquet; had long been under a cloud, beneath which were rare glimpses of the faintest silver lining. Odd Fellows enough there were, it is true: but no one had conceived the plan of banding them together in

an organization whose serried tread should, later, shake the very town. The theatre! Who, in those "orthodox" days, while the echo of Beecher's thunder from the pulpit of the Old South was yet vibrant in the atmosphere, would have dreamt of seeing Thespis save literally dragged at the tail of his own cart, thanking his stars if he escaped the pillory or whipping post and was not obliged to carry a second or third mortgage! The Continental uniform had faded into a memory. And, if the eye was annually directed to a muster of the Light Infantry, it was only to excite pity for the absurd dream that armed militia could ever become needful in a Republic like our own. In such an idyllic season of Arcadian peace, there was ample room and occupation for this Society. Its calm pursuits might well culminate in the Autumnal Harvest-tide, when abundant fruition was celebrated in rural leisure. Under such propitious auspices our foundations were laid,—broad and deep: so deep and broad that upon them the structure of our prosperity has been built and maintained, down to the present day. But now, when amusements of all sorts, occupations of every variety, and, shall I add—vacuity? claim time and attention; now,—when life is harassed with perplexity, in its effort to meet the problem,—what can I omit that I may the better devote myself to this which must not be neglected? does not the question recur with imperative urgency: Are exhibitions of Flowers, Fruits, Vegetables, etc., etc., the sole—nay, the best method A. D. 1890, and in the years to come, of

"Promoting the science, and encouraging and improving the practice, of Horticulture!"

All this conceded,—you may say,—aimless purpose or inert action, what do you advise? What shall be the remedy? But if there is a malady, does not the diagnosis take precedence? Can the physician invariably prescribe wisely? Is there anybody but your average Representative in Congress whose prerogative is omniscience? Your Secretary does not arrogate infallibility: only that conviction and faith which is based upon the observation of a lifetime, whereof more than thirty years have been largely occupied in your official service. And this, at

least, he notes with surprise and some mortification. Possessing a Library that has few equals; its superiors in America, restricted within its especial sphere, are less in number than the fingers of one hand; he sees its privileges contemned, and the prospective benefits from its use utterly disregarded. Some of our members have been ostentatiously delegated, by those who can be forgiven for ignorance of the opportunity at their very doors, to dive or delve at will in the pile of black-letter gathered in and heaped up on Tremont Street. Forty miles inland, right in the heart of this great Pomological County, is located a Library whose selection by Harris and Haven, Earle and Paine, should be a voucher for its intrinsic excellence: and for the sustained quality of which their successors may modestly assert that no depreciation has been suffered. Still, with all this accumulation of books, to what actual use are they put? Elsewhere,—with no invested wealth; with no commodious halls, in exclusive ownership; without even a printed page; we witness the origin and successful development of a flourishing School of Botany. Is that any concern of ours—as Florists? Does that boldly invade our peculiar province and challenge our perception of duty? Or do we rather achieve the complete aim and scope of our incorporation as, once a week, we invite this suffering brother to accept Three Dollars for showing us a dozen Boscs or Greenings; or award to the bashful thrift of that forlorn sister Fifty Cents in gratuity for a confession of inferiority that shrinks from competition!

How notable, or how insignificant, are our contributions to the study of Entomology, whereof the knowledge is fast coming to comprehend the problem of success or failure in any and every branch of Horticulture? What do we add to the lore of Noxious Insects;—what it is that facilitates their development;—to what extent the plague is influenced or modified by the relative severity or humidity of successive seasons! In what way are we to distinguish the useful parasites which hold them in check; and without whose beneficent aid the activity of our insect foes would be yet more pernicious!

Are our local applications,—our cunning contrivances,—of more good than harm? destroying only our enemies and sparing our allies. If aye,—in what manner, and to what degree, are

Hellebore, Pyrethrum, or patent trap, endowed with the superhuman wit to discriminate where man confesses himself at fault! What we do not know,—what we do not care or are too lazy to learn,—who shall tell us? Canker-worm, caterpillar, or codlin-moth, in more or less aggravated alternation, abide with us always. The ground is strewn with twigs, even limbs, from the massive Oaks that would otherwise, in perfect symmetry, endure, as it were, forever. The once superb Elm of Massachusetts is foul with tent and web-worm; its foliage curled and yellow from waste by myriads of aphides. And now a new and insidious foe threatens mortal injury to that noblest of all forest trees of the temperate zone, — *Acer Saccharinum*, — the Rock, or Sugar, Maple.

Again,—are those swarms of birds that now, in early October, make their homes upon our Bartlett and Washington Pear trees; or in our vineyards; the beneficent agencies that the sentimentalist asserts? For, with reason or not, it must be noted that their visits are ever to the fairest, brightest-colored pears; the clearest, thinnest-skinned grapes. Are they to be encouraged, or held in check? The flocks of the sparrow are countless. Our old friend! *Turdus migratorius*,—thrives mightily under the fostering wing of legislation. Of assumption, without facts, we have more than enough. Of birds,—inevitable result from that assumption of their beneficial agency,—is there not a woeful excess! The naturalist of tender years is allowed to shoot his little gun; and, of course, is sure to find that predestined early worm. The farmer and orchardist is forbidden to use fire-arms and is warned to distrust his own eyesight when he sees beaks busy and crops (of the birds!) swollen to very repletion. We have literally exterminated our wild birds, of predaceous instinct and habit, and for reward can roll up our grass-sward like a carpet. The crow, and crow black-bird are shot at sight; or, if rendered too wary to approach within range, that very excess of caution precludes their natural usefulness. What few birds survive whose instinct prompts them to get a living by beak and claw, from worm or beetle, are protected in a brief existence, only that they may fall a surer prey to the legalized pot-hunter or "sportsman." Would the quail or grouse, the plover or woodcock be of more

benefit or harm, if shielded by law the year round? Of graceful carriage, they would be pleasant to the eye. Insectivorous,—they might aid in maintaining the due proportion between the life that is beneficent or noxious. Encouraged to frequent and multiply in our homesteads and public grounds, they would soon overcome the extreme timidity that has become innate after generations of reckless slaughter. Perhaps their fecundity and increase consequent upon being in-lawed would be of no practical or appreciable use. But that is the point at issue; one which this Society might well assist in determining.

Your *Secretary* has no other interest in this matter than a heart-felt desire that this Society shall elect and follow that path which tends most directly to the public and therefore your individual welfare. Influenced solely by such concern, he is compelled to ask whether we shall enter upon the second half of our first century of corporate existence by inaugurating a new departure, of fairer augury to ourselves and the community! Or rather confess that the premium and gratuity must continue to be our highest aim; and that only by their lavish award do we expect or aspire to

"Advance the science and encourage and improve the practice of Horticulture!"

An Act of the General Court of Massachusetts whereby John Green, Anthony Chase, Frederic Wm. Paine, George W. Richardson, their associates and successors, are hereby made a Corporation by the name of the Worcester County Horticultural Society, was approved by His Excellency, John Davis, A. D. 1842, thereupon becoming a Law of the Commonwealth. You can compute for yourselves the precise period of time that has since elapsed. Suffice it for the present purpose to emphasize the fact that, upon the Third of March, A. D. 1892, little more than a twelve-month hence, a Half-Century will have expired since our Founders cheerfully invited the responsibilities to which we have fallen heirs. Should any formal recognition of such a notable event be authorized? Shall its marked influence upon co-eval life and development be noted in a way that shall endure? Of Horticultural Societies that are entitled, whether

from character or usefulness, to bear the name, the list is lamentably short. If our own has prospered beyond measure; if we are still in vigorous career when others that started in equal promise, have faded from memory; shall we now put down a mete or bound wherefrom another generation may be enabled to trace a new departure! If anything is to be done, there will be no time to waste, in deciding its proper character. What to omit is usually more essential than what to achieve. Hundreds of absurd, if plausible, schemes must be summarily discarded, since the scope of Horticulture, broad as it is, does not comprehend all human interests. A discreet Committee, early appointed, should be competent to evolve some wise and sufficient plan for celebrating an event wherein we have a right to feel such pride, without ensnaring us in the meshes of a multiform trades-procession or plunging the Society in the hopeless bog of political intrigue.

All which is Respectfully
Submitted by
EDWARD WINSLOW LINCOLN,
Secretary.

Horticultural Hall, Worcester,
Worcester County, Massachusetts,
November 5, A. D. 1890.

POSTSCRIPT.

Of the few men, famed in Horticulture, whose lives were contemporary with the existence of our Society; and whose names dignify our Roll of Honorary Membership; the number was signally diminished by the death of PATRICK BARRY. It was never the felicity of your Secretary to enjoy his intimate acquaintance. But, through the correspondence of a lifetime, I had learned to appreciate that rare conscientiousness which would profit by no advantage not honorably gained and was almost painfully sensitive to the fear that, by some mischance, aught might be disseminated untrue to name or report. The reputation of his great nurseries placing him easily at the head of his

profession, constituted of itself a power for incalculable evil, unless controlled by the most unflinching regard for principle. His growing fame for straight-forward, upright dealing rapidly developed his trade, which, in its turn by a reflex action as it were, tended yet more to attract the trust of all who once had dealings with him. The veriest tyro in pomology could depend upon getting what he ordered and feel implicit faith that no advantage would be taken of his evident inexperience. May it be long before his due share of credit must be apportioned to George Ellwanger!

An obituary notice by our honored associate, THOMAS MEEHAN, originally published in the *Gardeners' Chronicle* (London), is quoted at length, to inform you more fully of the merits of him whose loss to Horticulture is so serious; and, as well, to furnish an example to the young wherefrom they may derive profit, if only they deduce the proper inspiration.

Of the generous nature that was swift to proffer credit or purse without calculation of return, Mr. Meehan had perhaps no occasion to speak. But the writer cannot forget the kindly intention in behalf of one dear to him; none the less appreciated that it was not needed; a fact, the ignorance of which by Mr. Barry but served to render his open-handed munificence still more conspicuous.

E. W. L.

OBITUARY.

Patrick Barry. To my mind, June 26, 1890, ends a famous chapter in American Horticulture. The grave closed over all that was mortal of Patrick Barry, who, in connection with his partner, George Ellwanger, has for half a century been a central point, around which revolved much that was progressive in American horticulture. A respectful cortege of some fifty carriages followed his remains to the Cathedral of St. Patrick, which his munificence in great part founded, and a solemn high mass, in which twenty-four priests assisted, was offered in his behalf. The Catholic Bishop, McQuade, one of the most eminent pulpit orators, made a funeral address. Officials of the great city he did so much to build up were among the mourners, and brother nurserymen from some hundreds of miles paid their last tribute to his

remains. But the most touching scene was when, in passing the public schools along the line of the funeral procession, the children were all drawn up in line in front of the school buildings, until the body had passed by. He was borne to his grave in the Catholic cemetery of the Holy Sepulchre, by eight of his faithful workmen who desired this sad privilege.

I was so glad the cemetery was not one of the usual cold-blooded sort. The Catholic cemeteries of the United States are not generally among the types of beauty—but the diocesan of the district, Bishop McQuade, is in many subjects among the progressive spirits of our country. He employed a famous landscape gardener, F. R. Elliott, to design the grounds, and, beautiful as so many modern cemeteries are, this will take rank among the foremost. The rare and lovely trees, Virgilia lutea *(Cladastris tinctoria)*, will stretch its arms over him, and I was glad to see him reposing in so beautiful a spot.

How can men like these be rewarded, except in the consciousness of the good they do. Here was a lad born on a farm near Belfast, who came to America in 1834, first resigning his position as a country schoolmaster to try his luck among strangers in a foreign land. That luck brought him a clerkship in Princes' Nurseries at Flushing, and thus he gained a good knowledge of the machinery of a nursery business. Falling in with a thoroughly educated young nurseryman from Germany, in George Ellwanger, they started the nursery business in Rochester just fifty years ago. Like most young men, they found they had much to learn. Many would have been disheartened. They had, however, the good judgment, so rare in many cases, to turn even disaster to profit. This firm was, perhaps, the first to see the enormous capabilities of the fruit tree business, which has since grown to such enormous proportions through the United States. Rochester was then only a small settlement of some 10,000 inhabitants, and I could hardly help wondering how many of the 100,000 or more the beautiful city now contains knew, or cared to know, how much this great prosperity was due to this one man. When the only employment the workingman could get would be at most but a dozen or so in any one place, Ellwanger and Barry took to work several hundreds at a time. Their success was so marked, that numbers followed, and Rochester became a city of nurserymen, and from these radiated younger nurserymen, until almost every State and territory had its nursery, most of which got their first inspiration from Rochester experiences.

And the city itself—it was not in him to merely make and hoard the money he earned, but to turn it all to account for the beauty and glory

of his adopted town. The only thing I ever knew him decline to do was to be put in nomination as mayor of this great city, and to which, though the political party with which he was affiliated was largely in the minority, he would have, in all probability, been handsomely elected.

He and his beloved partner, Ellwanger—for they had worked together through life in outside affairs, as well as in the nursery business—had just about completed an enormous building, to be rented out for business offices—108 offices in the one building. Every day he would think that on the morrow he would go and look at the finishing touches of this magnificent enterprise; but it was left for me, his many-year friend, to examine it for him.

I pen these lines to you because I know how much he prized the English horticultural periodicals—how continuously his thoughts wandered towards the lovers of gardening he had left in the Old World behind him, and I have thought I could do no better service to those whom he loved than to offer this brief sketch of his career as an example for their encouragement. It is given to every man to do something for his life work. I know of no one who did so much, and did that much so well, as Patrick Barry; and I know that the gardeners of the Old World will share with me the exultation that such a man was one of themselves.

THOMAS MEEHAN,
Germantown Nurseries,
Philadelphia, U. S. A.

—*The Gardeners' Chronicle.*

REPORT OF THE LIBRARIAN.

To the Members of the
Worcester County Horticultural Society.

The Library has been considerably improved during the past year by the addition of a new bookcase and the enlargement of two of the old ones. There is still need of more improvement and space by replacing two at least of the old cases with more spacious, convenient and modern ones. The increased shelf-room made by the recent changes is already occupied and more is needed, not only for convenience but for the credit of the Society. The most important work done for the Library during the year just closed has been the binding of about 250 volumes of many pamphlets and reports that had accumulated during several years past, which for various reasons had not been bound. The principal works bound are the English Garden, the English Gardeners' Chronicle, the English Agriculturist, the American Garden, the Country Gentleman, the American Agriculturist, Transactions of the Mass. Horticultural Society, Reports of the American Pomological Society, and several volumes of the Journal of Horticulture. There are a considerable number of pamphlets and reports yet to be bound, which will be finished as fast as we can find room for them. The following list comprises the books, pamphlets, bulletins and reports that have been received during the past year, either by purchase, gift or otherwise:

The Illustrated Dictionary of Gardening, a practical and scientific encyclopædia of horticulture for gardeners and botanists, 4 vols., 4to, by George Nicholson, A. L. S., Curator Royal Botanic Gardens, Kew.

Report of the Commissioner of Education, 1887–88.

Proceedings of the Twenty-second session of the American Pomological Society; from F. M. Marble.

Bulletin No. 1; Report of the Proceedings of the Department

of the National Educational Association at its meeting held in Washington, D. C., March 6–8, 1889.

Bulletin No. 2; Indian Education.

Consul Reports, Nos. 106 to 118, inclusive.

Annual Report of the Parks-Commission of the City of Worcester, 1889; E. W. Lincoln.

Bulletin for Oct., 1889; Cornell University College of Agriculture; on Tomatoes; also 13, 14 and 15.

Second Annual Report of the Cornell Experiment Station, Ithaca, New York, embracing Bulletins Nos. 5 to 15, inclusive.

Catalogue Supplement, Worcester Free Public Library.

Curtis Botanical Magazine, Vol. 45, Third Series, 1889.

Rules for a Dictionary Catalogue; by Chas. A. Cutter, Librarian of the Boston Athenæum; second edition with corrections and additions, U. S. Bureau of Education, Washington, D. C.

Costa Rica and her Future; by Paul Boilley; translated from the French by Cecil Charles, 1889.

Henderson's Handbook of Plants and General Horticulture; New Ed., 1890.

The Journal of Horticulture; Vols. 19 and 20, New Series.

Report of Worcester Schools, 1889.

Annual Report of the Board of Health of the City of Worcester, Nov. 30, 1889.

Twentieth Annual Catalogue of the Worcester Polytechnic; Institute, 1890.

Transactions of the Mass. Horticultural Society, Part 2, 1888; Robert Manning, Secretary.

Bulletin No. 17; Cornell University, May, 1890.

Second Annual Report of the Board of Managers of the Rhode Island State Agricultural School and Experiment Station, 1890.

Bulletins from Michigan Agricultural Experiment Station, Nos. 55 to 62, inclusive.

Bulletins from Hatch Experiment Station, Amherst, Mass., Nos. 1 to 10, inclusive.

Bulletins from Mass. Agricultural College, Nos. 36 and 37.

Seventh Annual Report of the Board of Control of the State Agricultural Experiment Station, Amherst, Mass.

Bulletin No. 16, March, 1890, of the Agricultural Experiment Station, Cornell University, on Growing Corn for Fodder and Ensilage.

Bulletins Nos. 1, 2, 3, 4, 5 and 6; Mass. Crop Reports.

Bulletins Nos. 1–5, 6 and 7; Agricultural Experiment Station, Kingston, R. I.

Twenty-Seventh Annual Report of the Mass. Agricultural College, 1890.

The History of Federal and State Aid to Higher Education in the United States; by Frank W. Blackmer, P. D.

Third Annual Report of the Interstate Commerce Commission, 1889; W. G. Veasey.

Speech of John Sherman on Silver in the United States Senate, June 5, 1890.

Compendium of the Tenth Census of the United States, pts. 1 and 2, 1880.

Revue Horticole; Paris; 1889; Society.

How Crops Grow; new edition; 1890; Society.

Manual of Injurious Insects and Methods of Prevention; by eanor A. Ormerod, London, Eng.; Society.

The American Florist; Semi-Monthly; 1890.

The American Garden; Monthly; 1890; Society.

Gardener's Chronicle; English Weekly; 1890; Society.

The Garden; English Weekly; 1890; Society.

Gardening Illustrated; English Weekly; 1890; Society.

Garden and Forest; Weekly; 1890; Society.

The Country Gentleman; Weekly; 1890; Society.

The Agricultural Gazette; English Weekly; 1890; Society.

The American Agriculturist; Monthly; 1890; Society.

Vick's Monthly Magazine; 1890; Society.

Massachusetts Ploughman.

Popular Gardening; Society.

Essay on the use of Nitrate of Soda for Manure and the Best Mode of its Employment; by Joseph Harris; Society.

Catalogues received: Pitcher & Manda; Seibeicht & Wadley; R. & J. Farquhar & Co., Boston; D. Landreth & Sons, Philadelphia; Peter Henderson & Co., Farmer's Manual; Peter Henderson & Co., Manual, "Everything for the Garden," New York; Chrysanthemum, Pitcher & Manda; W. W. Rawson, 34 South Market street, Boston, Mass.; Parker & Wood, Seeds and Agricultural Implements, Boston, Mass.; W. W. Rawson & Co., Vegetable and Flower Seeds, Boston, Mass.; Fred. W. Kelsey, Shrubs, Roses, Bulbs and Hardy Plants, New York.

All of which is respectfully submitted.

CHAS. E. BROOKS,
Librarian.

HALL OF FLORA,
November 5, 1890.

REPORT OF THE TREASURER.

CHARLES E. BROOKS IN ACCOUNT WITH
WORCESTER COUNTY HORTICULTURAL SOCIETY.

DR.

1889.				
Nov. 1.	To balance	$3,961	25	
	To cash received from rent of stores	4,000	00	
	To cash received at Chrysanthemum Exhibition	142	00	
	To cash received from new members	18	00	
	To cash received of A. N. Currier, insurance	110	00	
	To cash received from rent of hall	2,797	50	
	Total			$11,028 75

CR.

By cash paid Premium Awards, 1889	$1,568	55	
By cash paid judges of Awards.	138	00	
By cash paid Mechanics Bank. .	1,038	88	
By cash paid Chas. Hamilton for printing	195	49	
By cash paid City of Worcester, tax	521	04	
By cash paid City of Worcester, water tax	7	72	

By cash paid for books and papers	144 67
By cash paid for insurance	30 60
By cash paid J. S. Wesby & Sons for binding	194 35
By cash paid Sanford & Davis for binding	54 25
By cash paid F. W. Wellington & Co., coal	58 00
By cash paid W. H. Jourdan & Co., coal	10 50
By cash paid for advertising	25 50
By cash paid O. S. Kendall & Co.	14 41
By cash paid Protective Union	4 41
By cash paid White & Conant	14 13
By cash paid Paine & Dean	9 00
By cash paid Arba Pierce, evergreen	15 00
By cash paid Henry Brannon, bookcase	50 00
By cash paid E. G. Higgins	5 00
By cash paid C. Baker & Co., lumber	9 25
By cash paid State Safe Deposit Co.	10 00
By cash paid George W. Mellen	35 00
By cash paid J. A. Long, mirror	40 00
By cash paid B. C. Jaques, work on bookcases	82 77
By cash paid B. C. Jaques, work on new stairs	66 80
By cash paid J. S. Perkins, roof paint and glass	20 49
By cash paid Strauss Bros.	45 75
By cash paid George L. Barr, repairs in store	20 00
By cash paid Heywood Bro. &	

Co., repairs on chairs.....	17 01	
By cash paid Augustus E. Peck, portraits	235 00	
By cash paid A. K. Gould and others, fare to Boston.....	20 00	
By cash paid E. W. Lincoln, salary	400 00	
By cash paid C. E. Brooks, salary,	1,000 00	
By cash paid extra labor and sundry small bills.....	377 10	
By cash paid Worcester Gas Light Co.	265 35	
	$6,744 02	
Balance.....	4,284 73	
		$11,028 75

Respectfully submitted.

CHARLES E. BROOKS,
Treasurer.

PREFACE.

At the Annual Meeting of the Society, November 5th, A. D. 1890, it was voted—that *Messrs.* O. B. Hadwen,
James Draper, and
Charles E. Parker,
be a Committee to consider the matter of providing Essays and starting Discussions upon Horticultural topics, on successive Thursdays, throughout the winter, with power to act.

This publication results directly from the action of that Committee. In most cases, it has been the good fortune of the Society to secure a revised report from the Essayists. Where that was impossible, resort to the columns of the contemporary press became imperative. In the better time coming, it is to be hoped that the relative consequence of matters under current observation will be more accurately weighed; and that success in growing flowers or fruit will command as close study and careful notice as endurance in the prize-ring, or sinuosity in sliding to base.

As it happens, the contributions of our own members to the lore of the various topics is almost entirely lost. It is hoped that no injustice will be found done to the guests of the Society, where their remarks are restricted to an abstract; and that the Society will be held to no responsibility for opinions that, howsoever correct, must be regarded simply as the utterance of their authors.

For the Committee on Publication.
Edward Winslow Lincoln.

Worcester, Mass., A. D. 1891.

WORCESTER COUNTY
HORTICULTURAL SOCIETY.

8th January, A.D. 1891.

ADDRESS

BY

Hon. HENRY L. PARKER, Président.

Subject:—The Influence and Benefits of Horticultural Societies.

The year 1891 is marked by two notable events in the history of this Society—the closing of the first half-century of its existence, and the extinction of its debt.

There is a certain worthy body of Christian worshippers, who, on the annual recurrence of New Year's eve, take that occasion to review the misdeeds and short-comings of the past, and to strengthen themselves for a renewed struggle with "the world, the flesh and the devil." In imitation of them, might not this secular body, devotees of Ceres, Flora and Pomona, with some advantage make this coming year a watch-night for a review of former work, and a careful consideration of the question, whether the methods of fifty years have truly advanced the science of Horticulture and accomplished thus far the objects of the Society's foundation.

Our veteran Secretary, like a sentry upon the wall, has sounded from time to time the note of warning, and the hortatory strain of his last annual report gives ample proof that he has not slept at his post. If intended as a whip and spur to greater vigilance and greater effort, it cannot be other than well

advised, for if "eternal vigilance is the price of liberty," it is no less the price which any institution must pay, if it would thrive and grow and accomplish the ends of its existence.

We may with reason and propriety confess that "we have done many things that we ought not to have done and have left undone many things that we ought to have done." And yet it does not seem in looking over our achievements that having made this our general confession, we need to occupy for a long time the mourner's seat, or prolong the wail of self-deprecation.

If through our intervention new and improved vegetables have been brought to the attention of the market gardener; if our weekly displays of fruit and the competition excited thereby has raised the standard of fruit culture—has stimulated the grower to aim at perfection in appearance and flavor—has educated the general public to better discrimination and increased consumption—has introduced new choice varieties and perpetuated those which have been proved and not found wanting; if our floral exhibitions, our periodicals and the rare volumes on our library shelves have so quickened an æsthetic taste that our lawns and grounds, both public and private, have taken on an added beauty; if garden and conservatory have been enriched with rare exotics and plants from every clime; if each succeeding year has witnessed an additional interest in the science and art of Horticulture on the part of both our own members and the general public; if this Society has accomplished these results it may well claim that it has shown a "*raison d'etre.*" And that it has accomplished these results there is no room for doubt. I make the assertion, without fear of contradiction, that the two societies, the Massachusetts and the Worcester County, have accomplished more for fruit culture and market gardening in Massachusetts than all other agencies combined. That it has accomplished more for Floriculture goes without saying.

The possibilities of Horticultural science in this direction may be best illustrated in the marked—the almost miraculous—improvements in those three typical plants, the orchid, the rose and the chrysanthemum.

The culture of the orchid with its curious mimicry of organic life—of the bee, the butterfly, the dove, the swan, beetles, flies,

the lady's slipper, and of so many other forms of animate and inanimate nature—with its rich and varied colors, its delicious perfumes, has grown by such leaps and bounds, that its distinct varieties now comprise according to different authorities from 3,000 to 6,000. Of the rose; out of about one hundred botanical species collected from every known habitable portion of the earth's surface, Dr. Lindley has made eleven distinct types or tribes to which all belong. From this material, horticultural art has been able to increase the list of varieties to an almost limitless extent. Some of the recent new varieties surpass in elegance not only any production of a generation ago, but anything that existed in the wildest dreams of the amateur.

But the flower which of all others has made the most marvellous development, and stands perhaps highest to-day in popular favor, is the chrysanthemum. Although its origin dates back, or perhaps it would be more correct to say its existence has been known several hundred years, the centenary of its introduction into England was celebrated only a year ago. Most of the Japanese varieties were introduced into England within twenty-five years, and into this country still later.

It can be recalled early in the history of this Society as an odorless, white or purple flower, imperfect in shape, insignificant in size. At our last November exhibition it had culminated in blooms which rival the rose in beauty and to some of which science has already lent a perfumed breath. In size, the blooms of certain varieties have reached the almost incredible measurement of twelve inches in diameter.

Some of the most unique varieties have been obtained from the Canary Islands, Madeira, Barbary, China and Japan. In those features which distinguish one tribe or species from another there is no flower perhaps except the orchid more strongly marked; and these tribes or species take their name from these distinctive features, as, for example, the Incurved, the Ranunculus flowered, the Recurved or Reflex-flowered, the Anemone or quilled, the Aster-flowered, the Pompone, the small reflexed Chusan, the Daisy-flowered, the quill or Pin-feathered Japanese and the large-flowered Japanese. Like the rose, also, the varieties produced from these species are almost innumerable. At a

recent exhibition in France 600 distinct varieties were exhibited by a single house; and there grew in 1889 in the Chiswick gardens 800 distinct varieties.

But to fully appreciate what this and kindred societies have accomplished for the objects of their foundation we need to look at the beginnings of Horticulture, or rather at the state of horticultural science when these societies began their work. At the beginning of the present century horticultural science was in its infancy. The Royal Horticultural Society of London was the first society of any note in Europe or America to collect and classify plants under the Linnæan system. Its establishment dates back to 1804 and its incorporation to 1809.

Its first active president, Thomas Andrew Knight, F. R. S., in his introductory remarks relative to the objects of the Association, in speaking of the primeval state of those vegetables which now occupy the attention of the gardener and agriculturist, says:

"We possess no sources from which sufficient information can be derived to direct us in our enquiries as to how to trace out the various changes which art or accident has in successive generations produced in each, and are still ignorant of the native country and existence in a wild state of some of the most important of our plants.

"We know that improved flowers and fruits are the necessary produce of improved culture, yet few experiments have been made the object of which has been new productions of this sort; and almost every ameliorated variety of fruit appears to have been the offspring of accident or of culture applied to other purposes. Societies for the improvement of domestic animals and of agriculture in all its branches have been established with success. Horticulture alone appears to have been neglected and left to the common gardener, who generally pursues the dull routine of his predecessor."

He goes on to speak of the mission of the Society, to promote experiments for the production of new and improved varieties of each species of plant and fruit, as well as the improved culture of the known varieties. The Society proceeded to act on these suggestions, and in 1817 it had corresponding members in almost every quarter of the globe. Through the assistance of the East India Company the Society sent its agents to collect plants from Bengal and China.

In 1819 the formation was begun of a collection of models in wax of the fruits grown in the gardens of Great Britain.

In 1820 the Society began the construction of an experimental garden, to become, as expressed in the language of its foundation, "a national school for the propagation of horticultural knowledge and a standard of reference for the authenticity of every species of garden produce." This garden was located at Chiswick, and consisted of a tract of land of thirty-three acres taken under a lease renewable forever at the will of the Society.

In 1822 two agents for the collection of plants were sent out under the auspices of the Society, one of them to the Western coast of South America and the West India Islands, the other to the Eastern coast of Africa, to Lisbon, Madeira, Brazil, and the Cape of Good Hope.

In 1823 a second mission for the collection of plants was organized, and Mr. John Dampier Parks was sent to China for that purpose. In the Spring of the same year of 1823 Mr. David Douglass was taken into the Society's service with the intention of sending him to the coast of Chili, but the disturbed condition of that country at the time made that impossible as an objective point, and he was sent to the United States instead. He selected from the nurseries of New York and Philadelphia such fruit trees as seemed desirable, and made a botanical excursion through the United States into Canada. The Council says of this expedition :

"This mission was executed by Mr. Douglass with a success beyond expectation ; he obtained many plants which were much wanted, and greatly increased our collection of fruit trees by the acquisition of several sorts known to us only by name. It would be unjust here to omit to mention the uniform kindness and attention with which he was received in every part of the United States that he visited. It is most gratifying to have to add that the presents of cultivated plants to the Society embraced nearly everything which it was desirous to obtain, and that the liberality with which they were given was only equalled by the hospitality with which the collector was received. Mr. Douglass was sent in the following year on a similar expedition to the mouth of the Columbia river.

"In the same year, 1824, Mr. James McRae was sent on a like errand to the Sandwich Islands. The Society meanwhile was

not content with mere acquisition. It exerted itself to transmit to various places abroad those seeds and plants known to be wanting to the comfort of its respective inhabitants. These efforts of the Society were appreciated and met with a corresponding return. The East India Co. sent valuable contributions from their gardens and possessions. The Hudson Bay Co. exerted itself to procure and send to the Society anything that could prove useful or interesting; and from individual correspondents from all parts of Europe as well as more remote countries articles of great value and variety were being continually received."

But the Society did not rest content with the mere collection of seeds, plants and trees, and their classification under their botanical names. It began their culture and careful study in their gardens at Chiswick. And in 1824, two years after the grounds were prepared, the Society had at Chiswick the most complete collection of fruit trees and of hardy trees or shrubs ever made, up to that date, in England or any other country. Then followed the construction of hot-houses, green-houses, pineries, melon pits, forcing beds, tanks for aquatic plants, in short, every conceivable structure and appliance necessary or needful for the protection and culture of exotics and the experimental work which followed on flower, fruit and vegetable.

The results of the experimental work of the garden were embodied in a series of papers read before the Society and published in its transactions. During the years 1824, 1825 and 1826, Dr. Lindley, the assistant secretary of the garden, made reports upon 173 new and rare plants which had flowered in the garden. Reports were also made by other members upon experiments and observations.

Nor was the literary work of the Society confined to reports upon the results of work at Chiswick. Papers were prepared and read by men of the highest scientific attainments, professors, Fellows of the Royal Society, Fellows of the Linnæan Society, as well as Fellows of the Horticultural Society itself. During a period of from six to eight years, from 1822 to 1828 or 1830, an average of about seventy per year of such papers were read and published in the transactions of the Society.

These were some of the topics discussed :—

On the accidental intermixture of character in certain fruits.

On the state of Chinese Horticulture and Agriculture.

On the supposed influence of pollen in cross-breeding, upon the color of the seed-coats of plants and the qualities of their fruits.

On the culture of new hybrid passifloræ.

On the culture of the African gladioli.

On the Neapolitan violet.

Many of the papers were of an intensely practical nature, such as the forcing of asparagus, the forcing of garden rhubarb, the best methods of constructing melon pits or strawberry beds, and the culture of various garden vegetables.

All this work the Royal Horticultural Society had accomplished when the Massachusetts and our own Society had their birth. The Royal Horticultural was the pioneer. It led the way. Under the auspices and prestige of royalty, with the contributions of its noble patrons and its army of wealthy members it was able from its very beginning to expend in one line of investigation, or on a single expedition, more perhaps than both our State and County Society combined could expend for the same time for all purposes. It has been able to send its agents to every corner of the earth and to collect and classify the plants, fruits and vegetables of all nations, and has made known and disseminated those worthy of culture, whether for pleasure or profit.

On the profit side the result has been a great impetus to fruit culture and especially small-fruit culture in England. Land there which formerly could not be made to pay with the ordinary crop cultivation, when turned to small-fruit culture pays for the value of the land in a short time, so that the tenant becomes the owner. And the consumption of fruits has increased to more than double within the past twenty years.

The tomato, occupying that half-way place between fruit and vegetable and which half a century ago was hardly known as edible, has now become almost as necessary an adjunct of culinary processes as the potato, and in the season of 1885, no less than 80,400,000 cans of this esculent were grown in Cornwall, Jersey and Guernsey.

Hygienic progress, increased longevity, the diminution of lep-

rosy, scrofula and kindred diseases (although sanitary science has done much), is due to a very large extent to the increased consumption of fruit and the various kinds of vegetable food.

On the æsthetic side it has ministered to the spiritual needs of man. It has gladdened the face of nature. It has adorned and brightened many a humble home. It has poured into the lap of the temperate zone the glowing colors of the tropics and enriched the English park with arborescent beauty. It has made the English landscape a picture on which the eyes of the tourist delight to dwell. A picture which becomes forever afterwards a pleasant memory.

I have attempted to sketch thus briefly the work of the London Horticultural Society, not only as the most striking illustration of the influence and public benefits of such societies, but as leading the way and laying the foundation of the societies which have followed. What it has accomplished has been done not for the benefit of England alone but for all other nations. Our own Society and the Massachusetts have received the benefit of its work, and we have followed its lead though not with equal steps. We have done as best we could with our limited membership and the limited means at our disposal. We have not been able to fit out botanical expeditions or to send collectors to foreign lands. Nor have we found it necessary. This work was accomplished for us by the Royal Society. And many other lines of investigation pursued by the Royal Society have been anticipated by other agencies.

At our agricultural colleges chairs have been established in entomology, meteorology, and botany and at both the Agricultural College and Experiment Station, special attention is given to the study of fungi and to the various diseases incident to plant life. The Agricultural College and the Agricultural Experiment Station with the State and National treasuries behind them have vastly greater facilities for these lines of work than any we could ever hope to attain. We have thus been compelled by the force of circumstances to move in a narrower circle. But within that circle we have accomplished much. Our collection of books forms a library of Horticultural science which, outside of that of the Massachusetts, cannot be duplicated within the limits of this continent.

We have been represented at Horticultural conventions and at those of a kindred nature in other States. We have maintained from time to time courses of lectures from scientists of the highest character, as well as discussions among our members. And each annual report of our Secretary has been a valuable contribution to horticultural knowledge.

Our exhibitions began, and for a long time were confined to a single annual one. They then began to be held at more frequent intervals until they merged at last into weekly displays maintained through all but the winter months. How successful these weekly displays have become, and with what ever-increasing interest they have been attended you well know. We may say of our work what is said upon the tomb of Sir Christopher Wren, the architect of St. Paul's, "Si monumentum requiris circumspice!" if you seek a monument look around you.

And now having reached that point where the last instalment of the Society's debt has been liquidated, and with an increased annual revenue, we are confronted with the problem, what shall be done with our surplus funds? What new departure, if any, shall be made. I must confess that, while I can see no reason to abandon the old methods, with such modifications as changed conditions may make advisable, there is no new field of enterprise to my mind more promising than an experimental garden after the Chiswick plan.

This Society is incorporated for the promotion of Horticultural science; and what is science but exact knowledge, and what is horticultural science but exact knowledge of the structure, growth and life of plants. And how may this exact knowledge be obtained? Not solely from books or from the analysis of the chemist or from the observations of the meteorologist or the scientist, but as well also from the careful study and investigation of the practical gardener. It is not the scientist pure and simple, who has originated new varieties in Horticulture. It is not the scientist, surely, who has enriched pomological nomenclature with pears like Earle's Bergamot, Clapp's Favorite, and Dana's Hovey, with grapes like the Concord and Moore's Early. These were all active and enthusiastic members of the Massachusetts and Worcester County Societies without any pretension to

any special scientific attainments, and who attained results by careful, patient study and experiment as practical growers. I do not mean by this, that such experimental work would by any means be outside the scope of the professional scientist. But the work of the professional scientist has been for the most part confined to the laboratory.

The State Board of Health of Massachusetts, with an annual appropriation of from $15,000 to $25,000 for the purpose of devising some satisfactory system of sewage disposal, have for years persisted in the idea, long ago exploded in Europe, that downward intermittent filtration was the only efficient system; and almost their entire appropriation from year to year has been expended in experimentation in this direction. And almost entirely by simply laboratory experiments. They are now compelled to admit that the *practical* solution of this great problem by our efficient city engineer has demonstrated that, so far as Worcester at least is concerned, they were mistaken, and that chemical precipitation has settled for us this troublesome question.

In this plan, therefore, while the work of the professional scientist would be not only welcome but essential, for the science of Horticulture includes almost the entire range of sciences, we should have also the principles of science practically applied. Phytology or vegetable physiology furnishes still a wide field for investigation. Much has been done in the line of hybridization and cross fertilization, but the possibilities in this direction, judging from what has been already accomplished, are almost infinite.

It would seem that the suburbs of Worcester should afford some tract of land of easy access, of the right exposure, and of other conditions suitable for such an experimental garden. Of course such an enterprise if entered upon should be attended with great deliberation, and years might elapse before it could be fully perfected, before the proper site could be selected, the ground prepared, the proper buildings and appliances constructed and the work in successful operation.

But these are simply crude suggestions. The plan may not meet the approval of your good judgment. You may pronounce it Utopian and chimerical. I offer the suggestions for what they are worth, in no pride of opinion and with the best good of the

Society at heart. But whatever may be the course determined upon, let us hope that the next fifty years may witness in the history of this Society the same enthusiasm, the same unity of purpose, the same good financial judgment, the same uninterrupted growth and prosperity which has marked the first half-century of its existence.

If a trust, in the nature of an educational duty, was imposed upon the founders of this Society in procuring its incorporation, and if we, its present officers and members, in undertaking the administration of its affairs have assumed that trust, may we not say without arrogance that we have not abused it, that we have made of it an institution of public benefit, that we have educated not only our own members but the outside world as well, and accomplished a work for which we shall receive the blessing of coming generations.

15th January, A. D. 1891.

ESSAY

BY

STILLMAN H. RECORD, A.M., OF WORCESTER.

Theme:—The Culture of Lettuce and Cucumbers under Glass.

PERHAPS there is no garden vegetable grown for our markets that requires less skill when raised in open culture than lettuce, for it will grow in almost any good garden soil, and, in open air, is seldom injured by disease. But when grown under glass by artificial heat, I know of no vegetable that requires more skill, or a longer apprenticeship to acquire that skill necessary for successful culture, than does the lettuce plant. I know of successful market gardeners after forty-five years of practical experience in its culture, declare their belief that a crop of good lettuce forced under glass is simply the result of "good luck," because while growing three and four crops per year they say they can get only about *one good* crop in the course of *four years.* Another lettuce grower, though younger in years, yet the largest lettuce grower in New England and probably the largest in America, says, that the same treatment never produces the same result twice in succession. Explanation of these varying and seemingly hap-hazard results, is probably found in the fact, that the culture of plants under glass requires nearly all the conditions for successful growth to be produced artificially, and these conditions, particularly in the case of the lettuce plant, are so numerous, and so obscure, that finite man, even after years of careful observation and practice is not quite equal to the task of bringing about uniform results, though he may attain partial and varying success.

The culture of lettuce under glass is really one of the abstruse sciences, and should be classed among the "learned professions," as much as Law or Medicine or Divinity. If the later cyclopædias do not so class it the bookmakers have failed in their duty. They have not thoroughly canvassed all the liberal arts and sciences, and properly arranged the subjects respecting which they profess to treat.

The lawyer in his study of jurisprudence, and the divine in his search of the Scriptures, have the statutes inexplicably stated and plainly printed language, which can usually be understood without great difficulty. But the horticulturist, who must study and conform to the laws that govern the growth of plant life, does not find those laws written in legible characters on a plain, white surface. His is the more recondite and profound subject. The laws which he seeks to understand and the conditions of healthful plant growth, which he is himself required now to produce artificially, are as obscure as the occult properties of matter itself. Those who have had the longest experience, acquired the greatest skill, and achieved the largest measure of success in producing artificially the necessary conditions for the growth of this difficult plant, are the most frank in confessing their deficiencies. After all they have learned they will assure you that there is yet left ample field for years of further study and careful observation, by the most scientific men in charge of our agricultural experiment stations, before all the conditions of successful growth are perfectly understood.

I confess to a feeling of much more modesty in attempting to give instruction on the cultivation of lettuce by artificial heat than possibly I might have felt immediately after attaining my first partial success. But seventeen years of practical experience, with the prerogative of standing all the losses of many expensive failures, has taught me that there was far more to learn to master the business than I had conceived, even after several previous years of reading and frequent and careful observation of the methods of our largest and most successful lettuce growers around the cities of Providence, Boston and New York. If I could secure correct answers to all the questions which I would like to propound on difficult points to be met with in the

cultivation of lettuce, I am quite sure that my catalogue of questions would outnumber the answers which I should dare to give as the correct ones to questions that might be proposed to me. Nevertheless, I have, I trust, learned some things, at least, as to what *ought not* to be done in lettuce growing.

And as one of the first and most essential things that a novice in any trade or profession needs to know is what he ought *not* do, such negative instruction may be of value to those who have not already learned it in the costly school of experience. My advice to one proposing to begin this business and to follow it as a means of livelihood would be: (1.) *Not to undertake* it at his own expense until he first serves a thorough apprenticeship of several years, with the best lettuce grower that he can find. Even if he should have to give his services, and pay his own board, and pay tuition for several years, it will be cheaper than to undertake it on his own account, particularly on a scale sufficient for a living business, provided he understood the intricacies of the trade himself. Such a course will cost him more money than it need to for a full collegiate and university course of literary and scientific instruction.

(2.) Do not think you can start into the business on a business scale and avoid such losses by hiring a professional expert to manage the business for you, and at the same time teach you the intricacies of the trade. Competent men cannot be hired for that business, at least, not by one who is himself a novice. Having hired the most competent man that you can secure, in all the States, and spread out your property for him to manage, the first you will realize as a tangible result of your enterprise will be a loss of $500 or $1,000 at a stroke by reason of his blunders, or rather his ignorance.

A few years ago, a man having a lucrative business purchased an adjoining vegetable farm, with a greenhouse and four or five hundred hot-bed sashes, and proposed to make a little money out of lettuce growing, by hiring an expert market gardener to operate his glass on shares, while he himself continued his former business. He asked me to refer him to the right kind of a man for such an enterprise, if I could. I asked him if he himself had a practical knowledge of growing lettuce under glass. He said

he had not. But he thought if he could secure a man who had, the man, "while making a dollar for himself, might also make a dollar for him." I told him I knew of no such man to be hired. And, besides, that I had never in all my life heard of but two such men that were hired to manage such a business, and in both these cases the owners gave their personal and constant oversight to every detail of work. I told him that while not able, under the circumstances, to help him make any money, I was confident that I could *save* him at least $5,000 if he would but adhere to the advice which I could give him in just *five* words—"*Don't do any such thing.*" Of course I knew he would not follow it, for it would seem to him to be prompted by personal interest.

He tried his experiment several years with two or more, I think, different men. I occasionally looked in upon him to learn what success attended the enterprise. On my last visit to his place, I met several teams loaded with hot-bed sash which he had wisely leased or sold to a market gardener who understood his business. The green-house was desolate and cold, and, besides, had collapsed under a heavy snowdrift, and the busy hum of market garden work no longer enlivened the scene. He frankly admitted that my advice given him was sound, but boasted of wisdom enough to quit the business before he had sunken quite as large a sum of money as I had predicted.

The Preparation of the Soil.

The preparation of the soil and the manipulations of the plants are very simple processes to one used to ordinary garden work. The soil for the seed bed should be mixed with about one-third its bulk of well rotted stable manure, and made as fine and mellow as thorough spading and pulverizing can make it, to the depth of about one foot.

For the first winter crop the seed should be sown in September, either in open ground or in an uncovered frame. The seed should be covered about one-fourth inch with very fine soil, pressed down gently with the back of a shovel. The best way of covering the seed is by sifting the soil through a fine coal sieve as evenly as possible. The seed, almost invariably used for forcing under glass, is the white seeded Tennis-Ball, sometimes

called "Boston Market." Too great care to get the very best of seed cannot be used.

Pricking Out the Plants.

When the young plants have attained sufficient size to handle easily—say when the leaves are an inch or so across—they should be transplanted, or "pricked out" as it is termed, into another frame of equally rich and equally finely pulverized soil, three inches apart each way. This frame should be covered with glass and, during the warmest part of sunny days, the ends of alternate sash should be raised three or four inches to give air.

If sufficiently late in the season for the ground to freeze quite hard nights and, particularly, if the ground remains frozen during the day outside the frame, the frame should have bottom heat of fermenting stable manure, showing a temperature of 120 or more degrees, placed beneath six inches of the mellow, rich soil into which the lettuce plants are to be set. This bottom heat should be about 8 inches deep, evenly spread and gently pressed down, and when covered the soil should come within two inches of the glass on the south side of the bed. The north side of the frame should be six inches higher than the south side.

While this heat is fresh and active, say for the first two or three weeks and particularly in mild weather, great care is essential to give it plenty of air during the day. At first it is sometimes needful to have some ventilation during the night, by placing a lath flatwise beneath a sash once in twenty or thirty feet. When the weather is cold enough to freeze hard nights the sash are to be covered nights with straw mats, and these mats also covered with broad shutters, later in the season, and particularly when snow comes. These shutters and mats by day are leaned back against the shelter fence, made of tight boards six and a half or seven feet high, two and a half feet north of the frame.

Planting 6 x 6 Inches.

When these plants are large enough to entirely cover the ground, they are again transplanted into another frame filled with fresh heat, a distance of 6 x 6 or 7 x 7 inches, which will give a less number but larger heads.

Great caution should be used at the first transplanting from the seed bed not to use plants that are infested at all with the green aphis or lettuce louse. If by any means even one louse is introduced into your frames, you have a hard enemy to fight, for they multiply so fast that if they do not ruin the first crop, they are almost sure to destroy the second winter crop in those frames. The only effectual way to destroy them, when they get on the plants, is by fumigating with tobacco smoke while the plants are comparatively small, before the foliage is dense enough to prevent the smoke from penetrating to every hiding place. The fumigation of lettuce in the hot-bed frame is much more difficult than it is when growing in the green-house. Indeed, fumigating the frames is seldom attempted. Weekly or semi-weekly fumigation is needed in the green-house when the plants are young.

But the real difficulty in lettuce growing under glass begins when the lettuce is planted upon bottom heat, or in the green-house, after the weather is cold enough to close your house tight and start your fires. Here the necessary heat, moisture, and needed change of air must be produced artificially, and it requires almost infinite skill to understand, and to regulate all these, and adapt them to the varying light and change of outside temperature. The temperature must be lowered just as soon as the sun ceases to shine, even during daylight, or the plants will soon become unhealthy.

As the plants begin to head in and, especially, just before they have attained the proper size and solidity for market, the black rot in the head, mildew and various other unnamed and unnamable diseases, are liable to manifest themselves, that greatly injure and sometimes utterly destroy the crop.

Night Temperature.

It used to be thought that the night temperature should be 45° and from that up to 50°. But experience has convinced many, and our experiment station has verified this opinion that a lower night temperature is necessary to avoid mildew. 40° or less is now regarded as high enough for healthy growth, especially after a cloudy day. The day temperature in clear weather should be allowed to go up to 60° or 70°. If the weather is cloudy the day temperature should not go above 55°.

Ventilation.

It used to be thought that considerable outside air should be admitted every clear day, no matter how cold the outside temperature. This may be necessary for lettuce in frames on fresh and strong bottom heat. But in the lettuce house it is found better to admit but little air unless the outside temperature is as high as 40°. In mild days give plenty of air.

Watering.

Lettuce requires a great quantity of water, especially when heading up, and particularly just before it is ready for market. But too much moisture is sure to induce mildew during the short days of early winter when but little ventilation can be given. To apply the water at such time requires nothing less than an expert, or the constant presence and oversight of an expert. I never knew a raw hand to put on quite *half* water enough the first time even after the most careful directions. Nor would he get on sufficient even the second time though sent immediately over the work. But having been twice shown at how little depth into the soil all the water he has put on, penetrates, in his third attempt he is almost sure to spoil the job by getting on altogether too much.

The only time that it is safe to break in a raw hand at watering lettuce is when the days are sufficiently long and mild to allow a good deal of ventilation. Then place the hose in his hand and a watch in his pocket, and tell him precisely how many minutes to let the water run upon a given number of sash, or a section (space between parts) in your greenhouse.

When to Water.

It used to be thought that the best time to water lettuce was in the afternoon, soon after the greatest heat of the sun had passed, say after 2 o'clock. But it is now found that the best time to apply the water is in the forenoon of a sunny day, as the leaves of the plants have more time to dry off, and are less liable to mildew from a possible too high night temperature.

Mildew.

As mildew is the greatest obstacle to the growth of good lettuce and occasions the greatest loss to market gardeners, it becomes the grower to study most carefully all the conditions liable to produce it, for here, if anywhere, the old adage proves true, that "*an ounce of prevention is worth a pound of cure.*"

Our Hatch Experiment Station at Amherst has already rendered much aid in determining and publishing *some* of the conditions by which this disease may be brought on. But I do not think that they have yet determined all those conditions. Besides, there are several other diseases that appear to be distinct from mildew, which often accompany it—sometimes preceding, and sometimes following it—that are quite as destructive as the genuine mildew. These diseases, if they really are distinct from mildew, do not seem to be described in the bulletins issued by the Experiment Station.

The conditions which produce mildew, as given by the Experiment Station Bulletin, are five, viz.:

(1.) Too high temperature at night, say 45° to 50°.

(2.) Want of proper plant food in the soil.

(3.) Too much moisture in the soil.

(4.) Sudden and extreme changes in the temperature when the plants have been growing rapidly and are soft and tender.

(5.) The same temperature both day and night.

All these conditions, I think, are correct as far as they go. But there is one other condition not mentioned in their bulletins that I am quite sure produces a disease that often accompanies the mildew, and may be a result of mildew, unless it is a distinct disease. The disease is black rot in the head of the lettuce just before it is ready for market, that resembles what is called "scorching" of the head, but is, I think, different from it. Too great *dryness* in the soil, when the lettuce is nearly headed, will cause this phase of the disease.

The rotting off of the trunk of the lettuce just beneath the head, when almost mature—and sometimes so suddenly as to leave the head loose before it has wilted—is another disease that sometimes accompanies the mildew, and may be a result of it, or it may be distinct disease. Too great moisture, occasioned by

dripping around the plant from the glass, seems to be one of the causes of this rotting; also too cold a stream of air dropping suddenly upon the plants seems to be another condition. But after several cloudy days in succession, when lettuce is nearly headed up, this disease prevails most destructively. There is still another cause of many of these diseases to which lettuce is subject, which I have never seen mentioned in any book, nor heard any of these old lettuce-growers refer to as a possible cause, viz.: the transmission of these diseases in the seed. My son first suggested this as a possible, yea, as a probable cause, some years ago, when the mildew and rot seemed to threaten the utter destruction of the lettuce business throughout New England. Acting at once upon that suggestion, I procured some of my seed from a part of the country (Northern Illinois) where the disease had never prevailed, and we became fully persuaded that had we used that seed wholly in the next planting in my house, we should have made a saving of at least one hundred dollars on that single crop.

Remedies.

To check the mildew, evaporated sulphur is often used. When I have used it, I have placed the sulphur in small tin cups, and heated them over kerosene lamps, by a simple nursing lamp attachment to the lamp chimneys. At the Hatch Experiment Station I see their arrangement is similar, but perhaps more convenient—a small kettle heated over an oil stove lamp. Great care is needed to prevent the brimstone taking fire, for, if combustion takes place, all plant life in the house will be destroyed in a very few minutes.

But Sunlight is Nature's greatest remedy for this, and perhaps nearly all the diseases that attack lettuce when confined under glass. It is because we have so little sunshine during the short days of early winter that makes the forcing of lettuce so difficult a business, for when this small amount of sunlight is still further diminished to any considerable extent by cloudy weather, as it frequently is, it is sure to bring disaster to the lettuce crop.

Artificial Light.

But it is right at this point where, I am confident, the next most important advance in lettuce-growing is destined to be

made, viz. : in the use of artificial light as well as artificial heat. Sunlight is one of the most, perhaps *the* most important factor in producing those subtle and mysterious chemical changes, essential in nearly all the processes of healthy plant growth. Ever since electricity was first introduced for lighting, I have believed that the electric light could be utilized in growing lettuce during the long winter nights. I did not suppose, however, that the pecuniary advantage would be enough to pay the cost. But I have often said that if I had a few thousand dollars that I could afford to throw away I would myself try the experiment for the sake of establishing what I believed to be a scientific fact. My reason for this belief was based upon the fact that the electric light has more of the elements of sunlight than any other artificial light, except the light produced by burning silver and gold. The light produced by the combustion of these two metals, we are told by scientists, give us precisely the same elements as constitute sunlight. But such a light would, of course, be altogether too costly for practical use in this kind of horticulture—at least, at the present low prices for lettuce—unless, indeed, unlimited coinage should sufficiently cheapen these metals. Perhaps that is what the Farmers' Alliance is driving at. But I think that gas light, or even kerosene affords a sufficiently brilliant light, if well focused, to show the folly of some of their financial theories.

A few years after I began to discuss my electric light theory for growing lettuce a paper was read before the French Academy of Sciences describing an experiment that had been tried in growing plants by electric light, and that it had proved a success.

In 1887, while spending the winter and nearly all the summer on the gulf coast at Tampa, in South Florida, an electric light plant was built in that city. The electrician was a young man from Chicago, whose acquaintance I made, and with whom I used to spend an occasional evening in social chat and discussing electrical questions, and in trying amusing electrical experiments, some of which we used to try in the college laboratory. Outside the office door of that electrical light plant was suspended an arc light of, perhaps, 2,000 candle power. I noticed that under that light the grass and weeds grew much more rapidly and vigorously

than they did just around the corner of the building, where they did not get the direct rays of the light. Perhaps you, who reside near the electric lights in this city, may have made similar observations.

I know of only one person who has actually tried the experiment of growing lettuce under electric light, and that is that enterprising Arlington market gardener, W. W. Rawson, whom you well know. It was about two years ago, I think, that he began the experiment. He was then confident that the light would be of sufficient advantage to pay the extra cost. Desiring to learn further about his experiment, I wrote him a short time ago, inclosing a list of questions and leaving blank spaces for him to fill with brief answers. To me these answers are exceedingly interesting, for they more than confirm my most sanguine expectations, at least, so far as pecuniary results are concerned.

Here are my questions and the answers given by Mr. Rawson :

1. How many seasons have you used electric light in lettuce growing? One.
2. How many hours each night? Until 1 o'clock.
3. Number of lights in each house? One are light outside.
4. What kind ; arc or incandescent? Arc.
5. Candle power of each? 2,000 ; total power.
6. Number of houses lighted? One.
7. Size of each house? 200 by 24.
8. Cost of the lights? $15 per month.
9. How much time is saved in growing a crop in the short days of December and January? 20 per cent.
10. Does the light improve the healthfulness and quality of the lettuce? It does.
11. Is the pecuniary advantage enough, on the whole, to pay the extra cost? It is.

Accompanying the above answers, Mr. Rawson sent the following letter :—

Boston, Mass., Jan. 3, 1891.

Mr. S. H. Record.

Dear Sir.—I have answered your questions and I should have had the lights this season if I could get them, but the Company have sold all their power, and I wanted three large lights, 2,000

candle power each, but they could not furnish it, so I shall try again next season. I am very sure it will pay in two ways,—in the time and in the quality. Hoping this will be satisfactory, I am yours truly,

W. W. RAWSON.

I also wrote President Goodell, at the Hatch Experiment Station, to ask whether they had made any experiments of growing lettuce under electric light, or whether they had collected any facts on that subject from other sources. I asked for the address of any parties either in this country or Europe who had made the experiment, if he was able to give them.

Since writing this part of my essay I received the following letter from Prof. Warner, the meteorologist of the Hatch Experiment Station :—

AMHERST, MASS., Jan. 9, 1891.

MR. S. H. RECORD.

Dear Sir.—President Goodell asks me to answer your favor of some days ago. I am at present preparing an article on Electric Culture, or Electricity in Agriculture, which I may publish in bulletin form later. The experiment of which you speak has been tried in Europe and also at Cornell University. I have also studied the effect of electric light on plant growth. The experiment in Europe was in favor of the electricity. At Cornell, I understand, the plants grew very rapidly, the foliage was much better, but fruit-bearing plants were not as prolific under the influence of electric light as when grown in the natural way. Electric light has many of the essential properties of sunlight, but it remains yet to be proved whether foliage plants can be grown profitably by this artificial means. My experiments with dynamical electricity on the growth and development of foliage plants has led me to believe that electricity, as it exists in the atmosphere and ground, is a potent factor in the economy of nature and has much to do with the growth of vegetation. I have grown lettuce by this means and found in two cases—I have only recently started—that the advantage was in favor of electricity, the plants were better and healthier. I shall continue my experiments in this direction, and will give them to the public from time to time. Yours very truly,

C. D. WARNER.

HEATING GREEN-HOUSES.

I have had experience with but one mode of heating a lettuce house, and that by hot water. In my house, 26 x 168, I have

1,200 feet of 4-inch hot water pipes, heated by one of Smyth & Lynch's largest boilers (No. 7), which is guaranteed to heat 1,600 feet of 4-inch pipe. I think that most of the lettuce houses built within the last few years are heated by steam. It is claimed for steam, at least by those who make steam heating apparatus, that you can heat a house quicker, and that one can better control the temperature.

Some three years ago, Mr. Budlong of Providence, I am told, tore down and rebuilt his four large lettuce houses, varying in length from 150 to 500 feet, and is heating the new houses with steam. Probably the principal reason for displacing his old houses, was to substitute larger glass for his 6 x 8 light hot-bed sash with which his old houses were covered, and which he could utilize quite as well or better on his hot-bed frames. Whether his new steam heating arrangement is an improvement enough over the water heating, to warrant so expensive a change, I do not know. But I very much doubt if it is.

I base this opinion upon the results of a careful, comparative test of hot water and steam heating for lettuce growing, made by the Hatch Experiment Station, and published in their Bulletins, Nos. 4, 6, and 8, in which every detail of the experiments are minutely described, and the daily and final results are tabulated.

Two houses were constructed during the summer of 1888, 75 x 18 feet, as nearly alike as possible in every particular. Two boilers of the same pattern and make were put in, one fitted for steam and one for hot water. Their first published test showed that the hot water gave the best results, and at a saving of cost of about twenty per cent.

Much discussion having been provoked relative to the results of that experiment, and especially as to the accuracy of those results, last winter, 1889–90, they made a "careful repetition of the experiments to correct any errors that might be found and to verify previous results, the boilers having been run with the greatest care possible from Dec. 1, 1889, to March 17, 1890," and, as before, the temperature was taken five times every twenty-four hours and the coal used in each house daily, weighed. This experiment confirmed the results of their former experiment, as

to temperature, and the better control of heat, secured by hot water, and this time at a saving of over 32 per cent. in coal in favor of the hot water.

Cucumbers Under Glass.

The conditions required to grow cucumbers successfully under glass are, in several important respects, radically different from those of lettuce—so much so, that the two plants cannot be grown together in the same frame or green-house. The high night temperature (60° to 65°) which the cucumber requires would be ruinous to lettuce, while the low temperature (35° to 40°) at night needed for the healthy growth of lettuce would soon give the cucumber its death.

Both lettuce and cucumbers might do fairly well together in the day temperature suitable for lettuce in sunny weather, provided no cold air was admitted to keep the thermometer from going above 70°. But while we should ventilate the lettuce when the thermometer was getting above 70°, we should not give air to cucumbers until the temperature reached 100° or more.

Another radical difference between the cucumber and lettuce is in the very much greater skill and care required in manipulating the cucumber plants. Any one can transplant the lettuce and make it live. None but an expert can transplant the cucumber with any success at all. A single day's work of a novice at potting cucumber plants once occasioned me a loss of a little over $300 even after being carefully instructed and shown just how to do it.

But even very much greater skill and care are needed to transplant a cucumber from the pot or from the bed into the place where it is to grow and fruit, than in potting the plant when small. If the soil falls off, or becomes very much loosened from the roots of a large cucumber plant when placing it in the hill, you might as well throw it away, first as last, for it can seldom be saved so as to amount to anything.

In planting out the cucumber into hills where it is to fruit it must be handled with such gentleness and care that it will never know it has been moved. To check the growth, even but a little, does the plant an almost irreparable injury.

The great secret of success in forcing cucumbers under glass, consists in giving the seed a quick start, and then keeping the plants growing rapidly and *continuously*, without any check if possible, either from unskilled handling or lack of heat or moisture.

The Seed Bed

Should consist of some six inches of finely pulverized and moist soil, placed on top of a foot or more in depth of fresh and very active bottom heat—stable manure in a very high state of fermentation—or in direct contact with the water tank of an incubator. It does not require a large space simply for the germination of a large quantity of seed, for the seed may literally cover the ground, or even be two deep for that matter, provided it is well covered with soil. Cover an inch deep with mellow soil sifted through a fine coal sieve, or mason's sieve, and press down firmly and evenly.

Potting the Plants.

Just as soon as the plants show themselves above the soil (which will be in 48 hours or less, if your heat is just right) they should be pricked out into pots (3-inch pots are about the right size) in fine, moist, warm soil, firmly pressed in and then plunged in soil over fresh fermenting manure in a hot-bed frame, or else in a house heated to a high temperature.

When the air outside is mild, ventilation should be given, but not enough to cause the thermometer to drop below 75° or 80° in the daytime.

The soil in the pots should be kept moist by frequent watering with warm water, if you can. Though this is not absolutely necessary.

Repotting.

When these plants have grown a few weeks in the pots, and especially if they become "long-legged," as gardeners term it, it is well to repot them, setting them deeper down in the soil, and perhaps in a pot one size larger—say a 4-inch pot. A larger pot, however, is not always necessary, for it is well to let the plant

roots pretty nearly fill the pot before being transplanted to ground where they are to grow.

Another plan of growing the plants, is to transplant them once or twice into the soil over the bottom heat in the frame, or in the house soil instead of into pots, at least 6 x 6 inches apart. When grown in this manner greater care and labor are required for the last transplanting into the place where they are to fruit. This is done by pressing deep into the soil around each plant a short piece of 6-inch stove pipe made smooth and sharp at one end. Then a shovel is pushed beneath the stove pipe, and the plant and its surrounding soil carried without disturbance and planted where it is to grow and then the stove pipe is withdrawn.

The plants should be from 8 to 10 inches tall, and as stocky as plenty of room will make them, and just beginning to put forth runners, when removed to the soil where they are to fruit.

If they are to fruit in hot-bed frames, a ditch 18 inches wide and 12 or 15 inches deep, running along the middle of the entire frame, should be filled with bottom heat and covered six inches with fine soil, which should be allowed to get thoroughly warmed through by fermentation and sunlight before receiving the plants. In a heated house no bottom heat like this is necessary.

From this time on, until large enough to fruit, the principal labor and care will be to keep them sufficiently moist and sufficiently warm, giving some air, of course, when the weather is mild.

One plant to each sash (3 by 6 feet) is sufficiently thick for fruiting. In a green-house the vines are trained on a trellis, usually made of tarred marline or lathe yarn, about one foot apart, stretched tight on leaning supports. In the hot-bed frames the vines are left upon the ground.

Fruiting.

When the plants have attained a vigorous and stocky growth of some three feet or more in length, they may be allowed to begin to fruit. If your vines are in a house now is the time to bring in your bees that they may mix the pollen, which is necessary for fruit bearing. If your vines are in hot-bed frames and

the season is not sufficiently advanced to permit them to be opened, at least a part of the day, for bees to enter, and particularly if too early in the season for bees to be flying, the fertilization or mixing of the pollen must be done by hand, else you can have no fruit.

But cucumbers grown in frames where it is so difficult to introduce the bee while the frames are closed, are not often planted early enough to require hand fertilization, as this would be slow work, although it can be done and often has been done.

Watering.

The cucumber, as well as lettuce, requires a great quantity of water, especially when fruiting and particularly after the weather gets warm enough to keep your house or frames open nearly all the time. A thorough watering every alternate day is then required to keep the plants thrifty and prolific.

My house having a slope of one foot in sixteen, I have for several years irrigated instead of taking the time of one man half of each alternate day to water the plants. This I do by letting the water run through the hose on to the bed at the upper end of the house, and follow a slight depression or channel in the soil along the roots until it reaches the lower end, changing once in several hours to other grooves on each bed until all parts have been sufficiently moistened.

We practice the same method also with the cucumbers in the outside hot-bed frames, which are also on sloping ground.

Diseases and Pests.

The cucumber does not seem to be so susceptible to diseases as lettuce, and in this respect is very much less difficult to grow.

Last summer, however, nearly all cucumber vines in this locality and particularly those in open culture, later in the season, seemed to be affected with some disease that nearly ruined them. Perhaps this was in part due to insect pests, for there are of late getting to be several destructive insect pests besides the old striped cucumber bug and the large black squash bug.

Last summer the cucumber vines in my green-house, when fully grown and yielding their best fruitage, became suddenly and

almost completely infested with a dark-colored aphis, or louse, upon which tobacco smoke seemed to make no impression. They nearly covered the under side of the leaves and soon sucked the life out of them. The whole crop was destroyed fully a month before they would have ceased bearing, if unharmed.

Twice, specimens of these insects were sent to the Hatch Experiment Station, but both times failed to reach the Professor of Entomology before the leaves became dried up and the insects invisible. Once the professor was at South West Harbor, Maine, on a vacation, and the insects were forwarded to him from Amherst. Why the second installment should have failed to reach his assistant at the station I know not.

I afterwards sent some cucumber leaves from the later vines in out-door frames, which were infested with a similar pest, if not indeed identical. My son was doubtful about their being the same insects. Prof. Fernald pronounced these the *aphis cucumeris*, a real plant louse, but the "life history of which has not yet been fully made out." He says, "There appears to be three forms: 1st, wingless females like those you sent; 2d, males and females with wings, which pair and lay eggs, but where is not known; 3d, a wingless form that feeds on the roots, differing considerably from those you sent."

He mentions "Road dust, Pyrethrum powders, tobacco smoke, and kerosene emulsion; all which have been tried with varying success," he says. But he suggests avoiding growing cucumbers on the same ground next year where these pests appeared last season. He makes the same suggestion for squashes, melons, etc., that have been similarly infested.

For the destruction of the root-infesting aphis, he recommends the use of "*bisulphide of carbon*, half a teaspoonful poured into a hole two inches or more deep made in the ground about three inches from the stem of the plant. Then press the dirt together and down into the hole as compactly as possible."

"The liquid changes to a vapor which is deadly to insect life, and as it permeates the soil it reaches the roots and destroys the insects feeding on them. It must not be used where there is a light, as an explosion might occur."

Cucumbers grown in out-door hot-bed frames or following let-

tuce in a lettuce house, in this latitude, are not usually sown until into March or April, and planted out where they are to fruit a month later, so as to come into bearing the last of May or first of June. To grow them in mid-winter it is necessary to have houses built expressly for this business, double glazed all over. But this is so expensive and the winter market is so limited but few undertake it.

22d January, A. D. 1891.

ESSAY

BY

J. HOWARD HALE, OF SOUTH GLASTONBURY, CONN.

Theme: — Small-Fruits; their Culture and Variety.

PRESIDENT PARKER introduced Mr. Hale, who proceeded at once to the consideration of his theme.

He said the increase in the consumption of small-fruits in the cities has been remarkable in the last twenty-five years. As people grow more refined their appetites become refined. A wonderful mental development is going on in this country, and that means an increasing demand for the delicate fruits. The market for poor fruit grows poorer at the same time, and the profits go only to those who grow the best fruit.

The old method of raising strawberries and raspberries in matted unkempt beds after the first year is no longer profitable. An average family of refined tastes will use 15 to 30 quarts of strawberries a day if given a chance at a field, and the farmer who neglects to plant his own fruit on the plea that his ground is unfitted, and that he can better afford to buy what his family needs, is sure to fail to keep his family supplied with the luscious berries. Every farmer has some land that will produce fruits for the family, and the production of his own food should be his first care. Any one near a small town can cultivate small-fruits at a profit. I should not advise a farmer who is at a distance from a railway to raise small-fruits on a large scale. Generally, any good corn land will be satisfactory. It is well to have a variety of fruits, so that the failure of one crop may not be a failure for the whole year's work. The strawberry is the leading fruit and the first to ripen. If your soil is light the

strawberry is the best plant, but if you wish to raise good berries, a strong loamy soil is better. On light soil, plant varieties that root deep. Low swampy places, I think, will afford excellent crops of fancy strawberries. In preparing the ground plough eight inches deep, unless the subsoil is poor. Subsoiling is satisfactory when possible. After ploughing apply the manure, and harrow it in. For strawberry culture commercial manure suits me best. Stable manure furnishes more nitrogen than is needed. It will make the foliage growth heavy and handsome, but the plants will not be so fruitful as when fed with commercial fertilizers. Make your own fertilizers. We use a fine ground bone for the phosphates, and wood ashes, cotton seed ashes, or muriate or sulphate of potash for the potash.

Apply a ton of bone and a half-ton of the potash for one acre of ordinary soil for the raising of fine fruit. Give each plant a square foot of soil. Plant the rows three feet apart, putting the plants from 12 to 18 inches apart. Another plan is to mark the field in "check" rows four feet apart, and put the plants in hills. This plan permits cultivating with the harrow.

In the first plan a few runners should be allowed to grow in the row. In the second, or "bog hill" plan, a new bed can be started easily. As soon as the berries are picked go to work on the bed. A horse and cultivator should go through as often as three times a fortnight all summer, and the field should be hoed by hand once in two or three weeks till October. The "Sunnyside" hoe, invented by Mr. Earle of Worcester, is the best. We use the French cultivator, which has adjustable teeth. The mulching in the fall is most important. Many a field has been ruined by mulching it too early. Don't mulch till the ground is thoroughly frozen. If your bed has not been mulched yet, it has not been harmed. The danger is from thawing in the spring. Don't mulch too deep. A ton and a half of marsh hay per acre is enough. Coarse stable manure may be used, but it is the poorest of all mulch, because it stimulates the growth of the foliage, to the detriment of the fruit. Let the plants grow up through the mulch. Irrigation produces magnificent results. Sprinkling water on the ground is the least satisfactory irrigation.

In the family plot, if the small boy will not, the women generally have to pick the berries. For market, good girls and women make the best pickers. Boys are a nuisance usually. Not more than a dozen pickers can be managed by one superintendent. I pick early in the morning for local markets. For shipment it is better to pick towards night. The fruit picked when dry in the afternoon will keep 48 hours longer than that picked when wet with dew. Berries should be packed honestly in new white baskets. Don't pack a basket of berries you would not be satisfied to buy yourself or give to your best girl.

The Crescent Seedling is, perhaps, the best known variety. The Haviland sells well and is profitable. The Bubach is another profitable berry. The Crescent lacks fertilizing properties, and other varieties, such as the Ironclad, have been planted with them to furnish pollen. The Warfield is another pistillate that is a good general purpose berry. The Charles Downing and Winner's Prolific are both excellent berries. Sharpless succeeds well, but is not very profitable.

It is impossible to predict the success of a berry in any locality. You must try the varieties for yourself.

F. J. Kinney, A. J. Marble, and Henry Reed, of Brookfield, asked the speaker questions on the variety and culture of strawberries.

R. A. Abbott said that he had had trouble with the Haviland.

James Draper asked if the speaker did not think that pistillate varieties were affected by the kind of berry from which the fertilizing pollen comes.

Mr. Hale did think so.

Herbert Cook, of Shrewsbury, who was called upon, thought occasionally over-production by reducing the price and tempting non-consumers to become consumers increased the demand for fruit ultimately. He favored sulphate of potash instead of the muriate. He did not believe that the second year of cultivating strawberries would pay.

Mr. Kinney said he managed to get a good crop of grass besides the crop of strawberries during the second year.

Mr. Hale then spoke of raspberry culture. Raspberry plants should be set late in the fall or very early in the spring.

Blackcaps are hard to set. Many plant them in hedge rows. "Check" rows are cheaper. The best pruning is done by pinching the new growth of the cane. It don't pay to cut out old canes before spring. In the winter they sustain the new canes. In the spring they can be cleaned cheaper. It pays to use pint or half-pint baskets for marketing. The Springfield Blackcap is early and good. The Gregg is the largest, but not reliable. The Pioneer is new and vigorous. The market for raspberries is limited and peculiar.

There are too many wild blackberries for the blackberry to be a staple crop here. The "Lucretia" dewberry (the ground blackberry) is a very rich, large berry. Let it run on an arbor; on the ground it is hard to pick.

There is a splendid market for currants here. At present New York supplies three-quarters of the currants used in New England. The Victoria is late, hardy and profitable.

29th January, A. D. 1891.

ESSAY

BY

WILLIAM H. SPOONER,

President of Massachusetts Horticultural Society.

Theme:—Garden Roses; and their Culture.

The taste for the cultivation of the Rose is constantly increasing, and the demand for the finer class of flowers is steadily growing; and the first question that a would-be grower naturally asks, is, "What varieties shall I plant, and how shall it be done to the best advantage? What class of plants shall be used for the purpose, the so-called worked, or the own-root plant?" There seems to be a peculiar fascination in this study even for persons of the highest culture; the yearly changes in the rose garden are so many that the charm never ceases. My friend Francis Parkman, the eminent historian, is a living example of its influence, and has given it expression in his charming published work upon the Rose.

The late George Bancroft, statesman and historian, found that his rose garden furnished one of his most healthful exercises, to which he was largely indebted for his good health; and even if one does not attend to the practical details of culture, there is great pleasure in the inspection of the flowers.

As to the soil best adapted for their success, since we are often obliged to conform to the conditions that surround us, almost any soil may be worked into the proper state by careful treatment. Soils best adapted to the rose are those of a somewhat tenacious character, or such as are not likely to dry quickly; but any good garden soil, properly trenched after being well drained, and thoroughly sub-soiled will be likely to produce

the desired results. Avoid a location where water will stand about the plants in winter.

Autumn is the best time for trenching. In doing this, take a given amount of ground, dig a trench at first a spade in depth, and half that in width, removing the soil to the other end; then turn up the sub-soil at the bottom of the trench, place on it a plentiful supply of manure, not stirring it in, cover with the soil from the next trench and so on till all is complete. Half-decayed leaf-mould, spent hops, or fresh manure will answer the purpose, as the manure will be in good condition for the plants by the time their roots reach down to it. A space of three feet between the rows and two feet between the plants is a suitable arrangement of distance, as the plants can then be easily banked with soil for protection in winter,—quite an essential matter with Teas, which are more tender than Remontants and require more covering. In planting, dig trenches about twelve inches wide and from sixteen to eighteen inches deep; in the trench should be placed a liberal supply of well-rotted manure, with a little ground bone, all to be turned under with a garden fork.

The next branch of our subject is the selection of stocks, as the roses, if not on their own roots, are worked either on Manetti, Brier, or De la Grifferaie stock. Which of these is the best has been a matter of much dispute among cultivators, and is likely to continue, as the finer varieties cannot be had except worked on one or the other of these stocks.

The Manetti, for rapid increase of stock and for early maturity, is by far the best, especially on light soils, though it will flourish in almost any soil.

The Brier stock is suited to wet or stiff soils, producing its roots in a thick cluster at the base of the shoot. The Grifferaie stock is strong, and well adapted for this purpose; it is in itself a rose of great vigor and hardiness, a very free bloomer, and quite distinct in color,—so much so as to be noticeable in a collection.

In using the Manetti stock, if planted two or three inches below the collar or junction of the bud with the stock the bud will throw out roots of its own, and with this addition will pro-

duce plants of remarkable vigor. A very good method of developing the roots rapidly is to tongue the collar of the bud, by paring up a strip of the bark about one inch long on each side of the collar, and planting this below the surface.

The leaf of the Manetti is not to a beginner very easy to distinguish from the ordinary rose leaf. The stem after attaining a little size is of a reddish tinge, brown upon the older portion of the stem, generally with seven leaflets, the suckers coming up about the stems, while in the Brier the sucker is likely to extend some distance from the main plant. This latter stock starts late in the spring, which causes the plants to flower later. It is well adapted, for this reason, to the tea rose, which is grown almost entirely in this way in England, and is admirable for bedding purposes, growing with great vigor.

The production of own-root plants is a slow process, attended with considerable labor and expense; plants for stock must be grown along for one season in pots, in sizes from three to five inches in diameter. In the summer, these are plunged in the ground to the top of the pot, to prevent the plants from drying up too rapidly; and they must be kept thoroughly watered, and in a growing condition until August, when water is gradually withheld to ripen the wood, and allow an early start in growth in the autumn. By placing them in what is called a cold frame, that is an ordinary hot-bed, three to four feet deep, without artificial heat, covering with glass and shutters to prevent freezing, and keeping them in this condition from six to eight weeks in a temperature of about 40°, they will slowly start into growth, and when started about one-half inch they can be brought into a higher degree of heat; in six or eight weeks they will be in fit condition for making what is called green wood cuttings. A bed for this purpose should be prepared with coarse, clean sand about three or four inches in depth, into which the cuttings are inserted about one-half inch, and firmly pressed into place; they must be well watered and shaded from strong sun. These cuttings must be made with a single leaf to start the sap, and cause the cutting to callous before it forms its roots; this leaf will drop off in about two weeks. A continuous and uniform heat must be kept under the cutting bed, about 70° or 80°, over it about 20° cooler; it

will require from five to six weeks to properly form the roots. When the perfectly developed plant is taken from the sand and placed in a 2-inch, or thumb pot, so-called, these potted plants are placed over heat again to cause growth as quickly as possible. Several weeks will be required to give the plant strength to take care of itself, keeping it watered, meanwhile, and by the first of June the little pot will be full of roots and the plant in condition to transplant into the open ground, or (if intended to be grown in pots) placed in the size larger, say 3 inches, and gradually on to 4 or 5 inches.

After our plant is put into the ground in June, care will be necessary to keep the weeds down, and if the weather is dry, frequent watering will be required for the first few weeks, and hoeing at least once a week. At the end of the season our plant is about one foot or more in height.

If we intended to leave the plants in the ground for two years, they would be planted in rows two feet apart to allow room for drawing the soil about them in the fall for winter protection; but if to be lifted for autumn potting, we should place the rows nearer together, say 1½ feet apart for economy of room. It will be seen from our description of a one-year-old plant that the size is small, with very little fibrous root, consequently there is considerable danger in transplanting that it may die; a two years old plant is better, while a three years old is far preferable. It will be readily seen that the process of growing the *own-root* plant is very slow and expensive, and in commerce, we seldom find a satisfactory size for the purpose.

Another plan for striking own-root cuttings is to take them off in the autumn. Having decided about the quantity of cuttings which is wanted prepare a small frame of suitable size, place it on firm ground, and on this put six or eight inches of light soil with a plentiful addition of coarse sand. This should be pressed very firmly, watered, and left to settle; the cuttings can then be prepared. Select well ripened shoots as soft wood will generally die; these should be cut off at a joint; and some propagators prefer a shoot taken off with a so-called "heel," that is, a piece of the old wood of the shoot from where the cutting is taken. The cuttings should be from five to six

inches in length, and all eyes should be left. They should be inserted in the soil nearly their entire length, and care should be taken that they are pressed very firmly in the ground leaving no chance for water to get in and rot the shoot; cover closely with sashes for a few days. Before cold weather sets in, an inch depth of leaves should be spread about the cuttings to prevent the frost throwing them out of the ground. In the spring, they should again be pressed firmly, as the frost has probably lifted them to a certain extent. This plan of propagation is not attended in this climate with much success; it is not easy to find the cuttings in just the best condition; and the most successful system is that adopted by the commercial florists, of growing from what is called green wood cuttings, as first described.

The best plan of propagation for an amateur if he has a few plants in a healthy, growing condition, and desires to increase them himself is by layering. The process is easy. First stripping the leaves from a portion of the stem to be layered, make a cut on the upper side about one inch in length, then twisting it slightly so as to bring the tip end of the stem upright, or nearly so, and the tongue made by the cut pointing downward, draw the soil away so as to allow the burying of the shoot about three inches, pegging it down with a forked stick to hold securely, draw the soil about it, and press firmly. With most varieties this tongue will soon callous over, and roots will be produced from it. The work should be done from the middle of July to about September 1st. July is the best month, as it gives a longer season of growth.

Planting.

There is a difference of opinion in regard to the best season for planting. If we could control our seasons, autumn would be the best time, as the plant becomes thoroughly settled in the ground, and consequently starts with the season in the spring. The work should be deferred as late as possible, so that the wood of the plant will become thoroughly ripened, giving a chance for the sap to return to the root; this is particularly important for the dark roses of the Jacqueminot type, as they are very late in maturing their wood. This is one great difficulty

with that most beautiful of all dark roses, "Louis Van Houtte," and I never should plant the latter variety in the autumn, nor the Hybrid Teas, such as La France, Capt. Christy, &c. Of course in autumn planting, some protection is required from extreme atmospheric changes. This can be done by drawing the soil nicely about the plants from ten to twelve inches high, and heaped above this a liberal coat of manure; cold, green manure will answer the purpose as well as rotten.

In spring planting, there is no danger from loss by frost, and if done early in the season as soon as the ground is in condition, it is a safe practice. Plants which have been carried through the winter in a sound condition are in a suitable state for planting at this time. After planting care should be taken to prevent the surface of the ground from becoming parched or baked, by frequently stirring with the hoe, and by syringing the top of the plant to prevent excessive evaporation from drying winds, which causes the stems of the newly-planted rose to wither and die.

Pruning.

The object of pruning is to shape and strengthen the plant, and to give size and beauty to the flower. I do not believe in autumn pruning: it is so apt to cause the low dormant buds to push. This late growth seldom matures, and the tendency is to weaken the plant at a time when its strength should be reserved in its main stems in preparation, so far as possible, for the next year's growth and bloom. The best time for pruning is in April, after the soil has been levelled from about the plant and the manure covered under as much as possible, if it was put on in the fall.

In a few days after the buds have swelled sufficiently to show their condition, the work can begin by cutting out all dead wood, and all wood that indicates weakness, cutting the plant back to the plumpest bud, and all weak shoots should be taken out, so that none shall cross each other. It is the top bud that will grow first and in the direction in which it points, and we should cut back to a bud that points outwards. If we want to get rid of a misplaced shoot, cut it out to the bottom. It should

be our endeavor every year to get rid of as much of the old wood as possible, keeping the centre clear, cut with a ruthless hand, particularly with old plants. The question is often asked how many buds shall be left to a shoot; our answer is, "more buds can be left on each shoot in proportion as the plant, both as a variety and as an individual, is strong, and less in proportion as it is weak." That is, in the case of "Mme. Isaac Pereire," for example, which is a plant of remarkable vigor, the shoots should be left much longer, with a much larger number of buds, than in such a variety as "Horace Vernet," which is a weakly grower, giving perhaps but a single shoot and that one very weak, and perhaps not more than two buds; therefore the general habit of the variety must determine how far to cut back, and how many buds to leave. "Prune to an out-looking bud; as a general rule the more a shoot is cut back the longer will be the growth from the bud left at the top." We frequently find at the end of the season, "an extra well-ripened shoot, almost as firm as the old wood, with large buds. This is valuable, and plenty of space should be allowed for its development, less ripe shoots being removed to make room for it." All intersecting shoots should be cut out, so as to leave the centre of the plant with a free exposure to the air and sun, for it is among these short stems that the red spider and other pests harbor in the summer.

Pruning for exhibition should be done differently, as in this case our growth is for the best development of size and form. As but few blooms can be expected from a single plant, the number of plants of a single kind should be increased, all new light wood should be cut away, and a few shoots only left of extra strength and but few buds to a shoot.

Another important point for exhibitors to remember, a few weeks later in the season, is that for growing large flowers, a certain amount of disbudding must be practised. Around the central flower bud, will be noticed two or three smaller buds, which must be removed to throw the entire strength into the central bud; then if properly cultivated the single stem will carry a splendid flower. Several applications of liquid manure not too strong (about the color of weak tea), to the root of the

plant a few weeks before the bud opens, will have an invigorating effect upon the flower. This application should be made again after the first crop is over, to give increased strength to the autumn bloom. But we cannot have good blooms without fine foliage and this can only be secured by early and constant attention. As soon as two or three leaves are formed in the spring, we must dust or sprinkle them with hellebore, and watch for the worm that ties the tender leaves together, to destroy him, for he will soon be ready to nip the delicate bud. He is easily found by a little attention at the right time, and after overcoming his advances we may expect to gather a harvest of beautiful flowers. Later on, the rose-bug will be the next invader, and must be picked off as soon as he appears. The green fly must also be looked for, and hellebore is useless for it, whale-oil soap and tobacco steeped together being the remedy.

An exhibition of roses is not always the best place to select varieties for general culture, as the exhibitor is forced to take whatever is at hand on the required day; it might be a single bloom of Horace Vernet, and the only one of the season, or perhaps Gloire de Bourg la Reine, or Mlle. Marguérite Dombrain.

The chief purpose of my paper, however, is to select and name a list of twelve, twenty-five and thirty-six kinds the most suitable for general cultivation.

Selection of the best twelve Remontants:

Alfred Colomb, Charles Lefebre, John Hopper, Hippolyte Jamain, Mrs. John Laing, Merveille de Lyon, Mlle. Annie Wood, Mme. Gabriel Luizel, Mme. Victor Verdier, Ulrich Brunner, Victor Verdier, Prince Camille de Rohan.

For the best twenty-five, to the foregoing add the following:

Anna de Diesbach, La France, Baroness Rothschild, Dr. Andry, Mabel Morrison, Marquise de Castellane, Duchesse de Vallombrosa, Mlle. Eugénie Verdier, Dupuy Jamain, Mons. Boncenne, Jules Margottin, Paul Neyron, Prince Arthur.

For the best thirty-six, to the foregoing add the following:

Camille Bernardin, Fisher Holmes, Catherine Soupert, Countess of Roseberry, Duke of Edinburgh, Etienne Levet, Francois Michelon, Louis Van Houtte, Maurice Bernardin, Pierre Notting, Thomas Mills.

As a desirable selection of Moss Roses I would suggest:—

"Common, or Old Moss," vigorous free grower, color pale rose, fine double flower; the best of all.

"Crested," next best, of vigorous growth, flowers very large and double, buds beautifully crested, color light rosy pink.

"White Bath," a good grower, flower large and full, buds well mossed, pure white.

"Laneii," vigorous, upright grower and moderately free bloomer, color deep rose, round handsome bud.

"Baronne de Wassenaër," color deep rose; perhaps the strongest grower of all; wood very dark and spiny, blooming in large clusters of buds, not as mossy as some others.

"Celine," hardy, moderately vigorous, spreading, foliage dark colored, leaves rather small, a profuse bloomer, bud rather soft, not very double, color purple and crimson, pretty in bud.

"Marie de Blois," rosy lilac, large and full.

A few perpetual Mosses which are good:—

Blanche Moreau, a strong grower, the bud quite mossed; the expanded flower is large, full and fragrant; color pure white; the growth is upright; one of the best of this class.

James Veitch, a plant of good habit; color of flower dark violet shaded with crimson; fragrant, well mossed.

Salet, a very strong grower of spreading habit; color bright rose, blush edges, large and full.

Soupert et Notting, a plant of medium growth, flowers beautiful bright rose; large, full, and of perfect globular form; scented like the Cabbage Rose, rather uncertain.

Tea Roses.

A bed of Tea Roses should accompany the Hybrid Perpetuals in every garden, for the purpose of prolonging the blooming term, as the Teas are the only true perpetuals. They should be planted in beds in a rather dry position, somewhat shaded from sun, and in regular rows so that the plants can be covered with soil and leaves or litter for winter protection. I should here add a word of caution; in placing the soil and leaves about the plant, it should be an alternate layer of soil and leaves. These

freeze together and make a solid barrier against the inroads of moles or mice. Such treatment will repay the trouble by a magnificent display of flowers, coming into bloom quite early, and continuing until late in the autumn. One of the hardiest of this class for bedding is Gloire de Dijon. Sunset is an admirable variety for this. Also Souvenir d' un Ami. Another is Homer, a little gem and quite sturdy in constitution. Marie Van Houtte is an admirable rose. Perle des Jardins, Mme. Lambard, Mme. Berard, and Papa Gontier are also fine. We must bear in mind that it is in this class that we find our yellow roses, in which Hybrid Perpetuals and all Remontants are lacking. When Gloire Lyonnaise was sent out in 1884 as a yellow hybrid, it was hailed with eagerness as the missing color in that class, but, alas! it was a fraud in color. It is an exceedingly pretty rose, of a pale lemon color with a tea fragrance. Some of the Noisettes should be included in a bed of Teas, such as Celine Forestier, pale yellow, fine and fragrant; and Mme. Caroline Kuster, globular flower, pale yellow, and free.

If the grounds devoted to roses are large enough, and one portion is dry, and another is moist or stronger soil, the chances of a good summer and autumn bloom are far more certain. A friend in Lexington who has a large collection of roses, with one bed planted on high ground, where the soil is rather dry, cuts his early crop of flowers from this bed, while from another bed located on rather moist, tenacious soil, he had fine flowers late this season, among them some of the finest blooms of "Ulrich Brunner" I have ever seen. Frequent transplanting is also necessary for successful culture. Plants that have stood in one location for six or eight years, if lifted, the root and top cut back severely, and replanted a little deeper than before will soon come into fine condition again.

We now come to the worst drawbacks to satisfactory rose culture, viz.: Mildew, a peculiar disease caused by fungus, Sphaerotheca pannosa, which, if neglected for a single day, increases with wonderful rapidity. If the mildewed leaf of a rose is put under a microscope, it will, says Mr. Worthington G. Smith, be seen to be covered by thousands of threads of mildew, each of which consists of eight or nine spores, which as

they ripen are carried off by the wind. The spawn threads are here and there dotted over with little black grains, each grain so small as to be invisible without a common magnifying glass. Under a strong hand lens, the dots look like minute but perfectly round grains of gunpowder. Each dot is seen as a round black box with a number of curious, brown, sinuous, radiating appendages. Each globular box is no larger than the point of a needle. There is a comparatively thick outer coat to this box made up of minute pieces, spliced or dove-tailed together like the shell of the tortoise.

One infected rose leaf will in the autumn bear hundreds of these black boxes, each with its contained air-tight bladder of eight living spores; the precious boxes are quite impervious to drouth, frost, or water.

Another of the worst diseases of the rose, is the Orange Fungus, *Coleosporium pinque*, which in its earlier stages is pale yellow, then becomes orange, vermilion, brown, and at length black.*

Mildew does not seem seriously to affect the life or strength of the plant, as being a surface disease it does not strike to its marrow. For instance, the rose Comtesse de Serenye is one of the worst for mildew I have ever known, and yet it is a rose that grows with great vigor from year to year. In fact, mildew does not claim as its victims the weakest growers, but takes the strongest, such as that splendid variety Mme. Gabriel Luizet, and others of a like character. The last of July and August is the time to be on the watch for it, when cool nights follow warm days. You must then be ready the next morning with your sulphur bellows, for the enemy will surely be there! If all affected leaves could be gathered and burned (which would be quite possible in a small collection) the chances of transmitting the disease would be greatly lessened.

Orange Rust or Fungus, is the reverse in its action of mildew, coming from the inside of the leaves and stem. Mr. G. Baker says, "Orange Fungus chiefly attacks the lower leaves of the smooth-wooded class of rose plants, such as Victor Verdier,

* The Rose Mildew is described and figured in the Journal of Horticulture and Cottage Gardener, Vol. 72, pages 478, 479; in the Rosarian's Year Book for 1886, pp. 4-14, and in Paul's Rose Garden, 9th edition, pp. 146-148. The Orange Fungus is described and figured in the Gardeners' Chronicle, Vol. 26, New Series, pages 76, 77; in the Rosarian's Year Book for 1887, pp. 4-13, and in Paul's Rose Garden, pp. 151, 152.

Countess of Oxford, Hippolyte Jamain, and the like, while it is worthy of remark that Mme. Clemence Joigneaux, William Warden, Edouard Morren, and those of the same character of foliage, etc., are seldom subject to these forms of fungoid disease." Cutting off the affected branches and burning them is the best remedy; cut freely as is done for the fire blight on the pear, but be careful to prevent the rusty powder on the under side of the leaf from being scattered to disseminate the disease, and keep the decaying leaves raked up and burned.

Black spot on rose leaves is another form of fungus, caused undoubtedly by atmospheric changes. Prof. Humphrey, of the State Agricultural Experiment Station, in Bulletin No. 6, of the Hatch Experiment Station, October, 1889, says:—

"This is probably the commonest and most troublesome disease of cultivated roses, whether of out-door or green-house cultivation, in both Europe and America. It first appears in the form of dark discolorations of the upper surfaces of the leaves, which spread outward and often show a yellow band surrounding the dark spot. The centres of the spot frequently become dry and brown, indicating the complete death of the tissue. The spores germinate promptly on a moist surface, and readily infect fresh leaves. It is probable that this parasite of the rose is merely an imperfect stage in the life history of a fungus. In the lack of definite knowledge on the subject, however, we can deal only with the parasitic form.

"In combatting the disease it is essential to begin early, for leaves once penetrated by the mycelium of the fungus are irretrievably lost. All effort must be directed towards preventing infection, by the application of some protective compound. For this purpose it is recommended that the bushes be sprayed shortly before the unfolding of the leaves, again as soon as they are fairly opened, and at intervals of three or four weeks until the flowers begin to open, especially after heavy rains, which may wash off the protecting substance from the leaves, with blue-water, prepared as follows: Dissolve 1 pound sulphate of copper in 4 gallons warm water; when cool, add 1 pint commercial ammonia and 18 gallons of water. Any leaves on which the spots may appear should be promptly cut off and burned."

In conclusion, my advice to a beginner in rose culture is to plant a few kinds at the start, thoroughly acquaint himself with their character, and gradually plant more; practical experience is the best guide.

5th February, A.D. 1891.

ESSAY

BY

S. T. MAYNARD,

PROFESSOR OF HORTICULTURE IN MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST.

Theme:—The Use of Insecticides in Fruit Orchards.

[The local report was so imperfect that application was made to Professor Maynard for leave to use the copy published by the Massachusetts Horticultural Society, engaged like ourselves in the laudable attempt to find out the truth; and equally desirous of its widest dissemination. His courteous reply will provide an apt preface to the essay.—E. W. L.]

AMHERST, MASS., Feb. 16th, 1891.

E. W. LINCOLN, ESQ.,

My Dear Sir:

My talk before your Society was very similar to that before the Massachusetts Horticultural Society. I spoke in Worcester on some other insects and diseases than in Boston; for instance the Peach yellows and borer, or the apple borer, the currant worm, etc., but the matter other than these exceptions was substantially the same, and you are at liberty to make such notes as you choose from the copy. I enjoyed my visit to your Society, and hope the subject discussed will be taken hold of by your practical fruit growers in such a way as to settle the matter of the practical and economical use of insecticides and fungicides. One great difficulty with our fruit growers is that they do not make careful records of their work when experimenting, and it takes a long time for them to get at the truth of such matters. We hope to have a series of experiments made in different parts of the State under one general plan the coming season, and have the results reported next fall.

Very truly yours,

S. T. MAYNARD.

AT this season of the year fruit growers, market gardeners and farmers are making their plans for the work of the coming

season, and in their estimate of the income they hope to derive from their crop, they reason, perhaps, something like this: One has one hundred apple trees or one thousand grapevines. If the apple trees are twenty years old they should yield at least three barrels per tree; or the vines if five years old or more should yield ten pounds per vine or 10,000 pounds, and reckoning the prices at the average for a decade he gets upon paper very satisfactory returns.

But how many of us make our plans for the coming year with any degree of certainty that the results will give us even a fair return for labor and interest on the capital invested?

We know too well from bitter experience the chances the crops must run with frosts, with storm and wind, with drouth and wet, and above all with insects and the many blights, rusts, mildews, rots and smuts, that feed upon and destroy the plants we cultivate.

We have the authority of the Entomological Bureau of the Department of Agriculture at Washington for the statement, that the loss to the farming interests, including all its branches for the past year amounts to four hundred millions of dollars ($400,000,000). This almost inconceivable amount of money from the destruction to our crop in one year. Yet who that has experienced the loss of his grape crop by mildew or rot, his apples by the scab, his pears by the scab and blight, his plums by the black wart and rotting of the fruit, his cherries and peaches by rotting of the fruit, his strawberries by the leaf blight, his potatoes by the potato rot and his oats and grasses by the rust, his cabbage crop by the club root, his celery by the leaf blight, his lettuce by the mildew, and his cuttings and plants under glass by damping off, will doubt that our losses are often as great if not greater from parasite or fungus plant growths than from insects.

It is seldom we get a crop of any kind without a valiant fight for it.

Fortunately we have learned to feel that we are greater than the foes that assail us, and that with each new insect or fungus pest soon comes a remedy with which we may protect ourselves if we will.

When the Colorado potato beetle first made its appearance among us we thought we must give up this important crop; but now we find that by proper vigilance the crop can be successfully grown.

So when we are almost discouraged in our attempts to grow fruit or other farm or garden crops, relief seems near us and we feel sure that we shall be able to combat all foes.

It is to the consideration of some of the most destructive insects and fungus enemies that I invite your attention.

Perhaps we can best get at the most desirable methods of using them by considering each fruit by itself.

THE APPLE. The codling moth lays its eggs in the blossom end of the apple soon after the blossoms fall, and continues to lay them for a period of perhaps two weeks to a month.

In some seasons and in some sections a second brood of eggs is laid by the perfect insect of the first brood.

The tent caterpiller and the canker worm feed upon the foliage, beginning their work as soon as the leaves unfold, while the plum curculio feeds upon the foliage and perhaps the fruit, laying its eggs in the crescent-shaped cut it makes in the skin.

These pests may all be destroyed by the use of the arsenit, Paris green.

To accomplish this we must make the application just as soon as the leaves unfold, to destroy the tent caterpillar and the canker worm; and as soon as the petals drop, for the codling moth and the curculio.

These applications must be made at intervals of from one week to twenty days, according to the weather. If there should be no rain after the first application for the tent caterpillar and canker worm, another application will probably not be needed until the one made to destroy the plum curculio and the codling moth, and then the applications should be made at intervals of from ten to fifteen days until July 1.

During this time we also combat the fungous growths, which under favorable conditions may begin work very early in the season. The apple scab is a minute plant that grows upon the surface of the apple-leaf and fruit, and while not penetrating

the tissue very deeply, stops the growth at the point attacked, and we have the distorted or gnarly apples resulting from its early attack, or scabby spotted apples when it appears later in the season.

Its effect upon the leaf is, if in large numbers, to destroy the functions, and it soon falls, or if only a few are found on the leaf, it simply looks a little yellow, and the whole tree has an unhealthy appearance. The past season it was so abundant that those trees that blossomed and set a large crop of fruit were so injured by it that they could not perfect their fruit.

Upon a large tree in front of the house I occupy, so much of the scab appeared that the leaves were constantly dropping nearly all summer, and the lawn had to be raked several times to get rid of the litter.

To destroy this parasite, solutions of copper have been found effectual, either in the form of the Bordeaux mixture, ammoniacal carbonate of copper, or simple carbonate of copper mixture.

While alone, the ammoniacal carbonate of copper has proved the most effectual. It cannot, however, be used with Paris green or other arsenites; and if we wish to reduce the cost of the remedy for both insect and fungous pests to the lowest figures (and all know how little margin for profit we have even when we do not have this difficulty to contend with) we must combine the two remedies and apply both at one operation.

With the Bordeaux mixture and with the simple carbonate of copper solution we can do this without fear of injury to the foliage. It has been found, by experiments made at several of the State stations, that Paris green and copper solutions can be used with lime mixtures at the rate of from one pound to fifty gallons of the mixture to one pound to one hundred gallons without injury, some even claiming as concentrated as one pound to twenty-five gallons. We also know that neither Paris green nor sulphate of copper can be safely used upon the foliage of our fruit trees in the required degree of concentration to destroy the above-mentioned foes, without serious injury to the foliage.

I am confident that the reason why the use of Paris green has been so unsuccessful in many cases for the destruction of insect life is from the fact that we have been unable to use it in a form concentrated enough to reach all parts of the plant without injury. This will also apply, in a measure, to the fungicides.

For the purpose of destroying both insects and fungous pests, we must make an application of simple solution of sulphate of copper, called by the French *eau céleste*, to the twigs and branches before the leaves appear to destroy any germs of the scab that may be lodged in the crevices of the bark; then as soon as the leaves have unfolded the lime and Paris green mixture must be applied for the tent caterpillar and the canker worm. Then as soon as the petals have fallen, a second application should be made for the codling moth and plum curculio.

This application must be repeated at the proper intervals of from one week to twenty days, according to the weather, until July 1. After this, the Paris green not being needed, the ammoniacal carbonate of copper may be used. The latter application is to be preferred, from the fact that it does not disfigure the fruit, while if the Bordeaux mixture is used late in the season it adheres to the fruit in such a manner as to injure its sale unless washed.

No substance has been found that can be used in this way, and at the same time, as the above fungicides and insecticides, owing to the apple maggot, a little insect that is doing, in many localities and upon some varieties, more injury even than the codling moth. The destruction of the fruit before the maggot escapes is the only remedy yet suggested that promises to be of any value.

The Pear. The insects attacking the pear that can be destroyed by arsenites are the codling moth and the plum curculio. The fungi that can be killed by copper solutions are the pear leaf blight and the pear scab or pear fusicladium.

The pear leaf blight is another minute parasite plant somewhat like the apple scab, but perhaps working deeper into the tissues of the leaf, causing all the leaves often to drop from the tree, and which also causes the scab and cracking of the fruit so

common on the Flemish Beauty, White Doyenne and some other varieties.

For the insect, Paris green is effectual and the Bordeaux mixture has proved as efficient as for the apple scab. While the "fire blight," so called, is not of such a nature as to be affected by the outward applications of fungicides after it has attacked the tree, we believe that this mixture will destroy any germs that may come in contact with it, and that by attention to the proper condition of the soil, manuring and cultivating, we may very largely overcome this most destructive disease.

The Plum. The plum curculio and the black wart, also the rotting of the fruit, have been found to succumb to the Bordeaux mixture and Paris green.

The only trees on the College grounds upon which the fruit was not stung by the curculio, or that did not rot as soon as it approached maturity, were those treated with the above combinations, and as other stations report similar favorable results, we feel warranted in urging its general use. The sulphate of copper solution should be applied to the branches to destroy any germs or spores of the leaf blight or plum wart that may be present before the leaves unfold. After this, from the time the blossoms fall until July 1 the combined mixture should be used. After this time, either the Bordeaux mixture or the ammoniacal carbonate of copper may be used. The latter will probably be the more satisfactory, as it does not disfigure the fruit.

The plum wart we feel sure was largely prevented from developing by this treatment, but the few that may secure a hold on the branches may certainly be destroyed by the kerosene paste.

The Grape. In the College Vineyard the past season the benefits derived from the use of the Bordeaux mixture, and we have similar reports from others whenever used, were such that there seems to be no doubt that this is a reliable remedy for about all of the fungous diseases of the vine. The great objection to it is the adhesion of the material to the fruit if applied late in the season, but after the work of the rose bug has ceased, I see no reason why the ammonia carbonate of copper may not be used with equal effect.

In our experiments the destruction of the rose bug by the use of Paris green was not *fully* demonstrated, but from reports received from other quarters and the light we did gain from our work we feel sure that by the concentrated form in which it has been proved it can be applied with the Bordeaux mixture, it must succumb to this treatment.

The sulphate of copper solution was applied to the vines before the leaves unfolded, and the Bordeaux mixture at intervals of from one to three weeks up to July 28. Paris green was used only up to about July 1, or about four weeks from the time the rose bugs began to appear.

The Strawberry. During the spring and early summer our strawberry leaves in some localities are seriously injured by a little brown beetle that feeds upon them. This little beetle is the crown borer, the larvæ of which are at work during the summer eating the crown and main roots. Soon after the fruit has ripened, and sometimes earlier, the leaf blight attacks the leaves, and when both of these enemies appear, it is a difficult matter to get rid of them. It is believed, however, that Paris green will destroy the crown borer, and it is certain that it will prevent the leaf blight. An application of Paris green should be made as soon as the new leaves begin to unfold in the spring, and another a little while before the first blossoms open.

Neither the Paris green nor copper solutions can be safely applied after the blossoms open; but as soon as the fruit is gathered the Bordeaux mixture should be used alone up to about August 1st, when the Paris green should be added to destroy the beetles which again appear at this time.

The cutting and burning of the leaves, or their destruction with the blight spores at the same time, with dilute sulphuric acid, as has been recommended, is undoubtedly of some value, but the Bordeaux mixture is thought more effectual, and what foliage is preserved will add strength to the plants.

If one fears to use Paris green, hellebore will undoubtedly prove successful in the destruction of the crown borer, which feeds on the strawberry foliage.

I give now formulæ for making the fungicides that I have recommended.

Bordeaux Mixture.—Six pounds of sulphate of copper are dissolved in 2 gallons of hot water, and 4 pounds of fresh lime are slaked in water enough to make a thin lime wash. When both are cooled, pour together, mixing thoroughly and dilute to 22 gallons. Strain before using.

Ammoniacal Carbonate of Copper.—Three ounces of precipitated carbonate of copper are dissolved in one quart of ammonia, strength 22° Baume. Dilute with 22 gallons of water.

Eau Céleste.—One pound of sulphate of copper, dissolved in 25 gallons of water.

Modified Eau Céleste.—Two pounds sulphate of copper, 2½ pounds carbonate of soda and 1½ pints of ammonia (22° Baume). Dilute with 22 gallons of water.

Kerosene Emulsion.—One pound common soap dissolved in hot water; 1 gallon kerosene. Stir or churn together until a smooth, butter-like substance is formed. Dilute with 25 to 50 parts of water.

Kerosene Paste.—Mix kerosene with any fine, dry material or pigment forming a thin paste or thick paint. Apply with a small brush.

Insecticides. In the discussion of insecticides I have mentioned only Paris green among the arsenites, from the fact that reports from all sources agree that it is less injurious than London purple, and that white arsenic is too dangerous a material to have about where it might easily be mistaken for many harmless substances of a similar color.

Spraying Pumps. Many forms of pumps are now to be found in our markets adapted for the application of the fungicides and insecticides. Of those most in use perhaps the best known are the "Field's Perfection," made by the Field Pump Company, Lockport, N. Y., the Gould pump, made at Seneca Falls, and the Mixon, made at Dayton, O., all of which can be attached to casks and placed on a stone-boat or wagon.

The knapsack pumps which are serviceable for small garden plots and small vineyards would be more useful if some means were provided for filling them without removing them from the back every time. The Excelsior Knapsack Pump, made by William Stahl of Quincy, Ill., is made after a design, I under-

stand, that was sent out from the Agricultural Department last spring.

The French use such pumps very largely; but Americans will make little use of them where much work is to be done, when the horse can be made to draw the liquid for them.

Nozzles. A nozzle to distribute such liquids as the Bordeaux mixture must have an adjustable opening at the end. Among those to be found in our market are the "Perfection," the "Nixon," the "Cyclone," the "Vermorel," and many others. Professor L. H. Bailey of Cornell University has contrived a clamp which is attached to the end of a common rubber hose, by the pressure of which the size of the opening is quickly adjusted. Whatever the nozzle used, it must be attached to a long pole to distribute the liquid most evenly at the top of high trees.

Many interesting facts have been brought out in the work of the many experiment stations of the country which could not be referred to in the previous discussion, and I have therefore introduced them here.

It seems pretty well settled that of the arsenites, Paris green gives the best results as an insecticide.

That the longer the mixture containing the arsenites stands the greater the injury from soluble arsenic.

That the foliage of the peach, plum and cherry is more susceptible to injury than that of the apple and pear.

That the injury varies with the varieties, some being more susceptible than others.

That young leaves are less injured than those fully developed, and are more injured on weak trees than on those that are vigorous and healthy.

That Paris green cannot be used alone with safety stronger than one pound to three hundred gallons of water, but with the lime mixture it may be safely used at one pound to from fifty to two hundred gallons.

That the foliage is most injured when kept constantly wet by light rains or foggy weather, but that heavy rains lessen the injury.

That the least injury is done when the liquid dries off most rapidly.

That the time of day when the application is made is unimportant.

The conclusions of this paper I have arrived at after a careful summary of the experiments made at the college and a careful study of those of all of the other stations of the country and I feel confident that as soon as we master the details of the application of the two great remedies, Paris green and copper solutions, so as to understand the exact time and quantity to apply under varying conditions, we shall be able to control the insects and fungi attacking our fruits as well as we now control the potato bug.

12th February, A. D. 1891.

ESSAY

BY

GEORGE AUSTIN BOWEN, M.D., OF WOODSTOCK, CONN.

Theme:—Rural Homes; their Comforts and Embellishments.

THE homes of a people are the index of a nation's civilization. They are the creators of sentiments and ideas, the growth of which show in civil governments, and broader, more advanced conditions, which we term civilization, a word grown from the old Latin *cives* a citizen, and means simply greater freedom and comforts for him.

In these days of astounding scientific discoveries and mechanical developments, which we term progressive developments of the times, we find many accessory questions coming forward which are mainly engendered by these wonderful advances; questions affecting the social life of the people, questions which the law cannot solve, custom cannot suppress or powerful armies remove. They are, however, amenable to the silent, unseen, but all-powerful influences of home and the home life, the truest educator, the best school, the most powerful elevator of the world, if its own conditions are right. If wrong, the most depressing and damnable. These questions will follow the home teaching. What better subject than this for us to discuss, and what better place for us to consider them, than in this very spot, in the heart of New England, for here are the best homes of any section of our country, and are in themselves an illustration of the truth of my statements.

It is the practical, the comfortable and the economic features of our home construction, that must claim our attention at this time, but I cannot pass the opportunity of emphasizing the fact that the mental growth of a people is coincident with their home

comforts and embellishments. Statesmen, divines, poets, men of letters, inventors, mechanical constructors, musicians, artists, directors of armies and civil governments, have never sprung from the dissolute and degraded, and from what we term the poverty-stricken abode. Many and many a time have they sprung from the home of the poor, but could we enter these homes we would find a refining influence somewhere within its walls, or that a previous generation had possessed them in abundance. We shall never see a reformer of morals, a Martin Luther, advancing from the adobe structure of the Southwest; a poet or musician from the Georgia "Cracker," or the mountaineer hut of Tennessee; nor a statesman from the abode of the French Canadian; but from them are more prone to come the gambler, the desperado, and the licentious.

The word home is one of the most vital in the English language, of good Saxon origin, and it has a dominating power equal to that of the Anglo-Saxon himself, who to-day dominates the earth. The Anglo-Saxon has a true home wherever you find him. The Gaul, the Spaniard, the Latin races, have no homes in the real sense of the word, and it is largely due to the home influences inherited through a thousand generations, that have placed this race at the head of the human family.

I have stated that the homes of New England are the best of our whole country, but we cannot regard them as perfect—on the contrary, far from it. There is much that we can criticise about them. Their location has not always been selected with the greatest discretion, their style of building is oftentimes heterogeneous enough to give delirium tremens to a well-studied architect. Their sanitary conditions are not in accord with modern ideas of hygiene, and the artist shudders and hurries by lest the inharmonious colors contaminate his well ordered ideas. Town homes and country homes as far as the house is concerned, are quite different things, and I am thankful, very thankful, Mr. Chairman, that you gave me the subject of Rural Homes, and not those of the city; for where land is valued by the square inch, and Mammon is the only God worshipped, my descriptions, criticisms, and exhortations would be of as little value as a minister's, but let us study a country home, what it can be,

what it should be, and then like good reasoning souls compare our own.

Let us start at the beginning, and present an ideal home as we would build one. We will commence where? At the foundation? No, that is too premature. At the location? That is secondary. The first consideration must be *what*, not where, we will have it.

First, we must make what ministers call a self-examination; if from their standpoint it is good for the soul, from ours it is good for the *vanities* of life which have always been the under dog, in a New Englander's reasonings, and now ought to have our sympathy. God Almighty placed them in our nature, I believe for a good purpose, and it will take more theology than New England has yet produced to change my ideas. A home should be for comfort, for happiness, and for health. For comfort we look to warmth and shelter, a dry soil, an easy access to the highway, etc.

For happiness, to views, cheerful surroundings, a suitable arrangement of rooms, to give personal seclusion when necessary, and the companionship of friends when we are so inclined, pictures, music, plants, open fires, piazzas for summer, heating for winter, and the hosts of little luxuries we all crave.

For health, to ventilation, good drainage, a full and pure supply of drinking water, and the proper arrangements of the outbuildings, the plumbing, sewage, etc., etc.

This self-examination will tell you what you want in these three categories, and if you also discover any little pet hobby or folly of your own you had better indulge it, and make your plans in accordance therewith, for the sense of comfort you will get out of it will more than counterbalance and be more satisfactory than the sense of "mortifying the flesh," as the old divines called it. Having discovered what we want in a home, the next step should be to secure the location. A gentleman of my acquaintance was once asked why he did not build his house on a level piece of land, rather than on a rough, uneven hillside. His answer was, that he "didn't propose to move out of New England, in order to find a building site." When a Western man builds a house, it makes no difference where he puts it. It

is like a ship at sea; one latitude is as good as another, as far as beauty, convenience, or sailing capacity of that ship is concerned, and a house on a prairie, is only a house on the prairie, and it cannot be made anything else. But New England has the finest building sites of the world. Healthful of location, cheapness and ease of construction, and picturesque views of hills, valleys, lakes and streams. An ideal location is not on a level piece of land, but upon a gently sloping hillside, with a rugged, uneven top, backed by a piece of wooded land. They abound everywhere.

When selected, adapt the house to the contour of the land, but don't grade the land to make it level for the house. One great advantage of such a location is, that you can get a cellar above ground,—if that does not seem a misnomer to you. A cellar under a house on level ground is a nuisance from beginning to end. This is a radical view of my own. I possess them on other matters as well.

For building material take that which the Irishman does when he goes into a fight, whatever comes most handy. What is more incongruous than a frame house painted a blazing white, set in a field where gray stones predominate? What is more beautiful than those same stones used in the construction of the house, their gray hues preserved, and presenting a harmony with the whole landscape? In New England we reject the best building material of the world, its granite and cobble stones. In New Jersey unhewn blocks of red sandstone are used almost exclusively in some localities, and blend in perfect harmony with the red soil of that locality. Wood should be used only in a region where trees abound, and are most accessible, and the house when built should not be painted, but stained some of the beautiful shades of brown, or gray, that harmonize so well with nature's coloring.

My chief criticism of house building has always been the imperfect foundations, and little or no care given to the soil and surface drainage. How seldom we find a good foundation laid in cement, and those foundations protected from the settlings and heavings of frost by complete drainage. Are your own buildings constructed that way, and how many of your neigh-

bors'? A dry wall of flat surface stone is almost universally used in the construction of foundations in the country; such a wall is subject to displacement occasioning an uneven settling of the building. In a brief paper of this kind, intended simply to head a discussion, we cannot mention all the various materials used in the construction of buildings that pertain to the modern system; should we attempt it, it would immediately grow to a volume.

The old-fashioned lath and plaster walls, to be covered with cheap paper made bright with poisonous minerals, has given way to more solid walls, painted or tinted, or made to look still more solid by the use of that sceptre of feminine authority, a house broom. The cheap flooring to be covered with an expensive carpet, has given way to a handsome substantial floor, whose beauty and healthfulness cannot be questioned. The narrow window screened with blinds on the outside, and heavily screened with curtains within, has gone, I hope, no more to return; the modern window is broad and ample, oftentimes of tinted glass which softens the rays of the too ardent sun, yet robs them of none of the life-giving influences. What is more comfortable than such a window slightly projecting from the room and furnished with easy chair or stationary seat?

I am not a builder, if I was I should be an enthusiast in this modern art of house construction, with all its details of workmanship and finish, the decorative castings for hinges and locks of doors, the various styles of ornamental wood-turning, carving, and stamping, which are now being used, and are so rich and tasty and withal so cheap. In fact, while it has assumed a more artistic form, giving a house an air of almost regal luxuriousness, it has actually cheapened the cost thereof, from one-fifth to one-quarter according to location.

The architecture of a country home is its chief consideration. I have but one word to say about that. Do not follow the present style and sacrifice the comfort of the interior for the appearance of the exterior. A friend told me a short time ago of an artist friend who had bought a country house and refitted it. In describing it to her he said "From every window I can look out

two miles and in any direction I see neighbors, but thank God, Miss Lily, not one Queen Anne house."

But shall we stop here in our ideas of an ideal home? by no means, for our house in its beauty of location and charm of modern construction is but a part of a home. The surroundings are equally essential, and what should these be? Statuary, bronze lions, dogs and deer, lying in impossible positions? by no means, they are terribly artificial if I may use the expression, and so are rows of sea shells and pebbles and hand-made rockeries. There are no greater ornaments for the house surroundings than trees and shrubbery, screening paths, breaking off the wind from driveways and much frequented parts, and always giving a change to the outlook as the seasons progress. Trees should not be too near the house but so placed that their shadows as they oppose the sun may pass over or near it.

Group the shrubbery in accordance with color, a Cut Leaf Birch with its beautiful white trunk and branches against a dark Evergreen, Purple Beech against the light green of the Junipers, etc. With the pathways and roadways filled with the surplus stone giving dry passage at all seasons of the year, with lawns following the natural contour of the land, still preserving the rocks and ledges, now ornamented with vines, which should also adorn the house, we have our ideal rural home. Although not expensive, displaying taste and elegance. Who would not be content in such a home? Especially if the interior corresponded therewith, and presented attractions for the mind by books, pictures, music, and furniture that was made to be used and not looked at. Would boys be anxious to leave such a home, and girls delighted when they had severed their relations therewith.

But I was to treat of the practical part of the subject, and house building is perhaps not pertinent to our individual condition. Because we are already supplied with a house, we may be like the little four-year-old boy, who was asked if he did not want a new papa, who answered "yes! but what in thunder can I do with the old one?" When we deal with the realities of life we have got to recognize one fact, that however desirable other scenes may be painted, we are fettered from the com-

mencement by the deeds of our predecessors. Our mental tastes and aspirations by hereditary transmissions, and our homes by the tastes and aspirations of some other person. The majority of us are not house builders, but are like hermit crabs living in the shell of another fellow, and the question that comes home to all is, how can I take this shell that was intended for a mollusk without any ambition than that of living and feeding, and fit it up, so as to give a dandy crab such as we the comforts and pleasures of a home.

Now this brings up the subject of the remodelling of old houses, a very important one in these days, and has become a special business with many men, some architects devote their whole time to it and receive handsome incomes therefrom. Now handsome incomes to them, must have a reverse side, and I judge that it reads a handsome outgo from the property owner. Therefore my advice to you who live in old houses and desire to remodel them is identical with Punch's advice to those about to marry, *Don't!*

Holy Writ cautions us against repairing an old garment with new cloth, and intimates that the rent will be made worse. If you are not a householder but hire your dwelling, you will find that your landlord will verify this text, at the close of the very first quarter.

I dwell in an old house. It is more than a hundred years of age. A large house, built not for modern wants but old-time necessities, and was bare of all ornament. It was a country inn and has a history linked with every old character that the town has known. General trainings made it famous. The old stage coaches added to its renown, and as it goes down farther in future, I think it will gain more yet as the only tavern in New England that Washington did *not* stop at. When it fell to me it needed repairing. One friend earnestly advocated transforming it into a Swiss chalet; another said raise the south roof one story, carry that left-hand corner up into a tower with an outlook and a flag-staff, and put a mansard roof on the rest of it; another suggested many changes in the interior, removing the huge chimneys with their open fireplaces that had caught and echoed the frolic and fun that had transpired around them, as

ancient worthies quaffed their flip and merry country dancers heeded not the fleeting hours, and suggested in lieu thereof a hot-air furnace, and, I added, an illuminated motto, God bless our register.

I wanted a rural home, and so I set about making one. A carpenter put a rustic porch, over three doors, a simple little structure, at a cost of less than fourteen dollars for all. The old sash had to come out, for they and the frames were as far apart as the representatives and senators of the Connecticut legislature, and the wavy old glass gave such distorted views of outer life as would transform a philosopher into a cynic, and as I was not much of the former, I feared that I should be very much of the latter if I allowed them to remain. A lower sash with large lights and an upper sash with small lights have taken their place. By letting my man and team, they earned the paint that transformed the glittering white monstrosity into an unobtrusive brown house, and my friend Mr. Hadwen—of whom some of you may have heard—sent me climbing plants that have now covered it all and made it a leafy bower in summer. Whether it was friendship for me that prompted the deed, or a sympathetic tendency to keep green the memories of the hot toddy of the days of yore, I will leave it for those who know him best to say. So my old home has been transformed, not modernized; when we attempt to modernize an old structure we find our work a failure, and that we have destroyed the charm that always clings to an ancient abode; we should strive to still further develop those charms, by simply intensifying the best features of the age to which it belonged.

The interior of a house should receive more attention than the exterior, for in this climate we are obliged to pass more time in doors than out, and here is the true home. And this is my idea of the general feature; large rooms, well lighted with broad windows, studding eight or nine feet which admit of uniform warmth and good air, and arranged to connect by wide sliding or folding doors, so that in summer they can be all thrown open, and have almost the appearance of one. "Le grande salon," as a Frenchman would term it. A broad hall running somewhere through the house, not necessarily plumb in the

middle, as the dude parts his hair, but wherever the arrangement of the rooms will best allow; the chief feature of this hall should be a broad staircase of easy ascent, and I much prefer that it should not be one straight ascent, but possess a couple of broad stairs and turns at right angles. These broad stairs are like "thank ye marms" on a long hill, and rests those whose powers are feeble, besides being more pleasing to the eye. Our old houses can many of them be improved in this way, by simply opening partitions and hanging portiéres over them, such rooms can be furnished according to our fancy, and here comes in the charm of a home; we show our individuality in this; we can make the pleasantest of houses stiff and formal, or we can take rooms naturally a little forbidding and make them bright and genial, if we are gifted by what is generally termed taste. Expensive furniture is not necessary, but it must possess a certain degree of artistic taste, and must be appropriate to the uses of the room. There are three decorative features that are always attractive to all classes of people and lend an air to a room that nothing else will. Books, pictures and plants. These are not expensive and are within the reach of nearly all our people. When Massachusetts equalizes her taxes, as I understand she is trying to do, taking one-half the present burden off the rural dweller, the farmer will have a little money each year to invest in books; just think what twenty-five dollars a year judiciously invested in books would do in furnishing a house and furnishing the minds of the occupants. I fear it would produce a mental earthquake in numerous instances, so if you report anything about this paper breathe this gently. Pictures are but reproductions of real life or nature, and the nearer they come to the actualities thereof the more pleasing. The picture of a home scene, groups of horses, sheep, or cattle, are always admired; so also of a quiet lake, reflecting shades of hill and woods with cattle on the shore, or deer feeding on the lily pads in the shallow; year after year they attract our attention; and such pictures ready framed can be purchased for a very small outlay. How much better to give such presents for Christmas gifts, than to spend twice their money value in worsted materials and develop an artistic monstrosity, which

when framed and hung on the walls half the callers read, "No T, no teapot," when the designer intended it for "No Cross, no Crown."

And so with plants, they need not be costly green-house specimens, which always disappoint, by the extra care demanded, and the lack of necessary conditions. A few packages of seed, a little fertile garden soil reinforced with a dash of ground bone, and a little loving care, and lo! the wooing of Flora is done and she graces the home with her showy and perfumed presence.

No art of social life, has attracted more attention of late years than the construction of dwellings; the time and thought of an army of intelligent men is devoted thereto; numerous journals serve to convey their ideas from one to another, and have completely revolutionized the whole building trade. This condition supplemented by the taste and skill of the landscape gardener, will in a few decades make the ordinary dwelling of to-day as obsolete as the log house of a century ago. In no one direction has this improvement taken place more than in the methods of heating. The old stone fireplace with all its charms was an expensive, imperfect and laborious method, and it is well for our health and comfort that it has passed away. The latest systems of heating by steam are wonderfully complete, are satisfactory in their results, giving a uniform temperature night and day, at a very moderate cost, and I am glad to note that they are being rapidly introduced into rural homes, one firm in my own vicinity placing two hundred and eighty during the last year.

I know of no greater comfort of a country home than this, or one more conducive to health and longevity. I have noticed a gradual betterment of the conditions and surroundings of rural life within my own memory.

There has been a steady improvement in the appearance of the buildings themselves, and especially in their furnishings. With the broadening of New England ideas—and God knows they needed it—there has been a result shown in the dwelling; less inclination to hedge oneself in with high walls either of prejudice or actuality. The front fence is an indication of it; in many villages not one is to be seen, and with it has gone the narrow prejudice and feeling of sect and denomination, adding

thereby years of comfort to our existence. You may tell me that the popular cry is, that rural life is declining in its conditions, and cite the everlasting statement of abandoned farms. All I have to say is that they ought to be abandoned, most of them. I will leave the development of this to your own thoughts.

I hope to see the comforts of rural life increasing, especially farm life, there has been so little in the past. Our life here is a short one. I believe that it was never intended to be one of labor and hardship, but of mental growth and development, which must have certain bodily comforts as necessary conditions. The subject your Committee gave me also included home embellishments, which I have developed but very little; it is a great one, and requires much thought, more than my limited time will allow. If you desire to see it promoted, I will suggest a transfer of the pocket-book to the good wife, who rules the home, and she will exemplify it for you, and prove that a good wife is in herself the greatest embellishment of a rural home.

19th February, A. D. 1891.

ESSAY

BY

JOSEPH JACKSON, Principal of Woodland-street School.

Theme:—Native Plants and Flowers.

Years ago we used to read, mark, learn, if we did not inwardly digest, in one of our school reading-books a little piece by Miss Roberts, "The Voice of the Grass," the mellow cadence of which is merely a type of the multitudinous voices of the native plants which are everywhere about us, but crowded from the paths of cultivation. While the vital interest of this Society lies in the cultivation of an exotic flora of æsthetic value, or of plants which have some economic value, the fact that such plants are native somewhere while our own are exotics elsewhere, should tend to prevent the native flora from becoming a matter of indifference. If we cannot rise to the feelings of Tennyson in "Flower in the Crannied Wall," we do not wish to sink to the depth of unsentimentality of Peter Bell, when

> "A primrose by the river's brim
> A yellow primrose was to him,
> And it was nothing more."

Somewhere between these two extremes we can find a place in which we can take a rational interest in the common every-day flora that surrounds us—an interest that will contribute to our pleasure and our intellectual profit.

Situated as we are, about half-way between the Equator and the North Pole, in one of the most highly favored latitudes, it is not strange that our flora should be a varied one, partaking of both a northern and a southern character, containing species of

world-wide distribution, genera related to tropical and polar kindred. One never realizes how varied and abundant it is until some special opportunity or interest leads him to investigate carefully.

The native flora is that which is associated with most of our recollections of nature. Fields of buttercups and daisies belong to memories of spring always, wild roses and wild berries to the summer, asters and golden-rods to the autumn. These are a perennial delight. They have been from of old; they are ever new.

From the sixteenth edition of Tracy's Manual, which covers the territory reaching southward to the 37th parallel and westward to the 100th meridian, we learn that the number of native genera of flowering plants is 761; of introduced genera, 128; of native species, 2651; of introduced species, 404. In addition to these there are 29 genera and 102 species of vascular cryptograms, represented mainly by ferns. Of this number it is safe to say that 400 genera and 1000 species may be found within a radius of a dozen miles from this city.

Some of our most common wild flowers have been introduced from Europe. Most of them, however, have kindred among the native genera and have here found a congenial soil. After the Old World competitions and survival of the fittest, they find themselves well adapted to hustle the more tender and less aggressive natives aside. They crowd into the domain of cultivation, and hence mostly take rank among the weeds. They belong largely to a few orders,—the cruciferæ, leguminosæ, compositæ, umbelliferæ, the labiatæ and the grasses. They often preëmpt the roadside and take possession of the abandoned or neglected garden. The bulbous and the tall buttercup are the two varieties with which most persons are alone familiar. The native species, less numerous in individuals and more retiring in habit, are mostly overlooked. The barberry is really a beautiful shrub, both in flower and fruit.

The first signs of returning spring are given us by the blossoming of the alders and the willows. The catkins of the alders have been hanging nearly full formed all through the previous summer and autumn and winter, ready to open when the first

warm days come. Their beauty will endure but for a moment, but that moment will be sufficient for its vital purpose. Many of the spring flowers are comparatively inconspicuous, and in the case of the trees and shrubs are mostly in catkins. The latter belong to the group of wind-fertilized flowers, those in which the pollen is carried by the agency of the wind from stamen to pistil. Here belong the alders, willows, hazels, the hornbeam and hop-hornbeams, oaks, the walnuts, the sweet fern, sweetgale, bayberry, butternut, poplars, nearly all of which are among the early spring flowers. But the most general interest does not lie in such flowers as these.

Year after year the pale pink blossoms of the trailing arbutus allure us to some favorite and well-remembered nook, where the sweet and quiet eyes are opening under the last year's dead leaves. Not so well known, but equally attractive, is the hepatica, whose pale blue or white peering among its tri-lobed downy leaves is the prize of the searchers for beauty. Fleeting, evanescent, dropping its two sepals before the petals are fully expanded and dropping its petals while you are carrying it home, the white-flowered, yellow-stamened bloodroot by many a brookside makes one more thread in the living garment of the Deity.

In the deep woods it may be that we shall find late in April one of our rare shrubs, which is more abundant farther north, leatherwood. Coming so early, the clusters of small, yellowish flowers naturally precede the leaves, as is also the case with others found in similar situations. The speaker then enumerated a large number of flowering plants, many familiar, telling something of the season in which they occur.

The speaker continued: Whatever can be found anywhere of botanical interest can be found in some form in our local flora represented in some degree. Does "the wild marsh marigold shine like fire in swamps and hollows gray" in English countries? If so, it shines under another name, cowslip, in our own meadows and lowlands. Do insectivorous plants attract the attention of naturalists? Nearly two-thirds of Darwin's work on Insectivorous Plants is devoted to the consideration of our common sun-dew. During several years that I had an oppor-

tunity to keep a record of the first appearance of each of our native flowers, the beaked hazel and the common hazel were among the earliest, the fringed gentian and the witch-hazel were the last. Between them came about six hundred species, the territory covered being quite small and only a limited time being allowed to devote to it.

Some of our native plants have an especial interest, from the fact that they have played an important part in the history of botany. Three illustrations must suffice. The first, pipewort, the only European representative of an especially American order, attracted the attention of Robert Brown, the most distinguished botanist of the first half of this century, and caused his life to be devoted exclusively to the service of botany. The discovery of that somewhat rare and curious moss, buxbaumia aphylla, directed the attention of Sir William J. Hooker, the organizer of Kew Gardens on its present high basis, toward botany and fixed the bent of his long and active life. It was the Spring Beauty that Asa Gray, who studied medicine, early watched.

An account of our native flora would be incomplete without some reference to those plants which produce edible fruits. About 24 species produce edible berries and 40 inedible berries.

Our flora is rich in the number of its forest trees and shrubs. Counting the evergreen plants that form a part of the forest flora, we have about 140 species, a noble list. Our knowledge of the local flora can scarcely be said to be ever complete. New species are being introduced in manifold ways, and many escape even watchful eyes.

About seven years ago the Worcester Natural History Society published a preliminary catalogue of the plants of the County, giving 812 species. I remember distinctly this circumstance connected with it. I often used to walk along the road from Millbury to Sutton. A slightly longer walk than usual one day resulted in the finding of two species not there recorded, arabis canadensis, sickle pod and water parsnip, then referred in the manual only to Pennsylvania around the Pocono mountains and to Connecticut. The additions to the flora since 1883 amount to 150 species, contributed by a considerable number of inter-

ested persons, and it is safe to say that more are interested in this subject than ever before.

Much yet remains to be done. There is an opportunity for some one to make a list of our common plant names, after the fashion of Holland & Britten's Dictionary of English Plant Names.

Our publishers, too, have an opportunity to popularize our native flora by issuing cheap editions of works, with colored illustrations. A picture is wonderfully helpful as a means of identification.

In concluding, the speaker warned people against destroying species, and said, "With a truer love for the beautiful, there will be no danger, and, with a greater knowledge of our native flora, will come the truer love."

After the lecture Mr. Jackson exhibited about a hundred mounted specimens of foliage and blooms of local flowers and plants, and President Parker, as he put the motion to give the speaker a vote of thanks, said that Mr. Jackson had spoken of giving the collection to the Horticultural Society. An interesting general discussion followed, O. B. Hadwen, S. H. Record, Arba Pierce and James Draper being among the participants.

26th February, A. D. 1891.

ESSAY

BY

E. W. WOOD, of Newton.

Theme:—Orchard Fruits.

In considering the subject of fruit culture, it is well to consider its relative commercial value compared with other leading agricultural and horticultural products of the State, also what, if any, are the local advantages for its production in this vicinity. The Secretary of the State Board of Agriculture, in his report for 1887, gives the following estimates for a single year: Fruit, $3,000,000; Market Garden, $2,500,00; Butter, $2,700,000; Corn, $1,000,000; Potatoes, $2,500,000; and this does not include the larger amount grown in private gardens and on small estates for domestic use.

The advantages of location are, first, in being situated in almost the centre of what may be termed the apple belt of the country. The northern portion of the Middle States, the New England States and a portion of the British Provinces produce the best apples, especially the later varieties known to commerce. And second, the opportunities for disposing of the crop.

With a constantly increasing home market and nearer the foreign market than any State having equal shipping facilities, with railroads running to every part of the State affording quick and cheap transportation, with simply a reference to the favorable opportunity offered to those wishing to engage in fruit culture by the large quantity of land running up with a growth of wood of little value but admirably calculated for growing the tree fruits and which can be purchased at a nominal

price I pass to consider the question proposed by your Committee.

Orchard Fruits. This term is applied to our tree fruits and consists of the Apple, Pear, Peach, Plum, Cherry and Quince, named in the order of their importance as New England fruits. The apple enters more largely into consumption and is more widely disseminated in commerce than any other of our fruits. From 1870 to 1880 the export of apples to foreign markets very largely increased, reaching in some years in round numbers one million and a half barrels, and some of our prominent horticulturists hailed the increasing output as the solution of the question how an abundant crop could be disposed of at a profit. Since that time a new industry has appeared in the Middle and Western States calling for large quantities of apples, mainly for export trade. It is estimated that within a radius of forty miles around the city of Rochester in New York State in some years more than five millions bushels of apples are consumed by evaporation. If these estimates are correct there are more apples consumed within this limited area than all the green fruit exported from this country and the British Provinces combined.

The apple is continually becoming and must in the future continue to become more exclusively a farm product. The tree requires large space, and the land in our cities and near the centres of the larger towns is being divided into small estates where only the smaller fruits can be profitably grown.

The most desirable land for an apple orchard is not the most suitable for the ordinary farm crops, especially the cereal and root crops: the rocky hillsides with strong soil, if not too rough for cultivation, are the best locations for an apple orchard. The advantages of a slope over a level plain are that the trees are more open to the sun's rays necessary to give color and flavor to the fruit, and there is less danger from stagnant water in the soil.

If the land is under cultivation and in condition to produce sixty bushels of corn to the acre it is in good condition to receive the young trees. In selecting young trees secure

those making a fairly vigorous growth, three years from the bud, with straight trunk and budded on seedling stocks. Many of the trees now grown in the nurseries are root grafts, these grafts are set during the winter months and planted out in the Spring and in order to bring the root up near the surface are usually set on an inclination of about forty-five degrees, thus throwing the roots out upon one side. In planting out young trees it is much more important to secure an evenly distributed set of fibrous roots reaching in all directions than any particular shaped top as you can easily form the latter as you wish after the tree commences making growth, but over the direction of the roots after the tree is planted you have no control.

The care of the orchard while the trees are making their growth will depend upon circumstances, but if the best results are to be obtained the ground must be kept under cultivation at least as far as the roots extend around the trees. If in a location where there is a near market for the small-fruits they may all be successfully grown among the trees; the currant is especially adapted to cultivation under such conditions and will continue longer than any other fruit to return a profitable crop as it thrives best in partial shades. As the growth of the trees is the primary object fertilizers must be applied in proportion to the crops taken from the land.

The small growing fruit trees may be grown among the apple trees; the peach, plum and quince set in rows each way at half the distance between the apple trees, which should be at least thirty feet each way, will not during the average lifetime of these trees interfere with the main object in view. A more economic method may be followed, as follows: Set currant bushes a distance of four feet apart one way between the trees and seed the ground with grass, keeping under cultivation a strip five or six feet wide the first year and turning under every year a furrow of the grass turf upon each side of the grass plat as the tree roots extend and require the room; the hay and currants if properly cared for should make a satisfactory return for the use of the land while the trees are making their growth.

The care of an orchard after it comes into bearing is light compared with any of the cultivated farm crops and it is safe to say it will make a larger average return in proportion to the expense for labor and fertilizers. As no crop of any considerable value can be grown in a close set orchard after the trees substantially shade the ground the trees should have the full benefit of the soil either by clean cultivation or by frequently cutting whatever growth there may be and leaving it upon the ground.

Poultry may be kept to advantage in the orchard; with fifty hens to the acre in a bearing apple orchard no other care will be required for the soil than to run the cultivator occasionally for the triple purpose of stirring the soil, turning up the grubs and furnishing food for the fowls; no other fertilizer than that furnished by the fowls will be required to grow first-class fruit.

In setting an apple orchard the selection of varieties will depend upon the object in view: if to grow fruit for the wholesale or export trade few varieties will be required. A few years since an effort was made to ascertain the quantity of each of the different varieties exported and from the best data that could be secured it appeared that between eight and nine tenths were Baldwins. For an orchard for the above purposes, however large, the following varieties will be found sufficient: Gravenstein, Hubbardston, Rhode Island Greening, Baldwin and Roxbury Russet. If a home market is to be supplied the above list would be extended by adding any well-known local varieties and a limited number of Astrachan and Williams' Favorite. There are many other excellent apples fully equal in quality to those named but not as reliable for a crop under ordinary conditions. The Tompkins King is an excellent apple and, well grown, commands the highest price in market, yet it often fails to give satisfaction. The Northern Spy has high quality and a reputation that sells it easily in market, but its frequent failure prevents its general cultivation. The list might be indefinitely extended by varieties that under favorable conditions might be desirable which can only be proved by trial.

The apple tree is less subject to disease than any of the tree fruits and its principal enemies are the borer, canker worm and codling moth. Many young trees are destroyed by the borer; the eggs are deposited in the bark, generally at or near the ground; they hatch from the middle of July to the last of August. Various washes are recommended for destroying this pest which may prove more or less effectual, but a sure remedy is in a careful examination of the trees the last of July and again the first of September; as soon as the eggs hatch the young borers commence operations and cause a moist spot and discoloration in the bark easily seen and they may be quickly removed with the point of a knife. If any have escaped the previous year they will have eaten through the bark, and the dust or chips made in their progress through the wood will be seen at the base of the tree, which betrays their presence; they usually ascend the trunk and if their course has been straight they may be easily removed with a small wire; if the course is irregular and they cannot be reached with the wire, the track should be followed with the knife or small gouge until they are found. If undisturbed they will remain tenants three years; it is a case where eviction is not only justifiable but desirable.

The arsenites have been found the most effective means of destroying the canker worm, either Paris green or London purple is generally used; as the latter is more soluble in water it is more easily applied; mixed with water at the rate of one pound to two hundred and fifty gallons, one application thoroughly wetting the leaves has been found sufficient, but if the application is soon followed by rain it will be necessary to repeat it; the application is made with a hand pump having a hose attachment having a nozzle throwing a fine spray. Experiments by Prof. Cook seems to prove that the same mixture applied to the trees as soon as the blossoms have fallen has destroyed a large portion of the codling moths.

The apple under ordinary conditions is a biennial crop the trees bearing in a fruitful year so profusely that they make little growth and few if any fruit-buds. The bearing year for

the apple in New England is the even calendar year, this has been changed in some localities by late frosts in the Spring and in others by the canker worms. The bearing year may be changed by picking the blossoms from the young trees for three or four years on which they would naturally bear their fruit.

Many of the advantages of location claimed for the apple may with force be claimed for the pear. Nowhere is the pear grown with more uniform success or of better quality than in this State. The pear in its wild state is hardier and longer lived than the apple. There are trees on record abroad of large size and known to be near four hundred years old. The Endicott pear tree in Peabody imported in 1630 is still standing and continues to bear fruit; there are several trees in Salem more than two hundred years old. The Bartlett grown in England in 1767 under the name of Williams' Bonchrétien was imported into this country by Thomas Brewer in 1806; before the tree bore fruit it came into the posession of Enoch Bartlett, a gentleman much interested in horticulture and one of the founders of Massachusetts Horticultural Society; and the name having been lost he gave it his own name by which it has since been known in this country. At the last meeting of the Pomological Society in Boston three dozen specimens of fruit grown on this tree were shown; though there were some larger specimens grown on younger trees there were none more perfect on exhibition.

The young trees sold from the nurseries are about equally divided between standards and dwarfs and while the soil necessary to secure the best results with the latter will prove suitable for the former, the standard will do fairly well in soil where the dwarf will utterly fail. The quince requires a rich, moist soil and budding upon it the pear does not change the wants of its roots. If set in a light soil with sand or gravel subsoil it will not succeed, yet the dwarf is an important factor in growing this fruit. The amateur with his limited space must depend upon its early bearing to grow some of the desirable varieties that would look dim in the distant future if obliged to wait for them on the standard.

If it becomes necessary to set the dwarf in a light soil the conditions may be much improved by mixing a liberal quantity of marl or peat mud with the soil to retain the moisture.

In selecting dwarf trees select those budded close to the crown of the roots and in setting let the soil cover the junction of the pear and quince stocks, and as the pear is of larger growth than the quince it will overlap forming a callus from which the more vigorous growing varieties will throw out roots, eventually becoming standard trees; and where it is desirable to continue the dwarfs for a long time this may be more satisfactorily accomplished after the trees have become well established by removing the soil in early summer around the trunk and with a narrow gouge or knife raising narrow strips of the bark in the callus and pressing in a little earth between the bark and the wood, replacing the earth around the tree and mulching to prevent the soil becoming dry; the descending sap later in the season will throw out roots from the lips, thus forming a well distributed set of pear roots. By this process the early bearing of the dwarf is secured and the longer life of the standard, though smaller in size: the growth being checked by the early fruiting.

As the pear is largely used as a dessert fruit (though the demand is constantly increasing for canning purposes) a wider range of varieties is desirable than of the apple. For market the Bartlett, Seckel, Sheldon, Bosc, Dana's Hovey, Clairgeau, Angouleme, Anjou and Vicar will be found desirable varieties. For the amateur the above list with the exception of Clairgeau to which may be added Summer Doyenne, Gifford, Clapp's Favorite, Rostiezer, Urbaniste, Hardy, Louise Bonne of Jersey, Comice, Lawrence and Josephine of Malines. There are many other varieties of excellent quality and desirable under favorable conditions but the above list will be found reliable under ordinary cultivation. The Angouleme, Clairgeau, Louise Bonne of Jersey, Urbaniste and Vicar should be grown on the quince stock.

The pear suffers less from insect pests than any of our fruits, there is a slug that occasionally appears on the leaves between

the middle of June and the middle of July but may be destroyed by scattering ashes or dry dust from the road-bed over the leaves.

The greatest drawback in growing the pear is the disease known as the pear-tree blight; there have been various theories advanced as to the cause of this disease but the fact that it has appeared irregularly in most parts of the country, sometimes in succeeding seasons and again after the lapse of several years and run its course unchecked shows that the question of its cause or cure is apparently as far from a solution as when it first appeared. The most recent theory as to the disease is that it is caused by bacteria which are said to be found in the diseased wood, but whether the cause or effect, whether they precede or follow the disease, does not seem to be definitely settled. The disease makes its appearance in the early summer and will be seen by the leaves turning black; if the tree is but slightly affected, by cutting away the diseased portion down to sound wood it may disappear; but if it appears generally through the branches, showing the whole tree to be tainted, the loss of the tree will almost invariably follow.

The fruit of most varieties of the pear requires careful thinning to secure satisfactory results; while no definite rule can be given it is safe to say no two specimens should be left to touch each other while making their growth. Among the smaller varieties the Seckel and Dana's Hovey, and of the larger varieties the Angouleme, Clairgeau and Vicar will require careful attention. For the benefit of those left to grow it is desirable to do the thinning as soon as the perfect, well-formed specimens can be distinguished, removing the smaller and any that show imperfections.

The recent improvements in cold storage process have been of great advantage to pear growers by extending the time during which the fruit can be put on the market or the table in good condition; formerly the season for the Bartlett was limited to two weeks; now with a slight expense for storage it is extended over six weeks and the fine October varieties may be had in good condition as dessert with the Thanksgiving and Christmas dinners.

Only those of us who remember with what ease and abundance the peach was formerly grown can fully appreciate the loss we have experienced in the difficulty with which this fruit has been produced in later years. Formerly the trees were found in almost every garden; they came up in the hedge rows and by the roadside wherever the drifting soil by chance covered the pits, grew rapidly, came early into bearing and for years produced annually an abundance of the most delicious fruit known to the temperate climate.

The only insect enemy that seriously injures the peach is the borer who commences work at or just below the surface soil in the soft bark of the tree and if undisturbed will often completely girdle and destroy the tree. It is claimed that a mound of leached ashes one foot in height around the base of the tree from May till October will prevent their entering it, the same treatment recommended for the apple will prove effectual.

The most serious difficulties in growing the peach are the disease called the yellows and the killing of the fruit buds during the winter. The appearance of the former is indicated by the growth of small wiry shoots on the trunk or branches near the trunk, bearing small light-colored leaves; it is also shown by the fruit prematurely ripening, the flesh being higher colored and inferior in quality. This frequently occurs on trees apparently healthy; but if allowed to stand the following year the fruit will not attain more than half its natural size and will be of no value. In speaking of the cause of this disease, Downing says: "No writer has yet ventured to assign a theory which would explain the cause of this malady." The disease is generally believed to be contagious and it is recommended to remove and burn the trees as soon as the disease makes its appearance.

There have been various theories advanced as to the causes of failure in growing the peach. It is said by some that the peach being indigenous to a warmer climate will not endure the low temperature of our winters, but the records do not show that our winters are more severe than formerly when the peach was almost a certain crop. Some go so far as to say they can give the exact degree of temperature at which the buds are

destroyed, but reports from Michigan show that the peach trees passing through a winter temperature of twenty degrees below zero have produced a full crop the following season; it is seldom we experience so low a temperature in New England. In 1884 the peach buds were substantially all killed in Massachusetts before Christmas and the thermometer had not indicated zero weather at that time. It is said our more open winters exposing the soil to more frequent freezing and thawing are the cause of failure, in answer it may be said the buds are frequently killed before these changes occur.

It is generally conceded that the continued perpetuation of plants and trees by cuttings, budding and grafting tends to weaken the constitution; this is most readily seen in the succulent plants, every florist knows that he must renew by growing seedlings his bedding plants if he would have healthy vigorous stock; the healthy life of some of them may be limited to five or six years, deterioration becoming more rapid as the stock becomes matured or diseased.

For the last forty years the peach growers have confined themselves mostly to a few well-known varieties, viz.: the early and late Crawford, Cooledge Favorite, Foster, Oldmixon and Stump the World. The stocks have been grown from pits gathered promiscuously, often from fruit grown upon diseased trees and buds taken from trees in similar condition.

Under such conditions could we reasonably expect to grow a fruit having its origin in a warmer and more equable climate? In alluding to this matter Downing says: "Every good gardener knows that if he desires to raise a healthy and vigorous seedling plant he must select the seed from a parent that is itself decidedly healthy." Again he says: "Is it not evident that the constant sowing of the seeds of an enfeebled stock of peaches would naturally produce a sickly and diseased race of trees." Lindley says: "All seeds will not equally produce vigorous seedlings but healthiness of the new plant will correspond with that of the seed from which it sprang."

The opinions of men who have made fruit growing a life study, confirmed by our own experience, would suggest more

care in the selection of pits and a main reliance upon seedling trees until healthy stocks may be secured from which buds may be taken to continue desirable varieties. Some varieties of the peach will reproduce themselves from seed if planted a sufficient distance from other varieties so that the pollen will not be transferred by the wind or insects to their blossoms.

There are three species of wild plum indigenous to this country but the stocks from which have come our improved varieties had their origin in Asia and the southern part of Europe. The trees are perfectly hardy and make a strong, upright growth and come early into fruit. Could we overcome two difficulties in the cultivation of this fruit the trees would be found in every garden and the fruit would become a profitable orchard product. The curculio makes his appearance soon after the fruit is formed and deposits its eggs in a crescent-shaped cut in the flesh of the fruit which soon hatch and the young grub eats his way to the stone, when the fruit falls and the young larva enters the ground to reappear the following year. One method of dealing with this pest has been to spread a sheet cut to the shape of the tree and large enough to extend outside its branches and spread upon the ground and with a mallet padded with thick cloth give the tree a sharp blow which dislodges the insects and they fall upon the sheet curled up as if dead and may be gathered and destroyed. An easier way of overcoming this difficulty or reducing it to a minimum has been found in keeping fowls in the orchard and occasionally jarring the trees. A more serious trouble is with the black knot; so generally prevalent has this become that few trees more than five or six years in the orchard are not more or less affected. Formerly the cause of the black knot was supposed to be an insect but recent investigation seems to prove that it is a fungoid growth, and as it increases the spores become detached and are blown by the wind from tree to tree, so that if unchecked all the trees in the vicinity where it first makes its appearance become diseased. The usual practice has been among growers of this fruit to examine carefully the trees in the spring and cut away every appearance of a knot, but this often results in the destruction of the tree in the course of two or three years. The

parts cut from the trees should be gathered and burned at once. When the plum is grown on adjoining estates its spread can only be prevented by concerted action, as one tree left uncared for will keep the whole neighborhood busy. Some recent experiments at the Agricultural College at Amherst with kerosene oil mixed with whiting to form a paste and spread over the knots with a brush have destroyed the knots without injuring the limbs of the trees. Among the desirable varieties of the plum the Green Gage, though not as attractive in appearance, stands at the head of the list in quality. The Washington, Jefferson, Coe's Golden Drop, McLaughlin, Lombard, Bradshaw and Niagara are desirable varieties. The fruit is liable to rot before it is in condition to pick and as a preventive should be carefully thinned.

The cherry tree combines the useful with the ornamental in a higher degree than any of our orchard trees, especially the heart-shaped varieties with their upright, vigorous growth; symmetrical in form, with dark glossy foliage they are hardly excelled in beauty by any of the shade trees grown on public or private grounds. The cherry tree well established will continue to thrive under wider conditions and requires less care than any of our orchard trees. The fruit of some of the soft flesh varieties is fine in quality and desirable for the table while the firmer fleshed bigarreaus and the more acid varieties are desirable for cooking and canning. Some of the best varieties are liable to decay at the turn of ripening if the weather happens to be wet, a shower sufficient to thoroughly wet the fruit followed by extreme heat will often result in total loss. Another larger loss without special regard to varieties is by the birds, among which the red breast robin plays a conspicuous part; they commence as soon as the fruit turns color and take an unfair advantage by selecting the finest specimens. Among the many desirable varieties of the cherry may be mentioned Mayduke, Bigarreau, Black Tartarian, Gov. Wood, Coe's Transparent, Hyde's Seedling, and Downer's Late.

The quince forms a small tree, rarely more than ten or twelve feet in height; it is perfectly hardy, though the tips of the season's growth are sometimes killed during the following win-

ter. The tree requires a rich, moist soil for the best results, land bordering running streams, if free from stagnant water, offers the most favorable situation. The fruit is desirable for preserves, either alone or with other fruits to which it imparts its peculiarly fine flavor. The variety most widely grown is the Orange, but Mammoth and Rea's seedling more recently introduced are both larger and finer in appearance. The only enemy that seriously interferes in growing the quince is the borer, and the trees require careful watching to prevent his getting a lodgment.

The farmers who are inclined to compare the advantages of fruit growing in the New England States with some of the more Southern States where the tropical fruits are grown, should remember that they possess every advantage in producing some of the most widely known and universally used fruits, and they should not forget the advantage of a large and constantly increasing home market, reducing the cost of transportation and commissions to a minimum, with an export trade to absorb the surplus of an abundant crop. Those who hesitate in growing the orchard fruits because the returns are more immediate from assured crops can in no way add more to the appearance or value of their farms or offer stronger inducements to the sons to remain on the farm than in the prospective revenue from growing orchards which, combined with the small-fruits, may be made a source of income every month in the year. The owners of small estates can in no way add more to the enjoyment of their families than by growing a liberal supply of the various fruits in their season. Some of the pleasantest recollections of our childhood are associated with the fruits of the field and garden.

As expressing the thoughts of one whose life was largely devoted to the improvement of the fruits of the temperate climate, I quote the words of Charles Downing: "Fine fruit is the flower of commodities, it is the most perfect union of the useful and the beautiful that the earth knows. Trees full of soft foliage blossoms, fresh with spring beauty and finally fruit bloomdusted, melting and luscious such are the treasures of the orchard and the garden temptingly offered to every landholder in this bright and sunny though temperate climate."

5th March, A. D. 1891.

ESSAY

BY

FRANK J. KINNEY, OF WORCESTER.

Theme:—Garden Vegetables.

"GARDEN VEGETABLES" is the subject given us for discussion this afternoon, and it is a very appropriate subject at this season of the year. The garden and the home are synonymous. The first mention we have in history of man and woman was in a garden, and who knows but that was a vegetable garden. Surely, we are told that "out of the ground grew every tree that was pleasant to the sight and good for food."

One thing is certain, a home without garden vegetables is a poor home, and the more space there is allotted to a garden and the better it is cared for, the better it will be for the family; in fact, in passing through the country one can judge somewhat of its wealth and intelligence by the gardens of the inhabitants. Whether they are floating gardens as we find in China, or gardens on the roofs of buildings as are common in some of the thickly settled countries of the Old World, or boxes on the window-sill, or the large fields tilled as gardens by professional market gardeners, or the cramped and weed-grown gardens of the country farms; all have their tale to tell the close observer.

No person can tell the amount of desirable vegetables that can be grown in a small garden unless he has had one to cultivate. To get the best results one should have a sunny window or a small hot-bed. In this climate, our seasons are very short and there are many desirable vegetables that don't have long enough time to grow if the seed is planted in the open ground.

One of the most important garden vegetables is the Tomato, and the history of its short life, well written, would read like a romance. Since I was a full-grown boy I have found many places in my journeyings where it was considered poisonous, and a quarter of a century will cover its active existence. Any of us can remember when the Boston Market and Keyes' Early were the best; then came the Trophy, advertised as a *solid* tomato; then Livingston gave us his seedlings so far in advance of all others that they were almost universally grown for a few years, but last year gave still others as good or a little better. The tomato is conceded now to be a healthy vegetable, either in its raw state or cooked; and there are few tables on which it does not appear nearly every day in the year in some form. It is easy to raise and very productive.

If one does not care to grow his own plants he can buy them. There are large fortunes made every year in handling tomatoes, and there is no excuse for not having the fruit fresh from one's own vines for several months, if so situated as to have a garden.

The next garden vegetable of importance is Spinach, and that like the tomato has grown in favor very rapidly and has also been greatly improved. It can be easily kept in the winter in-doors, and lives over out of doors to cut early in the spring; or it can be sowed in the open garden as soon as the frost is out of the ground two inches deep, and is seldom injured by the frost. It is a very wholesome vegetable, and easily prepared and cooked.

Lettuce is an appetizing salad and easily grown, and by starting in the window can be had quite early in the season; and there are varieties that can be grown all the season. The Deacon's and Hanson are the best summer lettuce.

Radishes, especially the turnip-rooted varieties, are easily grown, grow very quickly and are a wholesome green vegetable.

Peas are one of the earliest green vegetables and quite easily grown. There has been a great improvement in varieties within a few years. Henderson's Early is a very good and productive smooth pea; the best for early planting. The Stratagem is the

best wrinkled pea we have tested. There can be but little excuse for not having peas, for they are one of the easy vegetables to can for winter use.

Beets are another garden vegetable that has been very much improved in a few years, and can be had the year through with little trouble; are hardy, and like spinach and peas can be sown quite early, and by making good selections and planting several times in the summer, can be had fresh and tender. No dinner is perfect without beets, and no vegetable hash for breakfast is good without beet in it, in my opinion. It is one of the garden vegetables not properly encouraged by our Horticultural Society. The Eclipse and Edmands are the cream of the beet families, of my acquaintance, for early and medium. Dewing's is a nice winter beet when sown late and a good all around beet.

Parsneps need to be sowed early and are a garden vegetable of great value in the family. The Hollow Crown is the best flavored, but the Student, or some improved short variety, is better for spring use if wanted to leave them in the ground. There is a chance for improvement in parsneps, and a premium offered by our Society for a half long seedling would be a wise thing in my opinion. I heard one of our most conservative members say he would pay fifty dollars for a pound of such seed.

Salsify, or vegetable oyster, is a neglected vegetable; is as easily grown as parsneps and should be in every garden. There are many months in every year that have no *r* in them, and our Puritan or some other ancestors have long since prohibited the use of real oysters in those months. I never have known a family that some members did not wish oysters were good the year round, and salsify comes in to fill the place. It is easily prepared for the table, and universally liked by the people. It is a rich, healthy garden vegetable, can be kept in the cellar or ground over winter, and until the fresh grown roots are ready for use.

Turnips can be put into the ground early and are a vegetable easily grown, and profitable to raise to sell if the grower is an artist. There are some new varieties that come along very fast.

The Early Milan is the best early, and some of the globe purple tops, and White Egg varieties for late, to raise as a second crop after early peas or potatoes. There is some demand for the Golden Ball, also an English or fall turnip. The Sweet German, French or Cape, and Yellow Rutabagas are winter turnips, and need most of the season to perfect their growth; but if one has the proper soil and education they are a very profitable garden vegetable to grow. No garden is complete without a few Fall and Cape turnips.

For early *Cabbages* and *Cauliflowers* the seed needs to be planted in the window garden or hot-bed. There are many new and improved varieties, of which Henderson's Succession Cabbage, and Snowball Cauliflower, are good enough for any one. There are a few small pointed cabbages that grow very quickly. The Express and Extra Early Etampes are the best; but unless one is very fond of cabbage, he can't afford to grow them in a small garden. The Borecole, or Kale, is a species of cabbage used by the German population as greens, is very easily grown and kept, and when more of the community are educated to eat it will be a profitable crop to raise. Brussels Sprouts, another member of the cabbage family that is raised as a profitable crop in some localities, is too aristocratic for common people to bother with.

Endive is a vegetable but little grown in this vicinity, but is worth a place in any one's garden, if a person appreciates good salad, or wants a nice plant to garnish with. The green curled is best.

Parsley is another vegetable not much grown, but worthy a place in all gardens. It is one of the good things that few know about. For garnishing, or seasoning soups, it has few if any equals. It grows slow at first, but has a root like the parsnep, and when well started is easily managed. It may be grown in a flower pot, or box, in the house in winter.

Of course all must have a small bed of *Carrots;* they will be wanted for soups if nothing else. They are easily grown, are a large family; but some of the newer one-half long or short-horn are best.

Celery is a garden vegetable that has made wonderful strides in the past ten or fifteen years. Whether it has kept pace with the education of the American people is doubtful, but it has contributed more than any vegetable towards it, in my opinion. It is a green vegetable for winter use, and is eaten in its raw state. For the tired and over-worked American, it is a nerve panacea; and as it is not relished, or eaten, after it gets to be *second-hand*, it is a safe accompaniment of any meal. If people don't sell their good taste to fashion, but place the stalks on the table entire, with their beautiful leaves overhanging the dish, it makes a bouquet that will cheer the weary, and stimulate all the good there is in us. It is one of the vegetables when good, and well grown, that is all that most appetites desire of itself. Some will demoralize it, by eating it with salt; others with olive or some other oil; but the large majority of people find it good enough, as it comes from the garden, or storage pit, if it takes a thorough bath on the way to the table. There have been many new varieties introduced within a few years, and like all other *new* vegetables some very few have proved better than any we had before in some respects.

There is no celery that I have grown that is better than the Boston Market when it is well grown; but of late it requires more skill than the ordinary person possesses.

The White Plume is easily grown, and for early is very passable; not quite so good as Paris Golden, another variety that is easily blanched, and good for early. The Giant Pascal is the best of the new-comers for late, more hardy than most of the good varieties. Were it not for the vast amount of fungi in the air and ground, it would be an easy matter to grow celery; but thousands of people, after working hard all the season to get their celery grown, see it blight and rot. It seems too bad that we are obliged to eat celery grown in Michigan, a good deal of the year, but the fact remains. Celeriac or turnip-rooted celery is more easily grown and kept than celery, and is better for seasoning meat and soups.

Water-Cress is a desirable vegetable, can be grown in any garden soil as easily as pepper-grass, and is a very nice plant

for salad. It is grown under glass the same as lettuce, or in the open ground.

Most people like to grow their own sweet herbs, peppermint, thyme, sweet marjoram, summer savory, sage, etc. It takes but a small piece of ground, and they are ever so much better than can be bought at the apothecaries.

Sweet Corn is a garden vegetable that is eaten by as many people as any vegetable; and if the variety is good, and it has been well grown, it makes a vegetable that is nutritious and wholesome. As a farmer's son I knew nothing of this superb vegetable, but as a gardener I soon became acquainted with it. We children used to boil and roast field corn, and thought it was good; it was, and the only green vegetable we had as children. You think I was a child in some heathen land, perhaps? but I was not. My birthplace was in a good farming town in Bennington County, Vermont, and this statement is not more than forty years old. I presume you might find many good farms, next summer, were you to journey forty miles across the country, in any direction from Worcester, where there was not a hill of sweet corn raised, and never had been. I feel proud to state that I raised the first sweet corn, tomatoes, and celery ever grown in my native town, and that I learned how to raise and eat them, in this city, on the farm of Stephen Foster. There are many good varieties of sweet corn, but if I were asked for the best three for early, medium, and late, I should say Crosby's. Plant it once a fortnight, commencing when the apple trees are in bloom, continuing till July 4, and you will have good sweet corn all summer and until frost comes. If you choose, you can dry or can it, and have sweet corn all winter.

Beans are a good vegetable to have, either to go with the corn for succotash, to eat cooked in the pods, as string beans, or boiled and served with cream or butter as a vegetable for the day. If you want a very nice dish in the winter, shell the beans while they are tender and green, then dry them, and you can have it. Canned green beans are better than ripe ones. The wax beans are best for string, and the Horticultural, bush, or

pole, striped, and white, are the best we can raise for shell beans. If our seasons were a little longer I should recommend the Lima; but unless some of the new Dwarf Limas prove of value we can't many of us indulge in home-grown Lima beans, except on Sundays, in the late fall.

Rhubarb is one of the connecting links. It is not a fruit, but is used as a fruit; and where sugar can be afforded there will be found rhubarb sauce and rhubarb pies, when it is the off apple year. Some prefer it to apple any time; for a change it is certainly a nice thing to have. It can be grown in some corner of the garden, and when once established is no trouble, as it lasts many years. It is a good plan to take up the roots and divide them occasionally.

Asparagus is another vegetable that can be had with but little trouble; it is one of the first, coming up so early that the Spring frosts will kill it, if it is not covered on cold nights. Planted in the garden, it will live and thrive with little care for many years.

Of course you will have a small bed of Onions. White Portugal are the best for early and medium, and Yellow Danvers, the *Globe* varieties, for winter.

No garden is complete without a few *Cucumbers*, so we must all try every year to grow some. There are a good many reasons why we ought to—mainly, so we may know how much trouble and vexation it costs. The white spine and long green are the best varieties.

A few *Squash* seeds should be planted. If they come up, and we are very watchful, we shall see them; but the chances are we shall not. Some striped beetle, or platoon of beetles, will charge on them as soon as they dare to leave their earth covering; if not, the vines may grow and run over and destroy lots of our other nice things, living and rioting until the squashes begin to gladden our hearts; and then the black or trout bug, as he is called in some localities, will attack them and they will wither and die.

Melons are a most delicious garden vegetable, and will bear a better acquaintance than most people have with them. The

vines have fewer enemies than cucumbers and squashes. By using the unripe ones in the fall for sweet pickle—and they make the best—are as profitable as any vegetable grown. It is a good plan to plant the seed early in hot beds, in an inverted turf: later, remove turf and plants to the garden. The Emerald Gem and Christiana are the best salmon-fleshed, and Burpee's Nettled Gem and the New Surprise are the best green-fleshed Cantaloupes.

The Surprise is the cream of yellow-fleshed melons, when it does well, but not so sure as the others.

I have often wondered why our Horticultural Society did not offer more and better premiums for Cantaloupe melons. They are universally used for several months, and they are the cream of the garden vegetables.

Watermelons are not as desirable for our climate, though they can be grown with a little trouble. The Hungarian Honey and Phinney's Early are the best.

Okra or Gumbo is a vegetable not much grown or used, but is a desirable addition to our collection, and should be set out and grown the same as peppers.

Okra is a valuable vegetable, either green or dried for winter use.

We must try to grow *Egg Plant*, shall probably fail, but have got used to that by this time.

Never mind, we have a garden vegetable saved for the last, that is universally grown and eaten. Of course *anybody* can grow it, and it will be good every time, for its name is *Potato*. Its pedigree dates back so far that for want of a better Christian name, it was called Irish to distinguish it from the sweet or southern potato. It belongs to one of the largest families of any of our vegetable friends, and is both lowly and aristocratic in its connections. I know of no other vegetable so plenty, and so universally poor, as the potato. A large part of the potatoes eaten in our city are brought from a long distance, many of them across the ocean. There is no vegetable that changes quicker from good to medium, or poor. As a proof, expose a few nice potatoes to the *light* for two or three days,

and then test them. I wonder how many of my hearers could guess within hundreds of bushels how many potatoes are wasted and consumed in our city every day. The swill gatherers could judge best of the waste. Twelve bushels to a thousand inhabitants, would be a fair estimate, and that would give the moderate sum of 960 bushels at an average cost now of $1.20 a bushel, making nearly $1200 a day for potatoes.

Now, Mr. President, Ladies and Gentlemen, in my opinion there are but two other things used in large quantities in this city, that are worthless to those who use them; and those are tobacco and rum.

No good farmer values potatoes at more than 20 or 25 cents per bushel to feed stock; but it is a fashionable habit we have of using potatoes, so they must be grown. The very best variety is the early Beauty of Hebron. There are a few of the newer varieties, both early and late, that are worthy of a place in every garden. The early Essex and Charles Downing are giving universal satisfaction. According to government statistics, the potato crop exceeds all other crops excepting fruit and butter, reaching more than $125,000,000 in a single year.

The question of the day will be incomplete without a word on fertilization and vegetable hygiene. As great as have been the improvements on vegetables in a quarter of a century, the advance in the knowledge of fertilizing the soil, to grow them, has been greater; and we hope that the interest awakened in the prevention of disease of vegetables will continue. There was a time within the memory of the small boy, when it appeared as though many of the vegetables we prize the most, were doomed. The potato-rot seemed to have the grip of a giant, and many people gave up raising them; but thanks to our experiment stations, preventives were found in the new way of fertilizing with phosphates, and other special manure, and spraying the vines with a copper preparation at the same time as they were sprayed to kill the voracious larvæ of the potato bug.

Just as celery came to be almost a necessity a species of fungi attacked its leaves, and it disappeared from the gardens

by the thousands of dozens, in a short space of time. But patient study will very soon enable those versed in vegetable hygiene to counteract, or destroy, this new vegetable enemy.

There was a vile looking slug appeared on some of my celery ground two years ago, and he has defied all safe preventives as yet; but as we seem to have the entire stock in the country, his days of marauding will be short.

The pioneer who had the courage to say, that the *quality* of a vegetable could be changed by feeding it, was considered a crank if not a fool; but those who are successful in raising vegetables that approach perfection, are the ones who understand the art of feeding them. There are no two that require precisely the same fertilizing. Some need a great amount of potash, as the potato, others almost live on Nitrogen, like spinach, others on Phosphoric Acid, like corn, and so on through the whole list.

It may be necessary to follow a rotation in the cultivation of garden vegetables, putting beans next year where we have potatoes this, peas where we had parsneps, and strawberries where we had almost anything but potatoes. It is believed by some that because strawberries are a potash plant one will not follow the other to advantage. That has not been my experience. A good piece of land for any class of plants, can be kept in condition to grow them, as long as the cultivator proves himself smarter than the insects that infest them.

It is said that cabbages cannot be grown on the same land two years in succession, but we have plenty of evidence where many crops have been grown in succession without a failure. Peter Henderson had a piece where he grew cabbage six years in succession and had fine crops every year. I have seen fields in New Jersey where cabbage and cauliflower had been grown for 12 successive years without a failure. They used wood ashes and marl for fertilizers, and trimmed the roots of the plants when set out to avoid club foot.

I have given a short space to a few phases of this very important question, and am in hopes that the discussion to

follow will stimulate the growing of garden vegetables in our vicinity, so that every person can have fresh grown vegetables every day in the season of them, for they are God's best gift to man. Whittier says:

Give fools their gold;
And knaves their power;
Let fortune's bubbles rise and fall;
Who sows a field, or trains a flower,
Or plants a tree; is more than all.

12th March, A. D. 1891.

ESSAY

BY

MRS. FANNIE A. DEAN, OF EDGARTOWN.

Theme:—The Columbian Discovery—Its Benefits To Horticulture.

As we approach the four hundredth anniversary of the Columbian Discovery of America, it may not be unwise to consider its direct and indirect benefits to that department of industry in which you who are gathered here to-day, are especially interested.

It is not our purpose to discuss any question as to who first came to America, whether it was Heeli the Chinese, Ericson the Norwegian, Madoc, the Prince of Wales, or Columbus the Genoese; but we do affirm that it was through the voyages of the last-named and distinguished individual, that our country became well-known to the other nations of the earth.

The American or Indian had not much idea of horticulture. History tells us that his wife dug a few roots, or cultivated a little maize, the latter of which she prepared for food by crushing with the stone corn-cracker, or pounding in the stone mortar. The indolent and erratic disposition of the Indian was not favorable to landscape gardening, nor to the less ornamental work of the kitchen garden.

The forests, in all their stately grandeur were here; the wild flowers, in all their luxuriance, nestled at the bases of the grand old monarchs of the forest, or trailed silently over meadow and hill-slope; the feather-like Bryopsis presented as beautiful a green color as it waved under the blue sea, then as to-day, and the porphyra or purple weed reproduced itself then by

dividing, just as now. Whether under sea or sky, the great Continent of America, at that early day, contained those simples and forces which have been combined and exerted within the last four centuries, until the world has realized the vast resources of wealth and beauty which she possesses.

From the depths of her mighty rivers, from her inexhaustible mines, from the scenery of her natural parks and her thousands of lakes, and from the grandeur of her remarkable cañons and the loftiness of her mountain peaks, come forth the questions—Of what use has the American Continent been to the world? Have its inhabitants gleaned any additional knowledge, or received any benefits from us? In this paper, it is proposed, as was intimated at its beginning, to answer these questions, in regard to horticulture alone.

When we use the term horticulture, we consider it as meaning the most perfect method of cultivating the soil either for products of beauty or use. This art had been known to the inhabitants of the Old World or Eastern Continent, for thousands of years before Columbus had started on his voyages of exploration. A love of the beautiful in nature had been implanted in his soul, and the luxuriance of the tropical vegetation of the country he found so impressed him with its charming appearance that he made particular mention of it to Queen Isabella, when he wrote to her the glowing accounts of the new land.

Through the succeeding years, in the early unsettled state of this continent, not much attention was paid to aught except the cultivation of those cereals and vegetables which were required for the sustenance of nature. Different nations were sending colonies westward, each one desirous of acquiring a strong and permanent foothold in some chosen corner of either North or South America. To those lured hither first by a desire for gold, the products of the soil held little, if any, attraction. Like our own citizens of the eastern United States, who, in 1849, flocked, in so great a number, to the gold mines of California, they little realized what a variety and amount of flowers and fruit were possible to be developed from the glittering sands.

The Indians, as a race, have not progressed much in their botanical knowledge since the days before the European discovery of America. The aggregate knowledge of the doctors or learned men of the Cherokee Indians, according to the statement of Mr. James Morney who has recently spent much time in studying them, only embraces about eight hundred species of plants, and no one doctor knows the names of more than three hundred species. They have no names for even the most beautiful or noticeable flowers unless the plants are used as food or medicine. They are, as four hundred years ago, without sentiment for the fragrance or symmetry of the flowers, and yet the Cherokee Indians have dwelt in the regions of western North Carolina.

Whatever benefits may have resulted to horticulture, are found to be due mostly to the researches, industries, inventions and literature of the white men of the present century. The experiment stations in the different States for testing the peculiar conditions required for the growth of individual plants and for conducting microscopical investigations in regard to the causes which destroy them; the careful studies made by such enthusiastic botanists as Drs. Asa Gray and John Torrey; the extensive researches of such interested men as Dr. J. Triana of New Granada, who explored the flora of his native country for ten years amidst so many discouragements from his own government, and who then established himself in France for the purpose of describing his collections; and the experiments tried by hundreds of horticulturists, show the awakening of this American people to an earnest desire for acquiring knowledge and then communicating it to the world at large. While we may have imported plant specimens, other countries have been, and are importing from us, until they have already naturalized our elm, captured the Peruvian cinchona, adopted our Kalmia as one of their most highly prized plants, and have even disputed the American origin of the pine-apple.

Our facilities for research are constantly increasing. In a late number of Lippincott's Magazine, a writer mourns that we have no American Kew, and earnestly insists that New York

City shall be the first to establish similar gardens here, and not let Philadelphia, Boston or any other city get ahead of her in this respect. He certainly could not have learned that, second only to the Royal Botanical gardens at Kew, will be the Missouri Botanical gardens begun by the late Henry Shaw, and for whose completion and maintenance he has left a legacy of three millions of dollars. These gardens if completed will give a chance for study and research which will supply the long-felt need of horticulturists.

The explorations of Mexican and other adjacent regions early in this century, resulted in great additions to the number of varieties previously shown in Europe, of one kind of flower alone—the cactus. In 1796, only twenty-nine species had been found; in 1850, 670 species were known, and now over 1000 species are distinguished. Not only have our own botanists made these reseaches but celebrated travellers like Kalm and Michaux, Jussieu and Humboldt in earlier days, and Wright, Brewer and André, in the present generation have made expeditions to America for the sole purpose of collecting specimens of the new plants, on this side of the Atlantic. Will such men as these dare to say that America has accorded no benefits to the horticulture of the world?

The herbarium of Humboldt alone which contained 3500 new specimens shows that the discovery of the West Indies, in 1492, certainly opened new and rich botanical store-houses.

Horticulturists of the present day will not soon forget the sufferings and hardships of the late Charles C. Parry as he crossed the California Desert from San Diego to the mouth of the Gila River, and unfolded to the world the floral treasure of the western and southwestern parts of the United States.

On authority, it is stated, that the number of species of flowering plants and higher cryptogams indigenous to the United States is twelve thousand, and that that is practically the number for North America. Adding to these the known indigenous plants of South America, and imagining what may be reserved for us to discover, in the future, we may not hesitate to conclude that we have added no mean contribution to the world's flora.

Not only have the results of the researches in America become well known to the world, but still farther reaching are the results of the industries of the American citizens. Brain and muscle have united, and have succeeded in giving to the world the fruits of our industries. The market gardens, adjacent to our great cities, the fruit industries of the south, and even that unique horticultural industry of southeastern Massachusetts and New Jersey, cranberry growing, show, in a limited degree, what is being accomplished; but when we consider the horticultural possibilities of California, how can we begin to realize to what extent these industries may be carried?

In 1888, 1,250,000 boxes of raisins were produced in California. Every year, the quality of these raisins has improved until now they are considered to be sweeter than those sent from Spain, and will keep so for twice as long a time. During the last year alone, the value of the horticultural products—wines, fruits, vegetables, and flowers—is estimated at thirty-six millions of dollars, and it is affirmed that ten thousand tons of fresh, dried and canned fruits have been sent from there by rail, the past season, not including those sent by express. More fruit trees were to have been planted there last winter than ever before. The largest olive-oil factory in the world has been built in Sonoma County, California, recently, at an expense of a quarter of a million dollars, and the company are planting seven hundred acres of olive trees. Now that the growing of olives is to be engaged in as a special industry, and to so great an extent, California is indeed destined to surpass the southland of Europe. Those who perform manual labor, are apt to ignore the thought labor, and often do not understand the physical exhaustion it produces; but there is an industry of mind, without which there would be seen to-day but little improvement upon the old ways in which our grandfathers worked. It is by the industrious thought of the few progressive minds that the work of the many has been wonderfully lessened. The brain of the manufacturer who utilizes the products of the great cotton gardens of the South, and the intelligence of the members of a corporation who establish in the West the greatest flour-mill in the world, are potent factors in extending the

benefits so lavishly bestowed upon us. He who first thought of adapting the gum of the rubber plant so well known in South America, scarcely dreamed of the uses to which it would be applied. To be sure, there were rubber trees and plants in the East Indies, but it took the continued thought, for many years, of an American Goodyear to discover the process of vulcanizing. How could we do without this gum to-day? The physician and the mechanic, the manufacturer and the horticulturist alike use it. It assists in weaving our garments, protects us from the storms, cans our fruits and files our business papers. Its uses are too varied and numerous to be recounted here. Its commercial value is great. When we read of the gigantic schemes of capitalists to buy up the whole rubber crop of Para alone; when from three to five millions of dollars are raised for this purpose by English and American operators, we get a glimpse of the value of this plant which has been made of so much importance by the unremitting energy of an American mind. A simple illustration of the result of industry can readily be seen as we note the difference between the old-time flower garden of our grandmothers, refreshing as it was with its redolence of pinks, hearts-ease and roses and the well-planned parterres of to-day.

Last summer, curiosity perhaps, prompted me to make a call upon a lady one hundred and one years of age. As we drew near her home, we saw her busy at work in her vegetable garden. Clear in intellect, she soon recognized one of our party as the grandchild of an old friend of her youth. As we left, she took us to her flower garden, and gave us a few blossoms as a souvenir of our visit. Here was horticulture in its simplest form, but it rendered happiness to an old heart, nevertheless.

On arriving at Boston, a day later, the public gardens were decorated, in their holiday beauty, to greet the Grand Army of the Republic. All that art and modern knowledge could contribute were lent to give cheer to the thousands who should be in the city on that week. In a few hours we were carried from the early days of horticulture, in all their primitive simplicity,

to the present time so full of the results of the industry and civilization of the people. What America had accomplished in less than a century, was fully exhibited in these contrasting gardens.

Some say carelessly that America has no gardens to be compared with those which the Old World has possessed for centuries; but they do not just here allude to our comparative youth in civilization. They forget that America has given them, in all their wonderful beauty, natural gardens which they would gladly be willing to equal. They forget the flowers of Mexico which grow in such richness and profusion, and also that every variety of the edible fruits of Europe grow spontaneously there; they forget too that, owing to the fact of there being more than one crop every year, every kind of the garden vegetables known to Europe, can be found in the markets of the capital of Mexico, throughout the year; they do not remember the magnificent gardens of Montezuma at Chapultepec, nor the famous Dungeness garden with its twelve acres devoted to tropical fruits and flowers which was so unfortunately burned during the civil war, but which is now being reclaimed; they ignore the roses of California and the indescribable splendor of the wild flowers of Guiana, including the gorgeous Victoria Regia.

The extensive gold, silver, copper, coal, diamond and other mines of our great continent, North and South, are bringing to us the capital with which others, like Vanderbilt, will be enabled to lay out landscape gardens, and besides these, gardens especially for fruit and flower that shall excel in magnificence the wildest dreams of the Eastern horticulturist. But it is to be remembered, that it is by our industry that we shall collect and cultivate plants, or chisel the marble or granite for their ornamentation.

It is to the American men of the present century mostly, that we owe those inventions which have made agriculture and horticulture both, a pleasure rather than a drudgery. It took a Robert Fulton to give us a steam-boat, by means of which the products of one section of country can be transported easily

to another, or of our own country to foreign lands. By the invention of the steam-boat, horticulture has been made a profitable as well as an ornamental occupation. Horticulturists of different countries can now readily hold international conventions where subjects of interest and importance can be discussed, and we can visit with ease, the far-famed gardens of the East, while but few ventured to cross the ocean and seas, a hundred years ago. The botanist, in a two months' vacation, accomplishes more than could have been foreseen by Fulton himself. The steamboat produced a revolution which has shaken the whole civilized world; but American genius has since condensed the steam and adapted the steam-engine in a multiplicity of ways that have been of the greatest aid either in the cultivation of plants, or in their manufacture into articles of use.

Great philosopher as was Benjamin Franklin, he did not anticipate the effects of his discovery, as he held the kite string so that the lightnings of heaven might flash upon it; but a Morse has invented a telegraph that enables us to interview an authority on horticulture in France or England almost as readily as we would converse with a neighbor. By the telegraph, we can order our Sevillian oranges, or ascertain the price of Italian olives; in fact, the telegraph reports to us the prices current of all our vegetables and ordinary fruits. Nothing has so united the world as the telegraph, and placed the lovers of flowers and fruits so near each other. With its 1,680,900 miles of wire on land, and its 112,740 nautical miles of submarine cable, is there any reason why we should not acquaint each other with our latest observations and progress in this art of horticulture? There has been much discussion of late about the inventor of the electric motor and nearly all concede the honor to Davenport, also an American, but give to Morse the credit of the invention of the recording telegraph.

It has taken a Bell to construct the telephone that we might gather from our own countrymen facts which may affect our domestic commerce in fruit or vegetable. With the electric light, we transform our landscape gardens, or our public parks

into a fairy-land more bewildering and beautiful than the fantasies of a Rider Haggard, or even the visions of a Don Quixote, could have conceived to be possible. Not satisfied with these, nor with the processes of forcing the growth of plants, already known, we experiment at Cornell University, and other places to find how much power electric light contains, and may be made to exert for this purpose.

Edison, the electrician, has recently devised a method by which the utterances of a public speaker, together with an exact representation of his bodily presence, may be given to an assembly at any distant point. Let us apply this invention to horticulture, and we may see the photographs of plants at distant points, and be saved the expense of a journey, to examine or purchase them. It is yet an unsolved problem because of its recent application how far electricity may benefit horticulture. Should the motor supplant steam power, and electrical engine supersede the steam engine, as some have prophesied, we shall realize, more fully, its power over nature.

Those who are actively engaged in horticulture, have observed the numberless inventions which tend toward lightening the work of the present century. Labor-saving machines, in almost all departments of their work, are giving them an opportunity for reading and recreation which their ancestors never enjoyed. These inventions have been sent to different parts of the world, until machinery is an important export. Improvements in tools for the horticulturist, improvements in greenhouses and methods of heating and ventilating them, improvements in fertilizers and methods of irrigation have led to wonderful results. As a continent, we are not yet fully developed, but we are progressive. As we read the histories of many of the countries of South America, we find the fact stated that one plant or another would be of profit, were there enough laborers to care properly for them, or more labor-saving machines. South America then is full of resources and capabilities, and when more of the inventions of North America together with something of the Yankee energy shall be supplied to her, time only will reveal the increased benefits she will

bestow upon horticulture. You who live in a city like Worcester, which may well boast of its variety of manufactures, and from which so many practical inventions have been sent out to the world, whose railroads diverge in every direction, and which boasts of a Horticultural Society over half a century old, are especially calculated to appreciate the influence upon the world of the American aids to horticulture.

In comparison with the advantages resulting from the researches, industries, and inventions of our country, our literature does not hold an unimportant place. It is said by those competent to judge, that the works of foreign authors upon subjects connected with the garden, or upon horticulture generally, are better than ours, but that our books upon special subjects pertaining to, or connected with horticulture, are far more thorough and practical than theirs. So we may conclude from this, that we have, in a short life, benefited other countries, in this respect, as much in proportion as they, in their longer life, have aided each other. With these written volumes and her publications devoted strictly to the subject, like "The Garden and Forest" or "American Garden," with her scientific works, many of which are so closely allied to this art, the published records of horticultural societies and the bulletins from experiment stations, America is giving a literature which is of inestimable value both to the lover of the garden, or to him whose living depends upon its products. Wise supervisors of schools and far-seeing editors of children's magazines are striving to interest the youngest readers throughout the United States, in nature and especially in plants. Last spring, a child's paper contained an offer of a reward to any boy or girl who would collect, between the first of May and the first of September, fifty kinds of native flowers, and send a list of their names. Some of these children learned more than just the names; they found out when they blossomed and their habits. We cannot measure the extent of the influence that will be felt and exerted by the children of our own country by their early education, and this influence will extend to other lands as well.

Children like novelties; and where will they find them more

continuously than in planting the seeds and watching their growth and the beautiful blossoms and fruit which they produce? As the child becomes a man, will he ever lose a love for the beautiful pictures which the garden places before him, and which are so great in number, and varied that a life-time is far too short a time in which to view them all? With a Bryant to sing of "The Planting of the Apple-tree," a Lowell to write an ode to the dandelion, and a Whittier and Longfellow to charm us with their inspirations drawn from the flowers, and a Mary Dodge to remind us of beautiful "Blossom-time" when the flowers are "wreathed on every bough and branch, or falling down in showers," we give the influence of poetry, the American poetry of horticulture to the world.

Not remotely connected with our literature, is the thought that many of our greatest minds occupied perhaps in far different business for the most part, have shown themselves lovers of horticulture. Not unlike Luther who always kept a flower in a glass upon his writing table, and when waging his great public controversy with Eckius, kept a flower in his hand, was the late George Bancroft. Historian that he was, and engaged also in public life, one can never think of him but that he associates him with his roses at Newport. Nor can we think of the sermons of a Beecher, without remembering his love of the wild-flowers and particularly the trailing Arbutus.

Many of our greatest public men, like Washington, have taken time to plant the ornamental trees, or look after the floral adornments of their homes.

With North America containing 8,073,000 square miles and South America with its 7,316,000 square miles, Columbus bequeathed a garden large enough to satisfy the rapacious yearnings of the Eastern World. Within its limits, are found metals and minerals valuable enough to recompense its gardeners, and native flowers and fruits in sufficient abundance for the thousands of emigrants to our lands. How, in the exposition so soon to take place, can we show to the world, what benefits we have conferred upon her horticulture? Shall we show her simply our herbariums and samples of fruits and flowers, with-

out giving an idea of the methods and aids used in producing them? Shall we not take pains to exhibit, in some way, the power of our modern inventions and their application to horticulture?

We are not disposed to discuss the political side of horticulture, if it has one; but we fail to see that any benefit will accrue to horticulture when bills are passed which exact duties upon plants, bulbs or seeds of any kind. If we cross to the other side of the Atlantic and purchase a few plants, must our trunks be seized and our smuggled flower-germs be held for duty? America can afford to be more generous to her citizens than to let any country within her boundaries demand pay for the importation of a rare flower.

A question now of moment to the horticulturist, is that concerning the protection of the original growers of new varieties of plants. Legislation upon this subject might result in practical benefits. As every man has a right to have his own invention patented, so, it would seem, one who has spent months in studying the development of some new tint or form in a flower, and in originating ideas which should culminate in that new flower-creation, has a privilege to ask for protection in his rights. In this way, more thought might be directed and from the encouragement obtained, more zest imparted, to the studies required in order to attain to perfection in the horticultural art.

In this recent civilization of ours, we have overlooked, perhaps, the fact that it is to the horticulturist that we are indebted for much that beautifies the home, and refines and elevates the character. The United States lavishly use the flowers; some maintain that flowers are used for more purposes and in greater profusion than is known elsewhere. However that may be, the fact is true that the home influence of America has been exerted unreservedly for horticulture, in its commercial interests; and following in the footsteps of the adventurous Genoese, in his admiration of flower or tree, we send back to the Old World the messages of beauty which are borne in to our souls from the petals of the flower, or from the leaves of vine or shrub.

The Columbian Discovery then has given to the world benefits which cannot be overlooked. It has made of horticulture a broad rather than a limited art, it has instructed the older governments scientifically as well as practically. It has opened wide her storehouses from Cape Cod to Puget Sound; from the Arctic shores to the Cape Horn of South America, we have withheld nothing that would aid in research or industry. With a record of but four centuries, we are fast approaching the hour when no one will think of us as new, but as old, because results have been attained so speedily, and so numberless have been the benefits we have conferred upon the world's horticulture.

19th March, A. D. 1891.

ESSAY

BY

OBADIAH B. HADWEN.

Theme:—Hardy Flowering Shrubs and Plants.

It is not to be expected that one who has devoted the major portion of his life to the sturdy pursuits of the farm, can have found time to become skilled in the knowledge or the cultivation of flowers adequate to render an elaborate consideration of the subject. But nature has signalized and cultivators have brought out such an extensive variety and wealth of flowers, it has seemed to me that they are not sufficiently appreciated and enjoyed by the general public, and I venture to call attention to the subject from what may be termed the intermediate standpoint, in which every one having the slightest taste or love of flowers may safely grow some of them in their respective homesteads or premises by the way of embellishment or ornamentation. By their cultivation we may find relief from daily cares; we are filled with novel sensations induced by each flowering plant. It is by the thought and attention that is required that we draw the charm from familiar flowers and these should be within our knowledge, both of names and habits. It is useless for one to expect the full rounded out luxuries of life without the love of flowers, and their cultivation should be taught and obeyed as the Ten Commandments.

In the avocation and pursuits of Horticulture we learn to produce flowers that are gratifying to both simple and cultivated tastes, and which go far to fill up the enjoyment of rural life. To plant and grow a few flowers about the homestead

tends to educate and gladden the eye, to refine our better natures, and we grow to appreciate as our knowledge increases, for they are equally gratifying to the young and old. They soften the arduous day of toil in all pursuits of life, and crown those who grow them plentiful and well; broadening and improving the mind and educating the eye to appreciate the more beautiful in nature in its most comprehensive and delicate sense. Flowers embellish, decorate and charm our homes and immediate surroundings in due proportion to the care and skill devoted to their cultivation. Of late years we have the world to select from, giving variety adapted to all situations, either climate or soil; and with the hybrids annually produced by skilled cultivators, our interests are being constantly renewed with new kinds and coloring to the already vast collection found worthy of cultivation.

In attempting to speak of the hardy flowering shrubs and plants particularly adapted to Central Massachusetts with an area subject to the climatic conditions of an altitude varying from one hundred to more than one thousand feet above tide water, we find very many that are native and also of foreign introduction worthy of cultivation. It will be practicable at this time to dwell upon only a portion of them even very briefly. Perhaps in no period since the settlement of the country has the growing of ornamental shrubs and plants in the public parks of cities, on grounds adjacent to school-houses, at railway stations, on the farms and gardens, and even in windows, ever received so much intelligent care and cultivation as at present, although our ancestors were not entire strangers to some good flowering shrubs and plants, and even then flowers were not "born to blush unseen;" they were cultivated by hands as assiduous and delicate as those of the present age who are instructed and first inspired by the worthy example of their ancestors.

The Lilac, of late called *Syringa*, was well known and cultivated years ago: the common lilac was then indispensable in every garden. We have fifty sorts now that add very much to the interest in this hardy and much esteemed class of plants—

always profuse in bloom and long-lived, and often growing to half tree size. The new tree lilac of very recent introduction comes from the most northerly section of Japan; it makes a straight, shapely, well-branched tree with large leaves; it blooms in mid-summer and has large clusters of white flowers, and although but little known is regarded as a great acquisition and is justly termed the king of the lilacs.

The Philadelphus, sometimes called Syringa or Mock Orange, is a valuable shrub for its profusion of sweet flowers. Of fifteen or twenty sorts flowering from early to late; they are especially desirable, easily grown, long lived and hardy.

The Weigela, introduced within my recollection from Japan or China, proves a very popular shrub, comprising more than twenty sorts, most of them hardy, with white and rose-colored flowers, and some with variegated foliage. It seems to adapt itself readily to all soils and a wide range of latitude.

The Spiræas, both herbaceous and shrubby, form an elegant class of plants of easy cultivation, blooming in their variety nearly all summer with a great diversity of form and color, and they are very acceptable in all grounds.

The Prunus, or flowering almonds, are very charming, early flowering plants, flowers both pink and white. The masses of bloom are always attractive and easily grown, and they are among the earliest shrubs to bloom.

Cydonia Japonica, or Japan Quince, in their variety hold a favorite rank in all gardens. With proper pruning they form a thick massive shrub; when in bloom they are unequalled for brilliancy; the fruit is ornamental, but not edible.

The Deutzia is a very charming and beautiful class of plants, flowering in June; most profuse in bloom of white and pink. There are several sorts and they are continually increasing. In my grounds they grow from seed and prove very vigorous and hardy plants.

The Exochorda Grandiflora is a comparatively new shrub from Japan; it attains half tree size and the latter part of May is covered with large white flowers. The flower buds are round, and equally attractive as the open bloom. It is the most beauti-

ful when in bloom of any shrub at the same time, and is a decided acquisition.

The Halesia, or Silver Bell, blooms in May with white bell-shaped flowers; it forms a shapely shrub and has a pretty leaf.

The Viburnum, or Snow-ball, is an old and pleasing shrub with a gorgeous wealth of white flowers. The Viburnum Plicatum, of quite recent introduction from Japan, is the most ornamental of the family; both the flowers and leaves are very beautiful; the shrub is proving perfectly hardy, and thus far free from insects, and is a decided acquisition.

Lonicera, or Tartarian Honeysuckle, are old and hardy shrubs of a half dozen sorts, with a pleasing variety of flowers, and when properly trained makes a beautiful bush, and thrives in most soils and situations.

The Altheas are fine late flowering shrubs, sometimes growing half tree size. They are kind enough to bloom when but few other shrubs are in flower, and remain in flower for several weeks; they require but little care and often are very showy.

Calycanthus is a sweet fragrant shrub; the flowers are not pleasing to the eye, but quite agreeable to the smell. It is an old shrub and when well grown is desirable.

The Hydrangeas as a class are late flowering shrubs, which are very much esteemed. The Hydrangea Paniculata Grandiflora is the most desirable, and thrives especially well about Worcester, where it is largely grown and much esteemed for its very gorgeous display of large blooms varying in color from white to pink. I have in my grounds the largest I have ever seen, and when in bloom it forms a perfect bank of flowers. It thrives best in a deep loam, retentive of moisture, and will bear liberal treatment.

The Azalea in their variety are one of the most satisfactory shrubs. The natives—commonly called swamp pinks—flower in June and July; when properly transplanted, in a moist, peaty soil, make fine, large bushes, and when in bloom are very fragrant.

The Ghent varieties afford an opportunity for a fine display of different colors of all shades; they do best in a soil composed of

peat, sand, and loam, and bloom in the later part of May and June.

The Azalea Mollis is comparatively a new species from Japan, and, after ten years' trial in my grounds, is found hardy. It also thrives and grows well; it is the earliest to bloom and makes large trusses of beautiful flowers, of several shades of color, and is destined, when more widely disseminated, to become very popular.

Of the many flowering shrubs, both native and foreign, none are more attractive the year round than the Rhododendrons. This charming shrub, after many years' trial, is now fairly established and recognized as hardy. The maximum is native, and found growing wild in some sections of the State; the foreign, or catawbiense and hybrid varieties, are found to be most satisfactory, many seedlings being brought out every season. This class of plants, when nursery grown, are easily transplanted. When planted in groups or masses nothing can compare with the gorgeous effect of their bloom in contrast with their wealth of evergreen foliage. In the preparation of the soil for the Rhododendron it should be trenched three feet in depth, and the soil should be well mixed with peat and sand and well-decomposed leaf mould, in equal parts; a heavy mulch of forest leaves should protect the plants in winter, to prevent the ground from freezing, as the leaf undoubtedly derives some nourishment from the roots during the winter season. A northerly-sheltered situation contributes to the chances of success. A most beautiful collection is found in Elm Park, thanks to the untiring zeal and foresight of Edward Winslow Lincoln.

The Kalmia Latifolia, or the common Laurel of our hillsides and pastures, is now receiving more attention and is proving also one of the very desirable evergreen shrubs; the magnificence of these plants, when receiving good cultivation, can scarcely be imagined in their glossy green leaves, shapely form, and profuse trusses of unique and charming flowers. While they are largely grown from seed in nurseries, they are also readily transplanted in their wild state, during the period from August to November. They should be taken up with a ball of earth

adhering to the roots, and planted in a well-prepared bed as recommended for the Rhododendron. In the autumn of 1889 I removed from the woods one hundred and forty-five plants and lost but six, and twenty-two bloomed in the following spring of 1890. Their deep-green leaf that never curls or flinches with heat or cold enlivens the grounds the whole season with their summer bloom, and their green leaf in winter.

The Andromedas also prove a very interesting class of evergreen plants. Andromeda Floribunda is a leafy shrub of very compact and symmetrical growth, with a profusion of flowering spikes that form in the autumn and bloom in May. Andromeda Polifolia is a beautiful little shrub, in leaf the year round. The leaves are pinkish on the upper side, and white underneath; its flowers are white, tinted with rose; they require a peaty soil, and will repay a little space and care; a deep mulching of forest leaves applied in the autumn, to prevent the ground from freezing, is one of the requisites to success, as the evergreen leaf undoubtedly requires and receives some nourishment from the roots during the cold season.

The foregoing embraces the best of the hardy flowering shrubs. Any and all of them well repay for skill and care, and will embellish any grounds. There are a large number of climbing or trailing shrubs. The Actinidia Polygama is a new one from Japan, of very strong growth. The one in my grounds is more than forty feet in height, it has both beautiful leaf and flowers, and has for seven consecutive years borne fruit which is edible. The Chinese Wistaria is much esteemed as a climbing shrub, and in favorable seasons, when in bloom, is an object of charming beauty; it does best on buildings. The Clematis in its variety has of late years received much well-deserved attention; they are all very showy, and need a deep, rich, and moist situation. The Trumpet Vine is of very strong habit and is a good climber, with a profusion of scarlet trumpet-shaped flowers. The Lonicera, Climbing Honeysuckle, has long been cultivated, giving a profusion of flowers of many shades of color; it is delightfully fragrant, many sorts are free growing, and very suitable for arbors or lattice work.

The Rose is the acknowledged queen of flowers, in its great variety blooming from June until hard frost in autumn:

> "And first of all the rose; because its breath
> Is rich beyond the rest; and when it dies,
> It doth bequeath a charm to sweeten death."

To grow Roses well requires more skill and the know-how than is required by any other class of plants, and perhaps no flowering plant better repays all care bestowed upon it. The old June roses in former years were the only class of roses found in gardens; they made large stately plants, were free to bloom, and long lived, and even now what rose can surpass the old white, when well grown? But in later years the Hybrid Perpetuals are popular, and are enlisting the ardent attention of rose-growers. Their variety is numberless, and their forms and shades of color is seemingly without end, more than enough to satisfy the most particular and fastidious, and still they continue to come. New ones are brought out every season to be tried, approved, or condemned, and the list of the best twelve or twenty-five will not remain the same more than one or two seasons. The Rosa Rugosa, recently introduced from Japan, of robust habit, its leaf free from insects; its bloom, and seed, are ornamental.

I now come to the herbaceous, bulbous, and tuberous flowering plants, some of which are in bloom from spring until checked by the severe frosts of autumn. Perhaps no class of plants better repay for the care bestowed or add more beauty and cheer to the garden. In their great variety are well adapted to either large or small plantings, the most refined and fastidious taste can be satisfied, with the large class to choose from, and with a proper selection some are suited to all conditions, either of soil or climate, affording quick returns with their varied bloom during the season.

The Tulip is one of the earliest to bloom and has been a favorite for ages; their fine form and almost endless shades of color give them prominence wherever planted:

> "Then comes the Tulip race, where beauty plays
> Her idle freaks; from family diffused
> To family, as flies the father dust,
> The varied colors run; and while they break
> On the charmed eye, th' exulting florist marks
> With secret pride the wonders of His hand."

The Tulip, when under favorable conditions, is of easy cultivation, requiring re-setting every three years — in their great variety, from early to late, covering a season of several weeks, some new ones appearing every morning, keeping ever active the interests of the cultivator. The large beds of tulips of one color produce the strongest floral feature in public parks or gardens, and the contrast of colors when in large masses always enlist the warmest admiration and interest. For private grounds, even a hundred will give a variety of bloom and charming effect during the month of May.

The Crocus is a bulbous-rooted plant of the earliest bloom and of several sorts and colors; are easily grown, and with an occasional transplanting will last for years.

The Hyacinth, a showy flower, is not as well adapted to garden culture as the tulip or crocus, as the force of the bulb, after the first season, seems to diminish; the spikes of flowers continue to grow weaker, but when new bulbs are used produce fine spikes of flowers of intense colors and highly fragrant.

Following the earlier bulbous flowers the Pæony is the most magnificent when in bloom of all herbaceous plants. It embraces a very large variety, giving the most gorgeous and pleasing effect, is easily grown and perfectly hardy. The old Double Crimson, more than two centuries old, is now and has been a favorite sort, is found in all the old gardens, and has never been equalled in its color. There are many shades of color in the different sorts, running from white to dark, and often is very delicately variegated. No flower is more conspicuous in the garden, and the leaf is attractive during the season.

The Tree Pæony is another interesting class of plants, of bushy habit; it flowers earlier than the herbaceous sorts, and when in bloom is one of the most beautiful plants of the garden. There are two classes, the single and double; both have fine flowers with delicate tints of color. They appear to be long lived but in some winters suffer from extreme cold.

The Papaver, Oriental Poppy, is a favorite in many gardens; its large scarlet flowers grown on stems three feet high are when grown in clumps very conspicuous.

The Helianthus, or perennial sunflower, is a very desirable plant, flowering in August and continuing in bloom for several weeks; they look like yellow dahlias, are profuse in bloom, and hardy and desirable.

The Anemone Japonica of recent introduction from Japan, is one of the finest of the late flowering plants; they attain a height of four feet, and are profuse with white and pink flowers on long stems, and form a conspicuous feature in the garden in autumn.

Perennial Phlox comprises a hardy class of flowers with the greatest variety of bloom, covering a period of several weeks. They require but little protection in winter, they grow readily from seed and the varieties are constantly increasing, being so easy of cultivation they are deservedly popular in every garden. The grand and extensive display in Elm Park last season was the most beautiful ever seen in Central Massachusetts, forming a perfect blaze of flowers of most gorgeous colors.

Others worthy of cultivation are Yucca Filamentosa, Iris, or Flower d' Luce, some are bulbous, others tuberous. Hollyhock, Delphinium, Cimicifuga Racemosa, Pyrethrum, Lilies (day lily, Lilium Longiflorum).

The advantage of planting hardy flowering plants wherever there is room, and wherever ornamentation is desired, is recognized by all people of any pretension to refined taste in the effective lay-out of the garden.

Hardy flowering plants in their great variety constitute the groundwork, upon which ornamental planting is chiefly based; both the shrubby, herbaceous and annuals, fulfil the mission and scope so essential to the well ordered grounds, either of extended or limited area; even a limited number judiciously chosen render a place complete and finished, the admiration of every one.

It is gratifying to notice in late years that a growing taste is equally manifest in the suburbs of cities, towns and villages, and even about farm-houses some ornamental planting is found necessary to good order and pleasant surroundings.

To learn to appreciate the variety and beauty of flowers we

have an interesting study for a lifetime; with each season comes some new beauty of form or exquisite blending of color, of all the varied tints known in nature, so widely extended is their seemingly never-ending variety, to adorn each garden, affording the widest field for labor and taste, to beautify and add charm to every spot fit for the habitation of civilized man. Men and women of all ages have been devoted to their cultivation, they prove not only a pleasure but a recreation to those engaged in all pursuits of life; they build up a sentiment alike in the old and the young, and fortunate indeed is the one who encourages the growth of sentiment and æsthetic taste in their love and cultivation, for even a few flowers, grown by assiduous care up to the highest degree of excellence. Such persons get the most out of life.

The foremost men of earlier times in our Society's history, whose portraits adorn our Hall, have rendered their verdict in favor of fruits and flowers, and in favor of the refining and elevating influence in the practice of Horticulture. Let us find opportunities by their example to carry forward the unfinished work and the objects and interests of this Society.