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OF THE

Horticultural Society

OF

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PREFACE.

In completing the Second Volume of their Transactions, the Horticultural Society of London cannot but contemplate with satisfaction the progressive advancement of their Institution. Being founded, originally,* by a few private individuals, it has, by degrees, acquired the character of a publick establishment, which is likely to do some service to the country. Much credit is due to those persons, who, in its early period, supported and cherished it; and no less to others, who, in its progress, contributed, by their exertions, to the attainment of that flourishing condition, in which we now find it, and which is at once gratifying, for the present, and encouraging for the future.

The Society can hardly be said to have emerged from its infancy; yet it already displays a degree of vigour, which is not only calculated to render its present labours beneficial, but holds out the most flattering hopes of what it may accomplish hereafter. The approbation, which it enjoys from the publick, may be seen in the remarkable increase of its Members, especially for the last two years: among whom persons of the highest rank have been elected.

* In the year 1804. The Charter was granted in 1809.

The Society feels a just pride in the protection, which Her MAJESTY has graciously afforded it, by having become its Patroness: nor less gratification in the remembrance of the lamented Princess CHARLOTTE, who had condescended to be named an Honorary Member. The same place is still occupied by her illustrious Consort, Prince LEOPOLD, whose virtues as well as whose knowledge make him a splendid ornament to the Society. But even in foreign countries, the Society has excited attention, which is strikingly proved by the circumstance, that a Sovereign Prince of Germany (His Royal Highness, the Grand Duke of Saxe Weimar) has honoured it with an application, to be enrolled among its Members.

If the external state of the Society is so satisfactory, the internal concerns will not appear to be less so to those, who have an opportunity of observing them. They partly lie open to the judgment of the publick, in the increased number of written communications, of which the Transactions furnish the result, in the frequent and various exhibitions of produce, at the meetings, and the supply of seeds, grafts, and plants, which are distributed. A connection has, for these purposes, been established with almost every part of the globe, by means of the Corresponding Members, which have lately been instituted. Their number is daily augmenting, and very essential advantages may be expected from an intercourse, by which not only much useful information is imparted, but the fruits of the earth transferred to our soil, from the most distant quarters.

Highly is the Society indebted to the zeal, and the abilities of

some individuals belonging to it; among whom it will be pardonable to name that distinguished promoter of every thing that is good and useful in the sciences and the arts, Sir Joseph Banks, who though occupied in many different and important engagements, has never ceased to show this Society the most marked attention, and has greatly contributed to its welfare. And a tribute of gratitude is justly due, from the Society, to its excellent President, Thomas Andrew Knight, Esq., whose eminent talents, and profound and extensive knowledge of vegetable nature, combined with his devotion and attachment to the Society, have proved most singularly beneficial to its interests.

When the objects are considered, which the Society has in view, the encouragement given it will not be deemed to be ill bestowed. Comprehending Horticulture, in its widest extent, yet so as not to interfere with any matters, which more properly belong to Botany, or to Agriculture (in the strict and limited sense), its pursuits must be decidedly useful. It takes under its care all the variety of produce, which the *Garden* can yield, as food and sustenance to man. Of these productions some are become articles of necessity, while others remain objects of enjoyment. In as much as the Society endeavours to improve and multiply the former, it assists in relieving the wants of the community, and contributes to its comforts; and in cultivating the latter, it may likewise claim some merit. An association of this kind, which is not merely speculative, but aims at practical advantages, is not an inefficient member of the State; nor will it be regarded with

indifference by an enlightened Government, to whom every thing, that has a reference to the well being of the people, must appear interesting.

We have said with truth, that the labours of this Society are directed to practical purposes. But by this is not meant, that theory is excluded, and scientifick knowledge disregarded. On the contrary, we revere science, sensible as we are, that it is the surest and best guide to successful practice. We profess, for instance, not to enter the precincts of Botany: but we avail ourselves of the aid of this science, wherever a more accurate, or enlarged view of the vegetable kingdom is required, in order to throw light upon any particular subject. An accomplished Horticulturist cannot be without botanical and physiological knowledge; this must be the foundation of his art. Botany farther lends her assistance in the second, or subordinate department, as the Society regards it, of its pursuits, namely, in *Ornamental Gardening*, by furnishing, from her stores, plants for embellishing and adorning the garden. Here the line should be drawn. For though it is true that, among the first publications, there occur some botanical descriptions of plants, it is not what the Society acknowledges as coming within its sphere. They are deviations from the rule, which, it is presumed, may be pardoned in the early stage of the Society, when it had not taken its exact and fixed position. In this department, pleasure is more consulted than advantage, and the gratification of the eye rather than any substantially useful purposes. It is, however, an object, to which a civilized and refined people are well justified in

attending, as it both affords innocent amusement, improves the taste, and renders the mind susceptible of the beauties of nature. It is, accordingly, included in the plan of the Society: and the botanist, or more properly the florist, as well as the artist, whose skill and genius are employed in laying out and beautifying grounds, are, therefore, very fitly admitted to fellowship with the Horticulturist. They will find their places under the head of *Ornamental Gardening*, as it is termed in the Society's Charter.

But utility, as manifested in the production of wholesome, nourishing, and agreeable food, in the introduction of new vegetables, and fruits, or in the amelioration of those, which are already in use, in which things so much may be done; in short, in multiplying and improving some important sources of subsistence, remains the chief and primary design. It is here, where the Society knows that it can become most truly useful to the country; and it is anxious not to narrow its views, nor to limit its exertions.

Among the productions, which serve as food, the fruits are peculiarly attractive. There is something charming and delightful in their cultivation, as well as in their enjoyment: and he, whose mind was not steadily fixed upon things, generally and essentially useful, might easily be tempted to swerve from the original purpose, and become a *Pomologist*, by preference, instead of being a Gardener. Those humble, but valuable productions of the Kitchen Garden, the ordinary vegetables, which feed the largest class of the community, would, in that case, be overlooked and neglected; the efforts

of improvement would pass them over, and be concentrated upon those, which constitute the luxuries of the table. Against such an abuse of the fundamental principles, upon which the Society was established, we are particularly solicitous to guard. We are aware, that the merits, which the Society may claim, are in proportion to the benefits, which it confers upon the community at large. The most common vegetable, the cabbage, the potatoe, and other esculent plants of the cottage-garden, will not, and ought not, to receive less attention than the rarest, and most exquisite productions. It is from this point of view, chiefly, that the Society look for the approbation of their country.

Whatever has hitherto been done, has been the effect of the private exertions of individuals: but the Society, being conscious, that it is labouring for the general good, does not deny itself the hope, that it may, at some future time, obtain publick support, and deserve the countenance and protection of Government. It is of great consequence to its pursuits, that it should possess a garden of its own, in which not only experiments, necessary to assist the theoretical investigations, may be tried; but the best fruits and vegetables be collected. It will serve as a general magazine to Horticulture, from which genuine seeds, grafts, and plants may be procured. And by cultivating every tree, and vegetable, with care and attention, as there will be an opportunity of doing, in such a garden, the true characters, and distinctions between the several sorts, may be ascertained, and the confusion, that frequently exists among them, be removed. Thus the nomenclature, which

in Horticulture is still extremely vague, and unsettled, may be rectified, and better defined; which will be a matter of no small importance to the improvement of this Science, and Art. Measures are, at present, in train for the attainment of that object; but the means of the Society, unaided, as they hitherto have been from the publick, are small, and insufficient for the magnitude of the proposed ends. For, however great the zeal and liberality of some individual Members of the Society may be, it behoves those, to whom the conduct of its affairs, and the care of its interests are more particularly entrusted, to act with prudence and circumspection, and not to involve themselves in schemes, to which the resources of the Society are inadequate. That undertaking, therefore, however useful, and desirable, must be begun upon a confined scale, proportioned to the present abilities of the Society: and the hope of its being enlarged, and perfected, must depend upon the contingency of favourable circumstances, which, in process of time, may occur.

One consideration more it will be proper to suggest. There is a close affinity between Agriculture and Horticulture; and though they ought not to be brought into collision with one another, yet they may come into contact, and afford one another reciprocal help. Improvements, made in the one, may be rendered applicable to the other; and a tacit co-operation may take place between them, with great advantage to both. It may happen, that an article, produced in the garden, may be an acquisition to the field, and that another from the field may, with propriety, be added to the stock of the garden.

Agriculture performs its operations in the gross, and upon an extensive scale: it may occasionally furnish the gardener with new ideas, and suggest contrivances and manipulations, that may facilitate, and further his labours. *Horticulture*, on the other hand, acts in detail: it works with more precision and nicety, and its refinements may sometimes prove of no small benefit to the sister art. Both are employed in the cultivation of the soil, and in eliciting the gifts of the earth: if the one is honoured, the other must also lay some claim to regard.

Thus the Horticultural Society commits the Second Volume of its Writings to an enlightened, and judicious publick, trusting that whatever support and encouragement may be merited, will not be withheld.

March, 1818.

ADVERTISEMENT.

THE Committee appointed by the Horticultural Society to direct the publication of the Papers read before them, take this opportunity to inform the Public, that the grounds of the choice are, and will continue to be, the importance and singularity of the subjects, or the advantageous manner of treating them, without pretending to answer for the certainty of the facts, or the propriety of the reasonings contained in the several Papers so published, which must still rest on the credit or judgment of their respective Authors.

It is likewise necessary, on this occasion, to remark, that it is an established rule of this Society, to which they will always adhere, never to give their opinion, as a body, upon any subject either of Nature or Art, that comes before them. And therefore the thanks which are proposed from the Chair, to be given to the Authors of such Papers as are read at the General Meetings, or to the Persons who send fruits, or other vegetable productions, or exhibit Inventions of various kinds to the Society, are to be considered in no other light than as a matter of civility, in return for the respect shewn to the Society by these communications.

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Preliminary Observations *to the* Second Volume.

By Anthony Carlisle, *Esq. F. R. S. &c.*

The advancing steps, and the extending range of the Horticultural Society, seem to demand a further public explanation of its purposes; and the relative usefulness of the several classes of its Members appears to require some additional elucidation. The valuable Observations from the pen of its worthy President, prefixed to the first Volume of the printed Works, convey the most important views, and hold forth indications for future labours, sufficient to unite the efforts of the whole Society, and to direct them to beneficial results. The possibility of misapprehension, of jealousy, or of jar, among a numerous and diversified Association, has induced a humble but zealous individual, to submit a few supplementary suggestions, in the hope of securing a continuance of that harmonious union and co-operation, so essential to the well doing of the establishment. The Horticultural Society has united into one body, men of various conditions in life, and various intellectual attainments. Rank and Affluence promise the requisite worldly means, for its present support, and for its continued duration; Science and Art are ready to suggest theoretical experiments, and to dissuade uninformed adventurers from ruinous projects;

whilst practical Skill, and substantial Experience, are prepared to determine speculative uncertainties, and to bring the labours of the closet to the test of utility.

The Gardener's Art comprises many different branches of cultivation, all of them valuable in a civilized community, and more especially so in climates, where Nature, unaided, presents very few of the esculents, or of the ornamental and fragrant beauties, which enrich the Garden.

The Charter defines this Society to be "for the improve-"ment of Horticulture in all its branches, *ornamental* as "well as *useful*;" and we must be careful, when measuring the deserts of the several contributors, to avoid even the semblance of partiality towards any one branch. The comparative value of their researches must be limited to the relative merits of things of the same kind, and not invidiously extended to dissimilar subjects. There is no analogy, in estimation, between the cultivated vegetables for mere sustenance, for wholesomeness, for exclusive luxury, or for sensitive delight. And although the Society may be often impelled to give a seeming preference to the useful branches of Horticulture before the ornamental, still it should be fully known that the Pleasure Garden possesses both physical and moral advantages, which are capable of benefiting the lowest as well as the highest classes of Society, and therefore unavoidably claims the protection and encouragement of this Corporate Body.

Unquestionably, a priority in rank should be given to those vegetables which afford the most wholesome food, and which may be raised in the greatest abundance, and with

the least expense; because they are applicable to the general necessities, and serve the best interests of the whole community. Next, in the order of estimation, may be classed the auxiliaries to nutriment, and which may be considered as healthful accessories. A third division embraces the dainties and the luxuries of the table, which are not to be regarded as superfluous, or wasteful productions.

The encouragement of exact methods, and of skilful management, so requisite for the cultivation of many exotics, operates like the prize races upon the breeding of horses; and the refinement of this systematic labour descends beneficially to the cottager and to the artizan, presenting to their frugal board many of the foreign esculents, which, first introduced by affluence, are now rendered common and accessible: Lastly, the sweet perfumes, the gay and beautiful colours, and the infinite variety of Botanic forms which belong to the Flower, and the Pleasure Garden, are not devoid of important uses, neither are they exclusively the portion of the rich. Every branch of vegetable culture throws up some useful hints for all the other branches, and vegetable physiology may be especially advanced by the watchful cares, and the curious niceties of the florist.

The garden and the nursery ground may be regarded as the laboratories of Agriculture upon a small scale, and subject to critical inspection. All the experiments on soils and manures, on moisture and dryness, on hybrid or artificial generations, on grafting, budding, propagation by cuttings, by layers, &c. may be accurately conducted, and afterwards transferred into the grosser practice of husbandry. By a

generous respect for every science, for every kind of knowledge, for every refined or manual art, the civilized condition of man must be ameliorated. By a cordial and liberal union of the different classes of Members in this Society, mutual instruction will be obtained, and the ends of the Institution most effectually promoted.

The followers of ABEL are not however limited to the profitable views of supplying human food; they have always combined the *dulce* with the *utile*, and their duties forbid a disunion.

The weighty cares, the deep anxieties, and the tormenting ambition of the great, may be occasionally soothed by the innocent delights of flowers, whilst, with just pretension, the humble labourer and the artizan may be virtuously indulged at little cost with the fresh healthful fragrance, the pure beauties, and the peaceful tranquillity of an ornamented garden. To both descriptions of persons the moral effects are salutary.

The province of Horticulture is so very distinct, that its progress is not likely to trench upon the fair claims of kindred Institutions. One of the leading purposes of the Society is to bring forth the fruit, or in other words, the practical benefits, of Botanical knowledge. Seated in the Metropolis of the commercial world, the chief and free meeting place of all civilized nations, it may look forward to an intercourse not confined within the limits of the British realms, but stretching to a remoter circle. By a mutual interchange of knowledge, of arts, and of cultivated productions, and through the medium of an extended education among mer-

chants and colonists, it may even hope to establish a reciprocal Horticultural community between all the civilized people of the globe.

The Royal Society is principally devoted to abstruse and scientific labours, and which cannot be addressed to the mass of mankind. The profound researches of its Members, descend slowly and silently into the workshop, into the navigator's cabin, into the economy of farming and gardening, and into the art of medicine.

The Linnean Society is the especial conservator of nomenclature and of systematic classification. It is its province to arrange and catalogue, to ticket and label the different species of natural objects; to establish, and, if possible, to fix permanently, a system of appellations founded on accurate definitions, and unalterable descriptions, which may secure to posterity the knowledge of passing ages; and avert in future the clouded uncertainty, or the positive darkness, which unhappily abounds in Greek and Roman literature.

Whilst the Linnean Society is employed in recording the histories of natural objects, and in defining their alliances, the Horticultural may be occupied in directing the several methods of Science and of Art, to render the Vegetable kingdom more useful, and more pleasurable. The next near allies to the Horticultural Institution, are the Agricultural Societies; but their relationship towards it, as far as respects vegetation, is upon a large and gross scale; governed by œconomical views, and adapted wholly to the first necessities of mankind. With such obvious lines of demarcation,

it is almost impossible for the several Institutions to differ or to dispute, and the good sense of the majority in each is sufficient to check injudicious, obnoxious, or selfish individuals. It is essential to the best interests of the Horticultural Society, that a clear and a durable understanding of the intrinsic merits of each class of its Members should be constantly maintained. They are each and severally necessary to its welfare; and invidious or vain comparisons would be like an estimation of esculents by flowers, or fruits by timber. Reasonings from such loose analogies have always been, and will always continue to be, deceptive and unsatisfactory.

Men possessed of much worldly influence, and who have extensive connections among distant nations; and men of science or of learning, are the fittest persons to rule the affairs of the Society. The incalculable benefits which have been produced in this kingdom, from the publick and enlightened spirit of Sir THOMAS GRESHAM, Sir JOHN CUTLER, and Sir HANS SLOANE, are never to be forgotten; but it is to be lamented that some of the noble foundations of those departed patriots are suffered to slumber or to decay; however under that regret there is ample consolation, in the continued possession of Sir JOSEPH BANKS, the greatest promoter of Natural knowledge, which this or any other nation ever produced.

Hitherto, little more than incidental information has been received of the state of Horticulture in other countries; it still remains to be seen, whether especial inquiries, and judicious correspondence, may not rapidly advance the Art of Gardening, and supply a greater number of cultivated vege-

tables. By a free communication of every excellence, and of every skilful method, the practical gardener will become intituled to the publick gratitude, and to the marks of distinction which this Society has to confer; by a liberal encouragement of this Art, the suitableness of particular soils and other beneficial localities may become generally known; and even the profits of labour and skill may be rendered less subject to chance, or to the hurtful vicissitudes of the seasons.

In concluding these observations, the writer cannot help again urging it upon the Society, to avoid undue partialities, or preferences, and to foster and encourage every branch of Horticulture, and all the Arts connected with it.

Let it be kept in mind, that esculent vegetables are none of them wholly composed of nutriment; that they all differ from each other as to their wholesome qualities, both in their several species, and in the varieties of their culture; that fruits and many other esculents, though only healthful additions to food, are absolutely necessary in large cities, where the health of the great is inseparably linked with the health of the industrious. Lastly, while contemplating the mere support and the health of the body, let it be remembered, that the Society is bound also not to neglect the rational indulgencies and relaxations of the mind. The Exhibitions of the Conservatory, and the Flower Garden, have many recommendations; they are the most reasonable, and perhaps the most satisfactory gratifications, which can be presented to the inhabitants of the Metropolis; they afford the most pleasing contrasts, both with the dull grandeur of the town

mansion, and with the sooty confinements of the artizan, and, which will always have weight with the Members of the Horticultural Society, if they do not allure to positive virtue, they are at least powerful diversions from vice.

TRANSACTIONS

OF

THE HORTICULTURAL SOCIETY.

I. *Some Account of the* Elton Pear. *In a Letter to the Secretary. By* THOMAS ANDREW KNIGHT, *Esq. F.R.S. &c.* President.

Read March 3, 1812.

MY DEAR SIR,

I SENT to the Horticultural Society on the 10th of last September, a few *Pears* of a new variety, which I believe to be considerably better than any of the same season now cultivated. This variety ripens here generally about the 15th of September; but it must be gathered a week or ten days before it is quite ripe, or it becomes, in some degree, mealy: and it requires to be preserved, after being gathered, about ten days, before it be eaten. By collecting the fruit, at successive periods, I have brought it every day to my table during five weeks, and its season terminates with the commencement of that of the Autumn Bergamot. The fruit is always without seeds, and almost wholly without internal cavity. If trained to a wall, it becomes very large; but it is

then good for nothing: as a standard, it grows and bears well.

The original tree stands upon its own roots, in an orchard of seedling Pear-trees, in the parish of Elton, in Herefordshire; whence I have called it the *Elton Pear*. It is (as I have ascertained with a good deal of accuracy) about 140 years old; but its appearance indicates youth and vigour, and it is still growing considerably; and as a seedling Pear-tree, if it be not destroyed by accident, will probably remain in health about three centuries: the Elton Pear has scarcely yet attained its middle age.

I am, my dear Sir,

Sincerely yours,

THOMAS ANDREW KNIGHT.

Downton, February 27th, 1812.

Note by the Secretary.

The Committee of the Horticultural Society, who tasted the *Elton Pear*, venture to recommend it strongly for general cultivation, as an early sort, on standard trees: its fruit appears to combine nearly all the fine flavour of the Bergamot, with much of the melting softness of the Beurré.

II. *An Account of a* Walnut-tree, *which bore Fruit at an early Period, from Seed. In a Letter to the Secretary. By* Anthony Carlisle, *Esq. F. R. S. &c.*

Read March 3, 1812.

My dear Sir,

The following account of the favourable growth, and the early bearing of a *Walnut-tree*, may perhaps coincide with the purposes of the Horticultural Society.

A parcel of Walnuts were sent to me at Christmas, 1801, by my late excellent and estimable friend, Mr. Thomas Wedgwood, from near Blandford. The nuts were of a middle size, thin shelled, and of a compact oval form. They were of a particularly good kind for the table; but having been kept for several weeks in a close cask, in a damp state, they had begun to vegetate, and the germs were bursting through the seams of the shells. I had a wish to extend the remembrance of one whom I much esteemed, by raising a tree from these Walnuts, in the garden of my friend, Captain William Parker, at Camberwell Terrace. Six of these Walnuts were therefore planted, about two and a half inches deep, in the month of March, 1802.

This garden is situate nearly at the bottom of a hill which inclines northward, and the descent of the surface is nearly one foot in twelve. The spot where the tree (to be described) was planted, and whence it has never been moved, is about

five hundred yards from the summit of a hill, which there terminates the broken range of the Surrey hills, northward.

The surface mould is of a dark colour, and from eighteen to twenty inches in depth: it is what the workmen call a light soil; and immediately beneath is a fine siliceous sand, about two feet thick, then a stratum of ochry flint gravel, next a red clay; and, at the depth of twelve feet, good water, arising from a clean white sand. The tree, which becomes the subject of this description, was the only one suffered to remain upon the spot, being the most thriving of the six; the others were taken away within the year.

The situation of this tree is within the angle formed by the meeting of two gravel walks. The ground had been dug up from the state of a meadow about four years preceding, and had been moderately manured with stable dung. The surface soil, as well as the next stratum of sand, appears to have been washed down the slope of the hill: but what the vegetables were which, in remote times, produced this soil, is quite uncertain; because a long continuance of culture has destroyed the natural plants. The young tree has been protected from the east winds by a range of high dwelling houses, and by a thick row of tall Elm-trees; its north aspect is defended by buildings; so that it only feels the influence of light and wind from the south-east by south, to the north-west by north.

The paling of the garden is no where grown with lichens, nor are the walls with any mosses; and hence the local atmosphere may be considered dry. In the summer of 1808, this tree bore and matured ten Walnuts; in 1809, upwards of fifty, and in 1810, we counted one hundred and twelve

growing upon it on the 7th of September. The nuts are of the same character with the seed-nut. Its dimensions, at this period, were as follows:

	Feet.	Inches.
Total heighth - - - -	19	$7\frac{1}{2}$
Extreme extent of its lateral branches -	22	5
Length of the bole from the surface of the ground to the first division of its branches	5	6
Circumference of the bole at the bottom -	1	$9\frac{1}{4}$
Circumference at giving off the branches -	1	$4\frac{3}{4}$

The boughs are firm, and no where drawn out or weakly: they spring from four principal and equal sized stems, which expand the top of the tree into a circular form.

The bark of the tree is uniformly smooth, and of a deep brownish green colour; and it has none of the silvery whiteness which appears upon the skins of some healthy young Walnut-trees.

I am not sufficiently experienced in horticulture to know whether the habit of this tree is out of the ordinary course of growth and bearing; but if it should prove to be so, the narrative of its planting may help to show the favourable situations for that useful species of tree.

Allow me to suggest, that the composition and the previous history of the soils in which useful vegetables grow, and the manures which are employed for their nutriment or condiment, appear not to have been sufficiently examined; and that it might be of great practical utility to determine the most suitable kinds of such substances for the more important kinds of vegetables, by a course of experiments upon a small scale.

The natural history of the order of succession of different

plants upon newly exposed lands, the natural preference of certain species for certain soils, and perhaps the healthful or the noxious effects of some kinds of decomposing vegetables upon certain species of other vegetables, seem worthy of inquiry. The great mass of agricultural experience shows that each of the products of arable land are favoured, or the contrary, by different soils and manures.

Wishing the Society the fullest prosperity and encouragement,

I am, my dear Sir,

Your obliged and obedient Servant,

ANTHONY CARLISLE.

Soho Square,
January 10, 1812.

Since the above was written, I have been informed by our President, that seedling trees of every species, upon which he has made experiments, inherit more or less the habits of their parents, in affording fruit at an earlier or later period: thus the seedling plants, obtained from some varieties of Apple-trees, have afforded fruit when four years old, those of others not till fourteen years old; and probably the same habits are, to a greater or less extent, hereditary in all trees.

III. *On the Transplantation of Blossom-buds.* *By* THOMAS ANDREW KNIGHT, *Esq. F. R. S. &c.* President.

Read March 3, 1812.

IT has been long known to naturalists, that the blossom-buds of trees are generally formed in the season preceding that in which they unfold and execute their office; and the art of removing buds, from one tree to another, was probably almost as well understood two thousand years ago, as at present. But, as far as my information extends, it does not appear that any attempts have ever been made to transfer a part of the abundant blossom-buds from one tree to the barren branches of others; though the experiments which I shall proceed to state, prove that this may be done with much facility, and probably, in some cases, with very considerable advantage.

I observed, in the autumn of the year 1810, that the suckers, which had sprung from the roots of the rose-trees in my garden, were in a perfectly proper state to receive buds in the end of August; and that buds, which appeared to contain blossoms, might, at the same period, be taken, with facility, from the branches of trees of more valuable varieties of the same species. The largest and best buds I could procure, were therefore inserted into scions from the roots of other plants; and these buds, being abundantly supplied with nutriment, afforded much finer roses, than they would have done, had they retained their natural situation.

In the last autumn I repeated many similar experiments upon the Pear and Peach-tree, and with equal success. An old and unproductive Pear-tree, which grew upon a north-west wall, was pruned very closely, so as to occasion the protrusion of many strong succulent shoots; and into these, apparent blossom-buds of the true St. Germain and the Winter Verte-longue Pears were inserted at different periods. Many of these were inserted in the end of July and in the beginning of August; and these generally vegetated soon afterwards, and afforded leaves only; and the remainder, which did not then vegetate, still continued mere leaf-buds. But most of those which were not inserted till the end of August, or the beginning of September, have succeeded most perfectly, and are now beginning to unfold with greater vigour than the buds of the trees from which they were taken; and I do not entertain any doubt that they will afford, under favourable circumstances, very fine fruit.

I found those buds of the Pear-tree to succeed best which had formed upon the bases of abortive bunches of blossoms of the preceding year; and that, instead of taking out the wood of the bud wholly, as usual, it was most advantageous to let it remain in small quantities, and being pared very thin.

Some buds were inserted into seedling plants of four months old only, and others into yearling plants; and these succeeded so far as to live perfectly: but they were inserted in the end of July, and, like the others, removed at that period, these remain leaf-buds. I am, however, much inclined to believe, that Pears might be obtained even from yearling trees in pots, though such fruit would probably be without flavour or richness, and consequently not worth

obtaining, unless as objects of curiosity. But buds inserted into the strong succulent young shoots of old trees, will probably afford abundant crops of very fine Pears, and these might be obtained with little trouble; for a moderately skilful operator will easily insert at least three hundred buds in a day.

I made similar experiments upon seedling Peach-trees of five months old, under glass; and I do not entertain any doubt that abundant crops of fruit might be obtained from such trees in the succeeding season. I do not, however, imagine, that such fruit would possess much richness or flavour; and as trees of this species, unlike those of the Pear, afford abundant crops whilst very young, the experiment, if successful, would scarcely prove worth repeating. It may, however, be often advantageous to transfer a part of the blossom-buds of any valuable varieties of Peach, or Nectarine, to trees of less valuable kinds: and as this can be done after the fruit of any moderately early variety is ripe, and as the buds may be sent a great distance in wet moss, the experiment may perhaps be sometimes made with much advantage; and I do not entertain any doubt that it might be made with perfect success.

Note by the Secretary.

Mr. KNIGHT has subsequently informed me, that the transplanted buds of the Peach-tree, even such as were single and without a leaf-bud, have set perfectly well in the open air.

IV. *On an early Variety of* Grape *from* Amiens. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F.R.S. &c.* President.

Read March 3, 1812.

My dear Sir,

I have addressed to you a few cuttings of the Vine, which produced the white or pale yellow *Grape* you received from me in the last autumn.

I was indebted, some years ago, for a plant of this variety, to Mr. Brogden, of Park-street, who informed me that one of his friends had seen the fruit of it ripe in July, in the open air, at Amiens, during the late peace. The wood and foliage, and the whole habit of the plant, so closely resembled those of the White Chasselas, that I did not doubt of its identity with that variety; and I attributed its early maturity, at Amiens, to some incidental advantages of soil and situation. The form of the bunches, in the last spring, however, undeceived me; and I subsequently found the fruit to be essentially different. Its blossom appears to be much more hardy than that of the Sweetwater, or White Chasselas, or indeed than that of almost any other Grape; for scarcely a single one proved abortive last spring, under very unfavourable circumstances. It appears, also, to be a very early Grape, and to be, on account of the hardiness of its blossom, exceedingly well calculated for very early pruning; though, as I have only seen the fruit upon the extremity of a long annual

shoot, which sprang almost from the ground in the preceding year, I cannot state accurately its comparative earliness. In many respects its character agrees with that of the *Van der Laan hâtive* of KNOOP's *Pomology;* though he states the berries of that variety to be slightly (tant soit peu) oblong; and those in my house were all nearly, if not quite, round. The form of the berries of many Grapes, is however subject to some variation, as they are more or less detached from each other, by the bunches being thinned with the scissars; and I suspect this Grape will prove to be the *Van der Laan hâtive,* which is not, I believe, at all known in the nurseries.

Should the cuttings you receive prove acceptable to any Members of the Horticultural Society, it is to Mr. BROGDEN they are indebted.

I am, my dear Sir,

Your's, &c. &c.

THOMAS ANDREW KNIGHT.

Downton, Feb. 27, 1812.

V. *On Raising* Lemons *and* Oranges *from Cuttings. By* Abraham Hawkins, *Esq. of Kingsbridge, Devonshire.*

Read April 7, 1812.

The following communication will perhaps not be thought unworthy of the attention of the Horticultural Society.

To raise *Lemons* and *Oranges* from cuttings, I have often tried formerly, but never with success. However, a friend of mine, John Luscombe Luscombe, Esq. of Coombe Royal, near Kingsbridge, has discovered a method, which answers so well, that of thirteen cuttings planted the last season under my own eyes, eleven are now growing. The art is, to place them to touch the bottom of the pot; they are then to be plunged in a bark or hot-bed, and kept moist. By this means, Mr. Luscombe scarcely ever fails.

VI. *On the good Effects of watering the frozen Branches of* Peach *and* Nectarine-*trees, very early in the Morning. In a Letter to the Secretary. By* George Henry Noehden, *LL.D. F.L.S. &c.*

Read April 7, 1812.

Dear Sir,

The gentleman, in whose garden the experiment of *watering* the *Peach* and *Nectarine*-trees has been tried, as a preservative of the blossoms against the spring frosts, which subject I formerly mentioned to you, is James Stuart Wortley, *Esq.* of Wortley Hall, in Yorkshire.

On receiving your note, I immediately wrote to Mr. Wortley, communicating the wishes of the Horticultural Society, that he would have the kindness to furnish the data necessary to elucidate the statements which I had made to you, and I was favoured with an answer as soon as my letter reached him. He remarks, that his garden lies uncommonly high, perhaps as high as any garden in Great Britain, above the level of the sea. It consequently has not the advantage of a sheltered situation; but the local position seems, on the contrary, to be rather unfavourable. To the eastward it slopes a little down the side of a very high hill. The quantity of fruit alleged to have been produced, Mr. Wortley found, upon minute investigation, had been very much exaggerated by common report. He lays great stress upon the method of pruning and training the trees, practised

by the gardener; and he attributes to it a considerable portion of the success which has attended the gardener's labours. The man seems to excel in that part of his business. Mr. WORTLEY says, he can hardly do him justice in describing it; for he never saw trees so beautifully trained, and upon such good principles. The chief rule which he follows is, as Mr. WORTLEY states, never to allow the shoots that are left for bearing fruit, to run to any length from the strong wood; for which reason, when the trees are pruned in autumn, the gardener shortens the bearing branches, for the next year, as much as he can, taking care not to leave more fruiting-buds than he thinks will come to perfection. The Peach and Nectarine blossoms upon the open walls, in other gardens in Mr. WORTLEY's neighbourhood, were almost entirely destroyed by the frosts last year and the year before; but in both years Mr. WORTLEY was equally fortunate in the preservation of his produce. I will now subjoin Mr. WORTLEY's answers to several queries, which I took the liberty of proposing.

Query 1. What is the exact method which the gardener practises, to which he ascribes his success with the fruit-trees? Is it exclusively the operation of watering the blossoms and the branches, or has he any accessary means?

Answer. The Peach and Nectarine-trees are pruned and nailed in December and January; when the gardener always takes two-thirds of the young shoots away; and in two hand-dressings, in May and July, leaves the lowest and weakest shoots for a succession in the year following, pinching off the leading and other shoots.

This answer implies, that a great deal is supposed to

depend upon the pruning and dressing, and not every thing upon the watering, to which point the query was directed.

Query 2. At what time does he apply the water, and in what manner ?

Answer. The gardener applies cold water at the time of the blooming and setting of the fruit, in the following manner: viz. if upon visiting the trees, before the sun is up, in the morning, after a frosty night, he finds that there is any appearance of frost in the bloom or young fruit, he waters the bloom or young fruit, thoroughly with cold water, from the garden engine, and he assures me, says Mr. WORTLEY, that even if the blossoms or young fruit are discoloured, this operation recovers them, provided it be done before the sun comes upon them. He farther says, that he has sometimes had occasion to water particular parts of the trees more than once in the same morning, before he could get entirely rid of the effects of the frost.

I think this information extremely interesting; and I wish to recommend it to the investigation of every member of the Horticultural Society, who may have an opportunity of examining it; but especially to the acuteness of our worthy President. It is singular, that according to the testimony of the gardener, the operation of watering, in counteracting the frost, produces its effect only if it be done before the sun comes upon the blossoms or young fruit. This seems to be analogous to the condition of a frost-bitten joint or limb, which is recovered by the application of cold water; but injured, and sometimes destroyed, by being brought near a fire, or the influence of sudden warmth.

Query 3. What led the gardener to the discovery of that method.

Answer. The gardener says, that he first discovered this method by the following accident. In planting some cabbage-plants, among the rows of some kidney beans, very early in the morning, after a frosty night, in spring, before the sun was high enough to come upon the frosted beans, he spilt some of the water upon them which he used in planting the cabbage-plants; and to his surprise he found that the beans began immediately to recover.

It is impossible not to applaud the sagacity and reflection of the man, in not suffering this fact to pass by unheeded. I think it is an honour well merited by him, that his name should be mentioned to the Society: it is CHARLES HARRISON.

Query 4. Were the trees sheltered from the frost by any sort of covering?

Answer. The trees are protected from the frost in the month of January by branches of broom: these are previously steeped in soap-suds, mixed with one-third of urine, for forty-eight hours, in order to clear them from insects, and when dry, disposed thinly over the whole tree, letting them remain on only until the trees begin to break into leaf.

Query 5. What was the quantity of fruit that was ripened, as near as it can be ascertained?

Answer. I have good reason to believe, that the number consumed in the house, and given away in presents, was 5850 Peaches and Nectarines, exclusive of all waste from decay and other means.

Query 6. Was the fruit thinned ?

Answer. The fruit was twice thinned in the course of the spring and summer.

Query 7. Did it grow to a good size, and ripen well ?

Answer. The fruit ripened well, was exceedingly well flavoured, and was uncommonly large, some of the peaches measuring nine and ten inches in circumference, and some even as much as eleven inches.

Query 8. What was the number of the trees upon which it was produced; and their age ?

Answer. The number of trees upon which this crop was produced, was *thirty-three*. They were planted in the border about nine years ago.

Query 9. What is the extent of the walls ?

Answer. The extent of the walls is about 172 feet: they are flued.

By the facts which have been stated, the efficacy of cold water, upon the vegetable organization, in repelling the injuries of frost, seems to be established; and this practice may possibly throw some light upon certain points in the theory of vegetable life, which were hitherto unnoticed, or it may open a new path of inquiry to the attentive and philosophical observer.

I am, dear Sir,

Yours, &c.

GEORGE HENRY NOEHDEN.

Albany,
April 6th, 1812.

Note by the Secretary.

The quantity of Peaches and Nectarines produced appears to me only what ought to be expected on every well managed wall of the same extent, from the same number of trees nine years old; being not quite 200 to each tree, on an average; and, as it appears by the answer to the last query, that the walls are flued, the excellent flavour of the fruit was probably owing to artificial heat. In a situation not much below Wortley Hall, in point of elevation, I never failed to have abundant crops of Peaches and Nectarines, on a common south wall, without any care whatever; but the earliest varieties, even the Red Nutmeg Peach, never ripened till the middle of September, and some of the others not at all.

VII. *On the proper Stock for the Moor Park* Apricot. *By* Thomas Andrew Knight, *Esq. F. R. S. &c.* President.

Read May 12, 1812.

In the account with which Sir Joseph Banks has favoured the Horticultural Society, of the practice of the French gardeners, it appears that they consider stocks of different species to be necessary to correct the defects of different soils and varieties of fruit; and that the Peach-tree ought, in some cases, to be budded upon the Plum-tree, in others, upon the Almond, and in others upon its natural stock, or that of the Apricot. Our gardeners on the contrary, suppose the Plum-stock to be, under all circumstances, best adapted to the Peach; whilst Du Hamel, to whose opinions the greatest degree of deference is always due, pronounces the Plum-stock to be never eligible, and says he has seen the Peach-tree thrive upon stocks of the Apricot, in soils where it would not succeed either upon the Almond or Plum-stock. He also states it to be the opinion of the French gardeners, that the Peach-tree, when grafted upon its natural stock, is more subject to generate gum, than when it grows upon a stock of another species; and whenever the tree is confined to a small space, and consequently closely pruned, I believe this opinion to be, in some cases, well founded. But as I am not acquainted with any advantages that can be obtained from selecting stocks of a species different from the inserted bud or graft, except where it is necessary to render any tree

more dwarfish and governable, and therefore more productive, in soils and situations where exuberance of growth and health might prove injurious, I suspect that the Peach-tree might be budded upon its own stock, in many cases, with considerable advantage. The growth of the Peach-tree is so rapid, under these circumstances, that, with the aid of artificial heat, the stock which is raised from a seed in the spring, may be budded and headed down in the same season, and afford a tree large enough to bear many Peaches in the succeeding year; and for forcing-houses, where exuberance of growth may be effectually checked by a succession of heavy crops of fruit, I should prefer such trees to any others. The fruit they afford in the first season, I have, however, found to be inferior in flavour to that which older trees produce.

I am engaged in some experiments with the view of ascertaining the advantages or disadvantages of stocks of different species, in the culture of the Peach and Nectarine, and the Apricot, and I should have waited the result of those experiments, but that I felt anxious to state to the Horticultural Society the following circumstance respecting the *Moor Park Apricot*. This tree, in my garden, as in many others, becomes, in a very few years, diseased and debilitated, and generally exhibits, in spaces near the head of its stock, lifeless alburnum, beneath a rough and scabrous bark. Sixteen or seventeen years ago, a single plant of this variety was obtained by grafting upon an Apricot stock; and the bark of this tree still retains a smooth and polished surface; and the whole tree presents a degree of health and vigour so perfectly different to any other tree of the same kind in my

garden, that I have found it difficult to convince gardeners who have seen it, of its specific identity.

The preceding statement will, I trust, induce the possessors of public nurseries to try the effect of stocks of different species, and particularly those of the Apricot; for though it is their interest that the trees they sell should perish, as they now generally do within a very few years, I cannot suppose the more respectable nurserymen would be influenced by such considerations; and an additional price, which will be to some extent necessary, will afford them a fair compensation, if the number of trees they sell should be diminished.

VIII. *On destroying* Slugs *in Gardens.* *By Mr.* John Wilmot, *F. H. S.*

Read May 12, 1812.

Daily experience teaches us (and particularly in a season like last winter) the injury we receive from the *Slug*, which, if left unmolested, will frustrate our most sanguine wishes, and too frequently, unperceived, not only injure, but totally destroy a crop, which we cannot replace in sufficient time. To exterminate those nocturnal depredators has been for many years my study; but I always failed in the attempt, through the means not being properly applied. The usual way at present practised is with lime strewed on the ground very early in the morning, or late in the evening, when the thermometer is not below 45°; they are then found during moist weather in abundance, on the surface of the soil, when scattering lime fresh slacked, or pulverized, will destroy a great number, excepting rain comes to their assistance, which too frequently frustrates the design. As the principal time of their committing their ravages is in a rainy or a moist season, the very weather is unfavourable to the application of the lime, as it will not act as a caustic, after lying on the damp ground even for half an hour. At the suggestion of my friend, Mr. Whately, I was induced to make a trial of lime-water, which I found greatly to exceed my expectations. I now not only propose, but strongly recommend it on an extensive scale, as I can prove it a saving of nine pounds

out of ten, and it will entirely clear the land of those noxious vermin. The plan I recommend, is to take a small portion of the best fresh lime, and pour on it some hot water; when thoroughly dissolved, add water sufficient to make the liquid pass freely through a fine rose of a water-pot. Previous to the preparation, take some bundles of Peas haulm, (I give that the preference), or any large leaves of the Cabbage tribe, and lay them on the ground a pole distant from each other. If the weather suits, the slugs will be found in abundance, collected under the haulm, &c. both for shelter and food: as we always find them prefer vegetables in a state of stagnation, to those luxuriant in growth: when properly collected, take up the haulm, &c. and, by a gentle shake, the whole of the slugs will be left on the ground. A very small portion of the liquor must then be poured on them from the water-pot, and in the mean time the haulm, &c. must be removed to a different spot in the intermediate space. By pursuing this plan for one week, (when the weather is favourable), I am perfectly satisfied the whole of the slugs may be destroyed, for the least drop of the liquor will cause immediate death, whereas from lime alone they frequently escape, leaving a slimy matter behind. In the flower garden it will be found useful to water the edgings of Box, Thrift, &c. with the liquid, for wherever it penetrates, it is certain to kill, even in a rainy season. The first thing to be considered in any new experiment, is the trouble and expense attending it; for however certain and efficacious the remedy, it is frequently overbalanced by the expense. In the plan I propose, the application is simple, the effect certain, and the expense trifling; these are objects

worthy our consideration, as four middling sized watering-pots, at one time, will be found sufficient for an acre, allowing one pot to forty places; and when it is considered that a piece of lime, about two pounds weight, is sufficient, for one pot, we may conclude that to any extent, (even in agriculture), including labour, &c. the whole amount will not exceed five shillings per acre, to be passed over four different times, which if properly pursued, I am certain, will effect the object at any season of the year, excepting in frosty weather. The haulm of a crop of peas, if not wanted for other purposes, may be dried and put away for this; the expense will then be found nearly as below for one acre (every thing convenient).

Trouble in laying haulm, &c. a woman and boy	*s.*	*d.*
half a day each - - - - -	1	0
Removing do. four different times, one quarter		
of a day each time - - - -	2	0
Lime - - - - - - -	1	0
Total expense	4	0

Thus for four shillings per acre *Slugs* may be totally *destroyed*, however numerous. I can vouch for the statement being correct, having practised it to a great extent this winter, and strongly recommend it to the Horticultural Society.

IX. *On an Insect which is occasionally very injurious to Fruit-trees. In a Letter to the Right Hon. Sir* Joseph Banks, *Bart. K. B. P. R. S. &c. By* William Spence, *Esq. F. L. S.*

Read June 2, 1812.

My dear Sir,

As you give me reason to think that the few facts which I have observed relative to the history of *Tortrix Wœberana*, the larva of which is very injurious to the fruit-trees in my garden, will be acceptable to the Horticultural Society, I beg leave, through you, to lay them before that valuable Institution, accompanied by a popular description of the insect in its different states.

My attention was first attracted to it some years ago, by observing small masses of saw-dust-like excrement, the usual indication of the presence of larvæ, protruding from the edges of the cankered parts of a very diseased summer Apple-tree, of the name of which I am ignorant. On cutting off a portion of the wood, I found many small white larvæ inhabiting cavities, which they had excavated between the bark and alburnum, and sometimes wholly in the latter, upon which they seemed to feed. These larvæ were of different sizes, and amongst them were several chrysales, which being detached, and placed under a glass, produced in a few days the *Tortrix Wœberana*, a small moth very abundant in the garden, and thus proved to be the parent of the larvæ.

I at first supposed that these insects, like many others, deposited their eggs only upon parts of the trees previously diseased. Even on this supposition, their injurious effects would be very considerable, as it was clear that they every year greatly enlarged the extent of the canker, not merely by devouring the neighbouring alburnum, but by forming numerous cells in it, which when quitted by the chrysales, are filled with water by every shower, and thus become the source of more speedy and extensive decay. Many of the cankers in the tree above alluded to, have eaten half way through the small trunk and branches, which if not sheltered by a wall, must have been long ago broken off by the wind.*

Narrower examination, however, has shewn me, that their attacks are by no means confined to the diseased parts of fruit-trees; nor directed, as I at first conjectured, against the Apple-tree only. Being more anxious to ascertain the economy of an injurious insect, than desirous of preserving the tree which they chiefly attacked, I took no steps for extirpating them; and they have, in consequence, seemed to increase every year since I first observed them, and last year carried on their operations so extensively, as to threaten more serious injury, in return for my forbearance, than I had

* This tree is a remarkable example of the effect of partial decortication, as recommended by Dr. Darwin, (*Phytologia*, page 378), in inducing the production of flower instead of leaf-buds. Not only the bark, but half the trunk, as above observed, is eaten through in many places; yet though a new twig is scarcely ever put forth, it never fails to be laden with blossom and fruit. Here I may observe that a similar result, as to the increased produce of fruit, and the paler green of the leaves, with that above referred to by Dr. Darwin, I have myself seen on a branch of a Pear-tree, from which nearly a complete cylinder of bark had been gnawed by cattle. It was filled with fruit, while not a Pear was to be seen on the rest of the tree.

calculated upon. Not only were they more than usually abundant near the margins of all the old cankers, but I observed their masses of excrement adhering, in every direction, to the surface of the healthiest Pear and Apple-trees in the garden; and wherever these indications appeared, the application of the knife always detected the caterpillar beneath.

It is thus evident that where they abound, no other cause is wanting to generate canker and disease. Though their attacks upon the bark and alburnum should not at first be extensively injurious, the admission of water into their empty cells, and frequent repetitions of the mischief, must, in the end cause rottenness; and it is perhaps not improbable that to these insects should be often primarily attributed the canker laid to the charge of the soil, or the mode of cultivation.

After these prefatory remarks, I shall proceed to describe the insect in its different states, adding such observations as have occurred to me upon its economy, and the most probable means of extirpating it.

Eggs. I have never been able to detect any of these upon the parts of the tree where I conjecture they are laid; but several were deposited on the sides of a glass jar, under which I had kept the two sexes from their first exclusion. They are lentiform, flat below, slightly convex above, smooth, pale red in the middle, with a white and apparently membraneous margin. Altogether they very much resemble the seeds of the common garden Stock, except that they are not above one-fourth of the size; and they presented an appearance so very dissimilar to that of the eggs of insects in general, that I for some time overlooked them.

Larva. The eggs above mentioned, not having produced any larvæ, I am unable to say any thing as to the precise period at which they are hatched; but from observations made on those found in the fruit-trees, I conjecture that they appear very shortly after the eggs are laid, and immediately proceed to insinuate themselves beneath the bark. When full grown, they are from four lines to half an inch long, and about a line broad; and wholly of a dull semi-transparent white colour, except the head, which is pale chestnut, with which the adjoining segment is also sometimes tinged. In some specimens, an obscure reddish line runs along the body, which is owing to the red colour of the fluid contained in it. The body, besides the head, consists of twelve segments, which owing to the wrinkles in the three first, are not very easily counted. To each of the three first segments below, are affixed the usual pair of clawed feet, the claws of which are sometimes yellowish, and a pair of tubercular, or false-feet, as they are often called, are attached to the 6th, 7th, 8th, 9th, and 12th (or last) segments: so that in all, the insect has, as is usual in this tribe, sixteen feet; six clawed, and ten tubercular. Each of the segments above, is furnished with from four to six slightly elevated protuberances or mamillæ, more polished than the rest of the body, of a rather darker colour, and having one, and sometimes two, short stiff white hairs proceeding from each. As these mamillæ seem to furnish the best characters for discriminating these larvæ from others of the same tribe closely allied to them, it will be necessary to advert to their number and position more narrowly. There are none on the first segment. On the second, third, and last are four, placed in a

transverse line: and on each of the remaining segments, that is from the fourth to the eleventh inclusive, are six, one on each side and four in the middle, forming a square, of which the two anterior are larger and nearer to each other than the two posterior. It is to be observed that this description applies only to the back of the larva, as both the belly and sides have other similar mamillæ, which it is unnecessary to particularize. The period in which these insects exist in the larva state, is, as far as my observations extend, about a year; during the whole of which, except in winter, when they probably lie torpid, they are employed in boring into the bark and alburnum. As the female moth seems to deposit her eggs through the whole summer, the larvæ may be always met with, and of very different sizes.

Chrysalis. The larvæ which are then full grown, and these are the greater number, assume the state of chrysalis about the latter end of May, soon after which time many of the empty husks, from which the moths have escaped, may be seen projecting from the bark: and from this period, to the end of summer, others, lying still undisclosed within their silk-lined cavities, are found on cutting into the wood. The chrysalis has the usual sub-conical shape of those of the tribe of Tortrices. It is about one third of an inch long, and a line broad in the widest part; of a pale yellow colour when first disengaged from the larva, but nearly brown when mature; and smooth, except that each abdominal segment is set with two transverse lines of aculei, or little teeth, pointing towards the tail, of which those in the line nearest the head are larger and fewer in number than those in the line next the tail. These aculei, which are found in the

chrysalis of most species of Tortrix, evidently serve for enabling the insect, when in this state, to move itself to the entrance of the orifice in the bark, previously to escaping in its perfect form. The tail, when viewed under a lens, is found to be furnished with seven or eight minute hooks.

Perfect Insect. After remaining in the chrysalis state about ten days, the moth breaks forth. Of this the following is a description :

TORTRIX WŒBERANA.

T. Upper wings chocolate-brown, variegated with orange and silver streaks.

Pyralis Wœberana. *Fabricius Mant. Ins. II. p.* 230. *n°*, 52.—*Ent. Sys. III. ii. p.* 259. *n°*. 71.

Tortrix Wœberana. *Wiener Verzeichniss,* 4*to. edit.* 126-9.; 8*vo. edit. II.* 43. *Fam. B. n°*. 9.—*Haworth Lepidopt. Brit. p.* 457, *n°*. 201.

Phalena Tortrix Wœberana. *Gmelin Syst. Nat. I. p.* 2511.—*Turton's Translation, III. p.* 350.—*Brahm Insekten Kalender II. p.* 252. *n°*. 145—*De Villers Ent. Linn. IV. p.* 525.

Tortrix ornatana. *Hübner Schmet. Tort.* 32.6.

Description.—Head brown, margined behind with orange. *Proboscis* short, pale yellow, spirally convoluted between the *Palpi,* which are large, subtriangular, yellow, the apex and minute terminal joint, black. *Antennæ* one-third the length of the body, setaceous, not pectinate, brown, the first joint, which is thicker than the rest, yellow. *Thorax* brown, with two interrupted irregular transverse bars of

orange. *Upper wings* brown, beautifully variegated with many irregular streaks of orange, and a few of silver. The silver streaks are situate chiefly next the margin; one just above the middle of the wing, anteriorly dividing into a fork, whose ends approach the margin; another below the middle, extending in a curved direction nearly to the apex, and sending off anteriorly two or three branches towards the margin. These silver lines are margined with orange, as are two other short transverse silver lines near the inner angle of the apex of the wing, which include a small silver spot, and two longitudinal orange bars. Besides numerous orange streaks and marks, which it is unnecessary to describe minutely, the wings are characterized at the outer margins by about six short oblique yellow spots. At the apex they are fringed with brown cilia, which in some lights have a metallic shade, and are interrupted by two longitudinal bars of yellow cilia. *Under wings*, above wholly of a brownish black, except at the outer margin from the base to the middle, where they are white. At the apex they are fringed with cilia, white at the apex, and circumscribed just above the brown base with a very fine and almost imperceptible white line. Under side of the *body* and *legs* of a silvery or pearly white; the tibiæ and tarsi of the latter ringed with black. Length of the body about one-third of an inch; of the wings, when expanded, from half to three quarters of an inch.

Long as the above description may seem, it will not be deemed too minute by any one acquainted with the difficulty of discriminating many of the minuter species of this tribe of insects; nor could I have contracted it consistently

with the object I have in view, that of enabling any gardener to recognise the moth in question.

How long these moths live after being excluded from the chrysalis, I am not able to say: but from analogy, and the circumstance that some which I reared under a glass jar did not survive above a week, I conclude their term of existence does not much exceed that period. Hence, as I find them in my garden from May to the middle of August, it is clear that they are not, like many other insects, confined to one term of exclusion, but are issuing from the chrysalis throughout the whole summer; in greater number, however in June than afterwards. In the day time they usually remain sitting at rest on the trunks and branches of the trees from which they have emerged; flying about, like other moths, only in the night. The sexes, judging from those I reared under glass, copulate soon after their exclusion from the chrysalis; and as the female, as remarked by Brahm, is not provided with any instrument for piercing the bark, it is probable that she deposits her eggs on the outside of it, the young larvæ subsequently making their way into the tree.

The only work in which I have found any allusion to the economy of this insect, is a German publication, Brahm's *Insekten Kalender*. In this it is briefly observed, that the larvæ winter in the trunks of Apricot and Almond-trees, upon the sap of which they are supposed to live, and to which it is conjectured they are very injurious.

With regard to the best mode of destroying these insects, when their attacks are injurious, I have nothing better to offer than a few imperfect hints. The first and most essential process evidently is, to cut away the edges of the cankers

where they are chiefly found, making the wound smooth, and covering it with any composition likely to prevent the moth from depositing her eggs there again. One precaution is necessary, to put into boiling water, or bury at a considerable depth, the cut out pieces of decayed bark containing the larvæ; which, if left near the tree, would soon crawl from their holes and remount it; thus defeating the labour of the horticulturist, who, often from neglecting a slight additional trouble, loses the benefit of more painful exertions.* Where the larvæ are found to have insinuated themselves generally into the rough bark of old trees, it would probably be advisable to adopt Mr. KNIGHT's judicious recommendation on another occasion,† and scrape off the whole of the lifeless bark, and such portions of the alburnum, as are injured; a process which, there can be no doubt, would be advantageous to the tree in other respects pointed out by Mr. KNIGHT. Where projecting saw-dust-like masses shew that the larva has attacked even smooth-barked trees, the insertion of a blunt pricker into the hole would probably, in most cases, suffice to destroy it, and do less injury to the tree than suffering it to attain its growth. But the mode which I should recommend in this, as in the case of almost all insects

* Rössel tells us (Insekten belustigung, I. iv. 171.) that the German gardeners, after collecting from their cabbages, with unwearied industry, whole baskets full of the destructive Noctua Brassicæ, bury them in a shallow hole in the earth; thus unwittingly counteracting their object in the most effectual way. For as this insect naturally undergoes its metamorphosis under ground, and many of the larvæ are full grown, they assume the chrysalis form in the hole into which they have been thrown, and in a few weeks emerge in the moth state, ready to lay thousands of eggs for a new brood.

† Treatise on the Apple and Pear, 3rd. edit. p. 65.

injurious to the horticulturist, is to employ children in the summer months to destroy the moths themselves, giving a small premium for every ten or twenty they collect; and increasing it as the number becomes lessened. When taught where to look for them, they would discover numbers on the bark of the trees; and if provided with gauze clasp-nets, would find it a most healthy and interesting occupation to catch them when made to fly, by shaking the trees and bushes in which they repose. The destruction of every female moth, before the deposition of its eggs, may be fairly calculated to prevent the existence of some hundreds of larvæ; and thus in any garden not in the neighbourhood of others where the same methods are neglected, the whole race might in a few years be extirpated.

I have the honour to be,

My dear Sir,

Your obliged Servant,

WILLIAM SPENCE.

Drypool, near Hull,
May 4, 1812.

X. *On Inarching leafless Branches of Peach-trees.* *By* THOMAS ANDREW KNIGHT, *Esq. F. R. S. &c.* President.

Read June 2, 1812.

EVERY gardener who has paid the slightest degree of attention to the culture of the *Peach*-tree, must have observed that whenever the part of the bearing branch, which extends beyond the fruit, is without foliage, the fruit itself rarely acquires maturity, and never its proper flavour and excellence. The blossoms, under such circumstances, set well, in some seasons much better than upon other parts of the tree, and the fruit often grows with preternatural rapidity, but it will not subsequently ripen.

In the last season, a Peach-tree in my garden, of which I was very anxious to see the fruit, had lost, by the severity of the weather, all its blossoms, except two, which grew upon leafless branches: I was very desirous to preserve these, as well as to ascertain the cause why the Peach and Nectarine, under such circumstances, fail to acquire maturity. The most probable cause, according to my hypothesis, appeared to be the want of the returning sap, (which the leaves, if existing, would have afforded), and the consequent morbid state of the branch; I therefore endeavoured to derive the necessary portion of returning sap from another source. To obtain this object, the points of the branches, which bore fruit, were brought into contact with other branches of the same age that bore leaves; and a part of their bark, extending in length about four times their diameters, was pared off

immediately above the fruit. Similar wounds were then made upon the other branches, with which these were brought into contact; and the wounded surfaces were closely fitted; and tightly bound together. An union soon took place; and the fruit, apparently in consequence of it, acquired the highest state of maturity and perfection.

The preservation of a few Peaches, by the preceding process, is an object of so small importance, that I should not have thought the account worth communicating to the Horticultural Society, but that the result of the experiment appears to point out the office of the foliage under other circumstances, and may thus tend to throw some small portion of additional light, upon the dark and intricate path through which the investigator of vegetable physiology has to explore his way.

Monopsis conspicua?

Painted & Engraved by W. Hooker, from a Sketch by R. A. Salisbury Esq.r

XI. *On the Cultivation of the* Monopsis Conspicua, *a beautiful Annual, with a short Account of another Species of the same Genus. By* Richard Anthony Salisbury, *Esq. F. R. S. &c.* Secretary.

Read Nov. 3, 1812.

Monopsis Conspicua, *MSS.* Lobelia Speculum. *Andrews in Bot. Rep. n.* 644. *cumIc.* Lobelia Erinoides. *Linn. Sp. Pl. ed.* 1. *p.* 932. Lobelia caulibus ramosis procumbentibus, &c. *Linn. Hort. Cliff. p.* 426. Campanula Africana annua angustifolia, flore purpurascente major. *Commel. Hort. Amst. v.* 2. *p.* 75. *t.* 38. *figura ad dextram.* Campanula minima Africana, Erini facie, flore violaceo, caulibus procumbentibus. *Herm. Hort. Lugd. p.* 108. *exclusâ Icone.*

These are all the synonyms I can find of this charming plant, which constitutes a most distinct Genus in the natural order of Lobelēæ, and to which I have given the name of *Monopsis*, from its nearly regular corolla of one face; whereas all true *Lobelias* have two faces, if I may use the expression, one pointing backwards, the other forwards. That it is the plant of Herman, on which Linnæus founded his *Lobelia Erinoides*, I have not a shadow of doubt, from the excellent description in *Hortus Lugdunensis;* but the figure there given for it, is evidently some *Lobelia*, and I believe *Erinus* of the *Botanical Magazine*.* Herman informs us, that our plant grows wild at the *Cape of Good Hope*, "in pascuis aliisque "irriguis locis." Commelin's figure is exceedingly faithful for his æra, and the character of the genus is preserved.

This plant has been repeatedly introduced into this

* Plate 901.

country, but seldom seen a second season, for want of proper cultivation and due attention in collecting its seeds. The latter business is somewhat laborious, and requires a daily inspection of every branch. The first time I saw it was at Kew, a great many years ago, when in company with Mr. FRANCIS MASSON, who had brought its seeds from the Cape of Good Hope; but the plant was then rotting with our Midsummer rains. It had been in Kew garden, however, previous to this, and was described by that learned botanist, Dr. SOLANDER; who referred it to *Lobelia*, giving it the specific name of *Speculum*, from the similarity of its blossoms to those of *Campanula Speculum, Linn.* our *Venus' Looking-glass*. After that, it was a third time raised at *Kew* with greater success, as appears by a most inimitable sketch of the whole plant in full perfection, by Mr. FRANCIS BAUER, which is preserved in Sir JOSEPH BANKS's library. I cannot learn that it ever found its way into any other collection than the Royal Garden, till last summer, when I first met with it in a garden at Homerton, drooping under a north wall, with a parcel of seedling *Ixias*, *Gladioli*, and other common Cape plants. The owners setting no value on it, and indeed preferring cabbages and cauliflowers to all such exotics as this, seeing me in raptures with it, politely presented it to me; and I afterwards saw a few plants at Messrs. COLVILL's, King's Road, Chelsea, who also obligingly gave me one of theirs.

Anxious to keep in the country, and preserve seeds of this beautiful annual, I placed that from Homerton on some fresh gravel in the middle of my court, which is fully exposed to the south, and soon saw with joy several capsules swelling with seeds.

Being yet ignorant of the habits of the plant, however, all these first capsules were suffered to remain too long, and they shed their seed on the gravel, where, to my surprise, in about ten days after, not less than twenty young seedling plants appeared.

Having now studied it both in a botanical and horticultural sense, and having become better acquainted with it, I removed the parent plant to the south window of my library, clipping off one or more ripe capsules from it daily, till the end of September, about which time they ceased to produce perfect seeds. The plant from Messrs. Colvill succeeded equally well while the fine weather lasted; but being planted in highly manured earth, damped off early in October; whereas the other in poorer soil continued flowering all October, though with diminished lustre, and did not finally decay till the middle of November.

In the mean while, I learnt an important lesson from the young seedling plants in the gravel. After transplanting half a dozen into separate pots, three into thumb-pots, and three into pots of a larger size, filled with peat sand and pure gravel, equal parts, I transplanted a few more into still larger pots, having no small pots left. Of all these, I observed those in the thumb-pots throve best; but of those in the largest pots, two damped off by degrees, first one branch at the bottom, then another, and finally the principal stem, this decay always beginning close to the earth. I therefore left off watering them at the top of the pot entirely, placing them in pans, into which I poured more or less water as I saw occasion.

As the seeds I collected and distributed last year, have

made it now, in 1812, very abundant, I have only to hope, that those who are fond of flowers will be at the trouble of collecting its seeds; and I have particularly to thank, in this business, our worthy member Mr. Joseph Knight, who is so kind as to second all my horticultural efforts, with peculiar zeal. The soil it delights in is pure heath sand mixed with gravel.

I recommend three crops to be sown every year. The first at the end of September: these plants being kept very dry, will stand the winter in any dry frame or airy shelf, exposed to the full south; should be transplanted in February, and will flower from April to the end of July. The second in February, which, treated like the former, will begin to flower towards the end of June, and continue loaded with blossoms till October; and from this crop the principal supply of seeds must be expected. The third crop should be sown early in June, shading the pots with brown paper after four o'clock *p. m.* till eight the next morning. My reason for this is, that I believe most seeds that are not short-lived annuals, vegetate best when they have an equal portion of light and darkness, as at the equinoxes. This third crop will produce flowers from September till the end of December, especially if removed to a stove, or very warm room.

Monopsis Inconspicua. ***MSS.*** Lobelia Erinoides. ***Linn. Sp. Pl. ed.*** 1. *p.* 932. Campanula Africana annua angustifolia flora purpurascente minor. ***Commel. Hort. Amst. v.*** 2. *p.* 75. *t.* 38. *figurâ ad sinistram.* Campanula minor Africana, Erini facie, flore violaceo, cauliculis erectis. ***Herm. Hort. Lugd.*** *p.* 110. *cum Ic.*

This species differs from the former, just as the little small

flowered Viola Tricolor, as it is yet called, of our corn-fields, differs from the magnificent Viola Grandiflora. Few people, except botanists, will cultivate this species; but it requires no care, being much more hardy than the other, and will bear to be drenched with the midsummer rains, in a light sandy soil. I met with it at Messrs. LEE and KENNEDY's last summer, when I was collecting all the Lobelias I could find in our gardens, to study the genera of that order; they gave it the name of Lobelia Cliffortiana, which is an error, for that is an American species.

XII. *An Account drawn up one hundred years ago, of several* Pears *then cultivated at* Little Chelsea, *with Outlines of their longitudinal Sections. By Mr.* LUTTRELL.* *Communicated by* LUTTEREL WYNNE, LL.D. F.H.S.

Read Nov. 3, 1812.

BEZI D'HENRY, or GOOD KING HARRY.† *fig.* 1. From Mr. DUNEAU, 23d October, 1712. Eaten 18th December following. Pretty good, but rather going; others had no flavour.

CRESSANN. *fig.* 2. From Mr. DUNEAU, 23d October, 1712. Eaten 18th December after. A pleasant pulp with a sharp taste, and a good flavour. The outside rind is brown and rough, but pulp melting. Clearly different from the other Cressanns.

WINTER MUSK PEAR. *fig.* 3. From Mr. PALMER, 9th November, 1712. A fragrant sweet pear, with a musky taste. Will keep till Christmas; however, I eat it not till February 9th, 1713, but it was kept too long, being mealy and rotten.

MARQUESSE. *fig.* 4. From Mr. DUNEAU, 23d October, 1712. Eaten 10th December after. A good fruit and in prime order.

GROSSE MUSK, or WINTER ORANGE PEAR, *fig.* 5. From Lord CHENEYS, 9th November, 1712. A pleasant musky tasted Pear, but somewhat gritty. It will keep till after Christmas, but on the 9th of February, 1713, was beginning to rot.

* Mr. LUTTRELL was a member of Parliament, well known in his day, as a collector of scarce books; all the dates in this Paper refer to the old style.

† This English name has originated in a mistake, for it is called the Wilding of HENRY FORREST in some old catalogues.

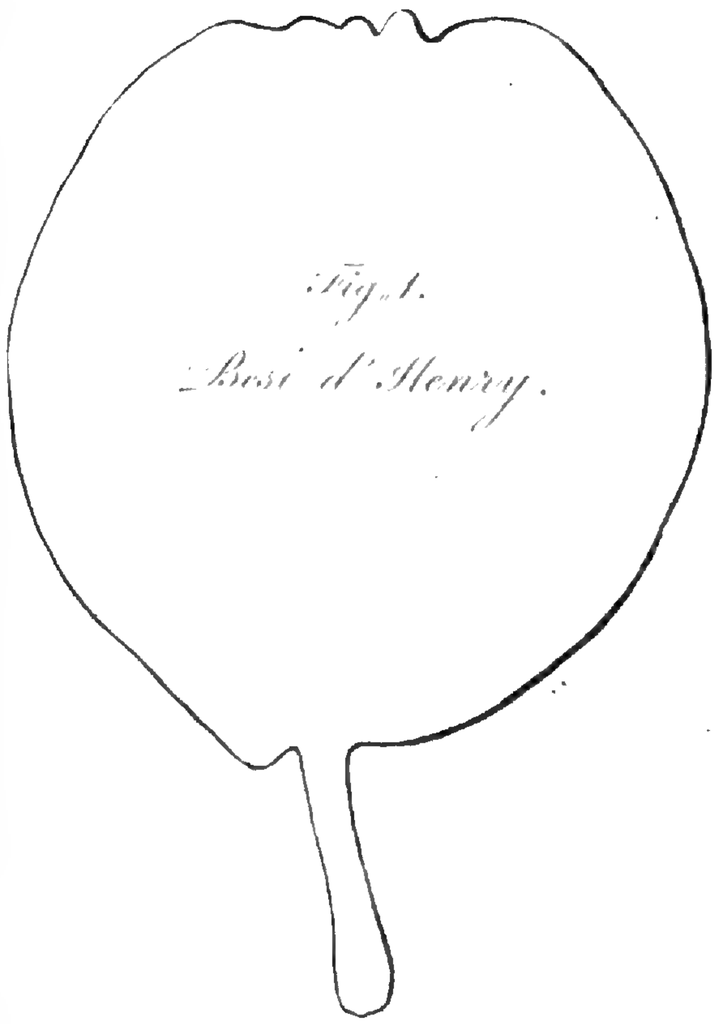
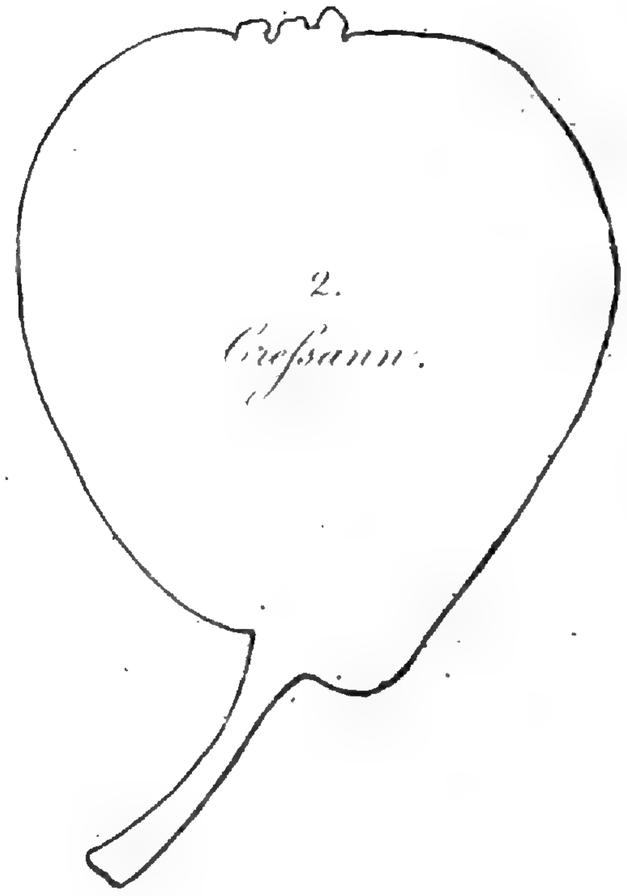
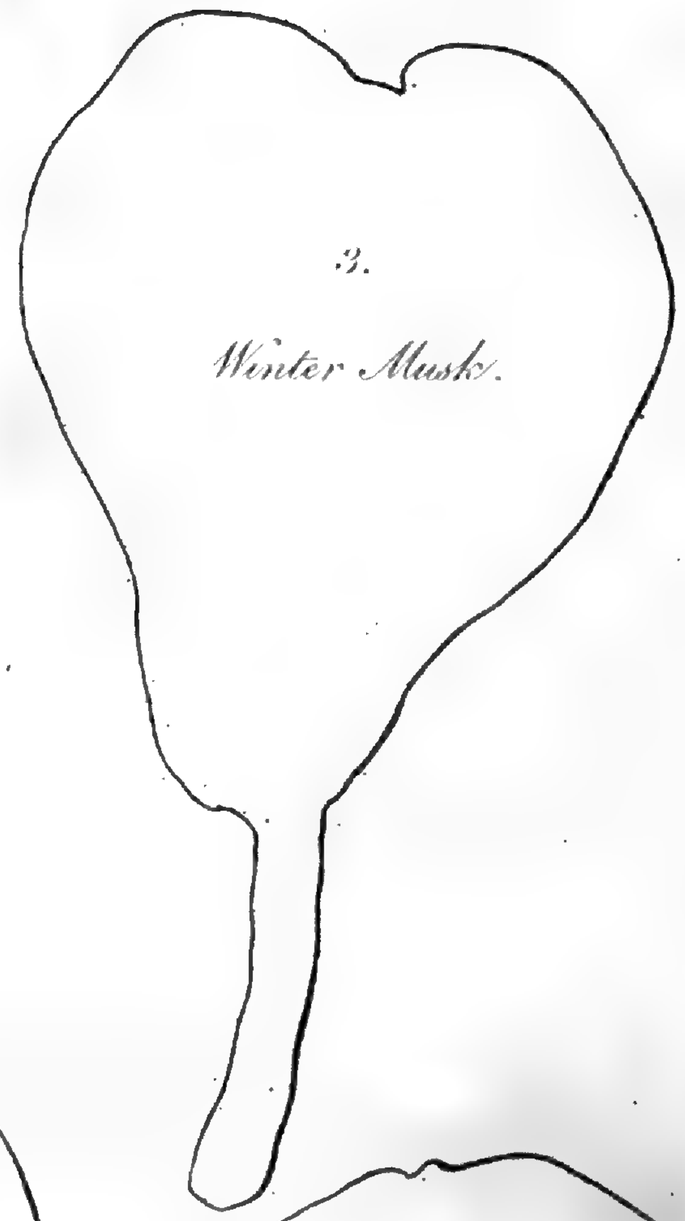


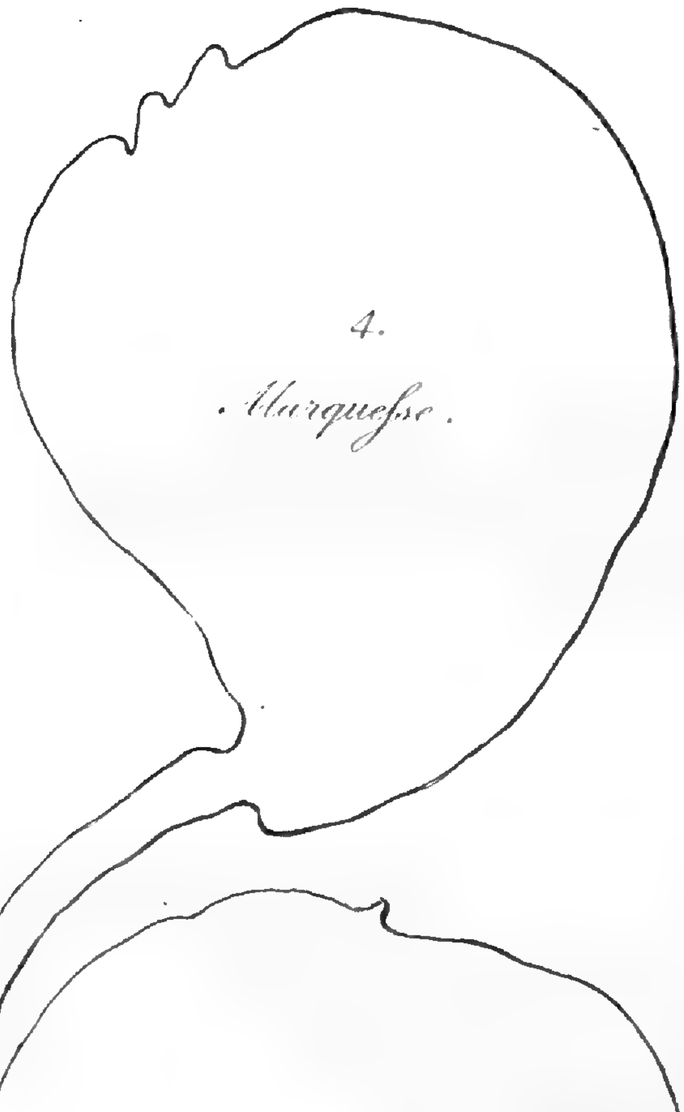
Fig. 1.
Bosi d'Henry.



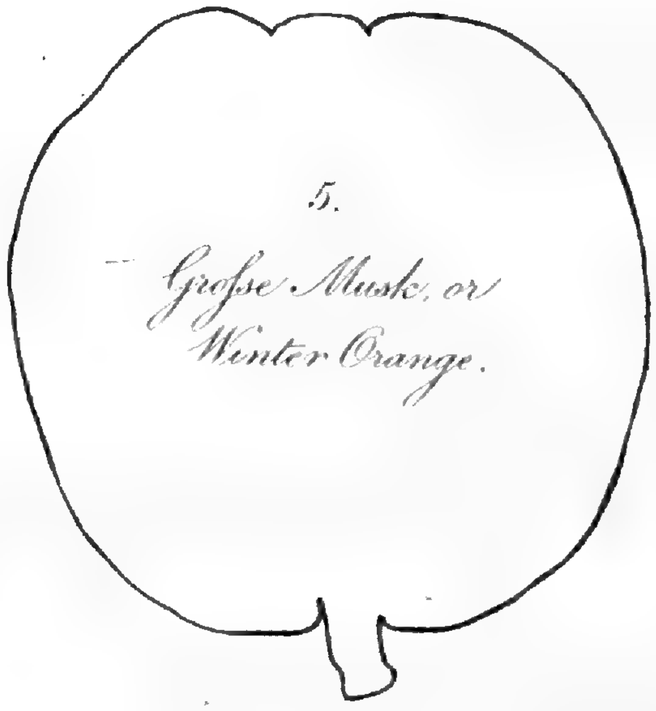
2.
Crassanne.



3.
Winter Musk.



4.
Marquesse.



5.
Grosse Musk, or
Winter Orange.

6.
Louise Bonne.

7.
Inconneau.

9.
Bergamot Bugi.

8.
Rufselet de Rhine.

Fig. 10.
Bergamot d'Automne.

11.
Orange Vert, or
Orange Bergamot.

12.
Rosen Bergamot.

13.
Muscat Robert.

14.
Virgoleuze.

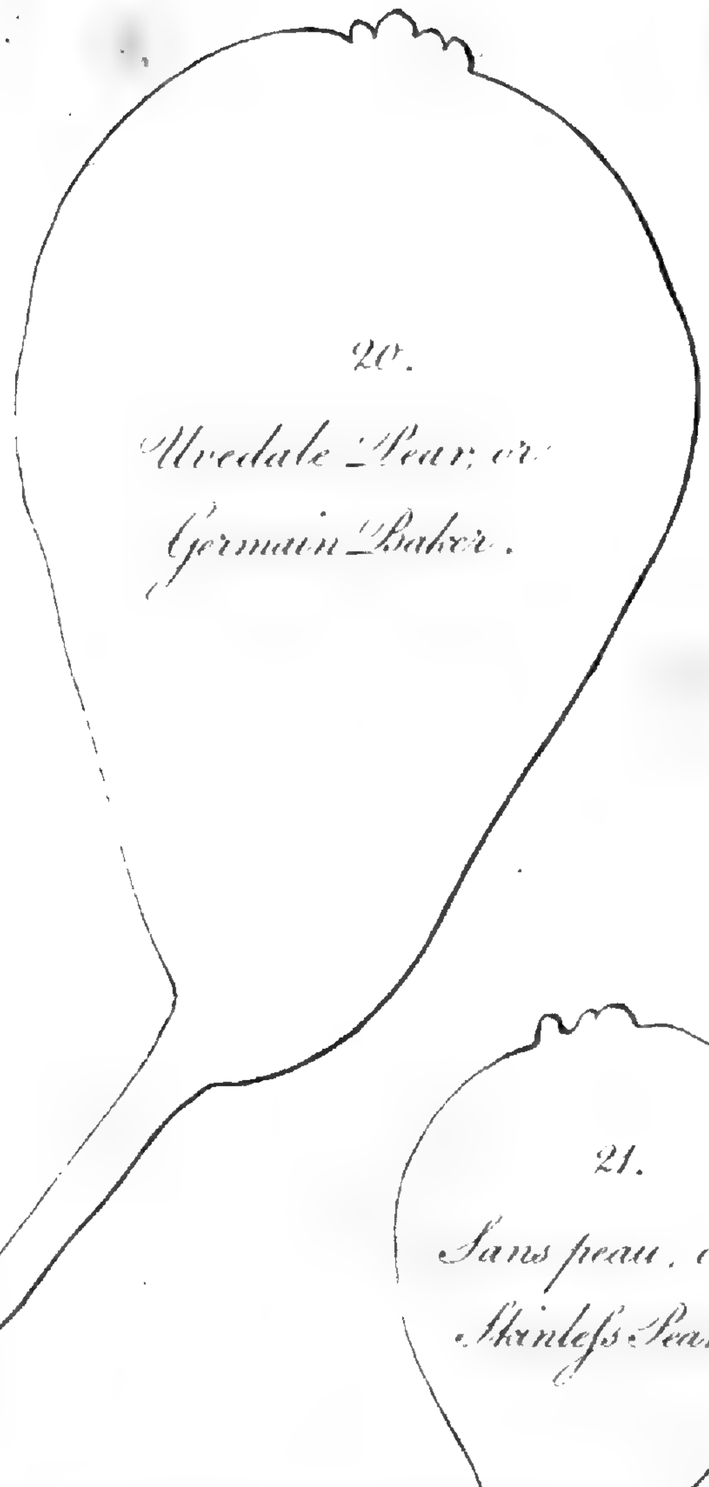
15.
Callio Rosat, or
Ruffelet Spicer.

16.
Vert longe.

17.
Les Chasseries, or
Ice Pear.

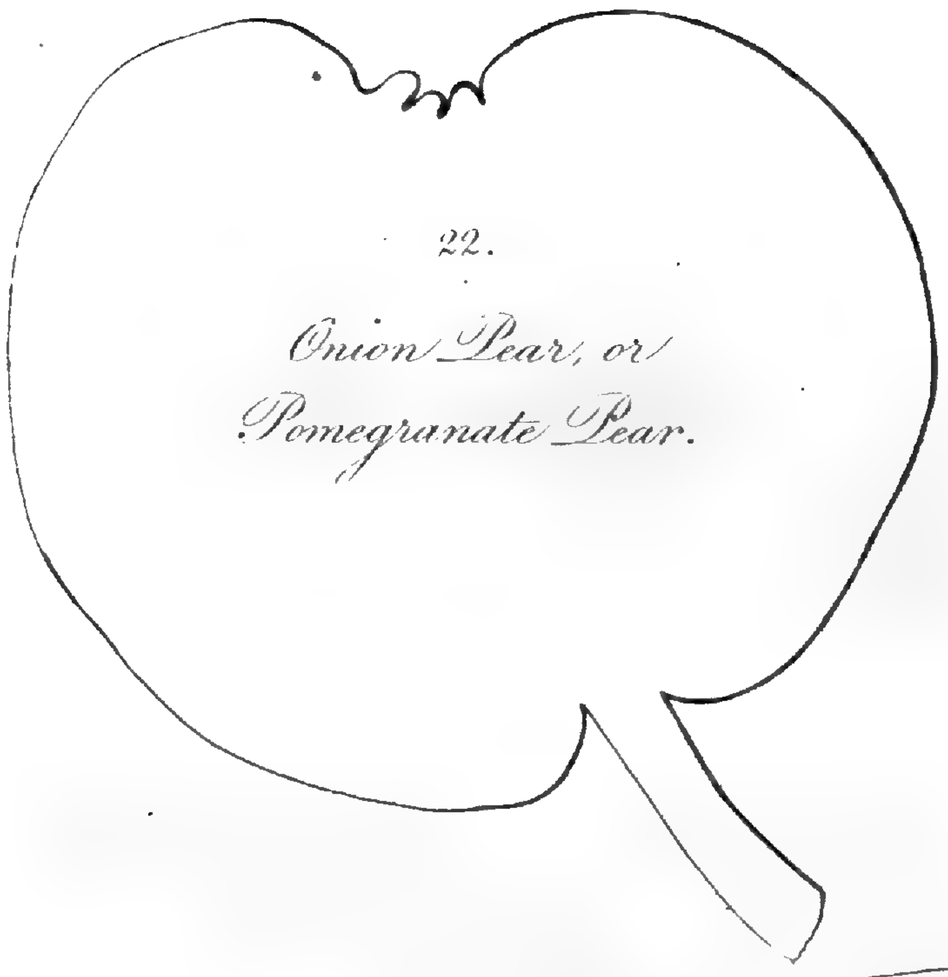
18.
Petit Oin, or
Marveille d'Hyver.

Fig. 19.
Petit Muscat.



20.
Uvedale's Pear; or
Germain Baker.

21.
Sans peau, or
Skinless Pear.



22.
Onion Pear, or
Pomegranate Pear.

23.
Verte longue Panachée.

24.
L'Epine d'Hyver.

Louise Bonne. *fig.* 6. From Mr. Duneau, 23d October, 1712. Eaten 10th December after. A good sort, with a flavour, green on the outside.

Inconneau. *fig.* 7. From Mr. Duneau, 23d October, 1712. A baking Pear, eaten 2d April, 1713, when it was beginning to rot, but had a strong sweet scent.

Russelet de Rhine. *fig.* 8. From Mr. Selwood. Gathered 6th August, 1712, rather too soon. Eaten 3d of December following. A good fruit, small, with a brown coat. Others on the 5th March, 1713, were shrivelled, and beginning to go.

Bergamot Bugi. *fig.* 9. From Mr. Duneau, 23d October, 1712. Eaten 5th March, 1713. A good firm fruit, with a pleasant sharp taste, but shrivelled on the outside. The rind all green, and so is the pulp in a manner.

Bergamot d'Autome. *fig.* 10. Hand gathered within the ten or twelve first days in October, 1716, from a tree upon a Pear-stock, against a south-west wall, in Mr. Duneau's ground. On the 10th of December following quite rotten, and but little of it eatable, though it looked fair without. This Pear decays inwardly first. It is usually put upon a Pear Stock, and will take well upon a Quince, but the English Bergamots like a Pear Stock best. Any form or order of culture agrees with this Pear; but the scabbiness of its wood doth induce M. de La Quintinie to advise against planting them in the dwarf fashion; and rather against walls, or in half standards, or in the neighbourhood of a great wall, exposed to a good sun; for they are incommoded by the full air. He saith, a cold moist earth is absolutely contrary to this Pear; that it is ordinarily loaded with a sufficient quantity, and the middling Pears as good as the biggest. If this Pear be

gathered green, it must be kept on boards of Oak, that it lose not its natural taste. Its shape is flattish, and sometimes it mounts up a little also at the tail; though at this end it draws a little more to a point: it is pretty round, and measures quite or very near as much in compass as the length of it from head to tail. The proportion of its bigness is sometimes 3 inches diameter, but most commonly only $1\frac{1}{2}$ or 2 inches. It is commonly a little wider above the middle than just about it, and abates by gentle degrees down to the stalk, where it is pretty blunt, and a little streaked or pounced with dark or grey russety specks or flakes; but close round the stalk it is a little tinged with black, sinking inwards at that end, but it doth not encompass the stalk with such an hollowness, as to call it hollow-sett. The Eye of this Pear is of a middling size, sunk a little; and I have seen it level with the top of the head or crown, which is a little ribbed about it, of a palish green close round it, which grows yellowish as the fruit ripens: longish pointed, because it retains part of the blossom leaves, which lie down flat upon the crown, but hardly any of the pendants round in form; open at top, but shallow, of a blackish colour first within, but turns yellower in keeping. The Stalk is of a palish green and russety brown, spotted with white, and hath a little wart upon it, pretty slender in substance, long and somewhat curved or bent; it turns black and shrinks with keeping; it is not so hollow-sett as that of our English Autumn Bergamot; for though the Pear falls inward at this end, yet it is wide, open, and loose about it: it takes good hold within. The Skin is very sleek, smooth, polished, and shines when turned yellowish, and not near so much covered with russet as our English Autumn

Bergamot; 'tis at first of a whitish or pale green colour in the crown, pounced over with small specks of a dark brown or blackish russety colour, which look brighter and ruddier, and the grain turns yellowish in ripening. The fruit sweats, and is a little moist or damp on the outside, and smells a little at the time it is ready for the mouth; but it never yields to the thumb, and the skin doth not shrink or shrivel, unless a little about the stalk. The skin is not thick in substance, nor tough in the mouth, but tastes a little bitter: it colours not with the sun. The Pulp is pretty white in colour, of a yielding melting substance, well furnished with juice, which is sweet and sugary, pleasant, but a little pert and eager this year, and free from any gritty substance at all, unless very near the core. The Core is of a moderate size, rather longish shaped than round, bulging out in the middle, lying much about the middle of the fruit, and not deep in it; its cells of a moderate size, straight, white, and poorly stocked with kernels. This Bergamot d'Autome is somewhat like a fair Petit Oin, only the pulp seems to be of a whiter complexion, its juice more liquid and thinner in its consistency, it is sharper tasted, and not so sweet and luscious.

ORANGE VERT, or ORANGE BERGAMOT, *fig.* 11. A windfall 24th August, 1714, (a very hot dry summer), from a dwarf upon a Pear Stock, being a very large specimen. A very great bearer, and comes in soon upon a Quince Stock, not only in form of a dwarf, but in an Espalier. Some plant them against walls, but they are ill advised, for it will bear well, and large and handsome fruit, without such helps, nay in a standard. The walls may be better employed by encouraging fruits of a more ticklish nature, and choicer in kind.

The Eye of this fruit is sometimes large, but generally of a middle size, very hollow, and sunk deep into its head, sometimes preserves part of the blossom leaves and pendants, sometimes none of them; round and open, and yellow within. The Stalk commonly is very short, thick, and fleshy, and a little curved or bent, of a green and russet colour, spotted with white, and hollow-sett like an Apple: it takes pretty good hold within. The Skin is smooth, sleek, and glossy, neither thick nor tough in substance, of a grass-green colour, pounced thick with specks of a darker green, with a black eye, and it colours a little with red upon one side: it turns yellow, and smells perfumed, as it comes in fit for eating: the true time is to eat it whilst the colour is upon the turn. The fruit colours most upon Quince Stocks; but if they hang exposed to the sun, they contract on that side spots of a bright clear red. The Pulp is rather of the breaking than the melting kind, and a little gritty and stony next the core; well furnished with rich sugared juice, very strong, of a musky perfumed flavour, but when over ripe, eats coarse, mealy, and dry. It must be eaten at the time the colour is upon changing, before it comes to be a tawny or orange colour. The Core lieth about the middle, not deep, is but small, and free from any stony matter as the rest of the body; it produceth between two and four kernels, plump, of a full brown colour, and edged round with a darker tincture: they are round in the head, with a tip on one side, longish in shape, but growing taper to the end. The kernels from Pear Stocks are commonly paler than those from Quince Stocks. This is the best of summer Pears.

ROSEA* BERGAMOT. *fig.* 12. Hand gathered 26th August, 1714, from a dwarf upon a Quince. A good bearer and bears soon. The Stalk long, slender, straight, and spotted with a few russet brown spots; the Pear grows hollow about it. The Eye small and even with the head. The Skin moderately thick and toughish, ground dark green, comes of a pale yellow as it ripens, spotted all over pretty thick with russet brown spots, and of a bright red colour on one side. The Pulp inclining to brittle, fluent in juice, which is sugared and somewhat perfumed. The core of a middling size with 4 or 5 plump kernels, longish, but large upwards. An excellent Pear if eaten by the 20th of August, but holds not longer in good condition; may be eaten just after dropt from the tree, keeping one week or ten days well. Preferable to the Hambden's Bergamot, because it keeps longer, and is a much better bearer.

MUSCAT ROBERT, also QUEEN PEAR, MAIDEN PEAR, AMBER PEAR, MAIDEN OF ZANTOIGNE. *fig.* 13. From a dwarf in Mr. DUNEAU's ground, gathered about the 8th of July, 1715. A middling specimen, but in very good condition, and time for eating on the 15th. A very great bearer in any form; usually put on a Pear Stock; shoots well. The colour of the Wood like the *Virgolouze*, only more yellow. The Leaf of a quite different shape. The Stalk long and small, curved or bent with a green rind to it: the Pear grows close about it. The Eye large in proportion to the size of the fruit, projecting above the head, a little contracted in form, the point blunt, black and yellow within. The Pulp fluent enough in juice, though not so much as the Petit Muscat, very

* In other parts of the Author's MS. this word is spelt Rochee.

sugary and a good share of musky perfumed flavour with it; eats a little short in the mouth and a little stony and gritty, whiter than the Petit Muscat in its colour. The Core proportionable to the size, and rather less than that of the Petit Muscat, with 2 or 3 kernels, more taper than that and a little lighter in colour. The Skin not thick or tough, greenish upon the tree, but turns yellow with keeping, when it is fit to eat; it is clear in the grain with very little variation of colour, or pouncing, or other outward mark. It came in this year 1715, before the Petit Muscat was gone, but commonly held out till after that was gone. It is a delicious morsel, larger, yellower, as well as richer in taste and flavour than the Petit Muscat, and has no fault but that of its size.

Virgolouze. *fig.* 14. Had of Mr. Palmer, 19th October, 1712, and eaten the 27th of November after. A charming beautiful Pear, yellow on the outside with some red, but was kept too long: another gathered the same day was in rare order.

Callio Rosat, or Russelet Spicer. *fig.* 15. A windfall 11th August, 1715, from a tree removed in November, 1713, on a Pear Stock in the hedge to the west end of the Melon ground. A good specimen. A very sorry bearer even against a wall, on which account it is more proper to graft it on a Quince Stock; it will take well upon that stock. It is a good tasted fruit, but being stony at the core, and so bad a keeper and bearer, one need not covet many trees of it; one is enough. However, when they please to bear, the fruit is pleasant to the eye, being well shaped, and of an agreeable size. They will not last any time; what we had this year, 1715, were all gone by 20th August. About 10th August, they

seem to be in prime. It decays first at the core, and feels soft outwardly. The Eye sunk a little below the head or crown, pretty large, open, round, and hollow, hairy within and yellow, hardly any points. The Stalk long and fleshy, somewhat curved or bent, the Pear growing close about it. The Skin is russety almost over the whole body, not thick, bites short, and will peel when the fruit is dead ripe: it is of a reddish tincture on the sunny side, which grows a little brighter as the fruit comes in fit for eating, and pounced thick with small whitish russet or mealy spots; that little green which is to be seen, hath a pale faint whitish cast about the same time. The Pulp is of the melting kind, aboundeth with juice, which is sugary, with a smack of perfume, but very stony or gritty about the core, which is large, and produceth not above one or two kernels, which are very black in colour, roundish in the head, with a little nib or point on one side, long in shape, and grow taper to the end.

VERT LONGE. *fig.* 16. Gathered about the middle of October, 1715, from one of Father's Fan Pears, on a Quince-stock, aspected east and west, next to the north side of the Apple-hedge in the kitchen ground. Eaten on the 11th of November after, when it was perished from the bottom of the core down to the stalk; the rest of it eat well. Mr. DUNEAU told me that one year he had eaten a Pear of this sort good at the beginning of March, which was gathered from a tree removed the winter before was twelve months; and we had one from him in 1716, gathered the 20th of September, from a dwarf on a Quince Stock in rare order, notwithstanding the cold dry summer, and wet autumn of that year, prevented them from attaining their due flavour.

Mo. Bot. Garden,
1897.

Le Chasserie, or Ice Pear. *fig.* 17. A very good specimen, hand-gathered 7th October, 1715, from the tree, on a Pear Stock in the middle of five, aspected north and south from the western division of the Pear-hedge to the south of the Melon ground. Eaten on the 8th of November, in rare order, and a little perfumed. The Le Chasserie is a Pear of a middling size, rather long than round, or as one may say, oval round; it is sometimes short in its make, and then it is next upon round, but generally it is longish, and affects to be spired or to draw towards a point at each end, but oftener at the head; and its dimensions are widest about the middle, which warrants the description of it to be oval round. It hath a smooth polished glossy thin Skin, of a light bright green colour, but its tincture not so deep as the Sucre Vert, speckled or pounced with russet, up and down the body, with a long and very thick fleshy Stalk projecting from the body, almost quite straight in its shape, but much pounced or streaked with dashes or specks of a brownish, or mealy white colour, like bran, encircled at the top of it most commonly with russet, and sometimes round the eye. The Eye is generally projecting above the top of the head or crown, rather large than small in size, pretty open and hollow, but not deep. The Pulp is pretty melting and yielding, almost buttery, well furnished with sweet sugared juice, sometimes a little perfumed, but seldom gritty. This Pear turns yellower and lighter as it grows ripe, smelling a little sweetish, and grows soft soon after. It loves a dry ground and warm weather, and then the flavour is advanced in goodness. It is but a middling bearer; and here in England doth not take so well, nor come to that perfection

as in France, its natural soil. So that I believe, in the method of ranging Pears into order, according to their innate good qualities, as practised by DE LA QUINTINIE, this Pear will be in danger of yielding precedence to several other sorts besides the Ambret; which Pear, though it neither grows to be so large in substance or size, as large Les Chasseries, yet bears more in number, comes sooner into bearing, tastes better in the mouth, and is commonly a long laster. We had scarcely one sound Le Chasserie the 11th of February, 1716, but we had some Ambrets; upon all which accounts I think it not adviseable to plant more than one of them, till trial be made how they answer expectation. The Le Chasserie hath another ill quality, viz. that like the Virgolouze, it is apt to receive a disagreeable taste from any thing it lies upon or near, if so be it be kept close, or upon deal boards.

PETIT OIN, or MARVEILLE D'HYVER. *fig.* 18. Had from Mr. DUNEAU 19th December, 1716. A tolerable specimen, but quite rotten and perished within. None of it eatable,

PETIT MUSCAT. *fig.* 19. Gathered 19th July, 1716. A tolerable specimen. Upon view of the wood, Mr. SELWOOD called it the Primatin. It is a pretty good bearer, and will take upon either stock. It may be planted out, to grow in any form; doth not require a wall, unless you would help it forward to come earlier into season. Mr. DE LA QUINTINIE doth not approve of the figure of a dwarf tree for it, vol. 1. Part. 3. Cap. 2, because of the disagreeable look of its wood; and at Cap. 3, intimates that the canker is apt to seize on its wood, upon which account he likewise condemns the form of a standard, and therefore assigns it a station against a wall

only. I do not find but it is a very healthy shooter in our ground, and bears very well in an espalier. GENTIL, author of *Le Jardinier Solitaire,* saith of this fruit, that no man curious in fruit, but hath them in his garden. The Eye of this Pear is small, even with or but very little above the head or crown, retaining very little of the leaves, and none of the threads or pendents of its blossom, which makes the points of its eye short, stiff, and strong; it is of a circular form, full, shallow, open, but of a mealy colour within, and the head or crown, which is flat, is puckered, or a little contracted round about it, and the end of the Pear is a little blunt, but much less in compass than at the head. The Stalk is not hollow-set, for the Pear does not seem to sink at all inwards at the tail; pretty long, and very slender in substance, a little curved, and a little pounced with small russety brown and mealy specks, and takes good hold within. The Skin is of a whitish or grayish green colour, pounced up and down with little white round specks in the ground, streaked or flaked with a few stripes of a red or flesh colour, which in our specimen was round about the eye and the upper part of its body. It turns to a palish faint yellow colour on the outside, and smells a little when ready to eat, for they soon grow mellow, and will not endure above three or four days after gathering; for they begin to perish within quickly. After the 10th or 12th of July, they may be eaten from the tree; vermin, such as birds, slugs, &c. will prey upon them while upon the tree. The skin is not smooth or very glossy, but rather coarse in grain, and firm enough in substance. The Pulp is partly of a yielding substance, well enough furnished with juice, which is sugared, a little

perfumed, but a little gritty, especially at the core, and of a yellowish white colour. The Core lieth nearer the eye than the stalk, of a narrow longish shape and middling size, pretty deep into the substance of the body; the cells small, of a whitish colour; this specimen produced no kernels.

UVEDALE PEAR, or GERMAIN BAKER, *fig.* 20. A windfall from a tall young tree in Mr. SELWOOD's nursery, 1st September, 1716, being only a middling specimen. On the 9th April, 1717, it was somewhat shrunk, and turned black over most of its outside, but not corrupted or turned to rottenness within.

SANS PEAU, or SKINLESS PEAR, *fig.* 21. A middling specimen from a dwarf in Mr. DUNEAU's ground. A moderate bearer, till it becomes a large tree, and will bear in any form; put usually on a Pear-stock. The Stalk very long, slender, and straight, the fruit sloping down to it: began to perish about the stalk where the skin shrivelled, and the fruit soft. The Skin smooth, and russety, a little green when gathered; turns to a bright yellow colour, and very tender in the mouth, when fit for eating. The Pulp very tender and sugary, fluent in juice, which is of a quick brisk flavour, not at all sharp; it is a little gritty about the core. The Core but small, produceth three or four kernels of a longish shape, and a whitish yellow colour, edged round with a brown russet coloured tincture, taper at the end, and a little nib or top on one side of the head. A very good fruit to eat raw, and allures the palate to feed heartily upon them. It will keep ten days, or a fortnight, after gathering. You may begin to unfurnish the tree by the middle of July.

ONION PEAR; or the POMEGRANATE PEAR, as Mr. BOBART calls it. *fig.* 22. A middling specimen from an Espalier on a Pear Stock, in Mr. PALMER's ground, gathered early in October, 1716. It decays first on the outside, and began to perish a little at a bruise on the head or crown, got by lyeing so long upon it. It is a very good bearer in any form or shape, or against a north wall, may be planted with success. Is usually grafted on a Pear Stock. It shoots well and healthily, not apt to run into strong gross wood; the colour of the shoot is something like that of the Muscat Robert more than that of the Virgolouze, being of a yellowish light brown colour. This Pear comes usually of a pretty handsome size, and is of a hardy nature; it is flat at top, and roundish at bottom, but longer on one side of the eye than the other; but the eye and stalk are much about the middle of the body. The Stalk is of a brown russet colour, pounced a little with specks, pretty thick and fleshy, somewhat curved or bent, hollow-sett like an Apple, turning a little black and wrinkled with keeping; it takes a good hold of the fruit within: the fruit is russety round about the stalk, and some way above it. The Eye is sunk below the head or crown, retaining good part of its blossom, pretty close made at top, blackish in colour, without as also within, and a little hairy, preserving part of the pendant of the blossom, of a middling or sometimes of a small size, rather square than roundish in its shape; deep and hollow a pretty way into the body: the head or crown is a little ribbed, puckered, or contracted, and the skin furrowed or chopped a little round about it: The skin is pretty thick and tough, feeling a little rough, and hath somewhat of a sullen look; it is at first palish green in its ground,

pretty much covered, sometimes with round, sometimes with longish russet spots pretty close to one another, and here and there a few larger spots or sometimes streaks of the very same russety colour, and receives little or no tincture from the skin; but in length of time it comes to be of a bright shining yellow colour. The skin grows wrinkled at last, and smells a little, but never yields to the thumb, though squeezed ever so hard, as long as it is sound within: there doth remain even to the last some spots of a fading pale green perceivable. The Pulp is clear white, of the breaking kind, but eats a little tough and gritty, sparingly furnished with juice of a quick pert taste, not dead or flat in its flavour, and a little sweet in the mouth. The Core lieth rather nearer the eye than the stalk, is short but round in shape, of a moderate or rather small size, a little gritty and stony: its cells tolerably well furnished with kernels, from 5 to 8, of a black colour, roundish at top, flat on one side of the body, a little rounder on the other, somewhat broad and pretty plump, growing taper at the end. The chief use of this Pear is for baking and stewing, in which it excels the *Cardillac*. It colours better in the stewing, and then it is a longer laster; its pulp is rather too coarse and dry to eat raw, but it is a great increaser and worthy of reception, for its other good qualities.

BERGAMOT SUISSE, by Mr. SELWOOD. VERTE LONGE PANNACHEÈ, by Mr. DUNEAU. *fig.* 23. But a small specimen, blown down by the wind, about 7th or 8th of September, 1716, from a young standard in Mr. SELWOOD's ground, upon a Pear-Stock, raised from a cutting which came from one Mr. CLEMENT's, at Vienna, in 1712, by the name of the Long Winter Bergamot. The fruit proved sound within on

the 23d of February, 1717, but much shrunk and wrinkled, and was specked in one place upon the side of its body, which had affected the inside a little. I believe it decays outwardly at first. QUINTINIE, saith, the Bergamot Suisse is ready for the mouth, when it begins to feel moist, i. e. to sweat on the outside. A good bearer, and comes soon into bearing; requires not the help of a wall, any form agreeing well enough with it, and takes upon either stock, though I should prefer a Pear Stock, because it makes a long slender shoot; and if it be the Bergamot Suisse, and partakes of the disposition of the Bergamot, they do not relish a Quince Stock. Its wood is remarkable for its colour, for it is striped with yellow and green, like the coat of the fruit. The Stalk of this Pear was of a yellow and russety brown colour, a little tinged but not striped with green, nor spotted with white at all, shrinking and growing a little wrinkled, but does not turn black with keeping; it was not hollow-set like other Bergamots, though the fruit seemed to sink a little inwards upon one side, yet it was not traced round with a hollow circle, long, which is not usual in Bergamots; thick and fleshy in substance, curved and bent, and runs up to the core within, the fruit being of the same complexion about it, as in other parts of the body. The Eye was stiff and short pointed, retaining hardly any of the leaves of its blossom, and none of the pendents; the crown or head gathers a little about it in puckers or ribs, but not discoloured or russeted; it is prominent, rising a little above the top of the head, large in size, full wide and open at top, round in shape, of a blunt or dark grey colour within, deep penetrating some way into the head, and does not change colour at all. The Skin was smooth, having a

clear glossy look, firm and thick in substance, eating tough, and a little bitter: the colour was stripy, of a grass green and pale yellow interchangeably in the ground, pounced with little small specks of a reddish sandy colour, and a few black ones among them; thus it continued several weeks; at last its green tincture began to abate and grow more soft and mellow, inclining to be ruddy and take a yellow cast, but the yellow part of it grew stronger, more lively, and attained to a golden complexion. It grew pretty much wrinkled on the outside, but that might proceed from not having hung its full time upon the tree: it did (as QUINTINIE intimates) feel moistish on the outside, but that a very little, did not cast any scent, nor yield at all to the thumb. It seems to speck and perish visibly on the outside by turning of a darker reddish colour just within the skin, and to spread inwards towards the core.

L'ESPINE DE HYVER, or WINTER THORN. *fig.* 24. Had of MR. SELWOOD, 18th October, 1712, eaten 3d December after. A gritty stony Pear with a green shrivelled coat, no juicy pulp nor flavour: may be a good fruit from a better tree, and when ripe.

XIII. *Report of the Fruit Committee. Drawn up by* ROGER WILBRAHAM, *Esq. F. R. S. &c. Vice President.*

Read Nov. 3, 1812.

YOUR Committee, in the course of the autumn, directed their attention to *Peaches* and *Nectarines:* and, in the very commencement of their inquiry, met with considerable difficulty owing to the same kind of fruit being worked under different denominations by the nursery-men about London; so that it is not uncommon for the same identical Peach to be known by three or four different names.

Your Committee will, in the course of their labours, as far as they are able so to do, point out those different names, as well as the varieties, which seem to belong to each sort; mentioning in the first place the name of the Peach the most generally known, and afterwards those which appear to be assimilated to it.

The custom with many gardeners, of giving their own names to fruit of any sort (except indeed when such fruit has been actually raised by them from the seed), the Committee think ought to be reprobated, as an idle and mischievous vanity on their parts, tending to confound the most intelligent Horticulturists; for in most cases a discovery is shortly made, and it is found that the newly-named fruit is in fact an old one, brought again into cultivation under a new name, after the neglect of several years.

From these considerations, your Committee have endeavoured, as far as it has been in their power, to adhere to the Nomenclature of the Royal Gardens of Kew, and of Hampton Court; as they are of opinion that the safest reliance is upon the old established custom of those two most excellent gardens; conducted, as they are at present, by the very able and intelligent persons who have the direction of them; from whose extensive knowledge, and free communication of it, your Committee has derived the chief part of what appears in this Report.

The delicious fruit called Peaches, as well as that distinguished under the name of Nectarines, are too well known to stand in need of any description of them. The classification of them, by the most celebrated French gardeners, is different from that which has been adopted by us, and is, for niceness of discrimination, perhaps preferable to it. To the downy-coated melting fruit, which parts easily from the stone, leaving only a few filaments adhering to it, they give the name of a Peach: The smooth-coated melting fruit, which parts easily from the stone, they call a *Violet Peach*, or a *Smooth Peach:* The downy, or rough coated fruit, which adheres closely to the stone, is with them a *Pavie*, and the smooth-coated fruit, which also adheres closely to the stone, passes under the name of a *Brugnon*.

Considering the instances, some of which are enumerated in the *Transactions of this Society*,* of Peaches and Nectarines growing on the same branch of one tree; and a recent one in this season of 1812, in the garden of Richard Wheeler, Esq. in the New Road, where a Peach of that kind called la

* Vol. i. p. 103.

Chancellière, and a Nectarine, proceeded immediately from the same twig, and actually touched each other: the French do well, perhaps, in calling a Nectarine a smooth Peach; not that it is here intended, by any means, to recommend a change in our present Nomenclature of these fruits, or a deviation from the old established custom of Horticulturists. It would, however, perhaps be adviseable to reduce the variety of names, by which each kind is now called, to a single one; and the French name by which it was first known in this country seems the most adviseable; correcting as far as possible, the errors which have crept into our orthography by bad spelling, or by vicious pronunciation.

Your Committee have, in the rules which they have laid down for the description of each kind of Peach or Nectarine, paid strict attention to those previously observed by that most excellent naturalist DUHAMEL, and have, in great measure, followed them; but though his description of each kind of fruit has been constantly before their eyes, yet in no one instance has that description been in the slightest particular adopted, without their being fully assured, by their own attentive examination of the tree itself, the bud, blossom, leaf, and fruit, of its perfect accuracy.

The buds and blossoms, indeed, it has not been in their power, at this season of the year, to inspect: therefore, whenever a description of them is attempted, it is from observation of preceding years. MILLER's description of each kind of Peach and Nectarine is very good as far as it goes; but he has wholly omitted any mention of the bud, blossom, or leaf.

It is believed that the number of the kinds of Peaches, as

clearly and accurately distinguished one from the other, might be greatly reduced. The difference of the Stocks upon which they are worked, and the diversity of climate, of soils, aspects, and seasons, make such a difference in the colour, size, and flavour of the fruit, that gardeners are thence often induced to give a new name to an old sort; and, singular as it may appear, it is still no less true, that the size, colour, appearance, and even flavour of the fruit, are by no means infallible, nor even the best criterions by which to distinguish the one kind from the other. What then are better criterions? Certainly, the character of the tree in general, the colour, size, and shape of the bud, and particularly of the blossom, and of the leaves, according as they are much or little serrated, if closely attended to, are less fallacious guides; but the difference in these particulars, and pointedly so among Nectarines, is so very trifling, that an attentive observation of all the discriminating points is absolutely necessary to enable a person to distinguish one of these varieties (if varieties they really are) from the other. The difference of the taste of fruit, from climate alone, must be very manifest to any one who has tasted, from the common walls, the same kind of each about London and at Edinburgh. The four degrees difference of latitude tell strongly in the flavour of the fruit. The three degrees, or nearly so, tell also between Paris and London; so that it is very difficult for us to recognise here several Peaches mentioned by Duhamel, from the description he has given of them. But if we go into the south of France, or of Spain, or into the southern provinces of North America, we shall find the melting Peach, which with us is far superior to the hard one, become there woolly and dry,

and consequently held in no estimation at all; and the hard one, which adheres closely to the stone, arrive at a high flavour, and great excellence, though these last will scarcely ripen at Paris, according to DUHAMEL, who speaking of the Pêche de Pau, says, "It is so late that it will not succeed "with us, except in very dry and warm autumns." And he says pretty much the same thing of the Pavie rouge de Pomponne.

The following are the rules by which each kind of fruit will be distinguished, and of which several copies were, in an early part of the season, distributed among the Members of the Committee on Fruit, under the title of "Desiderata." But every possible accuracy of description must be of little avail, to enable those who are not very conversant with the subject, immediately to know one kind from another, unless accompanied by a faithful coloured representation of the fruit described: and in this particular your Committee have been very fortunate, having received the greatest assistance from one of their own number, Mr. WILLIAM HOOKER, whose great skill in his profession, and whose quickness in seizing the true characteristic marks of each tree or fruit, have been only surpassed, by the zeal, and diligence, which he has manifested in the pursuit.

DESIDERATA.

The different names by which each kind of fruit is known, either about London, or in other parts of England, as far as they can be ascertained.

Tree.—Description of it; if of vigorous growth, or a good bearer in general.

Bud.—Colour, size, shape, and external appearance of it.

Blossom.—Size, colour; if early or late.

Leaf.—Colour, size, shape; if much or little serrated.

Fruit.—Shape, colour, size, taste; its various excellencies and defects; its general time of ripening about London; its qualities and appearances.

Stone.—Size, colour, shape; if adhering to the flesh.

Aspect, Soil, Disorders, Defects.—The aspect and soil that suit it best; if recommendable by forcing; if peculiarly subject to any disorders or defects.

Propagation.—The best mode of propagating it.

XIV. *On the Prevention of the Disease called the* Curl *in the* Potatoe. *By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read Feb. 2, 1813.

The rough and uneven surface of the leaf, which in excess, indicates, and indeed constitutes, the disease called the Curl in the *Potatoe*, appears to exist in, and to form an essential characteristic of, every good variety of that plant; for I have never found a single variety, with perfectly smooth and polished leaves, which possessed any degree of excellence; and I have endeavoured to prove, in the *Horticultural Transactions* of 1810,* that the rough and crumpled state of the leaf probably originates in the preternaturally inspissated state of the fluid, in the firm and farinaceous Potatoe. Those varieties are, however, generally most productive and grow with the greatest luxuriance, of which the leaves are smooth and polished; and this point tends to prove, that the smooth leaf is a more perfect and efficient organ than the rough one; the latter indicating some degree of approximation to disease.

I have stated, in the *Horticultural Transactions* of 1811,† that I obtained a second crop of Potatoes by planting those of an early variety in the same soil from which a crop of the same variety had been taken, in the month of July; and that I had employed, with success, the tops of those taken up, with green fern and nettles, as manure. But I found the

* See Vol. i. page 191.

† See Vol. i. page 249.

tubers produced by those last planted to be much more soft and watery, when boiled, than others of the same variety, and consequently much inferior in value for every culinary purpose; and therefore, these were kept for the purpose of planting in the last spring. I inferred, consistently with the hypothesis I adduced in the *Horticultural Transactions* of 1811, that the organizable matter these contained, being in a less firm and concrete state, would prove more disposable, and that I might therefore expect, in the succeeding season, plants of stronger growth, and more smooth and perfect foliage. The result, in every respect, coincided with my expectations; the plants presented the appearance of a different variety, and afforded a more abundant crop and larger tubers than I had ever obtained from the same variety.

This experiment was confined to a single very early kind, which had previously produced partially curled leaves; but I imagine the same mode of management will prove equally advantageous with other varieties which shew similar indications of incipient disease: and, as every improvement in the culture of this plant, which can add to the produce without increasing the expense, is of importance to the public, I submit the preceding account to the Horticultural Society.

A very respectable writer, in the *Memoirs of the Caledonian Horticultural Society*,* Mr. Dickson, has advanced an hypothesis, somewhat different from mine, respecting the Curl in the Potatoe: he conceives it to originate in debility arising from the too great ripeness of the tubers, and in the parent plant having too much expended itself in affording blossoms and seeds, as well as tubers. But I can

* Vol. i. p. 50.

scarcely accede to this hypothesis, because I do not think it probable that a plant, which is a native of Virginia, can be over-ripened in the climate of Scotland; and because those varieties, which never afford either blossoms or seeds, have, in my garden, been quite as subject to that disease as others. Mr. Dickson has stated the curious fact (and I do not entertain the slightest doubt of his perfect correctness), that a cutting taken from the extremity, which is most firm and farinaceous, of a long, or kidney-shaped Potatoe, will afford diseased plants, whilst another cutting, taken from the opposite end of the same Potatoe, will produce perfectly healthy plants; but I do not attribute this to the greater maturity of the buds at the extremity, than at the opposite end, for those nearest the parent plant are really the oldest, the tuber being formed by a branch, which has expanded itself laterally, instead of having extended itself longitudinally. Its buds are in consequence arranged as they would have been upon the elongated branch; and every tuber, in its incipient state of formation, will extend itself into a branch, as I have shown in the *Philosophical Transactions* for 1809,* provided the plant, to which it belongs, be cut off close to the ground, and the current of ascending sap be in consequence diverted into, and through the tubers. Mr. Dickson, and myself, however, perfectly agree that a tuber, or part of one, which is soft and aqueous, affords a better plant than one which is firm and farinaceous; and the trifling difference of opinion between us, being purely hypothetical, is of no importance.

I observed that the crops of Potatoes, which I raised from the late ripened tubers above-mentioned, were not quite so

* Page 174.

early as others of the same variety; but I attribute this variation in the periods of the maturity of the crops solely to different degrees of luxuriance in the plants, and to the encreased size of the tubers in the one. In quality, the produce of both was the same.

XV. *On the Culture of the* Mulberry. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read Feb. 2, 1813.

The *Mulberry* has not, I believe, been ripened by artificial heat by any person except myself; and possibly there may not be many, who will think it of sufficient value to deserve a place in the forcing-house. It is, however, a much finer, fruit when ripened under glass, in the north of Herefordshire at least, than in the open air; and in the still colder parts of England it is probably the only means by which it can be ripened at all.

I have stated in the first Volume of the *Horticultural Transactions*,* that dwarf-trees of this species of fruit, which will become productive at three years old, may be readily obtained by grafting a young stock, by approach, with the bearing branch of an old tree; and I have subsequently gathered, in one season, more than twenty dozen Mulberries from a plant not three feet high, and growing in a pot. I have since had reason to believe, that plants which will bear fruit at three years old, and subsequently, may as readily be obtained by laying, in pots raised upon poles of proper length, parts of the bearing branches of old trees; for I observe, that plants, which I thus obtained a year ago, present all the characters of bearing trees, and will, I entertain very little doubt, afford fruit as soon as those obtained by grafting. Layers of the most luxuriant wood which the bearing

* Page 5.

branches produce, afford the best plants; but the wood of the Mulberry tree, of almost any age, will emit roots under proper management.

The culture of this fruit, by me, under glass, has been confined to plants growing in pots; but I am not acquainted with any species of fruit-tree which, under such circumstances, produces more abundantly, or which requires less care. Its blossoms set equally well in different degrees of heat, and the same continued temperature, which will ripen the earlier varieties of the grape in the end of July, will afford perfectly ripe Mulberries early in June; and a tree of the latter species, when fully loaded with fruit, presents at least as agreeable an object to the eye, as many plants, which are cultivated as ornaments only. It is not subject, under common care, to any disease or injury, except the attacks of the red spider; and as the foliage and growing fruit of the Mulberry tree are not at all injured by being wetted every evening with clear water, that insect can never prove a very formidable enemy to it.

XVI. *On the early Puberty of the* Peach Tree. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read March 2, 1813.

It was asserted, a few years ago, by a gentleman who had held an official situation in New South Wales, that a *seedling Peach Tree* in that climate, had produced fruit under his care when it was only sixteen months old, without having been grafted. The silence of the French writers upon gardening, respecting this earliness of puberty in the Peach Tree, and the well known circumstance, that several years generally elapse between the period when a tree first springs from seed, and that in which it becomes capable of producing blossoms and fruit, appear to have induced a general disbelief of this account, which was mentioned to me, by several of my friends, as an extravagant and ridiculous falsehood; and probably I should too readily have coincided with them in opinion, if I had not previously noticed several peculiar circumstances in the habits of seedling Peach Trees. I had observed that such trees continued to grow as long as the weather continued favourable; and that their leaves in almost every succeeding month, assumed a more mature and improved character; so that at the end of the first autumn, the leaves of the parent and seedling trees, did not differ much from each other; and such seedling trees, though they were retained in small pots till they were eighteen months old, and subsequently trained against a wall in the

open air, and in a cold and late situation, produced fruit when only three years old.

I therefore thought it not improbable that, with the aid of glass and artificial heat, I might succeed in obtaining fruit from trees of two years old; and not impossible that, by a peculiar mode of pruning, I might obtain fruit from yearling trees, though the want of sunshine in our climate did not permit me to entertain very sanguine hopes of success.

Some Peach stones, which were the produce of trees upon which I had made experiments in the year 1811, with the hope of obtaining early varieties of Nectarines, were intended to have been placed in pots in a hot-house, in the beginning of January 1812; and one of my friends (I do not myself possess a hot-house) had offered me the use of his house to accelerate the germination and growth of the seedling plants. I, however, found the hot-house of my friend so much infested with insects of various kinds that I did not choose to risk my plants in it; and the seeds in consequence were not subjected to the influence of artificial heat till the middle of February, when I began to make fires in my vinery. The plants appeared above the soil, early in March; and they were kept under glass during the whole summer and autumn; but without any artificial heat being applied after the end of May.

Conceiving that Nature, in placing the age of puberty, in trees, so distant from the period in which they spring from seed, has intended chiefly to afford the plant, in this interval, the means of collecting a considerable store of organizable matter, before the expenditure of its sap commences in the production of blossoms and fruit, I adopted the mode of

pruning and culture which, consistently with my theoretical opinions, appeared best calculated to promote that object. The leaves being the organs in which alone I believe the true sap of the tree to be generated, as many lateral shoots were suffered to remain upon each plant, as could present their foliage to the light without injuriously interfering with each other; and these were shortened, whilst very young, to the fourth or fifth leaf; and the buds in the axillæ of these leaves were destroyed as soon as they became visible; so that whatever portion of sap these leaves might generate, none might be uselessly expended. I had previously proved, that leaves, under these circumstances, will promote the growth of the stem between themselves and the ground; so that any degree of taperness may be given to the stem, almost as accurately by the gardener, in proportioning the quantity and position of the foliage, as it can be subsequently given to the lifeless wood by the plane of the artificer; and I calculated that the true sap, which would be generated by the leaves upon the lower parts of the stem, and lateral shoots, would be employed in feeding the roots; whilst a portion of that, which would be generated by the foliage near the summit of the trees, might there contribute to the formation of fruit buds. The lateral shoots which were emitted near the tops of the young trees, when these had attained the height of seven or eight feet, were in consequence only shortened, the buds upon them being left, in the hope that some of them would be converted into blossoms.

The pots were filled with the green turf of the alluvial soil of a rich meadow, which substance I had previously employed

with much success in similar experiments; and the pots were three times changed during the summer, and new portions of living turf added at the same periods.

The summer, however, proved so cold and cloudy, that I relinquished all hopes of success, proposing to repeat the experiment under less unfavourable circumstances; and in consequence the artificial heat, which I had intended to employ in Autumn, was not applied. I had nevertheless, the unexpected pleasure to observe, late in the Autumn, that three of the seven plants which had been the subjects of my experiment, had formed blossom buds; and these buds have subsequently presented so vigorous and healthy a character, that I do not entertain any doubt of their being capable of affording fruit.

The narrative of the Planter of New South Wales was therefore, I conclude, perfectly correct; and I think it not improbable, that by shortening the lateral branches of his young plant, to give it a proper form, he incidentally adopted very nearly the same mode of pruning, which theoretical opinions pointed out to me, as the best.

XVII. *Account of two* Apples, *and a Winter* Potatoe, *cultivated in Cornwall. In a Letter to the* Secretary. *By Sir* Christopher Hawkins, *Bart. F. R. S. &c.*

Read March 2, 1813.

Dear Sir,

I beg you will do me the favour to lay before the Horticultural Society, a few cuttings of two sorts of *Apples* from Cornwall.

The one called the *Aromatic Apple* is said to have been an inhabitant of the county for centuries, though little known out of it. The tree is a good bearer, and the Apples are among the best and the latest of the store kinds. The trees generally shew marks of age and decay, but when cultivated with care, or on new stocks, the produce is large and fine.

The other cuttings are of a new sort of Apple, said to have been discovered about ten, or fifteen years since, by a gentleman in a cottage garden, near Truro; who having purchased some of the fruit, afterwards took grafts from the tree. It goes by the name of the *July flower Apple*, probably from the pleasant smell it gives out when cut. The fruit has a long conical shape, and is of a yellowish green colour, with red towards the sun. The fragrance of the smell when cut, and the excellence of the flavour, render it one of the best of modern Apples. The eye is large and deep; the leaf

remarkably long and narrow; the shoots very luxuriant and irregular, and not easily trained.

The Gentleman, who gave me the cuttings of the Aromatic Apple, desired me to notice to the Society, the *Potatoe*, in which they are inserted, as it is the Potatoe that is universally cultivated for winter use in Cornwall, and from its excellent qualities, is well deserving the attention of the Society. This winter Potatoe is frequently planted in the same ground that has borne an early crop of Potatoes.

It is the practice of those who cultivate Potatoes in Cornwall, to get fresh seed every year, or every other year from a granite soil, well knowing that the great increase in the produce, well justifies the additional trouble and the expense.

I have the honour to remain,

Dear Sir,

Your faithful humble servant,

CHRISTOPHER HAWKINS.

Argyll-Street,
2d March, 1813.

XVIII. *A Description of a* Fruit Room. *In a Letter to the* Secretary. *By Mr.* John Maher, *F. H. S.*

Read Dec. 7, 1812.

Sir,

I have the honour to send, for the Horticultural Society, the plan of a *Fruit-room* which I have found, by several years experience, to be very useful in preserving fruit, especially Apples and Pears.

Fig. 1. is an upright view of the drawers.

Fig. 2. The ground plot of the room.

Fig. 3. The numbers of the drawers, with a space opposite to each, for inserting the name of each fruit.

The lower drawers have close bottoms, and are called sweating drawers, the fruit being put into them, as soon as gathered. In ten days, or a fortnight, accordingly as I find the Apples and Pears come forward, they are sorted, and the other drawers are prepared to receive them, by covering the bottom of each with very clean wheat straw, thoroughly dried and ventilated. The bottom of these drawers is made of trellis work, see *Fig.* 4.

It will be desirable on many accounts, that this Fruit-room should be on the ground floor; and both the door and window should have slides, to admit a free circulation of air in fine weather; but in damp days, or when it rains, the room should be kept closely shut.

Fig. 2.

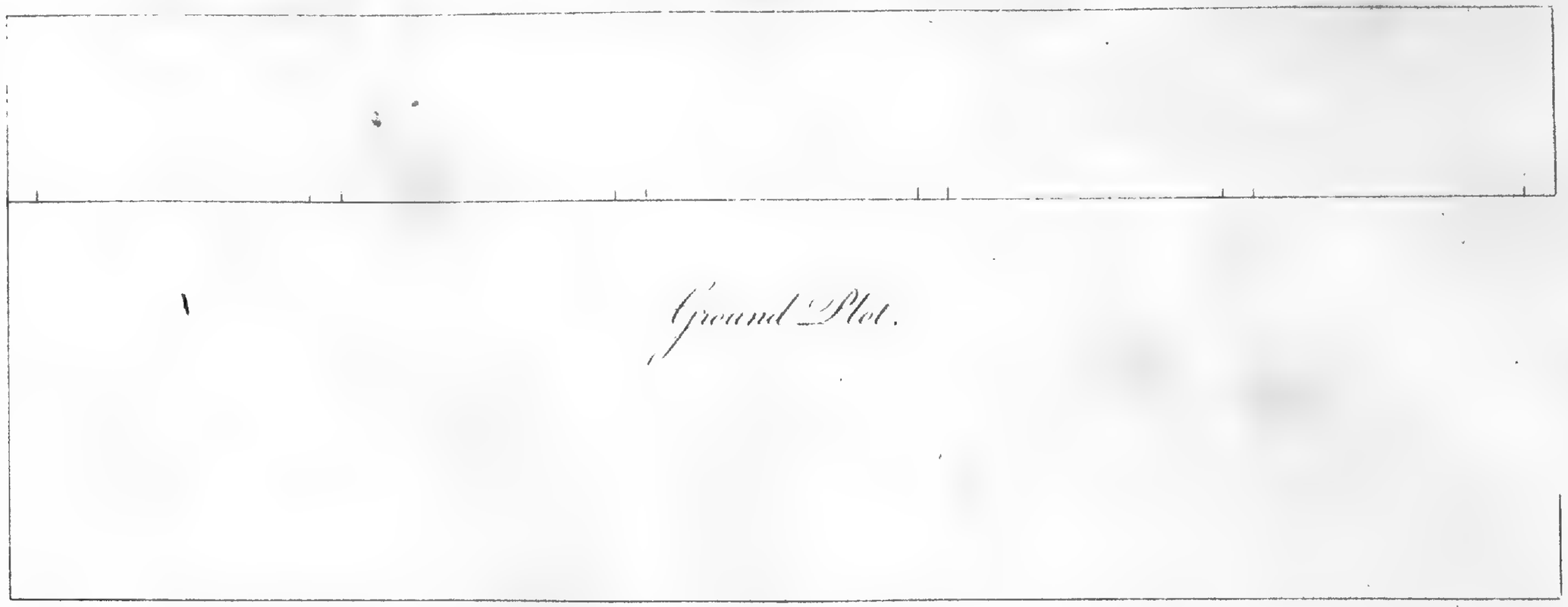


Fig. 1.

Fig. 3.

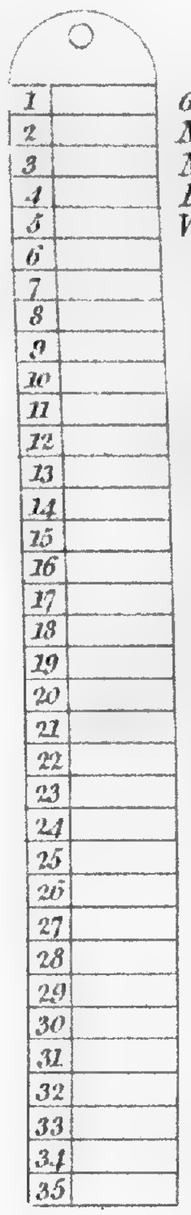
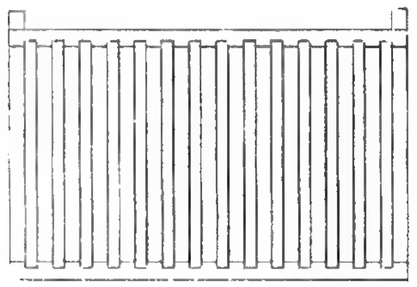


Fig. 4.



Scale ½ an inch to a Foot.

Plan of a Fruit Room.

A slate and pencil should hang in the room, divided into seven columns, on which may be registered, what fruit is delivered out each day in the week.

I remain

your most obedient humble servant,

JOHN MAHER.

Edmonton,
20th November, 1812.

XIX. *On the Culture of the* Pear Tree. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read May 18, 1813.

The *Pear* Tree exercises the patience of the Planter during a longer period before it affords fruit, than any other grafted tree, which finds a place in our gardens; and though it is subsequently very long lived, it generally, when trained to a wall, becomes in a few years unproductive of fruit, except at the extremities of its lateral branches. Both these defects are, however, I have good reason to believe, the result of improper management; for I have lately succeeded most perfectly in rendering my *old* trees very productive in every part; and my *young* trees have almost always afforded fruit, the second year after being grafted; and none have remained barren beyond the third year.

In detailing the mode of pruning and culture, I have adopted, I shall probably more easily render myself intelligible, by describing accurately, the management of a single tree of each.

An old St. Germain Pear Tree, of the spurious kind, had been trained in the fan form, against a north west wall in my garden, and the central branches, as usually happens in old trees thus trained, had long reached the top of the wall, and had become wholly unproductive. The other branches afforded but very little fruit, and that never acquiring maturity, was

consequently of no value; so that it was necessary to change the variety, as well as to render the tree productive.

To attain these purposes, every branch which did not want at least twenty degrees of being perpendicular, was taken out at its base; and the spurs upon every other branch, which I intended to retain, were taken off closely with the saw and chisel. Into these branches, at their subdivisions, grafts were inserted at different distances from the root, and some so near the extremities of the branches, that the tree extended as widely in the autumn, after it was grafted, as it did in the preceding year. The grafts were also so disposed, that every part of the space the tree previously covered, was equally well supplied with young wood.

As soon, in the succeeding summer, as the young shoots had attained sufficient length, they were trained almost perpendicularly downwards, between the larger branches, and the wall, to which they were nailed. The most perpendicular remaining branch upon each side, was grafted about four feet below the top of the wall, which is twelve feet high; and the young shoots, which the grafts upon these afforded, were trained inwards, and bent down to occupy the space from which the old central branches had been taken away; and therefore very little vacant space any where remained in the end of the first autumn. A few blossoms, but not any fruit, were produced by several of the grafts in the succeeding spring; but in the following year, and subsequently, I have had abundant crops, equally dispersed over every part of the tree; and I have scarcely ever seen such an exuberance of blossom as this tree presents in the present spring. Grafts of eight different kinds of Pears had been inserted, and all

afforded fruit, and almost in equal abundance. By this mode of training, the bearing branches, being small and short, may be changed every three or four years, till the tree is a century old, without the loss of a single crop; and the central part, which is unproductive in every other mode of training, becomes the most fruitful. When a tree, thus trained, has perfectly covered the wall, it will have taken very nearly the form recommended by me in a former communication,* except that the small branches necessarily pass down behind the large. I proceed to the management of young trees.

A young Pear stock, which had two lateral branches upon each side, and was about six feet high, was planted against a wall early in the spring of 1810; and it was grafted in each of its lateral branches, two of which sprang out of the stem about four feet from the ground, and the others at its summit, in the following year. The shoots these grafts produced, when about a foot long, were trained downwards, as in the preceding experiment, the undermost nearly perpendicularly, and the uppermost just below the horizontal line, placing them at such distances, that the leaves of one shoot did not at all shade those of another. In the next year, the same mode of training was continued, and in the following, that is the last year, I obtained an abundant crop of fruit, and the tree is again heavily loaded with blossoms.

This mode of training was first applied to the Aston-Town Pear, which rarely produces fruit till six or seven years after the trees have been grafted; and from this variety, and the Colmar, I have not obtained fruit till the grafts have been three years old.

* Horticultural Transactions, Vol. i. page 79.

In the future treatment of my young Pear trees it is my intention to give them very nearly the form of the old tree I have described, in every respect, except that these will necessarily stand upon larger stems, which I think advantageous: and I shall not permit the existence of so great a number of large lateral branches. In both cases the bearing wood will depend wholly beneath the large branches which feed it; for it is the influence of gravitation upon the sap which occasions the early and exuberant produce of fruit.

I scarcely need add, that where, in old trees, it is not meant to change the variety, nothing more will be necessary than to take off wholly the spurs and supernumerary large branches, leaving every blossom which grows near the end of the remaining branches, or that the length of the dependent bearing wood must be different in different varieties. The Crassane, the Colmar, and Aston-Town, will require the greatest, and the St. Germain probably the least length.

XX. *On the Prevention of* Mildew *in particular Cases. By* Thomas Andrew Knight, *Esq. F.R.S. &c.* President.

Read May 4, 1813.

The little pamphlet upon the rust, or mildew, of wheat, for which the Public are indebted to the patriotic exertions of the venerable President of the Royal Society, affords much evidence in proof that this disease originates in a minute species of parasitical fungus, which is propagated, like other plants, by seeds: and the evidence adduced would, I think, be sufficient to remove every doubt upon the subject, were the means ascertained by which the seeds of this species of fungus are conveyed from the wheat-plants of one season to those of the succeeding year. This, however, has not yet been done; and therefore some persons still retain an opinion that the *Mildew* of wheat consists only of preternatural processes, which spring from a diseased action of the powers of life in the plants themselves.

An hypothesis, which differs little from this, has been published in the present year respecting the dry rot, (*Boletus lacrymans,*) of Timber.* It is contended that the different kinds of fungus, which appear upon decaying timber of different species, are produced by the remaining powers of life in the sap of the unseasoned wood; and that the same kind of living organisable matter, which, whilst its

* Quarterly Review, Vol. vii. page 33.

powers remained perfect, would have generated an oak-branch, will, when debilitated, give existence to a species of fungus. But, if this power exists, and becomes capable, during its rapid declension, of deviating so widely from its original mode of action, the species of fungus it would produce, might be expected to become successively more feeble and diminutive; whereas the most robust and gigantic of the whole genus, the *Boletus squamosus*, springs from wood, when that is in its last stage of decay: and the best known, and the most valuable species to mankind, of this tribe of plants, the common mushroom, appears as obviously to spring from horse-dung, under favourable circumstances, as any species of the same tribe appears to spring from decomposing wood, without the previous presence of seeds.* Yet it can scarcely be contended that any vital powers, capable of arranging the delicate organization of a mushroom, can exist in horse-dung; and the admission of any such power would surely lead to the most extravagant conclusions. For, if a mass of horse-dung can generate a mushroom, it can scarcely be denied that a mass of animal matter, an old cheese, may generate a mite; and if the organs of a mite can be thus formed, there could be little difficulty in believing that a larger mass of decomposing animal matter might generate an elephant, or a man.

The hypothesis, therefore, which supposes the various species of fungus to spring from seeds, appears to me much the least objectionable; and, if the minute bodies, which are supposed to be the seeds of these plants, be really such, it will not be difficult to shew that these are sufficiently

* See Nicol's Forcing, Fruit and Kitchen Gardener, 4th Ed. page 119.

numerous to account, to a great extent, for the ubiquity of the plants they are supposed to produce, particularly as such apparent seeds, owing to their excessive lightness, are capable of being every where dispersed by winds.

A few years ago I raised some mushrooms under glass with the intention of collecting and subsequently raising mushrooms from the seeds they might produce; and I then endeavoured to ascertain the number which would be afforded by a single fructification; for a mushroom appears to be nothing more than a fructification of the plant, though it is generally spoken of as the plant itself. I placed thin plates of talc under a very large mushroom at the period when the minute globular bodies, which are supposed to be the seeds, first began to be disengaged from its gills; and I endeavoured to count the number which fell during each successive hour, within the narrow field of a very powerful lens. The labour to my eyes was, however, so severe, that I was unable to count with any considerable degree of accuracy; but the number, which fell from a single mushroom, within the succeeding ninety-six hours, exceeded, upon the lowest calculation I could make, two hundred and fifty millions. I endeavoured to raise mushrooms from these seeds, but I failed to obtain any decisive results; for though I readily procured mushroom spawn by mixing such seeds with unfermented horse-dung, I also obtained it in equal abundance in some instances, where I had not introduced any seeds.

Immense as the number of seeds produced by a single mushroom appears, it probably is not much greater than that which a single plant of mildewed wheat would afford; and, according to this calculation, a single acre of mildewed

wheat would probably afford seeds sufficient to communicate disease to every acre of wheat in the British empire, under circumstances favourable to the growth of the fungus: and I have never seen a single acre of wheat, since the publication of Sir JOSEPH BANKS's pamphlet, so free from Mildew, but that it would have afforded seeds enough amply to supply the adjoining hundred acres. There is also reason to believe, that the Berberry tree communicates this disease to wheat; and I have also often noticed a similar apparent parasitical fungus upon the straws of the couch grass, in the hedges of corn fields.

Neither the Mildew of wheat, nor any other kind, can however, I think, be communicated from the leaves and stems of one plant immediately to those of another; very numerous attempts made by myself to succeed in experiments of this kind having, I believe, proved wholly abortive; though I once fancied that I had succeeded in two or three instances. I am, therefore, much inclined to believe that the parasitical fungus, which occasions every disease of this kind, enters the plant, in the first instance, by its roots, though it may probably be transferred with the graft, and possibly by a bud, from one fruit tree to another: and if the seeds be capable, like those of many other plants, of remaining sound a considerable time beneath the soil, or in other situations, till circumstances, which are favourable to their growth, occur, the abundant appearance of the Mildew, or mushrooms, may be accounted for without supposing them to be generated wholly by the bodies from which they immediately spring.

I shall not trespass upon the time of the Horticultural

Society by dwelling longer upon the primary cause of the various diseases which are comprehended under the name of Mildew; but shall proceed to the immediate object of the present memoir, which is to point out the means by which the injurious effects of the common white Mildew may be, in particular cases, prevented.

The secondary and immediate causes of this disease, and of its congeners, have long appeared to me to be the want of a sufficient supply of moisture from the soil with excess of humidity in the air, particularly if the plants be exposed to a temperature below that to which they have been accustomed. If damp and cold weather in July succeed that which has been warm and bright, without the intervention of sufficient rain to moisten the ground to some depth, the wheat crop is generally much injured by Mildew. I suspect that, in such cases, an injurious absorption of moisture, by the leaves and stems of the wheat plants, takes place; and I have proved, that under similar circumstances much water will be absorbed by the leaves of trees, and carried downwards through their alburnous substance; though it is certainly through this substance that the sap rises under other circumstances. If a branch be taken from a tree when its leaves are mature, and one leaf be kept constantly wet, that leaf will absorb moisture and supply another leaf below it upon the branch, even though all communication between them through the bark be intersected; and if a similar absorption takes place in the straws of wheat, or the stems of other plants, and a retrograde motion of the fluids be produced, I conceive that the ascent of the true sap or organizable matter into the seed vessels

must be retarded, and that it may become the food of the parasitical plants, which then only may grow luxuriant and injurious.

This view of the subject, whether true or false, led me to the following method of cultivating the pea late in the autumn, by which my table has always been as abundantly supplied during the months of September and October as in June and July; and my plants have been very nearly as free from Mildew. The ground is dug in the usual way, and the spaces which will be occupied by the future rows are well soaked with water. The mould upon each side is then collected, so as to form ridges seven or eight inches above the previous level of the ground, and these are well watered; after which the seeds are sowed, in single rows, along the tops of the ridges. The plants very soon appear above the soil, and grow with much vigour, owing to the great depth of the soil, and abundant moisture. Water is given rather profusely once in every week or nine days, even if the weather proves showery; but if the ground be thoroughly drenched with water by the autumnal rains, no further trouble is necessary. Under this mode of management the plants will remain perfectly green and luxuriant till their blossoms and young seed vessels are destroyed by frost; and their produce will retain its proper flavour, which is always taken away by Mildew.*

The pea, which I have always planted for autumnal crops, is a very large kind, of which the seeds are much shrivelled,

* One of the most experienced and close observers of our Society (Mr. DICKSON) will probably recollect having seen my crops of peas in the state I have described, late in the autumn, in my garden at Elton.

and which grows very high: it is now very common in the shops of London, and my name has, I believe, been generally attached to it. I prefer this variety because it is more saccharine than any other, and retains its flavour better late in the autumn; but it is probable that any other late and tall-growing variety will succeed perfectly well. It is my custom to sow a small quantity every ten days till mid-summer, and I rarely ever fail of having my table well supplied till the end of October, though sometimes a severe frost in the beginning of that month proves fatal to my later crops.

The Mildew of the Peach, and of other fruit trees, probably originates in the same causes as the Mildew of the Pea, and may be prevented by similar means. When the roots, which penetrate most deeply into the soil, and are consequently best adapted to supply the tree with moisture in the summer, are destroyed by a noxious subsoil, or by excess of moisture during winter, I have observed the Mildew upon many varieties of the Peach to become a very formidable enemy. Where, on the contrary, a deep and fertile dry loam permits the roots to extend to their proper depth; and where the situation is not so low as to be much infested with fogs, I have found little of this disease: and in a forcing house I have found it equally easy, by appropriate management, to introduce or prevent the appearance of it. When I have kept the mould very dry, and the air in the house damp and unchanged, the plants have soon become mildewed; but when the mould has been regularly, and rather abundantly watered, not a vestige of the disease has appeared.

It must be confessed that it is not easy to account, at first view, for the appearance of this disease under some of the preceding and various other circumstances, if it be produced by a parasitical plant which propagates by seeds; but all we ever see of the Mildew is simply its fructification: the plant itself, if it be one, is wholly concealed from our senses; and it may consequently be transferred from one plant to another by the graft or bud, and never become visible till the health of the tree become affected by other causes. I could state some cases which are very favourable to this opinion, for this disease appears readily to be communicated by a graft to another tree, when that grows in the same soil, and in similar external circumstances. The different species of minute insects which feed upon the bodies of our domestic cattle are scarcely ever seen, and never injurious so long as the larger animals retain their health and vigour; but when these become reduced by famine or disease, the insects multiply with enormous rapidity, and though they are at first only symptomatic of disease, they ultimately become the chief and primary cause of its continuance. The reciprocal operation of the larger plant and the Mildew upon each other may possibly be somewhat similar.

I offer the preceding opinions merely as conjectures: the hypothesis I have chosen has led me to the successful treatment of the disease in particular cases, and it may in the same way lead others: and I therefore venture to submit it to the consideration of the Horticultural Society without being very confident of its truth. If, however, the countless millions of apparently organized bodies, which are generated by the different species of fungus, be not seeds, nature

appears to wander widely from its ordinary path: for amidst all its boundless profusion and exuberance, it does not ever, in other cases, appear to labour wholly in vain.

P. S. Observing that the *Almond* trees, round the metropolis, are likely to produce a considerable crop in the present year, I wish to recommend stocks of this species for *Peaches* and *Nectarines* to the attention of nurserymen, as likely to counteract the disposition in some varieties of the Peach to become mildewed. It has probably other qualities to recommend it, for it is obviously much more nearly allied to the Peach than the Plum is, if the Peach and Nectarine be not, as I suspect them to be, varieties only of the common Almond (*Amygdalis communis.*) The Almond stocks should be raised and retained in the nursery, in pots, as they do not transplant well.

XXI. *On the Culture of the* Mulberry, *and on forced* Strawberries *bearing a second Crop. By* John Williams, *Esq. of Pitmaston, near Worcester.*

Read June 1, 1813.

The *Mulberry*, although a native of the warmer parts of the earth, accommodates its habits so much to our climate, that it rarely opens its foliage till the severe spring frosts are over, and, as its leaves are not attacked by insects, or injured by mildew, or sudden heat, it affords a crop of fruit when at a bearing age in most seasons. The fruit, however, does not attain that size or richness of flavour, when ripened on a standard, which it does in the south of Europe. But it may be greatly assisted by being trained to a south or west wall, where it experiences a longer and warmer summer. Cultivated in this way, it will grow with very great luxuriance; but it requires some nicety in the pruning, or it will not bear fruit. The following method has succeeded in my garden for several years past. All the annual shoots, except the foreright, are neatly trained to the wall, and these last must be left to grow till towards midsummer, and then be shortened about one third of their growth to admit light to the leaves beneath. By the end of August the foreright shoots will have advanced again, so as to obstruct the light, and they must then be shortened nearer to the wall than before. In the month of March, or beginning of April, the ends of the

terminal shoots should be pruned away down to the first strong bud that does not stand foreright, and the front shoots which were pruned in August, must also be shortened down to two or three eyes.

If trained after this method the tree will afford fruit the third year;* when the management of the foreright shoots must be somewhat different. These should now be shortened at the *end of the month of June or beginning of July*, so as to leave one leaf only beyond the fruit, the terminal shoots being nailed to the wall as before, and left without any summer pruning; the forerights will not advance any further, as their nutriment, will go into the fruit, which, when quite ripe, becomes perfectly black, very large, and highly saccharine.

The standard Mulberry receives great injury by being planted on grass plats with the view of preserving the fruit when it falls spontaneously. No tree perhaps receives more benefit from the spade and the dunghill than the Mulberry: it ought therefore to be frequently dug about the roots, and occasionally assisted with manure. The ground under the tree should be kept free from weeds throughout the summer, particularly when the fruit is ripening, as the reflected light and heat from the bare surface of the soil is thus increased; more especially if the end branches are kept pruned, so as not to bower over too near to, and shade, the ground. The fruit is also very fine if the tree is trained as an espalier, within the reflection of a south wall or other building. If a wooden trellis were constructed with the same inclination as the roof of a forcing-house, fronting the south, and raised about six

* The trees being such, when planted, I conclude, as the nurseries afford. Secr.

feet from the ground, leaving the soil with the same inclination as the trellis, a tree trained on it would receive the solar-influence to great advantage, and would probably ripen its fruit much better than a standard.

FORCED STRAWBERRIES.

IT is not generally known to gardeners that the plants of the *Scarlet Strawberry*, after affording a crop of fruit in the hot house early in the spring, if carefully removed out of the pots or boxes, and placed in the open ground, will yield another crop of fruit in September. This second crop is very abundant, the warm rains of July and August proving highly favourable to the growth of the fruit; and as there is no other Strawberry to be had at this season of the year, except the Alpine, the addition of the Scarlet makes a pleasing variety in the dessert.

XXII. *Some Account of the* Chiogenes Serpyllifolia, *or* Snowberry, *a Fruit nearly allied to the* Cranberry. *By* Richard Anthony Salisbury, *Esq. F. R. S. &c. Secretary.*

Read Dec. 6, 1813.

Gaultheria Serpyllifolia. *Pursh Fl. North. Amer.* 1. *p.* 283. *t.* 13. Vaccinium Hispidulum. *Michaux Fl. Bor-Amer. p.* 228. *t.* 23. *Kalm Res.* 3. *p.* 37. *Linn. Sp. Pl. ed.* 2. *p.* 500. *exclusis synonymis.* Oxycoccus Hispidulus. *Per. Syn.* 1. *p.* 419. Arbutus Thymifolia. *Soland. in Hort Kew.* 1. *ed.* 2. *p.* 72. Arbutus Filiformis. *Lamarck in Encycl. Bot.* 1. *p.* 228.

This trailing plant, which I had the pleasure of bringing to the Horticultural Society in July last, with ripe fruit upon it, differs so materially from those, to which it is allied, as to constitute a distinct genus; and I have named it *Chiogenes, or Snowberry*, from the colour of its berries, as well as from its flowering, in its native land, soon after the snow is melted.

In the first edition of *Hortus Kewensis*, it is said to have been introduced by Dr. John Fothergill about 1776; but it was in this country long before, and given to him by Mr. Jonathan Laycock, one of his quaker friends, and my maternal grandfather; who received it as early as 1760 from Nova Scotia, and who cultivated it in his garden at Shawhill, near Halifax, in Yorkshire, where it produced fruit abundantly.

It was there planted under a north stone wall, shaded behind by high trees, in a border of sandy peat, taken from Skir-coat Moor adjoining; and it succeeded pretty well nearly in a similar situation at Chapel Allerton, during the eighteen years of my residence at that place, often ripening its berries; but they being little esteemed, I only preserved a patch of it as a rare plant.

The flavour of the fruit, however, is exceedingly agreeable to some persons; being strongly perfumed like Eau de Noyau, or Bitter Almonds, and mixed with a pleasant acid. I now regret that I never tried the berries baked with sugar in a tart: if gathered before they are too soft, they may, no doubt, be preserved in bottles, like Cranberries, and possibly prove a valuable addition to our winter fruits of that sort.

Michaux, in his work above quoted, informs us that this plant grows wild in the Cypress swamps; and long before his work was published, finding it mixed with *Sphagnum,* in the package of some *Zizania* plants, sent to Sir Joseph Banks, when he began to cultivate that aquatic grass, I concluded that it delighted in a very moist situation. Several roots of it were accordingly removed to the edge of the pond at Chapel Allerton, among *Pinguicula Vulgaris, Anagallis Tenella,* and other aquatics; yet those plants never throve so well in that wet situation, as the original patch brought from Shawhill, where the soil, though not dry, was certainly not wet; but it was completely shaded from the sun, and consisted of pure sandy peat, such as that in which *Ericas* delight. The climate of Shawhill, however, is very cold and damp, being near the high mountains which separate Yorkshire from Lancashire, as well as covered with

wood; which it is now well ascertained encreases the moisture of any place exceedingly; and the earlier Peaches and Nectarines will hardly ripen there till October.

The trailing stems of the Snowberry throw out roots as they lie upon the ground, very like those of the American Cranberry; and if all annual weeds and grasses are pulled up by the hand as they spring up, it will be rather benefitted than injured by the mosses, which soon cover the surface of such soil, when kept moderately damp and in the shade.

In the vicinity of London, it is cultivated with great success by our worthy member, Mr. Joseph Knight, of Little Chelsea, in whose nursery it produces fruit; also by Mr. Loddiges, of Hackney: and by Messrs. Malcolms, of Kensington.

The American Cranberry, from what I lately observed in a nursery at Bath, may also be cultivated very successfully in situations not positively wet, if only planted in bog earth, which retains moisture longer than any other soil; for a few plants, even in pots, which had stood some time neglected under a hedge, so that their branches were matted together, produced a plentiful crop.

XXIII. *On the Culture of the* Shallot, *and some other bulbous-rooted Plants. By* Thomas Andrew Knight, *Esq. F. R. S. &c.* President.

Read December 6, 1813.

The habits of bulbous-rooted plants of different species, relatively to the depths to which they naturally retire beneath the soil, admit of much variation, some occupying its surface, and others descending considerably beneath it. These circumstances do not appear to have been sufficiently attended to, and injurious consequences have probably been the result, in many cases.

I have been led to adopt this opinion, and to make the experiments, which are the subject of this communication, by a complaint of my gardener, that the greater part of his crops of *Shallots* had, during several years, generally become mouldy and perished: and I found, on enquiry, that the same thing had very often occurred in other gardens of the vicinity. The bulbs had in all cases been planted, according to the directions of different writers upon Horticulture, two or three inches beneath the soil; and to this cause I attributed their failure.

A few bulbs of this species, which were divided, as far as practicable, into single buds, were therefore planted upon the surface of the ground, or rather above it, some very rich soil having been placed beneath them, and the mould having been raised on each side to support them, till they should

become firmly rooted. This mould was then removed by the hoe and watering-pot, and the bulbs in consequence were placed wholly out of the ground. The growth of these plants now so closely resembled that of the common onion, as not to be readily distinguished from it; till the irregularity of form, resulting from the numerous germs within each bulb, became conspicuous. The forms of the bulbs, however, remained permanently different from all I had ever previously seen of the same species, being much more broad, and less long; and the crop was so much better in quality, as well as much more abundant, that I can confidently recommend the mode of culture adopted to the attention of every gardener.

A few experiments similar to the preceding were made upon bulbs of the Oriental Hyacinth. Some of these were planted in the ordinary method beneath the soil, and others wholly above it, the mould being raised upon each side to cover them, and subsequently taken away; and I found that those under the latter mode of culture flowered most strongly and in every other respect succeeded best. A compost, of great richness, formed of matter collected just without the gate of my fold-yard, and probably consisting of nearly equal parts of earth and cow-dung, by weight (if each substance had been perfectly dry), appeared to be exceedingly well adapted to this plant; which expends much in a very short period of time in the production of leaves and flowers, and retains its foliage only a short time afterwards, and therefore probably requires more nutriment than it can generally obtain under the ordinary modes of culture. It is true that this, and some other bulbous-rooted plants, protrude

their leaves and flowers as strongly, when supplied with water only, as when growing in good soil: but this growth is chiefly germination only, and during this process, in which the organs of the plant are merely formed out of matter previously assimilated, it may be questioned whether a single particle of new matter be ever vitally united to it.

A plant, of a very beautiful variety of the Oriental Hyacinth, which had been made to blossom with water only was, at my request, put into my hands in the last spring, just when its blossoms had begun to lose their beauty. Those were immediately taken off, but the stem was suffered to remain, and the plant was removed from the bottle of water, in which it grew, into a pot sufficiently deep to receive its roots. A quantity of the rich compost above-mentioned was then, in successive portions, put into the pot, and washed in amongst the roots; which were kept properly separated from each other. The bulb itself remained wholly out of the soil, with which it was not in contact, a thin layer of light and dry sandy loam, intervening between it and the rich soil; and the bulb was also thinly covered with the same material. As the roots of the plant had been accustomed to live in water, the compost in the pot was at first kept very wet; and the quantity of water subsequently given was lessened very gradually; and as its leaves had been little exposed to light, it was retained under glass till the leaves perished. The bulb was then examined, and was found as solid, and apparently as perfect, as it would have been if it had germinated, as well as ultimately only grown, in a rich soil. The water in this case occasioned the extension of the roots, and the developement of the leaves, and thus was instrumental in

forming organs capable of collecting and assimilating new matter; but exclusive of some impurities it contained, it probably had not given a particle of organizable matter to the plant. The formation of organs, and the action of those organs when formed, must not therefore be confounded, as has generally been done, and constantly by chemists who have endeavoured to ascertain the action of the leaves upon the surrounding air; and hence appear to have arisen the confused and contradictory results of their experiments.

I am wholly ignorant of the mode of management by which bulbous roots of different kinds, acquire so much greater perfection in the hands of the Dutch gardeners, than in those of our own countrymen: but I suspect that the Dutch gardeners employ subsoils of very great depth and richness, with which the bulbs are prevented coming into contact by the intervention of a thin layer of dry sand, with which substance they may be also thinly, or only partially, covered; and I am in part led to adopt this opinion, by observing the similarity of character in the external membranes of their bulbous roots, and of those of the Shallots, which had been wholly exposed to the sun and air.

XXIV. *An Account of a new* Strawberry. *In a Letter to the Secretary. By Mr.* Michael Keens.

Read February 1, 1814.

Sir,

Having been for many years eager in the pursuit of every thing connected with Horticulture, which is also my occupation, the desire of communicating whatever may have occurred in a long practice, apparently beneficial to society in general, urges me to trouble you with a few lines on the subject of a new *Strawberry*, different specimens of which I had the honour of exhibiting to the Horticultural Society last season.

Having frequently, in the course of many years practice, observed the deterioration of several kinds of fruit, when propagated in the usual ways by slips, buds, cuttings, scions, or division of the parent root, I have for a considerable time employed myself in raising new varieties from seed, which has been not only a source of great amusement to me, but also very profitable in my profession.

About the year 1806 I raised, as usual, a great many Strawberries from seed; and the seed I sowed at that time was that of the large white Chili Strawberry. The produce of a numerous progeny, thus obtained, was in general white, and by no means well-flavoured; one, however, among them which is the subject of this letter, attracted my notice, as

very different from, and far superior to all its companions; and the next year it fully justified the preference I had given it. The growth of the plant is free and vigorous, the stalk, as must have been observed by the specimens presented last year to your Society, erect, stronger, and more able to sustain the fruit than those of any other kind known, which alone would give it a decided superiority over others in wet weather. The shape of the fruit is round, like its parent, the Chili Strawberry: and its colour being of a very fine deep crimson, gives a richness to its appearance, far above that of any other kind. The seeds project considerably and defend it from bruises, which preserves the fine bloom upon the fruit, and renders it by far the most portable, as it is the most beautiful fruit of its kind.

I am, Sir,

your most obedient humble servant,

MICHAEL KEENS.

Isleworth, Jan. 10, 1814.

Note by the Secretary.

The flavour of the specimens of this Strawberry which were brought to the Horticultural Soeiety, was not high; but its great beauty, and the probability of its being useful in the London market, have induced the Council to publish a figure of it. It has been called the *Imperial Strawberry*.

XXV. *A List of* Apples *and* Pears, *of which Specimens were exhibited to the Horticultural Society, on the 2d of* November 1813, *with some Remarks on them. By Mr.* John Maher, *F. H. S.*

Read Feb. 1, 1814.

APPLES.

*Shepherd's Seedling.
*Flushing Pippin.
*Northern Reinette.
*French Rebel.
Old Nonpareil.
New Scarlet Nonpareil.
Hall Door Apple.
Transparent Pippin.
North's New Scarlet Pippin.
Wood's New Transparent Pippin.
Fearn's Pippin.
Kirke's Incomparable.
Warwickshire Pippin.
Kirke's Admirable.
Nonsuch.
Old Golden Pippin.
Two Year Apple.
*Grey Leddington.
Lemon Pippin.
Orange Pippin.
*Bell's Apple.
Aromatic Pippin.
Sack Apple.
New Nonpareil.
New Golden Pippin.
Winter Pearmain.
Green Harvey.
Priestley's Redstreak.
*Newbold's Duke of York.
*Strawberry Pippin.
Newtown Pippin.
Margil.
Stone Pippin.
Hayward's Bur-knot, *or* Gloucestershire Creeper.
Northern Apple.
Kitchen Reinette.
Cowring's Queening.
Norfolk Beaufin.
Bernard's Baker.
Kirke's Baker.

PEARS,

Gansell's Bergamotte.	Bon Chrétien.
Crassane.	Swan's Egg.
Brown Beurré.	Paddington Pear.
Grey Beurré.	Uvedale's St. Germain.
Chaumontel.	Cadillac.
Colmar.	D'Auche.

Of the above list, those marked with an asterisk are good keepers, and many of them highly deserving cultivation.

The greater part of the trees which produced the fruit exhibited, were transplanted at ten and twelve years of age; pruning the branches exceedingly, and applying clay-balls to their strongest shoots, as I have already recommended.*

The *Scarlet Nonpareil* is known by many gardeners now living to have been raised about forty years ago in the garden of a public house at Esher, in Surry, from whence the late Mr. Grimwood first obtained it.

The *Gloucestershire Creeper* produces good fruit for the dessert, and is easily propagated by cuttings, being of the Bur-knot tribe, but very different to the common Bur-knot.

The *Warwickshire Pippin* approaches closely to the Golden Pippin, but is flatter, and is excellent from October to January.

North's New Scarlet Pippin is so valuable a fruit, that I strongly recommend it. It is excellent to eat, of a beautiful colour, and may with care be preserved in prime order to the end of February or March, if not gathered too soon.

* Horticultural Transactions, Vol. i. page 237.

Wood's New Transparent Pippin resembles the last mentioned, but is spotted. It bears most abundantly, and was raised about twenty years ago, by Mr. WOOD, nurseryman, of Huntingdon, from seeds of the Golden Pippin.

The *Crassane Pear* succeeds best at Edmonton on an east wall, keeping better, and never cracking, as it does on west and south aspects.

XXVI. *Remarks on the* Verdelho *Grape of* Madeira. *By* John Williams, *Esq. of Pitmaston, near Worcester.*

Read February 1, 1814.

The celebrated white wine obtained from the Island of Madeira, and known by the name of "Madeira Wine," is understood to be produced from a mixture of several Grapes, but the *Verdelho*, pronounced by the natives *Verdellio*, is the Grape which is said to prevail most in the vineyards that are peculiarly famous for yielding the best wine.

I procured cuttings of this vine, with some others, from Madeira, about seven years ago. It grows with great vigour in a vinery, and is remarkably productive of fruit, frequently giving three bunches on a shoot. As it does not form a large bunch, it will probably not be thought deserving of culture in this country, except by those who are curious in the flavour of their Grapes. The berry is small, of an oval shape, and many very small berries without seeds are usually interspersed: these being cut out with scissars will much improve the appearance of the bunch.

The fruit is very acid till it arrives at the last stage of maturity, when the berries become of a fine amber colour, and of a very rich saccharine flavour. I am inclined to think this Vine will succeed in favourable situations on the open wall, especially where the soil is light, dry, and shallow;

The Verdello Grape.

but in a deep highly manured soil, it will run too much into wood and foliage.

The leaf is very thick, of a dark green colour, and resists the autumnal frosts somewhat longer than the Chasselas, and many other kinds; and will therefore, in the ordinary course of our seasons, afford protection to the fruit till towards the end of October.

XXVII. *On the Cultivation of the* Vine *in Forcing Houses, with Observations on Forcing* Peaches. *By* JOHN WILLIAMS, *Esq. of Pitmaston, near Worcester.*

Read February 1, 1814.

THE Fruit Committee of the Horticultural Society having expressed their approbation of the flavour of the Grapes I submitted to their judgment last autumn, I am induced to offer a few remarks on the management of the vinery, with the view of improving the quality of the fruit.

There are some circumstances attending the state of vegetation in forcing houses, not sufficiently attended to by the generality of gardeners, a strict attention to which, however, is absolutely indispensable for obtaining good fruit.

When a Vine is planted in a forcing house, it receives an increase of warmth from the solar influence operating upon the confined internal air, or from artificial heat communicated by the flues, or conjointly from both these sources.

In each case, when the foliage is expanded, a large portion of moist vapour is given out from the under sides of the leaves, and becomes mixed with the air in the interior of the house.

Plants will not only live, but grow with greater rapidity than ordinary, in a moist atmosphere, if the moisture do not exceed certain bounds. Under these circumstances, however, the annual shoots become large, soft, and spongy,

and the fruit, notwithstanding it may have a promising appearance, will prove watery and insipid.

A dry atmosphere produces effects the reverse of these, the growth here is slower, the wood is of a more compact texture, and the fruit, when it arrives at maturity, attains a rich saccharine flavour.

The flavour of fruit seems, therefore, to depend, in great measure, on the quantity of water daily evaporated from the leaves. Hence the superior strength of the wines made in the warm dry province of La Mancha, in Spain, when compared with those of Portugal. It is from this cause also, that Vines growing on the sides of mountains, in the south of Europe, where they experience more ventilation, yield richer Grapes, and make better wine, than when cultivated in the neighbouring valleys; in the latter situation, however, they experience greater warmth, and the fruit arrives sooner at maturity.

The experienced Horticulturist in this country knows that every kind of fruit which is sufficiently hardy to succeed in the open air, on standard trees, as Apples, Pears, Apricots, Plums, and Cherries, is of inferior size, but much better flavoured, than when trained to a wall, owing to the more perfect exposure of the leaves and fruit to the effects of light and ventilation. I have reason to think that the injury which some varieties of Grapes, habitants of warm dry countries, sustain in our hot-houses, during a continuance of damp and cool cloudy weather, is owing to the accumulation of water in the vessels of the leaves and green fruit; for I have frequently remarked, that an increase of ventilation during such a state of the atmosphere, will often pre-

vent the injury, particularly if a little warmth be given at the same time by the flues. Perhaps, instead of the deep rich composts in which our Vines are commonly planted, if we were to substitute a light soil, of from eighteen to twenty inches deep, mixed with stones, or old mortar rubbish, we should succeed better with the principal Summer and Autumnal crops of Grapes. Vines planted in a soil of this description will not grow with such exuberant vigour; and as less water will pass into the plants through the absorbent vessels of the roots, the Vines will probably receive less injury in moist cloudy weather, and the fruit will be better flavoured.

When Vines are intended to be forced in the winter months they require to be planted in a deep and rich compost, which ought to be well drained, for the surface of the soil is then so much chilled by frost, and melting snow, as to prevent the vigorous action of the roots.

Having some years ago constructed a vinery, with a steam vault under the soil, for supplying occasional warmth to the roots, I have noticed the effects of ground heat with some attention. In the early part of the month of February, the natural temperature of the soil, at the depth of thirty inches, is commonly about 42° by the thermometer. If the heat of the ground be then raised to 45°, the Vines in the course of two days begin to bleed; and when the temperature is gradually raised to 50°, the buds open with as much vigour, as when the forcing is commenced under ordinary circumstances at the latter end of March, when the natural warmth of the ground, owing to the increased excitability of the plant, is fully sufficient.

Forced Grapes may be brought to a tolerable degree of perfection at almost any season of the year, but in our climate they cannot attain their true flavour, unless they are ripened in the summer or autumn, when the temperature of the external air is such, as to admit of much ventilation, without danger of chilling the Vines.

Experienced gardeners need not be informed of the necessity of keeping up a regular warmth during the time the Vines are in flower, and till the fruit is set; it is, however, a common error, which many fall into in the long days of summer, that of closing the lights of their hot-houses too soon in the evening, and not opening them sufficiently early in the morning.

From the beginning of July till the middle of October, I generally leave several of the upper lights open about two or three inches all night, which prevents that suffocating degree of closeness and musty smell, occasioned by the action of the light on the leaves and condensed water on the inner side of the glass.

The flavour of the ripening fruit is greatly improved by allowing this stagnant vapour to escape, and the Grapes may by this method be kept from rotting many weeks longer.

In the hands of a judicious gardener, the hygrometer will be found as useful an appendage to the hot-house as the thermometer. A due degree of moisture during the night, in the early stage of the growth of the plant, accompanied at all times with dry warmth and ventilation in the day, is a very essential matter to be attended to; as also the

avoiding of all artificial moisture, by sprinkling the floor of the house, either in the day or night, in the latter stage when the fruit is ripening.

These remarks on the management of Grapes, are equally applicable to forced Peaches, Nectarines, Figs, &c. By far the best flavoured Peaches I have ever tasted, were from trees planted in large pots, and kept in a vinery from February till the first week in June; when the trees were removed into the open air, and after being shaded a little from the sun for the first ten days, were placed in the most open part of the garden till the fruit became ripe. Treated in this way, the Peach becomes beautifully coloured on the out-side and of a most exquisite flavour.

As it is now a common practice to ripen Peaches in large pits, the glass frames made use of for this purpose might be turned to a double account, by making another set of pits of the same dimensions, and planting them with Vines. The glasses should continue over the Peaches from the middle of February till the beginning of June, when they may be removed, and placed over the Vines, which by this time will have advanced a little in growth; and as the increase of warmth given by the glass covering will happen about three weeks before they flower, a full crop of fruit may be thus obtained without any expense of fuel.

It will be necessary, however, to harden the Peaches a little, by giving them more air in the day and night for a few days, before the trees are quite exposed. And if advantage be taken of a cloudy day to remove the glasses, the leaves will not be discoloured by the sudden action of

the full sun. Should the season prove wet when the Peaches are ripe, they should be gathered and placed for about two days in a dry airy room before they are eaten.

Another very material circumstance must always be kept in mind by every gardener who is desirous of excelling in the quality of his fruit, and that is not to be too covetous of quantity. For in the best constructed forcing-houses, many rays of light are necessarily intercepted by wood-work, dust, &c. and even the glass itself, if ever so transparent, does not transmit the whole of the solar rays. So that the quantity of fruit, proportioned to the surface of the leaves, must always be less under glass, than if the plant were exposed in its natural climate to the full influence of the Heavens.

XXVIII. *On the Propagation of the* Mulberry *Tree by Cuttings.*

By Thomas Andrew Knight, *Esq. F.R.S. &c.* President.

Read March 1, 1814.

Detached parts of the branches of many species of trees so readily emit roots, that mankind must, at an early period, have learnt the art of increasing, by cuttings, the number of plants of any valuable variety of fruit tree; and as this method is the most simple, it was probably that first known to them. The art of grafting has afforded more expeditious, as well as more eligible means, of propagating the greater number of species of fruit trees; and cuttings of almost all those kinds, which are not usually propagated by grafting, so readily succeed, that the skill of the modern gardener is rarely much exercised in this way, except in the propagation of exotics, of which seeds are not easily attainable in our climate, and for which proper stocks to graft upon cannot be procured. In the art of making cuttings of these emit roots, some gardeners are to a great extent successful: but this art is understood by comparatively few; and none of them, as far as I have had opportunities of observing, appear to proceed upon any true theoretical principles. I shall therefore, in pointing out a method of readily obtaining plants from cuttings of the bearing branches of the *Mulberry* tree, which will soon afford fruit, submit to the Horticultural Society a few observations upon the proper

selection and management of cuttings of that, and, probably, of other species of trees.

Every leaf-bud is well known to be capable of extending itself into a branch, and of becoming the stem of a future tree; but it does not contain, nor is it at all able to prepare and assimilate the organizable matter required for its extension and development. This must be derived from a different source, the alburnous substance of the tree, which appears to form the reservoir, in all this tribe of plants, in which such matter is deposited. I found a very few grains of alburnum to be sufficient to support a bud of the Vine, and to occasion the formation of minute leaves and roots; but the early growth of such plants was extremely slender and feeble, as if they had sprung from small seeds; and the buds of the same plant, wholly detached from the alburnum, were incapable of retaining life. The quantity of alburnum being increased, the growth of the buds increased in the same proportion; and when cuttings of a foot long, and composed chiefly of two years old wood were employed, the first growth of the buds was nearly as strong as it would have been, if the cuttings had not been detached from the tree. The quantity of alburnum in every young and thriving tree, exclusive of the Palm tribe, is proportionate to the number of its buds; and if the number of these were, in any instance, ascertained and compared with the quantity of alburnous matter in the branches and stem, and roots, it would be found that Nature has always formed a reservoir sufficiently extensive to supply every bud. But those of a cutting, under the most favourable circumstances, must derive their nutriment from a more limited and precarious source; and

it is therefore expedient that the gardener should, in the first instance, make the most ample provision conveniently within his power for their maintenance, and that he should subsequently attend very closely to the economical expenditure of such provision.

The autumn appears to be generally the most eligible season for preparing cuttings, because the wounds will not then be recent in spring, and because the buds will better adapt their first movements to their new situation; and better cuttings will be obtained from scions, which have sprung from the trunk and lower branches, in all cases where very early maturity is not required, than from the extremities of the bearing branches; for in the latter the powers of vegetable life are less alert and active, and the cuttings of these neither take root as freely, nor afford as large trees, and are therefore to be chosen only when the planter is anxious soon to receive a part of the reward of his labours, from such species of fruit-trees, as, under other modes of culture, long exercise his patience.

I have stated in the *Horticultural Transactions** of 1808 that a Mulberry tree, obtained by grafting by approach, had produced fruit at three years old: and I have subsequently given an opinion, which I am quite confident is well founded, that trees possessing the same property might be obtained by other means; for that every detached part of a bearing branch, by whatever means it be insulated from the tree, of which it once formed a part, always retains a strong bias to resume its former and natural habits; and under these impressions, I made the experiments which I shall proceed to detail.

* Vol. i. page 61.

A considerable number of cuttings were taken from the most vigorous bearing branches of a Mulberry tree, in the middle of November 1812, and were immediately reduced to the length adapted to small pots, in which I proposed them ultimately to be planted, and which were between four and five inches deep. Each cutting was composed of about two parts of two years old wood, that is wood of the preceding year, and about one-third of yearling wood, the produce of the preceding summer; and the bottom of each was cut so much aslope, that its surface might be nearly parallel with that of the bottom of the pot in which it was to be placed. The cuttings were then placed in the common ground, under a south wall, and so deeply immersed in it, that one bud only remained visible above its surface; and in this situation they remained till April. At this period the buds were much swollen, and the upper ends of the cuttings appeared similar to those of branches which had been shortened in the preceding autumn, and become incapable of transmitting any portion of the ascending fluid. The bark at the lower ends had also begun to emit those processes, which usually precede the production of roots. The cuttings were now removed to the pots, to which they had been previously fitted, and placed in a moderate hot-bed, a single bud only of each cutting remaining visible above the mould, and that being partially covered: and in this situation they vegetated with so much vigour, and emitted roots so abundantly, that I do not think one cutting in a hundred would fail with proper attention. Some of the pots were placed round the edges of a melon bed, which affords a very eligible situation where a few plants only are wanted.

The mould I employed was the alluvial and somewhat sandy loam of a meadow, which was sparingly supplied with water; and the plants, till they had become sufficiently rooted, were shaded during bright weather.

The leaves, and whole habit of the plants thus obtained, are similar to those of the bearing branches from which the cuttings are taken; and I do not entertain a shadow of doubt but that, if retained under glass, even without artificial heat, they will produce fruit at three years old. If trained to a wall, or even as standards, I am also confident that they would bear fruit at a very early period; but in the latter situation I have not an opportunity of trying them, as the Mulberry tree, as standard, survives with difficulty in the climate of this place, and does not ripen its fruit at all, except in very favourable seasons, and even in such very imperfectly.

The preceding experiments were confined to the Mulberry tree, which is not amongst the most difficult to be propagated by cuttings; but I imagine that similar means might be successfully applied in propagating many other species of trees; for in a former trial to attain plants from cuttings of the bearing branches of the Mulberry tree, which were taken off in the spring, and planted in a hot-bed, I did not succeed at all: and as I have never seen a single plant in the public nurseries, which had been propagated from a bearing branch, I imagine that others have had as ill success as myself.* It is, I think, not improbable, that the pressure of the lower

* Plants of this fruit tree, which have been propagated from bearing branches, have entire heart-shaped leaves; but those obtained from suckers, which have sprung from roots, present deeply divided, or half-winged leaves.

ends of the cuttings upon the bottom of the pots, in the manner recommended in the concise, but valuable, paper of Mr. HAWKINS, in the *Horticultural Transactions* of 1813,* might have been productive of good effects, though the cause of the beneficial influence of such pressure is not very obvious. It cannot, I think, be owing to the more ready absorption of moisture by the earth of the pot, for those employed by me were composed of a very compact brick earth, which scarcely at all absorbed moisture; and the pressure of cuttings against the side of the pots, did not afford, by any means, the same result; and it is still less probable that any good effects could arise from the stagnation of the water in the bottom of the pots. I am therefore rather disposed to attribute the ready emission of roots, by Mr. LUSCOMBE's Orange, and my Mulberry cuttings, in some measure, to the mechanical action of the hard and smooth surface of the bottom of the pots; for external mechanical causes have a much more extensive influence upon the actions of plants than is usually imagined, of which I could cite many examples. When a cutting has been placed in contact with soft and yielding mould only, and has lived a short time without emitting roots, and subsequently perished, a large mass of mal-organized cellular bark is generally found to have accumulated on its lower extremity. When on the contrary, the end of the cutting is firmly held down upon the bottom of the pot by the mould which surrounds, and is attached to it, the protrusion of this fungous substance is prevented, and a new direction given to the descending organizable fluid of the plant, which theoretical

* See page 12.

conclusions, drawn from former experiments, induce me to think extremely favourable to the production of roots. Future experiment alone can, however, decide this point, which is considerably interesting to the physiologist, as well as to the practical gardener. I must add, in justice to Mr. Luscombe, that the result of his experiment was known to me, though it had not been published before mine commenced.

XXIX. *An Account of a successful Method of raising* Onions. *by Mr.* FALLA, *Nurseryman of Newcastle. In a Letter to Mr.* WILLIAM ANDERSON, *F.H.S. By Sir* JOHN SWINBURNE, *Bart. F.H.S.*

Read March 1, 1814.

DEAR SIR,

I HAVE received the following information from a very well informed nurseryman, Mr. FALLA, of Newcastle; if you think it novel, or worth troubling the Society with, you are at liberty to state it.

"The practice of the market-gardeners at Hexham, in Northumberland, in raising *Onions*, for which article they are very celebrated, so contrary to received opinion and practice, in both Agriculture and Horticulture, is as follows. They sow their Onion seed on the same ground for twenty or more years in succession, but annually manuring the soil. After digging and levelling the ground, the manure, in a very rotten state, is spread upon it, the Onion seed sown upon the manure, and covered with earth from the alleys, and the crops are abundant, and excellent in quality."

Mr. FALLA then mentions a practice he used very successfully to prevent the depredations of mice in beds, or drills of Acorns, and other tree seeds, and likewise Garden Peas, which is, to cover the seed, before the earth is laid

upon it, with the tops of *Furze*, called in the North, *Whins*, chopped quite small; after a few attempts to get at the seeds, the mice very soon desist; and Mr. FALLA states that this practice is perfectly effectual in preserving the seeds from their ravages.

I am, dear Sir,

Your's sincerely,

JOHN EDWARD SWINBURNE.

Capheaton, February 20, 1814.

XXX. *On making* Wine *from the Leaves of the* Claret *Grape.*

By Henry Seymour Matthews, *Esq. F. H. S.*

Read March 1, 1814.

Mr. Knight has observed in the *Philosophical Transactions*, many years ago, that the tinging matter which appears in the foliage of young seedling Vines, and that which afterwards gives the colour to their berries, is probably the same; and he was thence led to ascertain whether it might not be substituted for the tinging matter of the purple Grape, in giving the character of red wines to solutions of sugar and honey. A strong astringent liquor, possessing some portion of vinous flavour, was the produce of these experiments; but the leaves employed did not contain sufficient tinging matter to afford what might with propriety be called a red wine. The partial success, however, of these experiments, induced the writer of this short account to try the effect of the leaves of the Claret Grape, which usually acquire a very deep red colour in autumn. Two pounds and a half of the leaves of this Vine were added to a gallon of water, and their tinging matter was extracted by boiling; and three pounds and a half of coarse sugar was then dissolved in each gallon of this decoction. Fermentation, of course, succeeded, and a vinous liquor was produced, a bottle of which was presented to the

Horticultural Society, in the spring of last year. The colour of this liquor was that of Port wine, and its taste a good deal similar to that of new Port, mingled with Claret; and it was generally admitted by a great number of the members of the Horticultural Society, who tasted it, that it was better than such as they had met with in taverns under the name of Port, and that there was every prospect of its improving by age; and as its astringent tinging matter is probably of the same kind with that of red wines, it may be expected to possess similar medicinal properties, and may consequently prove valuable to many, whose pecuniary resources do not permit them to purchase the produce of a foreign vineyard.

Note by the Secretary.

The Claret Grape will not ripen sufficiently in our climate to afford wine; but if its immature berries be macerated in water, and a moderate quantity of sugar be added, a better imitation of French wine will be produced, than by any other means; and the Council of the Horticultural Society therefore wish to suggest, that the Claret Grape might probably be cultivated with considerable advantage. About half a glass of brandy had been added to each bottle of the wine presented by Mr. Matthews; but the addition of ardent spirit of any kind is not necessary, nor probably beneficial.

XXXI. *On the beneficial Results of planting* Potatoes, *which have grown late in the preceding year. By* Thomas Andrew Knight, *Esq. F. R. S. &c.* President.

Read April 5, 1814.

I have described, in the *Horticultural Transactions** of the last year, the beneficial result of planting *Potatoes*, which had grown late, and been imperfectly ripened, in the preceding year. My experience was then confined to one variety, and a single season: I have now seen the effects of the same mode of culture on several varieties; and the advantages have been so great, that I am led to address another paper to the Society upon the same subject. The produce of the different varieties has not only been increased, where the soil and manure have been the same, but the variety itself has, in some instances, changed its character, to an extraordinary extent. One early variety, which had been several years cultivated for my own table only, on account of its small size, now produces as large Potatoes as I wish to raise for my servants' hall; and I find the earliness also of the crop, to some extent, dependent upon the state of the varieties; so that the success of the gardener in raising an early crop of Potatoes, of any variety, may be good or bad, according to the mode of culture, in the preceding year, of the tubers or plants. A variety also, which appears expended and worthless, may be restored, in some cases at least, to its primary vigour and value. I sent to the Horticultural Society, two years ago, two varieties of early

* See page 64 of this Volume.

Potatoes, which I had recently obtained from seed. Those had been planted, in the two preceding years, in a poor dry soil, and the tubers in consequence only, I imagined, of such culture, had declined from their original size; and to that I concluded they would return in a different soil, and under better culture. But on planting them in my garden, I found that few of the tubers exceeded the size of Cherries, and that the value of both varieties was totally lost. A few tubers of each remained unplanted, and from these, in the end of June, the young shoots were broken off and planted, according to the manner detailed in the *Horticultural Transactions* of 1810.* The tubers these produced were also planted late in the following summer, and in the last year both varieties had resumed their primary size, which is about ten times as great as that to which they had been reduced. I shall take an opportunity, in the autumn, of sending a few tubers of these varieties, in their restored state, to the Society.

New varieties of the Potatoe are so readily obtained from seeds, that the preservation of any one now cultivated is an object deserving little attention; but if the crops throughout the British empire can, with the same expense of manure and culture, be considerably encreased by a mode, which is not attended with any expense, of preparing proper tubers in the preceding year, for planting, the publication of such mode of management in the *Transactions of the Horticultural Society* may be productive of much national benefit; and I therefore venture again to trespass on their patience respecting a plant, on the culture of which I have already so often addressed them.

* Vol. i. page 192.

XXXII. *On the Application of* Manure in a liquid Form *to Plants in Pots. By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read May 17th, 1814.

The quantity of earth, which the most firm and solid parts of trees afford by analysis, is well known to be very small; and even the species of these earths have been proved, by the younger Saussure, to be dependant, to a great extent, upon the component parts of the soil, in which the trees happen to have grown. A large extent and depth of soil seem therefore to be no further requisite to trees than to afford them a regular supply of water, and a sufficient quantity of organizable matter; and the rapid growth of plants of every kind, when their roots are confined in a pot to a small quantity of mould, till that becomes exhausted, proves sufficiently the truth of this position.

I have shewn in a former communication,* that a seedling Plum-stock, growing in a small pot, attained the height of nine feet seven inches, in a single season; which is, I believe, a much greater height than any seedling tree of that species was ever seen to attain in the open soil. But the quantity of earth, which a small pot contains, soon becomes exhausted, relatively to one kind of plant; though it may be still fertile relatively to others: and the size of the pot cannot be changed sufficiently often to remedy this loss of fertility; and if it were ever so frequently changed, the mass of mould, which each successive emission of roots would enclose, must remain the same.

* See Vol. i. page 249.

Manure can, therefore, probably be most beneficially given in a purely liquid state; and the quantity, which trees growing in pots have thus taken, under my care, without any injury, and with the greatest good effect, has so much exceeded every expectation I had formed, that I am induced to communicate to the Society the particulars, and the result of my experience.

I have for some years appropriated a forcing-house, at Downton, to the purposes of experiment solely, upon fruit trees; which as I have frequent occasion to change the subjects upon which I have to operate, are confined in pots. These were at first supplied with water, in which about one-tenth, by measure, of the dung of pigeons, or domestic poultry, had been infused; and the quantity of these substances (generally the latter,) was increased from one-tenth to a fourth. The water, after standing forty-eight hours, acquired a colour considerably deeper than that of porter; and in this state it was drawn off clear, and employed to feed trees of the Vine, the Mulberry, the Peach, and other plants. A second quantity of water was then applied, and afterwards used in the same manner; when the manure was changed, and the same process repeated.

The Vine and Mulberry tree, being very gross feeders, were not likely to be soon injured by this treatment; but I expected the Peach tree, which is often greatly injured by excess of manure in a solid state, to give early indications of being over-fed. Contrary, however, to my expectations, the Peach tree maintained, at the end of two years, the most healthy and luxuriant appearance imaginable, and produced fruit in the last season in greater perfection than I had ever

previously been able to obtain it. Some seedling plants had then acquired, at eighteen months old, (though the whole of their roots had been confined to half a square foot of mould), more than eleven feet in height with numerous branches, and have afforded a most abundant and vigorous blossom in the present spring, which has set remarkably well; and those trees, which had been most abundantly supplied with manure, have displayed the greatest degrees of health and luxuriance.

A single Orange tree was subjected to the same mode of treatment, and grew with equal comparative vigour, and appeared to be as much benefitted by abundant food, as even the Vine and Mulberry tree.

An opinion generally, though I think somewhat erroneously, prevails, that many plants, particularly the different species and varieties of Heath, require a very poor soil in pots; but these might, I conceive, with propriety, be said to require a peculiar soil; for I have never seen the common species of this genus spring with so much luxuriance, as from a deep bed of vegetable mould, which had been recently very thickly covered with the ashes of a preceding crop of heaths and other plants, that had been burnt upon it. And I believe, if the branches and leaves of the common species of Heath were placed to decompose in water, and such water were afterwards given to the tender exotic species, that these, how heavily soever the water might be loaded with organizable matter, would be found as little capable of being injured by abundant food as the Vine or Mulberry tree, though the species of food, which would best suit those plants, might prove to every species of Heath destructive and poisonous.

XXXIII. *On the ill Effects of excessive Heat in Forcing-houses during the Night. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read June 17, 1814.

Few gardeners, if any, have ever believed plants to be at all endued with powers of sensation and perception similar to those of animals, or to be, in any degree, susceptible of pleasure or pain; and yet it is very questionable, whether there has ever been a single gardener, who, in the management of fruit-trees in a forcing-house, did not in some respects err, by treating his trees, as he would have done, if he had supposed them to possess such powers. Being fully sensible of the comforts of a warm bed in a cold night, and of fresh air in a hot day, the gardener generally treats his plants, as he would wish to be treated himself; and, consequently, though the aggregate temperature of his house be nearly what it ought to be, its temperature during the night, relatively to that of the day, is almost always much too high. The consequences of this excess of heat during the night are, I have reason to believe, in all cases highly injurious to the fruit-trees of temperate climates, and not at all beneficial to those of tropical climates; for the temperature of these is, in many instances, low during the night. In Jamaica, and other mountainous islands of the West Indies, the air upon the mountains becomes, soon after sun-set, chilled and condensed, and in consequence of its superior gravity, descends and displaces the warm air of the vallies; yet the sugar

canes are so far from being injured by this sudden decrease of temperature, that the sugars of Jamaica take a higher price in the market, than those of the less elevated islands, of which the temperature of the day and night is subject to much less variation.

During the progress of germination, in the spring, great chemical changes take place in the component parts of the sap of trees, analogous to those which have been observed in the germination of seeds. I could not detect any vestige of saccharine matter in the Alburnum, either of the stem or roots, of the Sycamore tree in the winter; but in the spring, its sap became very sensibly sweet: and I found this sap to be much more saccharine, and of greater specific gravity, in large trees, which were prepared to nourish an abundant blossom, than in small and young trees. The sap of the same tree proved also to be subject to some variations of specific gravity, at the same period of the spring, in different years; and DUHAMEL has observed, that the sap of the Sugar Maple becomes first saccharine, and afterwards acquires an herbaceous taste; in the latter state, it probably is best calculated to feed the blossoms and unfolded buds.

At the period of the preceding chemical changes in the qualities and properties of the sap, previous to the growth of the leaves, that fluid is found to ascend during the warm part of the day, and to flow, in many species of trees, from any recent wound, and to fall again during the night, particularly if that be cold; and as variations of temperature are the apparent cause of these motions, it appears not improbable, that the chemical changes, which take place in it at this period, are promoted by the same agents.

Some experiments, which I have made upon germinating seeds, have perfectly satisfied me, that these afford plants of greater or less vigour in proportion as external circumstances are favourable in promoting, beneath the soil, the necessary changes in the nutritive matter they contain; and I suspect that a large portion of the blossoms of the Cherry and other fruit-trees in the forcing-house often proves abortive, because they are forced, by too high and uniform a temperature, to expand before the sap of the tree is properly prepared to nourish them.

I have, therefore, been led, during the last three years, to try the effects of keeping up a much higher temperature in the day than in the night; and as experiments of this kind cannot be made by the common gardener, who must not risk the sacrifice of his employer's crops of fruit, I trust the following account will be honoured by the approbation of the Horticultural Society, though the experiments have been chiefly confined to the Peach tree.

As early in the spring as I wished the blossoms of my Peach trees to unfold, my house was made warm during the middle of the day; but towards night it was suffered to cool, and the trees were then sprinkled, by means of a large syringe, with clear water, as nearly at the temperature at which that usually rises from the ground, as I could obtain it; and little or no artificial heat was given during the night, unless there appeared a prospect of frost. Under this mode of treatment the blossoms advanced with very great vigour, and as rapidly as I wished them, and presented, when expanded, a larger size than I had ever before seen of the same varieties: which circumstance is not unimportant, because the size of the

blossom, in any given variety, regulates, to a very considerable extent, the bulk of the future fruit. As soon as the blossoms were expanded, and the pollen began to shed, water was applied in less quantity, as a light shower, sufficient to wet the pollen, without washing it off; but when the pollen was chiefly shed, I again, to promote its absorption, sprinkled the trees abundantly with water, having previously often observed, that heavy showers of rain are at this period always highly beneficial to the blossoms of the Apple trees in our orchards; and almost every blossom of my Peach trees set most perfectly. The watering was regularly continued till the fruit became very nearly ripe, the roots of the trees being, at the same time, abundantly supplied with moisture and food in the manner detailed in my last paper, in which I have stated the more than ordinary size and perfection of the fruit.

My house had been previously much infested with the red spider;* but not a single one now appeared, nor scarcely an *Aphis;* and the young wood became remarkable for the shortness of its joints, and the thickness, comparatively with the length of its shoots. A gardener, who is prejudiced in favour of old customs, will possibly imagine that he supplies the place of the cool evening dews of nature, and of the water in the preceding experiment, by sprinkling his flues with water, and filling his house abundantly with steam.

* I suspect, but I am no entomologist, that two distinct species of insect are confounded under this name, one of which forms a web, which the other does not. The latter kind often abounds in the open air, upon pear-trees, and appears to be, in the forcing-house, a much hardier insect than the other.

But the effect of no two operations can be more different: in the one, the plant is suddenly chilled by cold water, and subsequently kept cool by the evaporation of the water during the night: in the other, the steam is precipitated upon the leaves and branches of the trees, to which it necessarily communicates much heat. The former operation nearly resembles that of the shower-bath, sometimes used in this country, in which the patient is suddenly chilled by a heavy shower of cold water; the other resembles the hot steam-bath of Russia, in which he is violently heated; and if the gardener were to try each of these processes upon himself, during a single night, I suspect he would arise in the following mornings with very different feelings, unless he were blest with much peculiar hardness of constitution. It is true, that plants do not appear to possess sensation in the ordinary sense of that term, as it is applied to animals; but nature, in forming its whole organic creation, seems to have proceeded so much by substitutions and additions, that simple sensation, in its strict and limited sense, abstracted from all powers of perception, may not improbably be as widely diffused as organization itself; and animal and vegetable life may be, in consequence, susceptible of similar injuries from similar external causes. The influence of hot and damp air upon both, is greatly more powerful than that of dry air of the same temperature. In the experiments, of which Sir Charles Blagden has given an account in the Philosophical Transactions of 1775, he, with Sir Joseph Banks and others, sustained without injury a temperature of 260 degrees in dry air; but they found damp air, at half that tempera-

ture, to be scarcely supportable: and every gardener knows, how quickly the leaves of his plants are injured by the combined action of heat and moisture.

The succulent shoots of trees, however, always appear to grow most rapidly, in a damp heat, during the night; but it is rather elongation than growth, which then takes place. The spaces between the bases of the leaves become longer, but no new organs are added; and the tree, under such circumstances, may with much more reason be said to be drawn, than to grow; for the same quantity only of material is extended to a greater length, as in the elongation of a wire.

Another ill effect of high temperature during the night is, that it exhausts the excitability of the tree much more rapidly than it promotes the growth, or accelerates the maturity of the fruit; which is in consequence ill supplied with nutriment, at the period of its ripening, when most nutriment is probably wanted. The Muscat of Alexandria, and other late grapes, are, owing to this cause, often seen to wither upon the branch in a very imperfect state of maturity; and the want of richness and flavour in other forced fruits is, I am very confident, often attributable to the same cause. There are few peach houses, or indeed forcing houses of any kind, in this country, in which the temperature does not exceed, during the night, in the months of April and May, very greatly that of the warmest valley in Jamaica in the hottest period of the year: and there are probably as few forcing houses in which the trees are not more strongly stimulated by the close and damp air of the night, than by the temperature of the dry air of the noon of the following

day. The practice, which occasions this, cannot be right: it is in direct opposition to nature; and I need not point out to the intelligent members of the Horticultural Society, that the more nearly nature, in its best climates and most favourable seasons, is copied as to temperature, the more perfect will be the productions of the gardener's art.

XXXIV. *An Account of Two* New Varieties of Cherry. *In a Letter to the* Secretary. *By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read November 1, 1814.

My dear Sir,

I send a few buds of the *seedling Cherry* trees, the produce of which, I have the pleasure to hear from you, was approved by the Fruit Committee of the Horticultural Society; and in obedience to their wishes, I add the following account of the origin of those varieties. The mode of culture adopted by me was precisely the same as I had previously used in producing varieties of other species of fruit; and which I have detailed in a former communication:* and I therefore need not trespass upon the time of the Society by describing it.

Both varieties sprang from seeds of the Cherry, which Mr. Forsyth has called the Graffion, and which gardeners generally call the Bigarreau, but erroneously, for it is evidently the Ambrée of Duhamel; and the Bigarreau is a perfectly distinct kind.

The pale variety is the offspring of a blossom which was fecundated by the pollen of the White Heart Cherry; and it is distinguishable from every other Cherry, with which I am acquainted, by a deeper tinge of crimson in the petals of its blossoms, and by the extraordinary length of its fruit-stalks. Mr. Hooker has given a very accurate and excellent delineation of this variety, under the name of the *Elton Cherry*,

* See vol. i. page 34, &c.

in his *Pomona Londinensis :* but as the tree has grown older, the fruit has increased in size ; so that some of those I sent to the Committee were half as large again as those he received from me, and has delineated.

The May-Duke Cherry is the male parent of the Black variety,* and the young tree resembles that very much in its general character, and in the growth of its fruit in large bunches.

The trees of both varieties (which are only eight years old,) are at present trained to walls ; the Elton on a north-west, and the Black on an east-north-east aspect : but I am perfectly confident, that both will succeed thoroughly well as standards, and that the Black one, so cultivated, will prove excessively productive of fruit. The Elton Cherry tree has borne well ; but it has never loaded itself so heavily as the other. The Elton ripens about ten days before the Ambrée, and the Black soon after the May-Duke. The growth of both trees is extremely luxuriant.

These varieties were selected from about fifty seedling plants, which afforded fruits of many different forms and colours, and of very unequal merits, some differing little, either in size or flavour, from the small black native variety of our woods ; and one or two others, exclusive of those sent, possessed a considerable share of richness.

The Cherry sports more extensively in variety, when propagated from seeds, than any other fruit, which I have hitherto subjected to experiment : and this species of fruit is therefore probably capable of acquiring a higher state of perfection than it has ever yet attained. New varieties are

* This has been called the *Black Eagle Cherry*.

The Black Eagle.

also much wanted: for the trees of the best old kinds are every where in a state of decay in the Cherry orchards; and I am quite confident, that neither healthy nor productive trees will ever be obtained from grafts or buds of the old and expended varieties of this, or any other species of fruit tree.

On the merits of the fruit of the above-mentioned varieties, for the dessert and market, the Committee will decide: that of both has become larger and of superior quality, as the trees have advanced in growth and age; and I think it will probably continue to improve for some years, as the trees proceed towards maturity. Grafts and buds of both varieties will be much at the service of the members of the Horticultural Society, in the proper seasons.*

I am, my dear Sir,

Your's very truly,

THOMAS ANDREW KNIGHT.

Downton, July 23, 1814.

* The existence of the Cherry, as a native tree of Britain, has been questioned, because PLINY has stated it not to have been known in Italy till the end of the Mithridatic war, when it was introduced by LUCULLUS from Pontus; and that it was carried into Britain, a hundred and twenty years after that period. But PLINY must have meant a cultivated variety of the Cherry, of which the Romans had many in his time; for the small Black Cherry, which abounds in the woods of different parts of Britain, has much too permanent habits to have derived its origin from any cultivated variety. PLINY was also very ill qualified to distinguish a variety from a species; and VIRGIL seems to have been better acqainted with the habit in old Cherry trees, of emitting numerous suckers from their roots, than he would have been if the Cherry tree had been first introduced into Italy so short a time before he wrote his *Georgics;* for he cites the Cherry tree and Elm as examples, probably familiar to his readers, of that mode of pro pagation.

" Pullulat ab radice aliis densissima silva:
Ut *Cerasis*, ulmisque :"—VIRG. Geor. ii.

XXXV. *An Account of the* Acton-Scot Peach, *a new Variety.* *By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read January 3, 1815.

In the Report of the Fruit Committee of the Horticultural Society of 1813, it is very justly remarked by Mr. Wilbraham, that the character of the Peach is very greatly affected by a few degrees of latitude;* and that the merits of the same variety, when ripened in the open air, in the climates of Paris, of London, and of Edinburgh, are widely different. It must not, however, be hence inferred, that every variety of the Peach, which may be produced, will be equally, or at all injured, by being transferred from the climate of Paris to that of Edinburgh; or improved, by being removed from Edinburgh to Paris, however favourable the climate of Paris may be to the melting Peach. For, probably, every variety, to which Mr. Wilbraham alludes, acquired its celebrity in the vicinity of Paris, to which climate it proved to be nicely adapted; and it is not at all extraordinary, that such a Peach should lose a large portion of its merits, when removed to so much colder a climate. And if the Peach had been as long cultivated, and with as much skill and attention, in the climate of Edinburgh, as it has been in that of Paris: and if selection had been made from as many seedling plants, I think it probable, that many varieties would have been raised, which would have been capable of

* See page 61 of this volume.

acquiring nearly their greatest state of perfection in the climate of Edinburgh, and which would have become mealy and insipid in the climate of Paris; as the finest varieties of the melting Peach of Paris become under the more powerful sun of Spain and Italy. I do not, however, mean to give an opinion, that the Peach is capable of acquiring the same degree of excellence at Edinburgh as at Paris; but I think, that many varieties of it may, and will be obtained, which will attain in the climate of Edinburgh, and in the colder parts of England, nearly as much perfection as the same varieties would attain in any other climate; and that the fruit of these will exceed in richness and flavour that of the finest French varieties of the Peach tree, when those are cultivated in climates so much too cold for them.

I have been led to this conclusion, by observing that the Elruge Nectarine, which, as a British variety, acquires a much greater degree of excellence at Downton (where the climate from elevation is at least as cold as that of Edinburgh, and where the Red Roman and Newington Nectarines, are good for nothing,) than in the vicinity of London; and that the early Red Nutmeg Peach attains a much larger size than the delineation of DUHAMEL indicates, and a greater degree of excellence, than I should have inferred it to possess from his description of it: it has also always grown larger, and more perfect, here in the open air, than in the warmer temperature of a forcing-house. The Noblesse Peach also in moderately favourable seasons, when the trees do not mildew, acquires very nearly the same degree of excellence here, as in the vicinity of London; and I was hence induced to hope, that by breeding from these, I might obtain others, as well or better calculated for cold and unfavourable climates. About

twenty seedling plants, which have sprung from the seeds of one, and the pollen of the other of the above-mentioned varieties, have produced fruit under my care; three of these have afforded better Peaches than I previously possessed; and such as, I think, will be found to deserve culture, in those situations at least, where the finer French kinds do not succeed.

I sent some fruit of one of the above-mentioned varieties, the offspring of a seed of the Noblesse and the pollen of the early Nutmeg Peach, for the inspection of the Fruit Committee of the Society, in the last autumn, which, I had the pleasure to hear, was approved by them. The two other varieties are, however, larger, and, I think, better; but that, of which I sent the fruit, has borne very abundantly during the last three years (the whole period of its culture in the open air), and its fruit has attained a more uniform degree of perfection, than I have ever witnessed in any other variety The trees have also been perfectly free from every vestige of mildew, in a situation where this disease is very prevalent, and have entirely escaped the attacks of insects; and as these greatly prefer some varieties to others, I am inclined to hope that this will not prove a favourite with them. It ripens somewhat earlier, or rather more uniformly and perfectly, than the Noblesse Peach: for much of the fruit of the latter variety almost always falls off in my garden, in an imperfect state, and without acquiring its proper flavour and state of maturity. The new Peach, which has been named the *Acton-Scot Peach*, forms a perfectly distinct variety, and may be distinguished, at a considerable distance, from every other, with which I am acquainted, by the more than ordinary whiteness of the skin of such parts of the fruit, as have been

secluded from the sun during the earlier stages of its growth. The drawing which Mr. HOOKER has made, by order of the Committee, will give more accurate ideas of its form and character, than any words I can employ, and a minute description of it is, therefore, unnecessary. Its culture having been confined to my own garden, I am unable to say what will be its merits in other situations; and the Fruit Committee have seen only the samples I sent them. I believe, however, that I can confidently recommend it as a productive and useful variety.

XXXVI. *Account of a Method of growing* early forced Potatoes. *By Mr.* Thomas Hogg, *of Pine Apple Place, Paddington.*

Read February 7, 1815.

The object attained by the following method is that of *raising young Potatoes* at an earlier period of the year than they can be produced by the usual means of a common hot-bed, and though the taste of the majority of persons will probably prefer the old and mature root, in February, yet the price paid in this metropolis for young Potatoes grown during that month is a proof that they are in sufficient request, as an article of luxury, to induce both the market and private gardeners to attend to their cultivation.

The chief peculiarity of the method consists in using an old Cucumber bed or Melon bed, in which the dung has long lost all its heat, instead, of making one of fresh hot dung, whereon to grow the plants.

The sets should be cut about a fortnight before they are planted: for if they are not sufficiently dried before they are put into the earth, they are liable to be much injured by worms; one eye only should be left in each set.

The bed is prepared by removing all the earth from the top of the dung, and covering it about one inch deep with fresh mould, on which the sets are planted, in rows six inches apart, and the same distance from each other in the rows; they are then covered four inches deep with mould, and the frames and glasses are placed upon the bed, which

must be carefully protected from frost. The covering best adapted for this purpose is the second crop of short hay, called Rouen in the neighbourhood of London.

At the end of the fifth day, the outsides of the old dung should be cut away, from near the edge of the frame to the bottom of the bed, in a slanting direction inwards of about fifteen inches from the perpendicular; strong linings of hot dung must be applied to the space so made, and renewed, if necessary, at the end of three weeks.

Air must be given to the plants, by sliding down the lights at noon every day that the weather will permit, and water in the mornings, leaving about one inch of the light open for the admission of air, after watering.

The Potatoes will be fit for use in about seven weeks from the first planting of the sets, and the average crop to each light, if well managed, is usually about five pounds.

XXXVII. *Some Remarks on* pruning Gooseberry Bushes.

By Mr. John Maher, *F.H.S.*

Read February 7, 1815.

The Gooseberry, though so useful and early a fruit, is very much neglected in many gardens, no other attention being paid to it than to prune the tree at random, and often with a pair of shears, once a year. The crop of ripe fruit is also often injured, by having the largest and earliest berries prematurely gathered, whilst green, for tarts. To prevent this, a sufficient number of trees of such varieties as are the earliest, should be planted in a separate quarter of the garden, and devoted exclusively to the use of the kitchen, for tarts and sauce.

Both these and the other trees that are intended to bear ripe fruit, should be pruned twice a year: in the autumn, as soon as the shoots have ripened their wood, leaving at least six inches distance between every branch, and shortening the small branches to two or three eyes; again the trees should be examined about the middle or end of June, and all improper suckers and very luxuriant shoots, such as the French call gourmands, cut out. Both these operations should be done with a sharp pruning knife.

It will greatly contribute to the perfection of the fruit, if

the very small berries are taken away with a pair of scissars about the middle or end of May; and these small berries will be found quite as good for sauce, or gooseberry cream, as the larger.

XXXVIII. *On some vulgar Errors among Gardeners, respecting Insects being destroyed by cold. In a Letter to the Right Honourable Sir* Joseph Banks, *Bart. By* William Spence, *Esq.*

Read March 7, 1815.

My dear Sir,

"Vulgar errors" are prevalent in Horticulture as well as in other arts, and one of these seems to me to be the notion which we so often hear repeated, that caterpillars, grubs, and slugs are destroyed by the cold of severe winters. As a dependance on this supposed wholesale extermination of the enemies of the gardener may often prevent his taking active measures for their destruction, I shall make no apology for begging to communicate, through you, to the Horticultural Society, if you think them worthy of its attention, the observations which have induced me to believe, that this, like many other received axioms, is unfounded.

The facts mentioned by Reaumur and Lister relative to the power of insects to bear cold uninjured, have long led me to entertain this opinion. Not to advert to the well known fact that the eggs of the silk-worm and of other species, are capable of sustaining a degree of cold far greater than any ever felt in this country, Reaumur found that a common caterpillar (that of *Phalæna Bombyx Chrysorrhæa,*) was not hurt by a cold of 19° below 0 of his thermometer*

* Mémoires pour servir à l'histoire des insectes, ii. p. 142.

(11° below 0 of FAHRENHEIT); and LISTER, the truth of whose assertion has been fully confirmed by experiments made on the Grub (larva of *Tipula Oleracea*), by my friend Mr. STICKNEY, author of a valuable essay on that pest of Holderness, as well as by similar experiments instituted by BONNET,* on the chrysalis of the cabbage Caterpillar (larva of *Papilio Brassicæ*), informs us, that some caterpillars and hexapod larvæ, after being so frozen as to chink like little stones, when dropped into a glass, nevertheless revived.†

But there still were wanting, to carry conviction to the mind of the Horticulturist, proofs of the fact, that insects actually do abound as much after severe as after mild winters. Such proofs the present spring, at least as far as my observations extend, has amply supplied. The cold in the winter was greater, and of longer continuance, than has been known for many years: the former part of the time the ground was destitute of snow; and the final thaw was interrupted by frequent and intense frosts: so that every condition for the most effective operation of the destructive powers of cold was fulfilled. Yet, in my own garden, almost the first things that struck me, after the frost had left us, were hundreds of young caterpillars of the gooseberry moth (*Phalæna Geometra Grossulariata,*), quite uninjured, that had hybernated under the rims of some flower pots which stood in the middle of the garden, exposed to every change of weather; and I never knew these insects so numerous or voracious as this spring. They not only attacked the half expanded buds of Gooseberries and Currants (black as well as red and white), thus destroying the blossom, but even the buds and young leaves

* Oeuvres, tom. vi. p. 12.

† Goedartius de Insectis, p. 76.

of a Cherry tree nailed against the wall.* And in proof of their numbers, from one to two hundred were, in many cases, shaken† from a single tree. The case is precisely the same with regard to slugs, which in my own garden, and those of my acquaintances, are quite as numerous as they were before the winter: and the Grub, which last year so abounded in Holderness (though scarcely one was to be found in 1812), that in the district of Sunk Island, the herbage of many whole fields was laid waste by them, is, I am told, continuing its ravages this spring, apparently without abatement.

Both experiment and fact, I think, therefore prove, that the supposed destruction of insects by severe winters does not take place; and, consequently, that the gardener must rely on his own exertions, for ridding himself of these assailants.

I shall perhaps be asked, to what cause then is owing the remarkable diminution that sometimes takes place in the

* Linnæus cites as the food of this larva, besides the different species of Ribes, the Almond, Willow, and Black-thorn From my own observations it would seem almost omnivorous. In the autumn of last year, the young brood, in my garden attacked the leaves of Turnips, Apple trees, Black Italian Poplars, and even of Laurels.

† This seems to me the best mode of destroying these insects, which, when disturbed at any time, except when eating (which is chiefly at night and in dull weather), let themselves down to the ground by a silken thread. If therefore, a large sheet of strong paper or parchment be laid upon the ground, on each side of the stem, under a Currant or Gooseberry bush, and a sudden and violent shake be given to it, nine tenths of all the caterpillars upon it will fall down, and may be collected with the greatest ease; and by going over the trees twice or thrice in this way, the whole may be extirpated far more effectually, and at less expense both of money and time, than by watering the trees with solutions of tobacco, lime, &c.

number of insects which abounded the year before, if not to frost? I answer, that on this head we have yet much to learn, but that *one* frequent cause is the multiplication of the insect enemies, particularly those of the LINNEAN genus *Ichneumon*, appointed to keep the noxious species within due bounds. Birds do us great service in this way, but it is the Ichneumon, that is our most valuable friend. REAUMUR relates, that in the autumn of 1735, when he examined a great multitude of the common cabbage caterpillars, he found that, out of every twenty-three, at least twenty-one were filled with the grubs of Ichneumons, and consequently doomed to infallible destruction.* A French gardener, who observed in the spring of 1736, that the cabbage butterflies were not one twentieth part so numerous as the caterpillars which infested his greens in the preceding year might have led him to expect, would naturally give the credit of destroying them to the winter, though evidently without reason.

At the same time, I am ready to admit, that severe winters may be occasionally the indirect cause of the destruction of some kinds of vermin, as in the case of the garden Shell-snail (*Helix Hortensis*), which is said, in the newspapers, to have been sought out last winter with such unusual diligence by the thrushes, that in some places half a peck of fragments of the shells lie round the stones to which these birds brought them for the purpose of breaking them, and getting at the snails. But besides that grubs, slugs, and most caterpillars hybernate under ground, out of the reach of

* Mémoires, &c. tom. ii. p. 42.

birds, it is clearly not in this indirect mode that frost is popularly, and, as I have endeavoured to shew, erroneously, considered as serviceable,

I have the honour to be,

My dear Sir,

Your obliged humble Servant,

WILLIAM SPENCE.

Drypool, near Hull,
May 31, 1814.

XXXIX. *On the Cultivation of* Lobelia Fulgens, *in Belgium.*

By Jean Baptiste Van Mons, *M. D., of Brussels.*

Read March 7, 1815.

This plant, which was introduced into Europe, by Baron Humboldt, one of the most learned naturalists who ever travelled, was sold in Belgium, only three years ago, for three and four gilders, and in Germany for five dollars; yet it is now so common in our flower markets, that it sells only for a shilling: so simple is its culture, and so easy is it to be increased. This is done by slips and cuttings: it also pushes suckers from the root, and each of these separated becomes one, two, or three plants. The stem also may be divided into as many pieces as there are leaves, and these put into a shady border, will each soon become a plant with roots; and the base of the stem, taken up before the frost, is surrounded with two or three circles of roots, as well as an infinite number of rudiments of buds, which finally develop themselves, strike fresh roots, and may be separated about Midsummer. A very strong plant, if not suffered to flower, may be multiplied ad infinitum. The Lobelia Fulgens succeeds perfectly, all the year, in the open air, and I am not even sure, that it is necessary to cover it with fallen leaves of trees, during severe frosts; it will also accommodate itself to every soil, but multiplies more in a strong ground, which proves that it enjoys there less health: for a plant often

makes great efforts for re-production, previous to its death. We have tried to vary this beautiful plant, by raising it from seed, in order either to acquire double flowers, or to change its colour; but our trials have not been attended with success. We have, however, produced a dwarf variety, the flower of which is more shining; the flowers are likewise nearer each other, and the foliage shorter and thicker in proportion. The Lobelia Cardinalis has already produced a permanent dwarf variety, but which is more liable to perish. There is also another variety of the Fulgens, of a different colour, namely a pale rose-coloured one, similar to that of the Cardinalis. This want of success has nothing surprising in it, the first propagation by seed being still too near nature to produce a variation. This mode of re-production must not therefore be given up, but repeated; the seed should always be taken from the last plants that have been separated from the original exotic. In thus departing from nature, the plant rather yields to art, and falls into monstrosity, which in artificial gardening, is often the perfection sought for. A plant, transported from its native soil into a climate, where it does not grow spontaneously, when repeatedly propagated by seed, often degenerates, changes its colour, and becomes double. This is the principle of varying plants. It is impossible that a plant, which is so easily multiplied by slips, should not vary, when propagated by seed. A plant once degenerated, that is to say, once sown in a soil which is not natural to it, does not come back by seed to the form it originally had in its native country. Thence the continual variations of species, even in those climates where they grow in the open air. The plants

spontaneously growing are distinguished from those that are sown, by the absence of cotyledons.

The slips of the Lobelia Fulgens flower in the first year, but if they are neglected, and suffered to grow into tufts, they are two years before they flower. The plants raised from seed bear flowers in the second year. The seed should be sown, as soon as it is ripe, in earthen pans; the earth should be moistened, and after it has imbibed the water, the seed must be spread over it without being covered. The pans should be sheltered from the frost, and the young plants may be transplanted in April and May. Very few of them remain more than the second year, without flowering. A little seed is ripened here, at Brussels, when the season is hot, and especially from those plants which flower earliest.* The moment that vegetation stops in the flowering stem, it should be cut off, and suffered to dry. The seed is so like dust, that it might be mistaken for it, and be thrown away. Mr. WITZTHUM, assistant in our botanic garden, has particularly attended to the cultivation of this plant. The Lobelia Cardinalis, which perishes so frequently in sandy soils, becomes strong, and multiplies without any care, in a clay ground; but it flowers in all its magnificence only in the former soil, and is, in this respect, conformable to the habits of the double varieties of Hesperis Matronalis.

* I obtained a few perfect capsules last summer, by fecundating the stigma, and taking off all the suckers as they sprang up.—*Secr.*

XL. *Some Account of the* Melidora Pellucida, *of* Noronha, *a beautiful Evergreen Shrub from China. By* Richard Anthony Salisbury, *Esq. F. R. S. &c. Secretary.*

Read April 5, 1814.

In the charter, which our gracious King has granted to us, we are denominated a Society "for the Improvement of" "Horticulture in all its branches, *ornamental* as well as" "*useful*;" and in his own royal garden at *Kew*, during the last forty years, his Majesty has set an example to all his subjects, of progressive excellence in every department of that delightful science. But though *useful* productions may justly claim a decided preference to such as are merely *ornamental*, I trust that the latter will never be totally excluded from the pages of our *Transactions*; and whenever a curious exotic, of more than common beauty, is introduced, and first flowers in this country (especially if it be so hardy as to thrive in the open air, or with a trifling degree of protection from frost,) I think it my duty to give some account of it to this Society, together with such information respecting its culture, as will be necessary for a gardener to possess, who may have ocasion to cultivate it.

The shrub, which I have selected this year, as being particularly worthy of your attention, is the *Melidora Pellucida* of Noronha, a Spanish botanist. I received flowers and fruits of it which he sent to Mexico, from the Marquis d'Apartado, and his brother, Viscount Fagoaga, two very intelligent noblemen of that country; and upon the paper

which contained the fruits, was written, "*Originaire de Canton.*" But though they were full of apparently perfect seeds, these did not vegetate, being five years old, if not more.

This species, or perhaps another of the same genus, which is cultivated at Canton, has been called *Enkianthus* by Loureiro, but as his name originated in a misconception, signifying *Gravid flower* (he having taken the red bractes for outer flowers), Noronha's excellent name will probably be adopted. It means *Honey gift*, which substance the flowers contain in great plenty; and as the same degree of vernal warmth which enlivens our bees, will probably bring out its blossoms, it may prove to us, in some degree, an useful, as well as ornamental, shrub.*

The Honourable Robert Jenkinson first introduced living plants of it into this country about four years ago, from Canton; all which, at the sale of his collection, were purchased by our worthy member Mr. Joseph Knight, of Little Chelsea, where it flowered for the first time, on the 10th of March last.

The plant which flowered is between two and three feet high, and has been preserved through the late long and severe winter, with very little artificial heat, upon an old bark-bed of a small hot-house; and I saw another, and younger plant, in a more elevated and colder part of the same house, the earth of which had been frozen so hard during the night, that it was not quite thawed at 10 A. M. when I was there. Yet it was not at all injured, and I believe,

* Since this paper was read to the Horticultural Society, Dr. Sims, in the *Botanical Magazine*, has given a figure of this shrub, calling it *Enkianthus Quinqueflora*.

this shrub will be found quite hardy enough to grow in the open air, especially in the southern parts of the island, or if planted against a wall, and protected with a mat during frost. This opinion is strengthened by the structure of its buds, which are very large, scaly, and viscid, like those of the *Rhododendra;* and the branches push forth with such rapidity, that the wood soon ripens. At all events, it is a hardy shrub, under a frame or a green-house, and exceedingly ornamental the whole year; for it is not only a lively evergreen, but the young shoots and footstalks of the leaves are tinged of a fine red colour, resembling at first sight the *Illicium Floridanum,* more than any other shrub I know. Whilst the buds are bursting, the flowers hang down among the bractes in bunches five or six together, somewhat resembling those of *Andromeda Pulverulenta,* but larger, and with five brilliant ruby-coloured lobes at the bottom, which lobes being filled with honey, and transparent, produce an effect, when the sun shines, that I have rarely seen equalled.

All yet known respecting the cultivation of this shrub is, that it may be easily increased by cuttings; and by the deep verdure and uncommonly healthy appearance of all the young plants, which are planted in a mixture of fresh turf from a common, and bog earth, there can be no doubt that this mixture suits it. The fibres of its roots being also rather succulent, it is very probable that it grows naturally in a moist soil, and that it should never be kept very dry.

When the plant is older, and flowers more abundantly, I have no doubt, that seed of it may likewise be obtained: for the stigma is large, and full of a glutinous liquid, as in many other plants of the natural order of *Rhododendra;* but

in a green-house, or where the bees have no access, it should be fecundated: for the anthers do not discharge their pollen spontaneously, like those of many plants, but by sudden jerks, when their spurs are bent down by insects attempting to get at the honey below.

XLI. *On the Want of Permanence of Character in Varieties of Fruit, when propagated by Grafts and Buds.* *By* THOMAS ANDREW KNIGHT, *Esq. F.R.S. &c. President.*

Read April 4, 1815.

NEW varieties of fruit are generally supposed, by gardeners, to be obtainable from seedling plants only; and every part of each seedling tree, which has been detached, as a graft or bud, is usually believed to be capable of affording fruit of the same kind, if subsequently grafted upon the same stock, and cultivated in the same manner. This opinion I also formerly entertained; though I was always at a loss to account for the existence of many kinds, which were obviously different, and which yet much more closely resembled each other, than any varieties which I had ever been able to obtain from seeds. But I am now satisfied, that many varieties of fruit, which are supposed to be totally distinct, have been propagated from branches of the same original tree; and that few, if any, varieties of fruit can, with strict propriety, be called permanent, when propagated by buds or grafts.

I have witnessed many instances of the variations above mentioned, but much the most extraordinary of these occurred in my garden, in the last autumn. A tree of the Yellow Magnum Bonum Plum (the Dame Aubert of DUHAMEL), which was forty years old, had always borne fruit of the usual colour; but, in the last year, one of its branches pro-

duced red fruit in every respect perfectly similar to the well known Red Magnum Bonum Plum. I had also, some years ago, a May Duke Cherry tree, one branch of which constantly produced oblong fruit, that ripened later than the produce of the other branches of the same tree, and was of greater weight, but of inferior excellence. I am confident, that neither of the branches above-mentioned had sprung from an inserted bud or graft; and I therefore cannot hesitate to decide, that the Red Magnum Bonum Plum is a variety only of the Yellow. The D'Auch Pear I also conclude to be a variety of the Colmar; the large Swan's Egg, a similar variety of the small; and the two kinds of St. Germain Pears (which MERLET and DUHAMEL have noticed, and which I have described in a former communication,)* to be varieties only of each other. The Green Gage and other Plums, and the Nonpareil and Golden Pippin, and other Apples, appear to have sported considerably in variety, in this way; and I therefore wish to point out to those Members of the Horticultural Society, who are in the habit of raising fruit trees, the necessity of selecting their grafts and buds from such trees only, as are found to afford each variety of fruit in its greatest state of excellence: or from such as may happen to present any valuable peculiarities of character.

* Vol. i. page 226.

XLII. *Notes relative to the First Appearance of the* Aphis Lanigera,* *or the* Apple-Tree Insect, *in this Country. By the Right Honourable Sir* Joseph Banks, *Bart. G.C.B. P.R.S. &c.*

Read April 4, 1815.

Nov. 4, 1790. Dr. Layard informed me, that he had been told of a new insect, infesting the Apple trees, in the neighbourhood of Kennington; that it first made its appearance in the year 1788, and was supposed to have been brought over with French Apples, of which a large number had been imported in 1787.

5. I received a bough of an Apple tree from the Doctor, who procured it from Mr. Michelson of Kennington; the wood of it was covered, especially on the under side, with mealy insects, which appeared to be Aphides.

6. Mr. Lee and Mr. Dickson called in Soho Square; both had seen the insect in question, and agreed that they had not before met with one of that nature, that attacked Apple trees. Mr. Lee thought it the same species as he had seen on the Ash frequently, and Mr. Dickson that of the Weymouth Pine.

Mr. Lee had them abundantly in his nursery at Hammersmith, and was much alarmed for the mischief they

* *Aphis Lanigera* of Hausmann, described by him in *Illiger's Magazine*, vol. i. part 2. page 440. This species may be readily distinguished from the *Aphis Pyri Mali* of Fabricius (with which, by its habitat, it might be confounded) by the absence of the horns on the under part of the abdomen, which are noticed in the character of that species by Fabricius.

'Aphis lanigera'.

Reeds Baurr delt.

Benj.n Taylor sculpt.

threatened. He observed, that they are more detrimental to the Crab stocks than to the Apple trees and that they do not attack the Pear.

Nov. 8, 1790. Visited my Garden at Spring Grove; no insects were there, and SMITH, my gardener, had never heard of an insect attacking Apple trees, in the manner above described.

9. Saw Mr. AITON at Kew: his Majesty's gardens have not been attacked, and he likewise has not heard of such an insect.

Called at Mr. LEE's at Hammersmith. He told me that all his young Apple trees were full of insects, and that he was at that moment employing smoke in hopes of destroying them. He first observed them last year, but they were not numerous; this year he has not a young Apple tree free. He shewed me the insect on the stem of a *Pyrus Spectabilis*; they were near the ground, in detached spots as white as meal. Wherever they were fixed, the bark under them was cankered in a high degree, and was swelled into a hunch above the level of that on the other side of the branch.

15. Called this day at Kennington, and saw Mr. MICHELSON. He had known the insect about three years, but was not certain, exactly, when he first observed it; believed, if it came from France, that it had been brought with young trees, and not with Apples; he had never seen it on fruit, though it was abundant on the trees from which the fruit was gathered It did not begin in his nursery, several gardeners had complained of it before he did, but he could not recollect their names: had been told, that the insect was very rife at Maidstone, but did not know how long it had been observed there.

In his garden, it attacked nothing but Apples; Pears were safe from it; but it took Apple trees of all ages. He inclined to believe it the same insect as he had been used to see on Willow leaves: the easterly winds had much lessened the quantity in the garden, but there were still plenty near the ground. July and August were the months, in which they were most numerous and pernicious.

Nov. 17, 1790. Mr. Dickson tells me, that some of the gardeners suppose the insects to have been brought into the neighbourhood of London, with Apple stocks from Surrey. Mr. Smith, who lives at Dalston, near Hackney, declares that neither he nor his neighbours have yet been troubled with it; if so, the head quarters are in the S. E. of London.

July, 1791. Early in July, I observed this insect, in some abundance, on a Codlin tree,* near the northernmost hot-house in the Botanic Garden at Kew. Mr. Aiton told me he never had seen it before: and though I carefully looked among his other Apple trees, both in the Botanic and Kitchen Garden, I did not observe any signs of it.

August. In August, I visited her Majesty's garden at Frogmore, and found the espalier Apple trees much infested. Mr. Greening told me that the insect was new to him, but had been there about two years; before which time he had no knowledge of it whatever.

Aug. 20. I this day visited a house Mr. Greville had lately hired at Paddington, and found in the small garden annexed to it, an infinite number of the insects on the espalier Apple trees.

Dec. 19, 1791. Mr. Greville, in conversation this day,

* This tree died, and was cut down in 1795.

suggested the expedient of white-washing trees completely over, in winter time, after they have been pruned, as likely to destroy this insect; and told me that it had been found a decisive remedy against moss, by a gentleman who had tried it in Pembrokeshire.

July, 1793. In the beginning of this month I first observed the insect fastened on the stems of the Codlin trees, near the insertion of the branches, in my garden at Spring Grove. I shewed them to SMITH, my gardener, who had not before observed them, and he assured me, that he had never, in his practice as a gardener, before seen them.

December. Mr. DICKSON tells me, that the insect has this year wholly disappeared in a garden at Bethnal Green, where more damage was done by it in the year 1790, than any where else, several newly grafted Apple trees having been entirely destroyed. He is of opinion, that it is a native insect of this country, and has its seasons, like many others, in which it is more or less abundant.

January, 1794. Mr. DICKSON, who at my desire had seen Mr. DUTHIS' gardener at Bethnal Green, above mentioned, brings word from him, that when the insect first appeared in the autumn of 1789, he thought himself wholly ruined; but that now he receives very little damage by it. A thunder-storm that happened when they were abundant in his garden destroyed great quantities; since that time he employs men to rub the insects with their hands from the stocks, and in this manner one man will clean a thousand grafted stocks in a day. He says, that care must be taken to tread the ground close to the roots, as the greatest damage is done by these insects, when by means of cracks in the earth, they

are enabled to fix themselves on the tops of the roots, or on the stems, where the roots are inserted.

June, 1794. This year has been a seasonable and a warm year, the easterly winds did not prevail in the spring, and in the summer they have hitherto produced hot and dry weather. In April, we had unusually warm weather for several days, which caused the leaves to unfold earlier than usual: but many species, among which were the Apples, suffered much from cold nights in the month of May.

The insects are this year almost general at Spring Grove, where they were unknown till last year: they are now at the very top shoots of the Codlin trees. At Chelsea, they are almost universal, and at many other places; this is owing, in all likelihood, to the length of time the season has afforded for their increase. The autumn will shew whether the damage they do is formidable.

1795. The Codlin trees at Spring Grove missed a crop for the first time since I recollect. They seem to be more damaged by the insect than the other trees.

1796. The Codlin trees have no fruit this year, and not more than one fourth of the leaves they used to have. The Russetings have as many insects upon them, but do not appear to have suffered in so high a degree.

Mr. Smith, my gardener, tells me, that a gardener near the King's Bench, in the Borough, used to be famous for Codlins, the damp soil of his garden being suitable to them. The trees wanted no care, and he often got £100. a year for the fruit. This year he was told that the insect had so completely done its duty, that not one Codlin tree remained alive in the garden.

June 21, 1796. Mr. ROBINSON, of Windsor, tells me that the Golden Pippin trees, in the Maestrich garden there, are more hurt by the insect, than any others he has observed. He has few, or possibly no Codlins.

July 10. The season has been rainy, frequent showers, both day and night, have produced about an inch of rain within the last ten days; and my Apple trees have shot very vigourously. The insect appears to be checked considerably, especially on the western side, which has been the windward side, during all the rain. The Apples which a week ago were scarce visible, and seemed likely to drop off, have during this time filled incredibly. The crop, however, will not be one-fourth of the usual produce before the insect attacked them.

It is contrary to the usual course of nature, that every created entity should be wholly destroyed by another: nature will, therefore, no doubt, provide some remedy; otherwise the Apple trees in this island will be destroyed: as it is, they certainly will be much diminished, and the fruit become dearer than formerly.

28. Mr. FORSYTH, of Kensington, has suggested that the insect was probably imported by SWINTON, who kept a garden, at the time it was first observed, at the corner of Sloane Street, and dealt largely in foreign fruit trees, particularly those imported from France. He says, he observed it fourteen years ago, and it is certain, that it appeared very early in that neighbourhood.

The rain which has prevailed during the whole of this month has stopped materially the progress of the insects, and the trees have recovered surprisingly. My Codlin trees will yield a moderate crop, and they have made some wood.

July 26, 1796. In Sussex, at Lewes and Sheffield Place, no insects had been heard of.

29. Smeared two Codlin trees with soft soap and flour of brimstone.

30. Saw the insects in Mr. CHALIE's garden at Wimbleton.

August 4. Mr. DALRYMPLE tells me, that a friend of his had some Apple trees infested with the insect four or five years ago: he lighted a smoaking fire under them, which killed the whole; and the trees have not suffered since! I doubt: fire is lighted under the Nopals in Mexico, at particular times, with dry horse dung, and the smoke does the insects no harm.

9. Saw the insects at Addiscombe, near Croydon; the gardener has observed them about three years. Saw them afterwards at Thames Ditton, as I passed the road, on the Apple trees, and abundantly on the Crab trees in the hedges opposite Hampton Court.

Feb. 19, 1797. Mr. MURRAY, gardener at Kensington, called upon me, and shewed me some of the insects alive on an Apple tree branch. The frost in the winter was not of long duration, but Mr. CAVENDISH's thermometer at Clapham, was one night at 6 degrees below zero. For these five days past, the weather has been frosty in the night; once the thermometer was at 23° in the day. The sun has shone this day, and the thermometer has been at 40°, or upwards.

Mr. MURRAY tells me, that he purchased, ten years ago, some Paradise stocks from the foreign nursery in Sloane-street, and that he first observed the insect on the roots of these, without knowing what it was. He thought it worth his pains to wash these stocks, but that did not destroy the insects,

which appeared next summer in his garden. He says, that lime water and soap suds, used as a wash, will kill them.

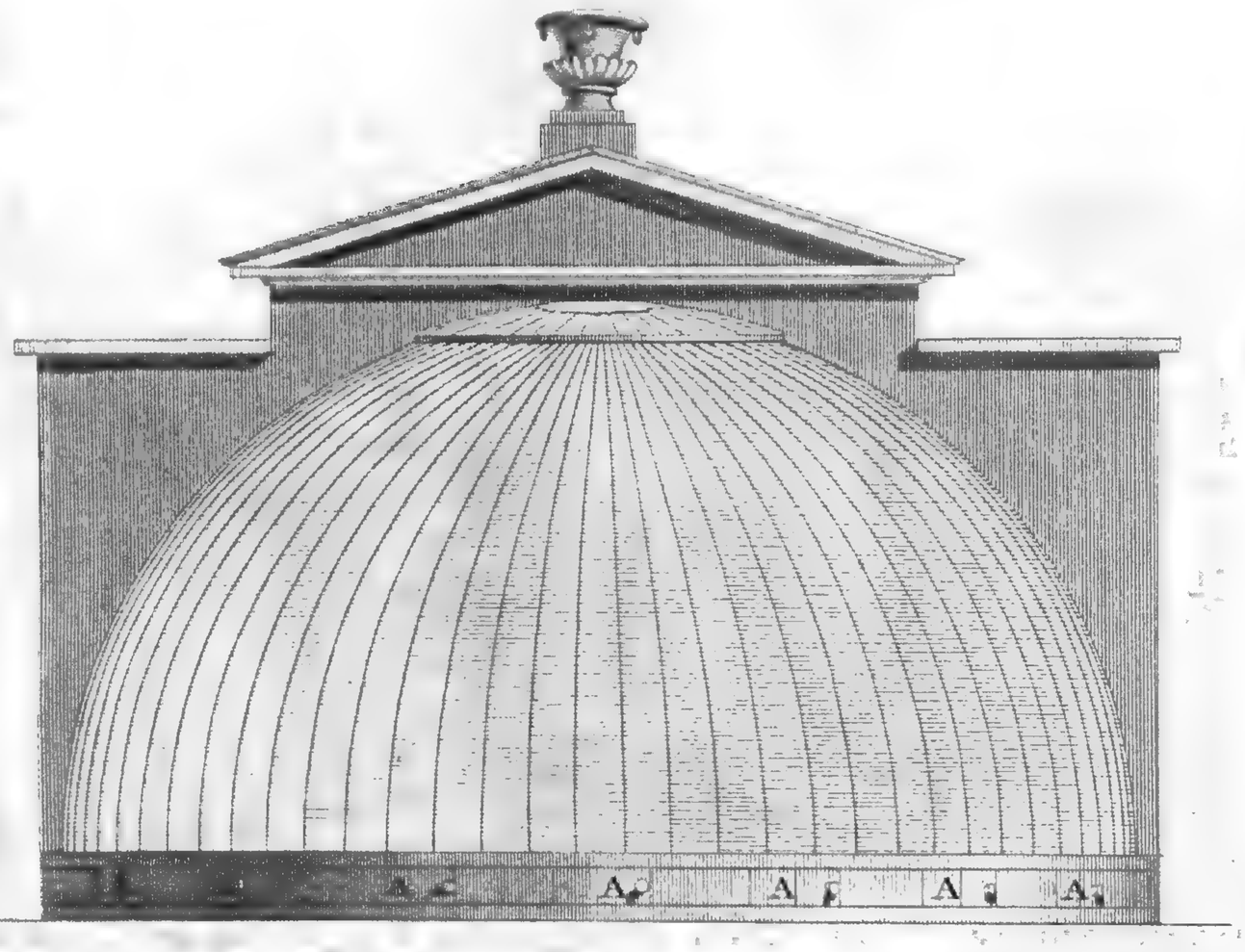
Aug. 16, 1797. The exceeding wet season which we have had all the summer, near four inches of rain falling in June, has checked the insect so much, that it is hardly to be seen, and does not seem to have done any mischief to the Apple trees at Spring Grove. The Codlins, which in the beginning of the last year seemed mortally affected, have recovered their vigour entirely, and bear a heavy crop of fruit.

The insects are, however, by no means exterminated; little white clusters of them are to be seen in fissures of the bark, or in cankery places.

Aug. 29. Tried an experiment on my Codlin trees at Spring Grove, in the hope of lessening the breed of insects. The dead and cankery part of the bark was cut off from the living part, on their trunks and main branches, and the whole surface, deprived of dead bark, was painted over with a mixture of one pound of flour of brimstone mixed with four of soft soap.

Elevation of the Front.

Fig. 1.



A *Sliding shutters in low wall to admit Air.*

B *Shutters along the top of back wall to open and shut on pivots with a cord. Larger openings may be made by means of windows in the back wall.*

C *Half the plan of the glass cover formed of cast iron astragals 2½ inches from front to inside and ½ inch thick on which the glass is fixed thus* *Glass.*

D *Half the plan shewing the flue* **F** *going round to* **E** *and out at the vase at top.*

G *Treillage for vines with an opening in the centre 6 by 2½ or 3 to allow a person to pass.*

H *Cast iron astragals glazed.*

Plan of the House.

Fig. 2.

The roots of the Porch & Furnace will be about 8 feet from the ground.

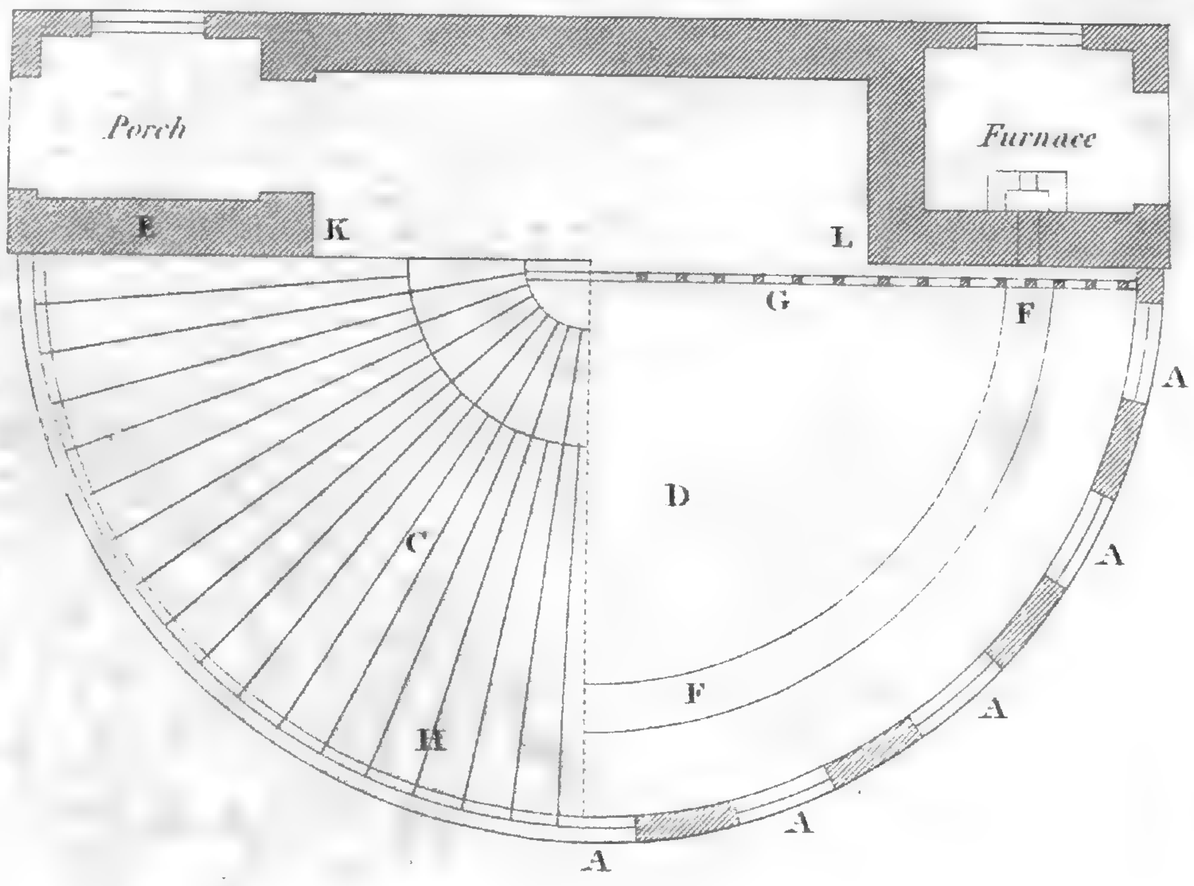


Fig. 3.

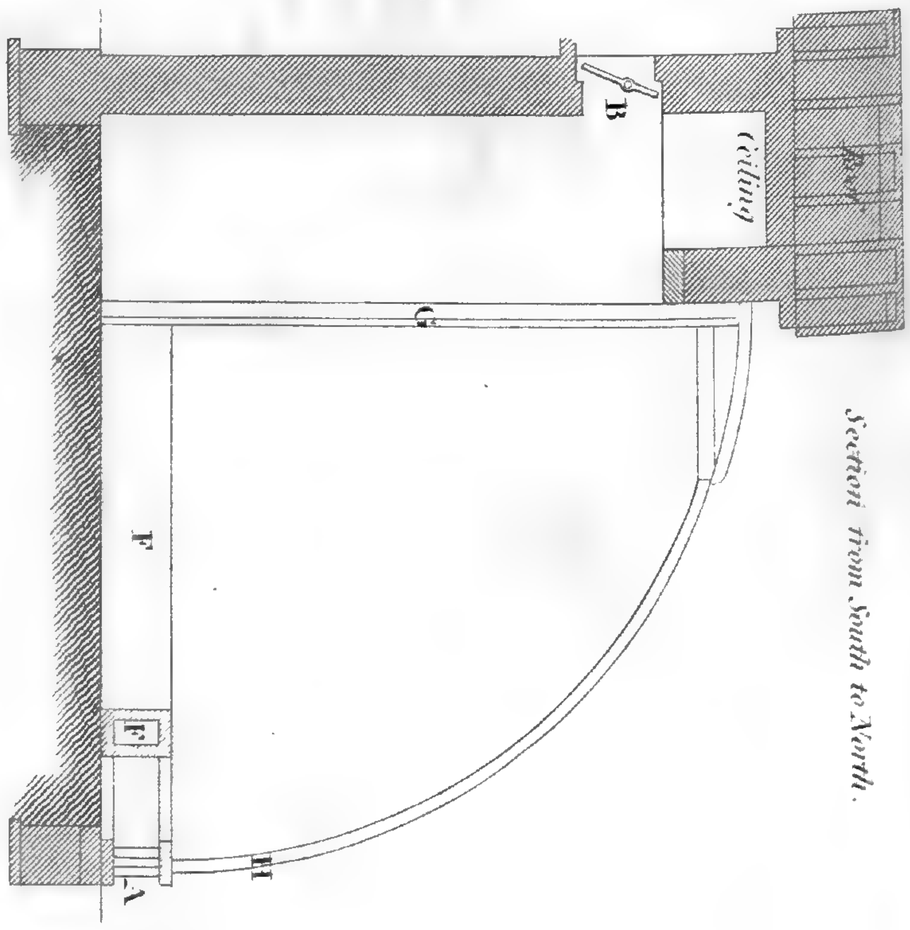
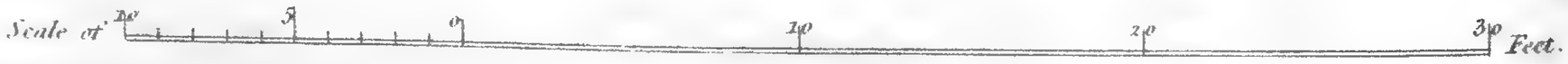


Fig. 4.



XLIII. *On the Form which the Glass of a Forcing-house ought to have, in order to receive the greatest possible quantity of Rays from the Sun. In a Letter to the Right Hon. Sir* Joseph Banks, *G. C. B. P. R. S. &c. By Sir* George Stewart Mackenzie, *Bart. F. R. S. &c.*

Read August 1, 1815.

Dear Sir,

The debt which horticulturists owe to Mr. Knight is of such a magnitude, that any attempt to improve on what he has advanced may be considered hazardous, if not presumptuous. Yet I feel persuaded, that the lucubrations of a fellow labourer will be received by him with that candour and indulgence which are the distinguishing features of a true philosopher; a title which no one can deny to the President of the Horticultural Society of London. The observations, with which Mr. Knight has introduced his remarks, on the best construction of a Forcing-house, are consistent with what constantly occurs. The frequent changes of form, which are announced as improvements, are sufficiently notorious; and I myself am one of those who have contributed to their accumulation. In the second volume of the *Memoirs of the Caledonian Horticultural Society*,* I have described an œconomical hot-house, in which as great an extent of surface as possible, is made use of for training. Give plants heat and food, as Mr. Knight observes, and they will grow;

* Page 55.

and according to that maxim, I recommended the construction referred to, as one likely to afford a greater quantity of fruit in a given space, than any plan with which I am acquainted. If I have been understood as having brought that plan into notice, believing it to be the best possible, I shall be exceedingly sorry. It is evidently not that which will receive the greatest quantity of the sun's rays; nor is any form hitherto proposed, at least, as far as I know, calculated to attain that object.

In desiring, through you, to point out to the London Horticultural Society, what that figure is, which will receive the greatest possible quantity of the sun's rays, at all times of the day, and at all seasons of the year, I do not presume that any of the members are ignorant of the solution of so simple a problem. It is the supposed difficulty of constructing it, which I am persuaded, has deterred many from bringing it into notice. The difficulty not appearing by any means insurmountable, since the use of cast iron has become so familiar, I have lately turned my attention to the subject; and am happy to find that, in reality, there is no difficulty in the case, even if the work was to be constructed in wood.

The glass, in ordinary forcing-houses, is set in a plane at right angles, or nearly so, to that of the meridian, and more or less inclined to the horizon. It is, therefore, evident, that the rays of the sun will fall in a perpendicular direction on this inclined plane (if it be not calculated to receive the rays in that direction, at either solstice) only twice in the year, and that for a very short time; no longer than while the sun is in the meridian, on two days in the year. At all other times the rays fall in an inclined direction, and are never

perpendicular to the plane of glass. Mr. KNIGHT, and the Rev. Mr. WILKINSON, have differed in regard to the proper inclination for the glass; so that without the rays ever falling perpendicularly upon it oftener than twice in the year, they shall do so, as nearly as possible, during those periods when the influence of the sun is chiefly desired! It is not my intention to interfere with that question. It will be sufficient for me to point out what is the best, and what is the worst form for the glass, leaving it to horticulturists to choose any intermediate degree of perfection, which may suit their purposes. If a form for the glass can be found, such that the rays will be perpendicular to some part of it, during the whole period of the sun's shining, not twice, but every day in the year, that form must be considered as the ne plus ultra.

It must already have occurred to you, that that form is to be found in the sphere, and it is the segment of a globe which I propose for the glass, when it is desired to receive into a forcing-house the greatest possible quantity of light. The segment is one-fourth, or a semi-dome; which I consider sufficient, though to catch the sun at all times, during summer, the segment would have to correspond with the greatest segment of the circle which the sun describes.

That form which deviates from the sphere to the greatest extent, is evidently the worst; and we may consider the limit to be a plane, perpendicular to the horizon. The ordinary form, that of a plane, inclined to the horizon, is better: then comes a polygonal shape; and the nearer this approaches to the sphere, that is, the greater the number of faces of which it is composed, it will be the better adapted to the purpose in view. As it would be attended with great

and useless expense to bring each pane of glass into the form of a small segment of a sphere, it is evident that we must be contented with a polygon. But the deviation from the curve, in the size which I am about to recommend, is so small, as will scarcely be perceptible. All this might be easily demonstrated; but the matter is so simple, that every one, who considers for a moment the path described by the sun, must be satisfied of the truth. I therefore proceed to the mechanical part of the problem, and to point out the method by which the semi-dome may be constructed; and in doing so, any disadvantage attending it, will come into view.

It will also have occurred to you, that there is a limit prescribed to the size of a house, glazed according to this figure, both by utility and convenience. A radius of fifteen feet appears to me best suited to a house of this form. Any thing less than this would be confined, and any thing greater would render necessary an inconvenient height. Should it be desired to make the length of the house more than thirty feet, a spheroidal form may be resorted to with advantage. But as that form would require a much greater degree of nicety in the workmanship, a smaller segment of a sphere may appear preferable.

On looking at the elevation, Fig. 1, I doubt not of your being struck with the neatness, I may say elegance, with which this construction is capable of being arranged. For my own part, I consider that several houses of this size and form, disposed over a garden, would have a much better effect than one great range. Whatever construction may be adopted, it appears to me better, in many points of view, to have several houses of a moderate size, than a long single

range. It is therefore no disadvantage to the globular form, that it does not admit of being extended more than thirty feet. I can imagine that the inside of such a house must be very beautiful, when covered with clusters of ripe grapes, and that the effect will far exceed that tame uniformity which is seen in houses of ordinary construction.

On referring to the plan, Fig. 2, you will perceive, that the entrance does not interfere with the glass, which is immoveable. From K to L, the wall supporting the glass is arched, and another wall is built, five feet behind, in which windows, or openings, of any convenient form, for ventilating the house, may be made. For ordinary airing, there are openings in the low front wall A A, and others at the top of the back wall, as seen at B, in the section Fig. 3. By means of these, a current of air may be conducted along the inside of the glass. It is by no means impracticable to make portions of the glass moveable, should that appear to be necessary. The plan for the back part may be varied, without interfering at all with the glass.

I cannot too strongly recommend that form of flue which I have given in the *Memoirs of the Caledonian Horticultural Society*, and which I call the embrasure flue. I have compared its effects with that of an ordinary flue, and have found, that the heat is much more easily kept up than in a common one, with a saving of more than one-fourth of fuel. An inspection of Fig. 4, will satisfy you, that a greater heated surface is exposed, and that the heated air must pass much more slowly in this form than any other, while at the same time there is a sufficient draught.

The ribs of the semi-dome, which will form the astragals

for the glass, are easily made of cast iron. The distance between them at the base may be about fifteen inches; and when the gores contract to half that width, every alternate rib may stop, as seen in Fig. 2.

As it is, at times, desirable to defend plants from the sun, when the heat is too great, two external moveable ribs may be placed on a pivot at the top, and to them may be fastened a gore of canvas, which, when stretched, by keeping the ribs asunder, may cover one-half of the glass; or several of a smaller size may be used.

There is one inconvenience (if indeed it be really one) which attends the construction I have proposed, viz. that the plants cannot be exposed to the rays of the sun, without the intervention of the glass. Such an exposure has been found, by Mr. KNIGHT, to be of great use during the time of the ripening of peaches. But it appears to me uncertain whether the advantage be derived from any additional quantity of light. I am rather inclined to think, that the fruit being exposed to the air, the process of ripening is prevented from proceeding so rapidly as it would otherwise do; and is thus rendered more perfect. I attribute the advantage more to the air than to the light. But this is a question which may be easily determined by experiment; and I hope Mr. KNIGHT will put it to that test. Whether an equal advantage be derived from exposure by grapes, my experience does not allow me to say; though I believe, that all kinds of fruit should have as much fresh air as possible during the time of ripening.

I have the honour to be, Dear Sir,
your obedient and faithful Servant,
GEORGE STEWART MACKENZIE.

Edinburgh, 6th July, 1815.

P. S. Since writing the above, it has occurred to me, on seeing the old observatory here taken down, that by making the glass semi-dome in two parts, and placing it on rollers in the manner of an observatory dome; the whole might be moved with great ease and safety, so as to expose the whole of the plants in the interior to the direct influence of the sun, when that may be thought expedient. Thus the only difficulty, in the way of constructing a house of a spherical form, seems to be removed. But if experiment shall prove that a circulation of air is of greater importance in the ripening of fruit, than the loss of a portion of the sun's rays; the expense of this movement, as well as considerable expense in the ordinary construction of hot-houses, may be avoided.

XLIV. *On the Mode of Propagation of the* Lycoperdon cancellatum,* *a Species of Fungus, which destroys the Leaves and Branches of the Pear Tree. By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read December 5, 1815.

I had the honour, two years ago, to address to the Horticultural Society some observations upon the propagation of these supposed species of parasitical plants, which, under the name of Fungi,† appear as diseases upon other living plants: and of other supposed species of the same tribe, which decompose and feed upon organic substances, that have ceased to live. In the present communication, I shall endeavour to shew, that one of these, at least, is a parasitical plant, which propagates like other plants, by seeds.

I observed, about seven years ago, a disease upon a few of the leaves of one of the Pear trees in my garden at Downton. Bright yellow spots, from which a small quantity of liquid exuded, appeared upon the upper surfaces of the leaves in June; and subsequently, several conic processes, about one third of an inch in length, were protruded from the same parts, but from the opposite surface, of each leaf; and from these a large quantity of brown impalpable powder, consisting of very minute globular bodies, was discharged in

* I am indebted for the name of this species of fungus to the extensive information of Mr. Dickson, who referred me to the *Flora Danica* for a delineation of it: but Sir Joseph Banks subsequently shewed me a drawing of it by Mr. Bauer, which is much more elaborate and correct.

† See page 82 of this volume,

August and September. These minute globular bodies I concluded to be the seeds of a species of fungus; but as a few only of the leaves of my trees were affected, and no very injurious effects were visible, I did not take any measures to prevent their dispersion over my garden.

I did not, however, long remain ignorant of the formidable nature of my new enemy; for within two years, every Pear tree in my garden became in some degree diseased. The leaves only, at first, appeared to be injured; but the disease soon extended itself to the annual branches, in many protuberant yellow spots, beneath which the bark was found to have acquired a bright yellow colour: and as far as this colour extended, the bark, and the wood beneath it, invariably perished, either in the same or following season, leaving wounds similar to those inflicted by canker, but less curable. The fruit also became diseased and worthless, and almost all the young shoots, when once attacked, perished in the following winter. These effects were not confined to my garden, but extended to the Pear trees in an orchard which was two hundred yards distant; and I cannot entertain a doubt, but that the disease was communicated to these by seeds which had been conveyed by the prevalent west winds. I endeavoured, during the summers of 1813 and 1814, to check its progress in my garden, by picking off every diseased leaf; but I found all my efforts nearly abortive, and I have been obliged to destroy the greater part of my Pear trees: those which remain, have become annually more diseased, and I fear never can be ultimately preserved, unless a remedy for the disease can be discovered.

I tried the effect, in the last season, of sprinkling the

leaves of different Pear trees, just at the period when the liquid exuded from the spots upon their surfaces, with quick lime and with fresh wood ashes, in which the alkali and lime were in a caustic state; and with flowers of sulphur. The spots, to which the quick lime and ashes were applied, soon became paler; but I had not an opportunity of observing the ultimate effect of these substances: for almost all the leaves of the Pear trees upon my walls, in the last season, became covered with black and lifeless spots, and fell off prematurely. Those of a single small standard Pear tree, on which flowers of sulphur had been sprinkled, remained alive till late in the autumn; and upon these I did not observe the sulphur to operate in any degree, till the period at which the conic processes above-mentioned would have appeared; but the yellow spots then became black, and perished, without affording seeds; whence I have reason to hope, that flowers of sulphur will prevent, in some measure at least, the rapid extension of this disease.

As the existence of this species of fungus appeared, three years ago, to be confined to my garden and a few Pear trees in its vicinity, and to the Hawthorn in an adjoining hedge (for it attacks the Hawthorn as well as the Pear tree), I then thought that it would be practicable to ascertain decisively the means by which it transfers itself from one tree to another: and this appeared to me to be an important object; because the habits of the Lycoperdon cancellatum, and of the fungus which forms the rust or mildew of wheat, are, in many respects, very similar.

I had so often tried, without success, to transfer the mildew of wheat, and other plants, from a diseased to a healthy

subject, in the same season, that I had not any expectation of succeeding in an attempt of that kind; but I thought it not improbable, that I might succeed in communicating this disease to seedling plants of the Pear tree, having long ago satisfied myself that the species of fungus, which forms the mildew of wheat, always rises from the root of the plant.

I have many years been in the habit of raising annually Pear trees from seeds, with the hope and expectation of obtaining new and hardy varieties for the dessert in winter; which may succeed without the protection of a wall; and as the means I employ to obtain seeds well calculated for my purpose, necessarily cost me a good deal of time and labour, I have always planted them in pots, and in the kind of mould which long experience has pointed out to me as the best. This I have always obtained, at the period of sowing the seeds, in January or February, from the banks of a river at some distance from my garden; and in this mould my seedling Pear trees always sprang up, and remained during the first season, perfectly free from disease. In the Spring of 1813, a portion of this mould, which I did not want, was intentionally placed very near some Hawthorns and Pear trees, upon which the Lycoperdon cancellatum abounded, where it remained till the Spring of 1814, when it was put into pots, and new seeds deposited in it. These sprang up as usual, and remained in perfect health till the end of May or beginning of June; when the fungus presented itself upon almost all the first true leaves of the plants, which leaves had composed the plumules of the seeds.

That the fungus, in this case, rose from the ground, will, I think, scarcely be questioned; but it is necessary to state,

that the seeds were all taken from trees which were not quite free from disease; and that I saw in the last spring some diseased plants, in a case where every precaution, except that of using new pots (which had been my previous custom), had been taken; and therefore, whilst so little is known respecting the habits of plants of this tribe, the preceding facts are not sufficient to support a decision, that the source of the disease might not have been in the seeds themselves. For as the fructification is probably every thing which is seen of this, and many other parasitical fungous plants, the plant may extend in minute filaments through the whole body of the tree which supports it; and it appears in this view of the subject possible, that these slender filaments may extend into the seeds. The following circumstances, however, militate strongly in opposition to this conclusion. A great number of seedling Pear trees, which were very much diseased, were removed, in the last spring, from my garden to a distant situation, after having had their roots and stems carefully and repeatedly washed, and brushed, so as to remove from them every particle of the mould, in which they had previously grown; and upon these not a vestige of disease has since appeared. Grafts also, which were formed of parts of diseased trees, have in all cases produced perfectly healthy foliage, even when inserted into the branches of other diseased trees; which circumstance I think interesting, because it tends to point out a further apparent similarity in the habits of this species of fungus, and that which forms the mildew of wheat; which ceases to vegetate as soon as the straw is severed from its roots, though that remains for some time green and living: whence arises the

advantage of cutting mildewed crops of wheat in an immature state. Further experience can, however, alone decide these points: and the only inference I wish to draw from the facts I have stated is, that the Lycoperdon cancellatum is capable, under certain circumstances, of being transferred from one plant to another in its vicinity, by means of its seeds.

I observed this disease, in the last summer, upon a few of the leaves of several Pear trees in the vicinity of London; and I fear that the fungus which occasions it, is an imported species, that is likely to increase in our climate, aud to become, in some situations at least, extremely injurious to one of the most valuable of our fruit trees. I have met with several intelligent gardeners who, at first view, thought they had observed this disease some years ago; but on further inspecting its habits and injurious effects, they have always changed their opinion.

The enormous injury which the crops of wheat sustained in the year 1814 and other seasons, by mildew, attaches a great degree of interest to the investigation of the habits of parasitical plants of this tribe; and the similarity of habits of the mildew of wheat, and of the Lycoperdon cancellatum, renders it probable that both are propagated in the same manner. I therefore venture to hope that the foregoing account, though very imperfect, of the apparent mode of propagation of the latter plant, may be thought deserving the attention of the Horticultural Society.

XLV. *On the* Connection between the Leaves and Fruit *of Vegetables, with other physiological Observations. By* Anthony Carlisle, *Esq. F.R.S. &c.*

Read January 2, 1816.

In the art of gardening, it must be allowed that the greatest value will always belong to special facts, noted down by experienced, acute, and judicious men. Still, however, the mind, which is constantly occupied upon particular details, may not be equally awake to those affinities and connections in nature, from whence useful general rules may be deduced; for it is by a comprehensive classification of leading facts, that abridgments of knowledge are made, and these must form the boundary to unprofitably minute particulars. This gathering together of similar evidence, and the assortment of it into systematic order, are more within the province of the inspector, than that of the experimenter. Under those impressions, the following observations are submitted to the Horticultural Society, trusting, that scientific or practical men may employ the accruing suggestions, so as to enlarge the scope of this branch of useful knowledge. Without presuming on the general series of facts which I have to mention, being free from apparent exceptions, I offer them as an extensive range of coincidences, from whence beneficial inferences may be drawn. There is an obvious connection

between the kind of foliage, and the kind of fruit, in many of our orchard and garden trees; and although the full and true uses of the leaves of vegetables are not well understood, yet the subject seems to be open to research, and even now capable of practical applications. The first remarkable coincidence is, between the size of the leaves and the size of the fruit. This may be seen in the contrast between the fruit and the leaves of the Magnum bonum plum, and those of the Damascene; the Bigarreau, and the wild Cherry; the Catillac, and the little Musk Pear; the yellow Antwerp and the red prickly Raspberry; the several varieties of the Gooseberry; the common small Walnut, and the large or double Walnut; the small and large Medlar; the different species of Cranberries; the Filbert, and the Hazle nut: and the same indications prevail in herbaceous fruit-bearing plants, as in the Melon and Gourd; the Strawberry; and among esculent vegetables, as in the Pea and Bean.

By an accurate observance of these characteristics, new seedling varieties may be partly estimated in an early stage, and the known kinds of fruit trees better distinguished when they are not in bearing. Other evident properties in the foliage of vegetables, such as their tints of colour, their hardness, thickness, and capability of resisting cold, are associated with the qualities of their fruits. The local influence of mountainous situations, and of a bleak aspect, which stunt the foliage, affect both the fruits and the growth of timber, in all trees. The ravages of herbivorous insects, and of parasitical fungi, are thus also indirectly mischievous to fruits. It is probable, that the great differences in fruits of the same variety, which arise from local causes, are princi-

pally dependant on the foliage. Even the diversity of the seasons, between one year and another, gives rise to noticeable alterations in the qualities of the produce from the same trees.

Perhaps a further advancement in the knowledge of vegetable nature may enable the scientific gardener to govern the foliage of his trees by artificial methods, so as to adapt them better to the vicissitudes of locality, and to the production of the more desirable fruits.* It is likely that the unfavourable change induced upon the Downton Pippin by a milder locality than that of its native place, may depend upon a more luxuriant production of leaves; and if so, under such new situations, the good qualities of that fruit might be again restored by reducing its exuberant foliage. The gradual deteriorations arising from old age in trees, are equally evinced upon the foliage and the fruit. It belongs to the peculiar habits of some varieties of trees and plants, to produce a greater or less proportion of leaves than is ordinary; and perhaps the peculiarities in their physical properties, make some of such leaves more efficient than others; since the differences in their firmness, thickness, and colour, may be reasonably supposed to influence one or more of their vital offices. A remarkable instance of the adaptation of foliage occurs in Winter Spinage, the leaves being of a more

* I am informed by a practical gardener, that buds may be artificially produced upon the long naked spaces of boughs, by making scars into the bark, similar to those left by imperfect leaves, or gem-like stipulæ. Indeed nature points out the efficacy of such methods, by those clusters of twigs so often displayed in the branches of the Elm, Birch, and Wild Cherry, and which result from the punctures of insects.

dense texture, of a deeper colour, and more compacted about the stems and roots, than in the summer variety.* These and similar evidences may probably indicate the hardiness of other esculent or ornamental plants, and may lead to the introduction of many new, useful, or ornamental vegetables, where they are at present unknown. In the spring of 1815, the first tender leaves and the immature male catkins of the generality of our Walnut trees were destroyed by the frosts; the subsequent crop was very small, and of indifferent quality. I consider those consequences to have arisen from the destruction of the first shoot of leaves; but there was also in the same season an unusual number of abortive or empty nuts, and this was apprehended to be wholly owing to the want of masculine impregnation, as I have produced the same effect upon Filbert and Hazel nut bushes, by taking away the male catkins, before the stigmas were evolved. The well known fact of clusters of empty nuts, often depends upon the destruction of their neighbouring catkins, and I have seen it extensively produced by a dormouse. A series of experiments, which I began some years ago, upon the different freezing capacities of viscid fluids, induces me to conclude, that many, if not all the vegetable powers of resisting congelation, depend on the same or similar physical causes. I was led to this enquiry by noticing the difficulty of freezing treacle, paste, dissolved starch, and some oils, as those from the nut and almond, and the most

* The attenuated and delicate foliage of forced hardy plants and housed shrubs are known to be more readily injured by frost, than if they had remained exposed; and the physical differences, in the texture of such leaves, sufficiently explain the cause of that acquired tenderness.

part of essential oils. The remarkable low temperature required to freeze these viscid compounds, directed my attention to the composition of the juices, and to the parenchymatous parts of the Willow, the Holly, the Misletoe, and the Alder; and also to the physical composition of many Evergreens. Some of those, as the Box, extend over a wide range of climates, and others which have been transported hither from mild regions, bear the frosts of this country with impunity. The causes of this capability in plants of enduring such vicissitudes, are worthy of research, because the results may, as before intimated, teach us how to ascertain those vivacious properties, both in exotics, and in the new varieties of our own culture.*

The advancement of vegetable physiology has been too long retarded by a continued effort to force upon it analogies with the structure and offices of animal organs. The ways of nature are, however, not limited by confined rules like those of man; her diversities are endless; and she is not obliged to work by any methods of system, of analogy, or of classification. Such methods are indeed great (if not indispensible helps) to human knowledge; but when we attempt to impose them upon the works of creation, we often darken and dull the evidences of our senses, and confuse the operations of reason.

The leaves of plants have been compared to the lungs of

* The generality of winter buds are admirably adapted for resisting frost, by the compacted and dry state of their spongy substance; the buds of the Horse-chestnut are coated with a viscid varnish, which is impenetrable to rain or dew. Most of the other species of winter buds are equally protected against evaporation from within, and moisture from without, by dense shelly coverings.

animals, upon a few slender analogies; but the additional offices known to be performed by leaves, shew them to be also allied to the digestive and assimilating organs. Nor is it at all unreasonable to enquire whether the digesting, secreting, excreting, and pneumatic operations of life, are, or are not compatible with each other in the same part, and whether in some examples one of those functions may not singly belong to leaves, and in other cases many of them be associated together.* The greatest number of resemblances between plants and animals are to be found in those of the most simple structure, in both kingdoms: and in all such instances, the governing influence of physical causes is strikingly obvious; whereas under a complexity of organic textures, we are apt to put aside the only natural causes which we are permitted to comprehend, and to attribute the phenomena to an occult cause, known under the ill-defined term, vitality. Assuredly, the leaves of vegetables very generally perform the offices of animal stomachs; as when they convert the raw material of vegetable nutriment into a new and peculiar substance for building up the fabric of plants. The extensive variety of new compounds which different plants contain, are elaborated from nearly the same kind of

* I wish it to be understood that I consider the green cellular tissue of the bark in young branches to consist of the same material with their leaves, and that it is devoted to the same purposes: this parenchymatous pulp seems to be a reservoir for the next successions of foliage and fructifications, because buds consist chiefly of fibrous material. The branches of the China Rose possess more of this green pulp than the branches of other roses, and which may be the cause of its continued flowering. May not the stock of the China Rose be therefore more efficient for the healthy support of buds and grafts, from the yellow, and other difficult flowering Roses?

raw material; and doubtless the vast variety of vegetable leaves is in each species adapted to their special secretions. It is probable that the novelty of these statements may give rise to controversial opinions; but since I only adduce them as connected with general views, and not as universal truths; my object will be fully attained if they occasion any new series of accurate and decisive experiments, being myself wholly indifferent as to the side on which truth is ultimately to rest, provided it be clearly elicited.

My individual power, or ability, to prosecute these and similar researches, is forbidden by a hopeless want of leisure. I therefore gladly concede the task to those who are better circumstanced.

XLVI. *On enriching the Soil of Gardens by* fresh vegetable Manure. *In a Letter to* THOMAS ANDREW KNIGHT, *Esq. President. By the Rev.* JAMES VENABLES.

Read January 2, 1816.

SIR,

I AM induced, from your knowledge and love of Horticulture, to submit to your consideration, and to that of the Society, over which you preside, an experiment for the purpose of enriching the soil of a kitchen garden, without the aid of animal manure.

The cabbages, cauliflowers, brocoli, potatoes, peas, beans, &c., are planted in my garden, as in most others, in straight rows, or drills. Before the gardener mows the lawn and pleasure ground, he is directed to open a trench between these drills as wide as the space will admit without injury to the vegetables growing in the rows, and about nine inches in depth. The short grass mown upon the lawn is then carried into the trench, and trodden closely down till it is full, and the earth which had been removed, is again thrown upon it and the ground raked smooth and even.

Every time the lawn and walks are mown, the same course is followed, till the whole kitchen garden is regularly and successively enriched with the most excellent vegetable manure. In a very few weeks, the short grass buried beneath the surface is decomposed, and incorporates with the earth; and where the peas and beans, and other vegetables

are hoed and earthed up, it imparts a very great degree of vigour and luxuriance to their growth.

But it is not the grass only that is converted to this useful purpose. When the potatoes are dug, and the crop of peas and beans gathered, the potatoe haulm, the pea and bean haulm, the outer cabbage leaves and cabbage stalks, in short, the whole vegetable refuse of the garden to a great amount, is buried in its fresh and green state in the trenches, and far more than repays the nourishment that has been drawn from the ground.

In the end of October, the asparagus beds are dressed for the winter. The earth, to the depth of about five inches, is first drawn into the alleys; a vegetable coat of manure is then spread over the whole bed; and the earth from the alleys thrown upon the top again. The weeds by this process, are effectually destroyed, the bed is enriched, and the plants preserved from the effects of the cold and frost.

My strawberries are also planted in rows, or drills, and in the months of October and November, have their narrow intermediate trenches filled with the fallen leaves of the trees, of which there is at that season a very plentiful supply. Few plants profit more by this system than strawberries. From the rapid manner in which they exhaust the vegetable manure in the earth, they are observed to require frequently a change of ground, that is, to be removed to a soil where the vegetable manure has not yet been consumed.

I will touch but briefly upon the advantages to be derived from this system.

Mould composed of vegetable substances which have rotted and fermented in a heap, till their texture has been

broken down, and the greater part of their juices evaporated, is unquestionably of great value, and admirably calculated to impart vigour and strength to the growth of plants. But the vegetable refuse of a garden requires a length of time, before it can be brought into this state; some trouble in frequently turning the heaps; and in whatever part of the garden, or grounds, they are placed, they have always an unsightly and slovenly appearance: add to this, that these heaps lose nine parts out of ten, not only of their size and substance, but also of their most valuable qualities, by the continual action of the sun, air, and rain, upon them. But if the vegetable refuse of the garden is buried beneath the surface of the ground while fresh and green, it is then easy of solution. The moisture of the earth assists the fermentation, and decomposition; and the juices being preserved in the soil, become the nutriment and support of succeeding crops.

When a garden is manured in this way, it is scarcely possible to exhaust the soil. One crop may succeed another during the Spring, Summer, and Autumn; and in the Winter, the same ground may be fully stocked with every vegetable that will stand the severity of the frost. Each crop will leave behind it sufficient vegetable refuse to keep the soil in constant good condition. To the market gardeners such a method of cultivation must be of incalculable benefit.

I will only mention one more advantage attending this system, which will strongly recommend it to all those who delight in gardens; I mean its extreme neatness. When the gardener depends upon vegetable matter for the support and improvement of his soil, every weed will be speedily buried

in his trenches, and every decayed leaf, or withering stalk, will immediately be hid beneath the surface of the ground, and converted into a source of fruitfulness and plenty.

It is with great deference that I offer these suggestions to one so much more experienced than myself, in every thing that relates to Horticulture. If, however, you should think them of any value, you will perhaps be induced to try the experiment I have mentioned in your own garden, and to bring the result before the public with greater advantages than I can hope to give to it.

I have the honour to be, Sir,

your very obedient Servant,

JAMES VENABLES.

Buckland Newton, Dorsetshire,
December 20, 1815.

XLVII. *On the Preservation of Fruits, during Winter and Spring.* *By* THOMAS ANDREW KNIGHT, *Esq. F. R. S. &c. President.*

Read January 2, 1816.

THE art of *preserving fruits* for the dessert, in Winter and Spring, appears to be better understood, or, at least, to be practised with better success, by the gardeners of the continent, than by those of the British Islands; and it becomes a very interesting subject of enquiry, whether the superior success of the continental gardeners be dependent upon the superior qualities of their fruits, upon the influence of a less humid atmosphere, during Winter, or upon some peculiarities of management.

Fruits which have grown upon standard trees, in climates sufficiently warm and favourable to bring them to maturity, are generally more firm in their texture, and more saccharine, and therefore more capable of being longer preserved sound, than such as have been produced by wall-trees; a dry and warm atmosphere also operates very favourably to the preservation of fruits, under certain circumstances, but under other circumstances, very injuriously: for the action of those elective attractions, which occasion the decay and decomposition of fruits, is suspended by the operation of different causes, in different fruits, and even in the same fruit, in different states of maturity. When a grape is growing upon the vine, and till it has attained perfect maturity, it is obviously a living body, and its preservation dependent

upon the powers of life; but when the same fruit has some time passed its state of perfect maturity, and has begun to shrivel, the powers of life are probably no longer, or at most very feebly, in action; and the fruit appears to be then preserved by the combined operation of its cellular texture, the anti-septic powers of the saccharine matter it contains, and by the exclusion of air by its external skin; for if that be destroyed, it immediately perishes. If longer retained in a dry and warm temperature, the grape becomes gradually converted into a raisin; and its component parts are then only held in combination by the ordinary laws of chemistry.

A Nonpareil Apple, or a Catillac, a D'Auch, or a Bergamotte de Bugi Pear, exhibits all the characters of a living vegetable body long after it has been taken from the tree, and appears to possess all the powers of other similar vegetable bodies, except that of growing or vitally uniting to itself other matter; and the experiments, which I shall proceed to state, prove that the Pear is operated upon by external causes, nearly in the same manner after it has been detached from the tree, as when it remains vitally united to it.

Most of the fine French Pears, particularly the D'Auch, are much subject, when cultivated in a cold and unfavourable climate, to crack before they become full grown upon the trees, and consequently, to decay before their proper season, or state of maturity: and those which present these defects in my garden, are therefore always taken immediately from the trees to a vinery, in which a small fire is constantly kept in winter, and they are there placed at a small distance over its flue. Thus circumstanced, a part of my crop of D'Auch Pears ripen, and will perish, if not used, in November, when

the remainder continue sound and firm till March or April, or later; and the same warm temperature which preserves the Grape in a slightly shrivelled state, till January, rapidly accelerates the maturity, and consequent decay, of the Pear. By gathering a part of my Swan's Egg Pears early in the season (selecting such as are most advanced towards maturity,) and subjecting them, in the manner above mentioned, to artificial heat, and by retarding the maturity of the later part of the produce of the same trees, I have often had that fruit upon my table nearly in an equal state of perfection, from the end of October to the beginning of February; but the most perfect, in every respect, have been those which have been exposed in the vinery to light and artificial heat, as soon as gathered.

The most successful method of preserving Pears and Apples, which I have hitherto tried, has been placing them in glazed earthen vessels, each containing about a gallon (called provincially, steens,) and surrounding each fruit with paper; but, it is probable, that the chaff of oats, if free from moisture or any offensive smell, might be used with advantage, instead of paper, and with much less expense or trouble. These vessels being perfect cylinders, about a foot each in height, stand very conveniently upon each other, and thus present the means of preserving a large quantity of fruit in a very small room; and if the spaces between the top of one vessel, and the base of another, be filled with a cement composed of two parts of the curd of skimmed milk, and one of lime, by which the air will be excluded, the later kinds of Apples and Pears will be preserved with little change in their appearance, and without any danger of decay, from

October till February and March. A dry and cold situation, in which there is little change of temperature, is the best for the vessels; but I have found the merits of the Pears to be greatly increased by their being taken from the vessels about ten days before they were wanted for use, and being kept in a warm room; for warmth at this, as at other periods, accelerates the maturity of the Pear. The same agent accelerates its decay also; and a warmer climate cannot contribute to the superior success of the French gardeners; which probably arises only from the circumstance of their fruit being the produce of standard, or espalier trees.

I have, in a former communication,* given an opinion, that good varieties of hardy Winter Pears, which will succeed without the protection of walls, may be easily obtained by propagating from the seeds of the best and hardiest varieties of Winter Pears that we now possess, and the pollen of the best French Pears: and I have, subsequently, raised several hundred seedling plants, which, by their foliage and general character, promise the most ample success. Many years must, however, elapse, probably more than I shall live to see, before the greater part of these will produce fruit; but I trust, that the plants will not be neglected by those to whose care I shall entrust them, and that the produce of some of them will be hereafter honoured by the approbation of the Horticultural Society.

* Hort. Trans. vol. i. page 279.

XLVIII. *On a remarkable Property of the* Hoya Carnosa. *In a Letter to the Secretary. By Mr.* John Maher, *F. H. S.*

Read September 5, 1815.

Dear Sir,

As it does not appear that any notice has hitherto been taken of the very singular preference which the greater number of Summer insects evince for the blossoms of the *Hoya Carnosa*, in situations where their favourite fruits are both abundant and well ripened, I trust the following observation may not be deemed unacceptable to Horticulturists; since I am led to believe, that if this plant were generally introduced into graperies, it would altogether set aside the necessity of using bags.

At the same time that a flourishing plant of the Hoya Carnosa was blooming in a hot-house under my charge, at Millfield, near Edmonton, some healthy vines were loaded with ripe fruit, in a grapery immediately adjoining; the door communicating with the hot-house being kept constantly open.

At this time I daily remarked, that while the blossoms of the Hoya attracted innumerable wasps, bees, and other insects, the Grapes remained altogether untouched. The honied exudations of the Hoya, are therefore evidently preferred by insects to the pulp of those fruits which they so commonly destroy. And it would appear, that this plant

might, with advantage, be made the general inmate of the forcing-house.

The individual plant alluded to, was introduced from China about ten years since; and has now extended its shoots to the length of twenty-four feet.

I am, dear Sir,

your very obedient Servant,

JOHN MAHER.

Edmonton, September 5, 1815.

XLIX. *On the Effects of different Kinds of* Stocks in grafting.

By Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read February 6, 1816.

The practice of propagating fruits of different species, by grafting upon stocks of other species, has been so extensive, both in ancient and modern times, that the good and ill effects of it can scarcely be supposed to have escaped the observation of gardeners. Accurate information upon this subject can, however, only be acquired by experiments accurately made, and closely attended to, during many successive years, upon the comparative good and ill effects of stocks of different species, when growing in soils of the same, and of different qualities: and no such experiments, have, I believe, ever been made in this country, nor, to a proper extent, in any other. Du Hamel has pointed out, with his usual ability, the erroneous opinions entertained by his countrymen upon this subject, and has given some valuable information, which I have cited in a former communication;* but he admits, that relatively to some very important points, he only details the opinions of others; and he laments that he has not himself made the experiments necessary to decide the questions, which he wishes to investigate. I also feel, that I am not, by any means, master of the subject upon which I have taken up my pen to write: but I believe, that I have made and seen the result of more experiments, during the last thirty-five years, than any other person; and I ven-

* See page 19 of this volume.

ture to hope, that my experience enables me to draw a few conclusions, which may prove useful.

Whenever the stock, and graft, or bud, are not perfectly well suited to each other, an enlargement is well known always to take place at the point of their junction, and generally to some extent, both above and below it. This is particularly observable in Peach trees, which have been grafted, at any considerable height from the ground, upon Plum stocks; and it appears to arise from obstruction, which the descending sap of the Peach tree meets with in the bark of the Plum stock; for the effects produced, both upon the growth and produce of the tree, are similar to those which occur when the descent of the sap is impeded by a ligature, or by the destruction of a circle of bark, in the manner recommended by Mr. WILLIAMS in a former volume of the Horticultural Transactions.* The disposition in young trees to produce and nourish blossom buds and fruit, is increased by this apparent obstruction of the descending sap; and the fruit of such young trees ripens, I think, somewhat earlier than upon other young trees of the same age, which grow upon stocks of their own species; but the growth and vigour of the tree, and its power to nourish a succession of heavy crops, are diminished, apparently, by the stagnation, in the branches and stock, of a portion of that sap, which, in a tree growing upon its own stem, or upon a stock of its own species, would descend to nourish and promote the extension of the roots. The practice, therefore, of grafting the Pear tree on the Quince stock, and the Peach and Apricot on the Plum, where extensive growth and durability are wanted, is wrong;

* Vol. i. page 108.

but it is eligible wherever it is wished to diminish the vigour and growth of the tree, and where its durability is not thought important. The last remark applies chiefly to the Moor-park Apricot.*

When great difficulty is found in making a tree, whether fructiferous, or ornamental, of any species, or variety, produce blossoms, or in making its blossoms set when produced, success will probably be obtained in almost all cases, by budding or grafting upon a stock which is nearly enough allied to the graft to preserve it alive for a few years, but not permanently. The Pear tree affords a stock of this kind to the Apple; and I have obtained a heavy crop of Apples from a graft which had been inserted in a tall Pear stock, only twenty months previously, in a season when every blossom of the same variety of fruit in the orchard was destroyed by frost. The fruit thus obtained was externally perfect, and possessed all its ordinary qualities; but the cores were black and without a single seed; and every blossom had certainly fallen abortively, if it had been growing upon its native stock. The experienced gardener will readily anticipate the fate of the graft: it perished in the following winter. The stock, in such cases as the preceding, promotes, in proportion to its length, the early bearing and early death of the graft.

The authority of DUHAMEL gives us reason to believe, that the defects of particular soils may be remedied by a proper selection of stocks; and that cases may occur, in which it will be eligible to bud the Peach and Nectarine

* The Abricot-Pêche, or Abricot de Nancy of the French.

upon the Apricot or Plum. My own experience induces me to think very highly of the excellence of the Apricot stock, for the Peach or Nectarine; but wherever that, or the Plum stock is employed, I am confident the bud cannot be inserted too near the ground, when vigorous and durable trees are wanted. The opinion of Mr. Wilmot, in a former Volume of our *Transactions*,* is, upon this point, opposed to mine; but I speak upon the evidence of long experience, and of experiments accurately and purposely made with my own hands.

The form and habit which a Peach tree of any given variety is disposed to assume, I find to be very much influenced by the kind of stock upon which it has been budded: if upon a Plum or Apricot stock, its stem will encrease in size considerably, as its base approaches the stock, and it will be much disposed to emit many lateral shoots, as always occurs in trees whose stems taper considerably upwards; and, consequently, such a tree will be more disposed to spread itself horizontally, than to ascend to the top of the wall, even when a single stem is suffered to stand perpendicularly upwards. When, on the contrary, a Peach is budded upon the stock of a cultivated variety of its own species, the stock and the budded stem remain very nearly of the same size at, as well as above and below, the point of their junction. No obstacle is presented to the ascent, or descent, of the sap, which appears to ascend more abundantly to the summit of the tree. It also appears to flow more freely into the slender branches, which have been the bearing wood of

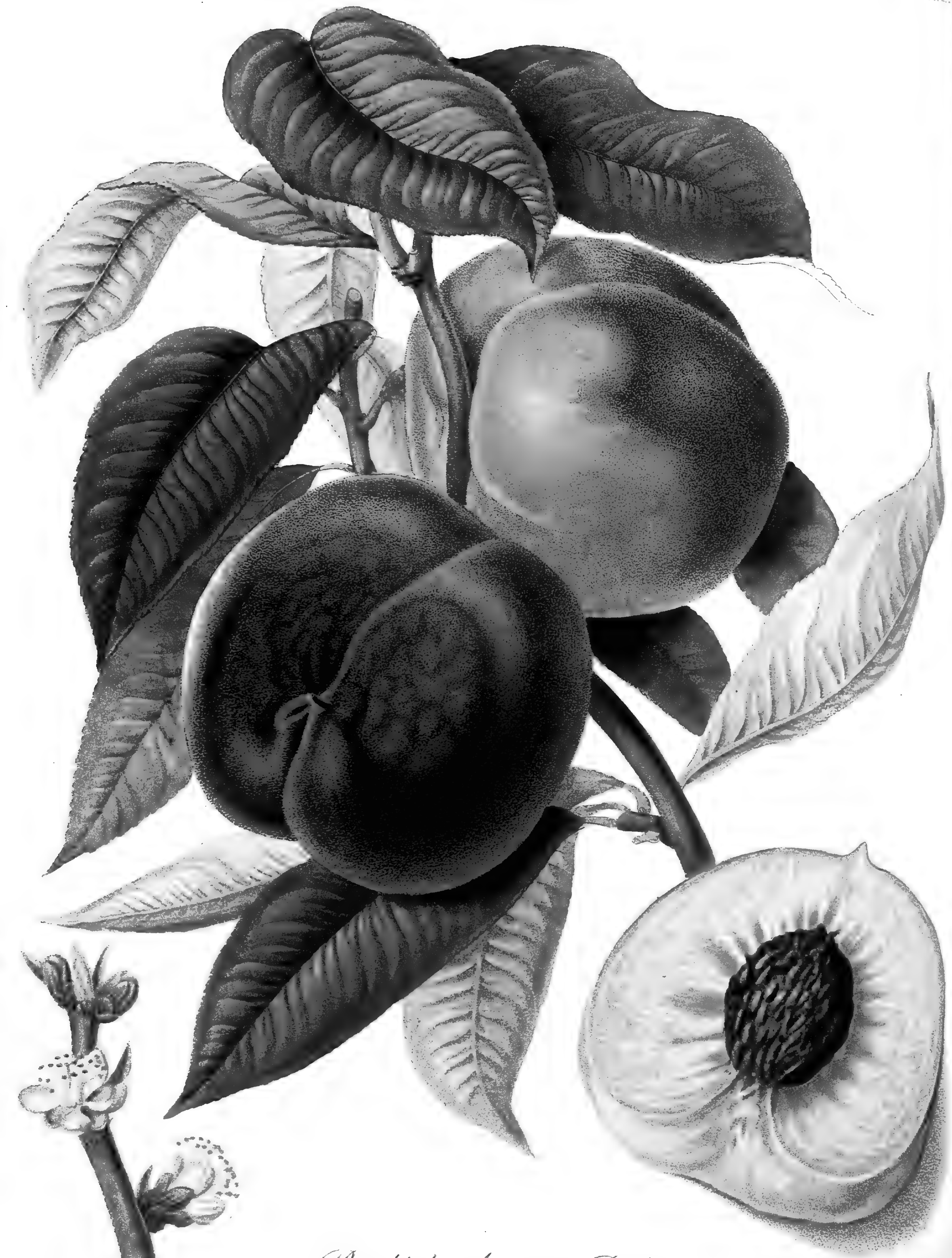
* Vol. i. page 216.

preceding years: and these consequently extend themselves very widely, comparatively with the bulk of the stock and large branches.

When a stock of the same species with the graft or bud, but of a variety far less changed by cultivation, is employed, its effects are very nearly allied to those produced by a stock of another species, or genus: the graft, generally, overgrows its stock; but the form and durability of the tree are generally less affected, than by a stock of a different species or genus.

Many gardeners entertain an opinion, that the stock communicates a portion of its own power to bear cold, without injury to the species, or variety, of fruit, which is grafted upon it: but I have ample reason to believe, that this opinion is wholly erroneous: and this kind of hardiness in the root alone can never be a quality of any value in a stock; for the branches of every species of tree are much more easily destroyed by frost, than its roots. Many also believe, that a Peach tree, when grafted upon its native stock, very soon perishes; but my experience does not further support this conclusion, than that it proves seedling Peach trees, when growing in a very rich soil, to be greatly injured, and often killed, by the excessive use of the pruning knife upon their branches, when those are confined to too narrow limits. The stock, in this instance, can, I conceive, only act injuriously by supplying more nutriment than can be expended; for the root which nature gives to each seedling plant must be well, if not best, calculated to support it; and the chief general conclusions which my experience has enabled me safely to draw, are, that a stock of a species, or genus,

different from that of the fruit to be grafted upon it, can rarely be used with advantage, unless where the object of the planter is to restrain and to debilitate: and that where stocks of the same species with the bud, or graft, are used, it will generally be found advantageous to select such as approximate in their habits, and state of change, or improvement, from cultivation, those of the variety of fruit which they are intended to support.



Braddick's American Peach.

L. *An Account of a new Peach from North America: called* Braddick's American Peach. *In a Letter to the Secretary.* *By* John Braddick, *Esq. F.H.S.*

Read November 7, 1815.

Sir,

In compliance with your request, I now give an account of the *Peach* tree, fruit of which was tasted at your last meeting, and deemed worthy of notice.

Some years ago, when travelling through Maryland, Virginia, and the neighbouring provinces of the United States of America, I had an opportunity of observing the mode in which the Peach trees of those provinces were propagated, which was invariably from the stone of the Peach, the plant being never budded, but always remaining in a state of nature. In the middle, and southern provinces of the United States, it is no uncommon circumstance for a planter to possess a sufficient number of Peach trees to produce him, after fermenting and distilling the pulp, from fifty to one hundred barrels of Peach brandy: the manufacturing of this liquor, and the feeding of hogs, being the principal uses to which the Peach is applied in those countries. A Peach orchard usually contains a thousand or more standard trees. These trees being raised in the manner which I have detailed, it is easy to conceive, that the fruit growing on them must consist of an endless variety, scarcely any two trees producing

exactly alike; and although by far the greatest number of trees, in any of these orchards, will always be found to produce fruit below mediocrity, in point of flavour, yet a judicious observer will never fail, among so great a number, to pick out a few trees, the race of which may be considered worthy of preserving. Impressed with this idea, about five years ago I requested a correspondent in the United States, in whom I could confide, to select for me any young Peach trees, the fruit of which he might judge, upon tasting, to be of exquisite flavour. He obeyed my instructions, by sending me a small bundle, containing about two dozen trees. Of these only one grew, which is the tree that produced the Peaches in question, and which is now growing vigorously in my garden at Thames Ditton.

I hope it will not be deemed irrelevant to the present subject to mention, that for several years past I have endeavoured to bring the Peach trees from South America into England, from the Rio de la Plata;* but owing to vermin destroying the bark of the trees on ship-board, the great length of the voyage, and other untoward circumstances, I never was able to accomplish the desired point, until a gentleman residing near Buenos Ayres selected for me, from fruits of a superior flavour, a parcel of stones, which he packed in sand. These came safe to hand about three years ago, I distributed them amongst my friends, and planted some myself. The trees from these stones may be expected to fruit next year; they are now growing in the gardens of Lord King, at Oakham, of John Sudlow, Esq. at Thames Ditton,

* Fire-wood is so scarce round Buenos Ayres, that Peach trees raised from the stones are chiefly used for the purpose of burning.

and in the Royal Gardens at Hampton Court; about two dozen of fine healthy young trees, which indicate different varieties by the leaf, are also growing in my garden at Thames Ditton. Some of these, I hope, at a future period, will be found worthy the attention of the Horticultural Society.

I have the honour to be,

SIR,

your obedient Servant,

JOHN BRADDICK.

Thames Ditton, October 17, 1815.

LI. *Some Account of three new* Cherries, *the* Elton, Black Eagle, *and* Waterloo. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F.R.S. &c. President.*

Read March 5, 1816.

My dear Sir,

I send a few grafts of three new varieties of *Cherries*, the *Elton*, the *Black Eagle*, and that to which the Fruit Committee of the Horticultural Society gave, in the last season, the name of the *Waterloo Cherry*. Of the two first mentioned varieties I have already given descriptions, relative to the growth and habits of the trees; and I have, therefore, only to give such an account of the Waterloo Cherry, as the very limited means I have had of ascertaining its habits will enable me to furnish. This Cherry, like the Black Eagle, sprang from a seed of the Ambrée of Du Hamel, and the pollen of the May-Duke; and in the growth of its branches it a great deal resembles the latter variety; but its buds and leaves are larger, and more pointed. It sprang from the largest and finest Ambrée Cherry that I ever saw; and I imagine that it was the best fed; for it stood alone upon a tree which was well capable of bearing, at least, half a dozen pounds of Cherries. I had not suffered so much as one hundredth part of the blossoms to remain upon the tree; and of sixty blossoms, which had been the subject of my experiment, fifty-nine were destroyed by frost. I anticipated the appearance of a fine Cherry from the seed of the single one

which remained; and the Fruit Committee will, I believe, decide that I have not been disappointed. I nevertheless think, that they have only seen it in a very imperfect state: for the first fruit of young Cherry trees is never perfect. Of this fact the first produce of the Black Eagle Cherry tree afforded a striking example; I sent a part of it, with other Cherries, to the Horticultural Society; and it was then in my estimation, as the Fruit Committee found it, positively good for nothing. It was so bad, that I should most certainly have taken off the head of the tree, and employed its stem as a stock, but that it had been called the property of one of my children, who sowed the seed which produced it, and who felt very anxious for its preservation; and I suffered it to retain its head, lest by destroying it, I might also destroy the fondness for a pursuit, which I had laboured with some success to create. The fruit, which it has subsequently produced, rivals, I believe, in richness, if it does not exceed, that of any Cherry we possess, when produced by as young a tree.

The blossoms of the Waterloo Cherry expand somewhat later than those of the Elton and Black Eagle, and it ripens some days later. I had reason, in the last spring to think its blossoms very hardy, like those of the May Duke: for the whole of it set very freely, and none of the fruit fell prematurely. On approaching maturity, however, one side of the greater part of the berries presented a dark livid colour; and my gardener was, for some days, perfectly confident, that the whole crop was going to decay, instead of ripening. It nevertheless ripened perfectly, and acquired, in ripening, a rich and deep red colour, nearly black, being scarcely a shade

paler than that of the Black Eagle Cherry. Should this peculiarity of change of colours continue to characterize the immature fruit, it will effectually serve to identify the variety, though by an appearance, at one period, which is very far from being agreeable. In form, this Cherry is more conic towards its point than the Black Eagle, and it is a full size larger than that variety.

I beg leave to suggest to the Society the expediency of publishing, annually, their decisions upon the merits of such new varieties of fruits as are presented to, and approved by them: for I have recently had occasion to observe, that the effects of different soils, and culture, upon many varieties of fruit, are much more extensive than I previously conceived, and, possibly, than any other person has imagined. The individual who has raised a new variety of fruit, however excellent it may be, cannot be certain of, nor responsible for, its merits, when it is transferred to a different soil, or climate; and therefore it is desirable, that the Society should decide upon the merits of such fruit, in the state it was presented to them, and report, as far as practicable, the kind of soil, and climate, in which it grew. The same variety of Apple, which, when it is the produce of one soil, will remain sound and perfect till March or April, will from another soil, become mealy and insipid in the end of October. The skins also of many varieties of Grape will be thick or thin, and the fruit, generally, good or bad, according to the kind of culture given. I have seen the Autumn Bergamotte and Swan's Egg Pear, when grown in a strong soil, and the latter in one situation, in a light sand, remain as hard as the Catillac Pear, and perish without becoming in the

slightest degree soft or melting. What changes the Cherries abovementioned, may undergo in different soils, I am, of course, wholly ignorant; and I therefore feel anxious, that the Society should publish their opinion of the samples I send them, and that they will take similar measures relatively to any other valuable new varieties of fruit, which I, or any other person, may, in future, have the honour to address to them.

LII. *An Account of a Method of growing* Mushrooms *under Glass. By Mr.* Stephen Jeeves, *Gardener to the Hon.* Thomas Brand.

Read March 5, 1816.

Although it is probable, that the method of growing *Mushrooms*, which I have pursued, these four months past, is well known to many of the Fellows of the Horticultural Society, and may have been practised by other gardeners, yet, as it has not, I believe, been publicly communicated, I hope the following statement may be acceptable.

Not having a shed which could be conveniently adapted to the plan directed by Mr. Oldaker, in his account of the method practised in raising mushrooms in Russia, without considerable expense in making a flue and erecting stages, it occurred to me, that the pit of a small stove (hitherto used for forcing flowers) might be applied to a similar purpose.

To make my bed, the dung was placed in the bottom of the pit, and rammed tightly down, to about the thickness of eighteen inches; the dung itself producing sufficient heat to set the spawn running, after it had been introduced in the usual manner. The bed was made up last September, and came into bearing in six weeks; it has continued to produce regularly to the present time, and requires no more heat than is collected by the effect of the sun on the air within the house, except on frosty nights, when a little fire is put into the flue.

The mushrooms come up uniformly over every part of the bed, which is covered very slightly with straw (not sufficient to exclude the light,) for the purpose of preserving moisture on the surface.

The spawn was obtained from the natural plant in the fields, in October 1814, and was kept in lumps of earth, in a dry room, till it was used. In growing it, however, by this method, it is requisite to be particularly careful to select it from places where the true mushroom alone grows, lest a bad sort, or other noxious fungi, be introduced thereby into the bed.

When a daily supply is not wanted, this method of raising mushrooms might be adopted, and a sufficient quantity for a small family raised, by putting the dung and spawn into boxes of such a size as might be conveniently placed into the shelves, or other parts of greenhouses or conservatories.

LIII. *An Account of three* new Peaches. *In a Letter to* Joseph Sabine, *Esq. F. R. S. &c. Vice President. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read April 2, 1816.

My dear Sir,

In the absence of Mr. Salisbury, I have addressed to you a few *Peaches* of *three new varieties*, which I have obtained from seeds; and I will beg the favour of you to submit their merits to the decision of as many members of the Fruit Committee of the Horticultural Society, as you can, with convenience, get to attend. All are early, but No. 1 and 4 are more early, than No. 2.

No. 1, is the offspring of an early Peach, which I received under the name of the large French Mignonne, and the pollen of the early red Nutmeg Peach. The female parent, however, was not the Grosse Mignonne of Du Hamel; but a Peach very closely resembling the variety called, in the nurseries near London, Neil's Early Purple. The new variety has grown very freely, in my garden, and borne well, and it ripens, in ordinary seasons, some days before the Noblesse Peach; but in the present season, which has been peculiarly warm and favourable, that, and the Noblesse, have ripened at the same time. The sample sent, grew upon a very young tree, which bore a very heavy crop: and it will probably prove, on that account, somewhat less saccharine than if it were the produce of an older tree of the same variety: in every other respect, the sample sent is good.

* Since called the Early Downton Peach.

No. 2, is the *Acton Scott Peach*, of which a plate and description are given in the *Horticultural Transactions.** The sample sent is, in every respect, favourable.

No. 4, springs from the same parentage as No. 1, and ripens, under similar circumstances, at the same time. The sample sent, of this variety, is below the ordinary size; and I suspect the stones of it to be a good deal larger, than usual: for the young fruit, at the period the stone formed, was remarkably large, and owing to some cause, with which I am not acquainted, it did not afterwards increase in size, nearly so much as I had reason to expect. This variety, in my garden, never becomes over ripe, that is, it never becomes mealy. or insipid; but it shrivels a little whilst it still remains on the tree, like a Nectarine, and it is then most perfect. One of those you receive, was ripe nine days ago; and you will, nevertheless, probably receive it in a very perfect state. The growth of the trees of this variety is rather slow, even upon a Peach stock; but the wood is perfectly healthy, and always appears to acquire maturity earlier in the summer than that of any other variety; and it affords blossoms in rather injurious profusion. It appears to succeed much better on the Apricot, than on the Plum, stock; and were I to judge, solely, from its growth, in the present season, I should say, that the Apricot stock suited it better even than the Peach stock; but the season has been exceedingly favourable.

What I have said of the Acton Scott Peach is, in a great measure, applicable to the two other varieties abovementioned: and all will probably succeed, in many

* See page 140 of this Volume.

cold and unfavourable situations, where the more delicate French varieties would fail. Good new varieties of the Peach are, I believe, very readily obtainable from seeds: for I have never raised a single variety which was not tolerably good; and my experiments have been confined to a few early varieties, which I found to be capable of ripening tolerably well, in the open air, in this situation. The first produce of the original tree, No. 4, was so harsh and austere, that I instantly threw it away; and the preservation of the variety was solely owing to a bud, which I had inserted in an older tree, at the time when I first noticed the approaching early maturity of the new variety; I gave it the name of the *Spring Grove Peach*, as soon as I observed its merits.

I am, my dear Sir,

sincerely your's,

THOMAS ANDREW KNIGHT.

Downton,
August 21, 1815.

LIV. *Observations on the Peaches described in the preceding Letter.* *By* JOSEPH SABINE, *Esq. F.R.S. &c. Vice President.*

Read April 2, 1816.

THE specimens of *Peaches* entrusted to my care by our President, arrived at a time when it was not in my power, at the instant, to call a meeting of our members; and as the state of the fruit admitted of no delay, I was under the necessity of examining them, with the assistance of Mr. Hooker, alone.

Due consideration must be given to the circumstances under which these Peaches were tasted. Such delicate fruit suffers much in carriage; and being also the produce of very young trees, their flavour, of course, was inferior to what they will attain in a few more seasons. Notwithstanding these disadvantages, however, I do not hesitate to announce them as most valuable, and important additions to our gardens, and possessing advantages which we have hitherto not obtained, in this species of fruit.

The early maturity of No. 1,* even in the unfavourable climate where it has been ripened, is a powerful ground of recommendation for its cultivation. It is nearly the size of the Acton Scott Peach; is a handsome fruit, the yellow and red colours being very bright; the flesh is juicy, melting, and parts from the stone; it is rich in flavour, with a strong nutty taste, but not equal to that of the Acton Scott Peach, the specimen of which, being gathered from an older tree, was preferable,

* Since called the *Early Downton Peach*.

No. 4, which Mr. KNIGHT has named the *Spring Grove Peach*, possesses qualities which are quite new, and so excellent, as must place it in the highest rank of its species. Of its colours, the yellow is bright, and the red dark; the flesh, though firm, is not hard; it melts in the mouth, and resembles a Nectarine much in consistence as well as taste, having a remarkably rich, brisk, and vinous flavour. The specimens were small in size, and the stone rather large in proportion: it parts readily from the flesh, which has a greenish cast, with a tinge of red at the centre. It may, shortly, be described, as a Nectarine, possessing many of the properties, and all the appearance of a Peach.

The *Acton Scott Peach* has been described, and figured, in our *Transactions* of the preceding year.* It is very rich in flavour, juicy, and sweet: the flesh parts from the stone, which is small. It is an excellent fruit, and its disposition to ripen well, and perfectly, at Downton, will ensure it a place in all collections, when the climate is not propitious to the more tender sorts.

* See page 142 of this Volume.

LV. *On the Culture of the Peach and Apricot on* Espalier Trees. *By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read April 2, 1816.

A more favourable climate is generally necessary to bring to maturity the fruits and seeds of trees, than is required to ripen their wood; and, consequently, many species are found to subsist, and flourish, in the climate of England, which never produce in it either fruit or seeds. Exceptions to this rule are not, however, wanting; and both the Peach and Fig tree will ripen their fruit, without the protection, or reflected heat of a wall, in situations where their annual wood will, very rarely, become sufficiently mature to bear even a moderate degree of cold. It follows, therefore, that wherever the climate is sufficiently warm and favourable to ripen the wood, it will also ripen the fruit, of the Peach tree, if its blossoms can be preserved; and this I have found to be very easily practicable on Espalier trees. My experience, however, has not been very extensive: for the wood of the Peach tree does not ripen at Downton, at all, on standard or espalier trees, and very imperfectly either on an east, or west wall; and consequently, I found it necessary to plant my trees in pots, and train them to a south wall, till they attained a proper age and size; and then to remove them early in the spring, and employ them as Espaliers, under the following circumstances.

A row of stakes, about five feet high, and somewhat exceeding the height of the trees, was placed at a few inches

distance behind them; and between these stakes twisted bands of Pea straw were interwoven. A mat was then fixed to the top of these stakes, and thrown forward, over the trees, to protect them during the night, and returned back to the other side of the stakes during the day. The materials here used, exclusive of the mat, are scarcely of any value, and the time and trouble necessary, will be found very inconsiderable; and if I may be allowed to judge from the results of a very few experiments, made under very unfavourable circumstances, as to climate, I cannot doubt, but that abundant crops of Peaches might certainly be obtained from Espalier trees, in the vicinity of London, and in all the warmer parts of the island; for those I obtained, though small, were not defective, either in maturity or flavour, and became ripe within about a fortnight after those, which grew upon a south wall.

Every variety of the Apricot, even the Moor-park, might, I am quite confident, be thus cultivated with the most perfect success; and the fruit, though smaller, would probably be found better flavoured, than that obtained from walls.

Less ample means of protection than those above detailed, would, I conceive, be generally found adequate to protect the blossoms of the Apricot, and of many of the less delicate varieties of the Peach: for I recollect an instance, in which a standard double-blossomed Peach tree, in the vicinity of London, bore several successive, and rather abundant, crops of fruit; and if trees of any hardy variety of the Peach were trained in rows, in the direction of north and south, and mats were thrown over them at night, so secured as to descend on each side, nearly in the angle of the ordinary roof of a build-

ing, I doubt much, whether any further protection would be necessary for trees not exceeding the height of five feet. That this, or some similar mode of cultivating the Apricot, has not been tried, (and I believe none ever has) has long appeared to me somewhat extraordinary: and I therefore recommend the experiment, which I cannot myself properly try, to those Members of our Society, who are more fortunately circumstanced, relative to climate, with the most perfect confidence of its success in all seasons, which do not prove more than ordinarily unfavourable.

LVI. *Extract of a Letter from Sir* BROOKE BOOTHBY, *Bart. to Sir* JOHN SINCLAIR, *Bart. dated Brussels, 10th January,* 1816; *regarding some Improvements in Gardening. Communicated by* JOSEPH SABINE, *Esq. F. R. S. &c. Vice President.*

Read April 2, 1816.

"I CANNOT furnish you with any very accurate observations regarding the subject I mentioned to you, the other day; but, I believe, it has been understood, that at certain periods, preventing, or retarding, the ascent of the sap, tends to produce and ripen the fruit. An abundance of sap is found to increase the leaf buds, and decrease the flower buds. A process to retard the sap has long been employed, with the greatest success, in the gardens of Montreuil at Paris, which you will find well described in the treatise on the subject by the Abbé SCHOBAL, which is easily procured. His practice, thereby, is to divaricate the sap as near the root as may be, by cutting off the main stem, and training two lateral branches, from which his wall is to be filled.

"The other process of interrupting the rising of the sap by separating the bark, has, I believe, been long in practice in Vine forcing-houses; this is done when the Grapes are full grown, and is found to assist the bark in diminishing the aqueous, and encreasing the saccharine juice.

"I mentioned to you yesterday, that I had succeeded in banishing, entirely, the red spider, &c. from my hot-house and green-house at Ashbourne, by the simple process of

cutting off the infected leaf. I had observed, that the leaf once attacked, soon decayed, and fell off; but in the mean time, the animals had removed to another; and the leaf, from the moment of the attack, seemed to cease to perform its office. In short, by persevering in this amputation, my plants became the most healthy I have ever seen housed.

"To destroy the insects in the wood and walls, washing them with a solution of corrosive sublimate in water, I found effectual. But care must be taken that none falls on the plant; and the workmen must be apprised of the strength of the poison."

LVII. *On the Ventilation of Forcing-houses.* *By* THOMAS ANDREW KNIGHT, *Esq. F. R. S. &c. President.*

Read May 7, 1816

IN a Memoir, which I had two years ago the honour to address to the Horticultural Society,* I stated an opinion that the gardener often erred in the application of heat, by treating his plants as he would wish to be himself treated, and consequently by keeping them much too warm during the night. Experiments, made previously and subsequently to that period, have satisfied me that he as often, and as widely errs, by too freely admitting the external air during the day, particularly in bright weather. Plants generally grow best, and fruits swell most rapidly, in a warm and moist atmosphere; and change of air is, to a very limited extent, necessary or beneficial. The mature leaves of plants, and, according to SAUSSURE, the green fruits, (grapes at least,) when exposed to the influence of light, take up carbon from the surrounding air, whilst the same substance is given out by every other part of the plant; so that the purity of air when confined in close vessels has often been found little changed at the end of two or three days by the growth of plants in it. But even if plants required as pure air as hot-blooded animals, the buoyancy of the heated air, in every forcing-house, would occasion it to escape, and change as rapidly, and indeed much more rapidly, than would be necessary.

* See page 130 of this Volume.

It may be objected that plants do not thrive, and that the skins of Grapes are thick, and other fruits without flavour, in crowded forcing-houses; but in these it is probably light, rather than a more rapid change of air, that is wanting; for in a forcing-house, which I have long devoted almost exclusively to experiments, I employ very little fire-heat, and never give air, till my Grapes are nearly ripe, in the hottest and brightest weather, further than is just necessary to prevent the leaves being destroyed by excess of heat. Yet this mode of treatment does not at all lessen the flavour of the fruit, nor render the skins of the Grapes thick; on the contrary, their skins are always most remarkably thin, and very similar to those of Grapes which have ripened in the open air. It is always my wish to see the temperature of this house, in the middle of every bright day in summer, as high as 90°; and after the leaves of the plants have become dry, I do not object to ten or fifteen degrees higher. In the following night the temperature sometimes falls as low as 50°; and so far am I from thinking such change of temperature injurious, I am well satisfied that it is generally beneficial.

Plants, it is true, thrive well, and many species of fruits acquire their greatest state of perfection in some situations within the Tropics, where the temperature, in the shade, does not vary in the day and night more than seven or eight degrees: but in these climates the plant is exposed during the day to the full blaze of a tropical sun, and early in the night it is regularly drenched with heavy wetting dews; and consequently it is very differently circumstanced in the day and in the night, though the temperature of the air in the shade at both periods may be very nearly the same. If the ther-

mometer, under the above-mentioned circumstances, were to be exposed, as the plant is, to the sun, it would probably indicate, in the middle of the day, a temperature little below that of boiling water. In the forcing-house, so much light and heat are repelled by the glass and wood-work of the roof, that the degree of heat to which the leaves are subjected does not greatly exceed that indicated by the shaded thermometer; and by excess of ventilation, I have several times found the temperature of forcing-houses in the gardens of some of my friends reduced so nearly to that of the external air, in the middle of a bright, but not very warm day, that the progress towards maturity of the fruit was certainly rather retarded by the shade, than accelerated by the protection of the glass roof. During the night, the loss, as far as related to time, was probably redeemed by the flues; but the fruit thus ripened during the night never rivals in flavour that which is chiefly ripened by confined solar heat. This kind of heat can also be made to operate in every moderately bright day, without incurring either expense or increased trouble; for any observant gardener will soon discover precisely to what extent air may be confined in differently constructed forcing-houses in every different state of the atmosphere and weather, and thus guard in his absence, for a short time, against all danger of injury to the foliage of his trees; at the same time that these may be placed securely in nearly the highest temperature that can be beneficial to them.

A less humid atmosphere is more advantageous to fruits of all kind, when the period of their maturity approaches, than in the earlier stages of their growth, and such an increase of

ventilation, at this period, as will give the requisite degree of dryness to the air within the house, is highly beneficial; provided it be not increased to such an extent as to reduce the temperature of the house much below the degree in which the fruit has previously grown, and thus retard its progress to maturity. The good effect of opening a Peach-house, by taking off the lights of its roof, during the period of the last swelling of the fruit, appears to have led many gardeners to over-rate greatly the beneficial influence of a free current of air upon ripening fruits; for I have never found ventilation to give the proper flavour or colour to a Peach, unless that fruit was at the same time exposed to the sun without the intervention of glass; and the most excellent Peaches I have ever been able to raise, were obtained under circumstances where change of air was as much as possible prevented consistently with the admission of light (without glass) to a single tree.

LVIII. *On the Preservation of* Fig *Trees in the Winter.* *By Mr.* James Mean, *Gardener to Sir* Abraham Hume, *Bart. at Wormleybury, in Hertfordshire.*

Read July 2, 1816.

Most of our *Fig* trees against the walls having been killed by a long and severe frost in the winter preceding, I attempted in 1789 a plan for protecting them from a similar injury, which I can now detail with some confidence in its merit, having continued to practise it since that time with uninterrupted success.

In the autumn, as soon as the leaves are off, the branches are unnailed and brought down to the ground, which is opened to the depth of nine or ten inches close to the wall; in the trench thus made the branches are laid, and covered with a light red sand to the thickness of two feet, which is sufficient to exclude all frost. About the middle of April the sand is removed; the branches being then well washed, are again nailed to the wall and never fail to produce a crop.

I always introduce a proportion of young wood every year, and do not suffer any to remain on the trees older than six or seven years.

The Florence Cherry.

LIX. *Account of the* Florence Cherry. *By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read October 1, 1816.

For the knowledge of this *Cherry*, the qualities of which will ensure it a place in every good collection of fruit trees, the Society is indebted to Walter Calvert, Esq. of Hunsdon in Hertfordshire, who has not only sent to the Society specimens of the fruit, but has supplied us with abundance of grafts, which have been so distributed, that in a short time no difficulty will occur in obtaining plants.

Several years ago, two trees of this Cherry were brought from Florence by the father of the present John Archer Houblon, Esq., one of which was planted in his garden at Hallingbury Place in Essex, and the other at the Priory, a house belonging to Mr. Houblon, in the same county.

Richard Vachell, Esq. who lived some years at the Priory, found it there. This original plant is dead, but Mr. Vachell having taken grafts from it, they are now growing in his garden at Coptfold Hall, near Ingatestone. From him, Mr. Walter Calvert received a young tree, which he planted in the garden belonging to the Parsonage-house at Hunsdon; and from this, the fruit and grafts which have been presented to the Society were taken.

The fruit is well known to persons who have visited Florence, where it is in high estimation, and has been erroneously supposed to be the Bigarreau of DUHAMEL, generally known in the neighbourhood of London, by the name of the Graffion Cherry; but though of the same class, the Florence Cherry differs from the Bigarreau in shape and size, whilst in the quality of its flesh it is superior, and in the time of its ripening is much later.

The Fruit is very large; the general form may be defined as being more square than that of the Bigarreau, rather flattened on the clefted size, and rounded on the other; the footstalk, which is long and slender, is inserted into a deep cup-shaped cavity, the other extremity of the fruit being very obtuse, and not (except in poor and small specimens) pointed like the heart-shaped Cherries; the Cleft is not deep, but is very perceptibly marked with colour. The Skin is remarkably shining, giving it much the appearance of a wax fruit; is of a beautiful coral-red on the side next the sun, being pale on the shaded side, but inclining to and tinged with red, the whole surface being minutely dotted with colour. The Flesh is firm, but not hard; white, and abundantly filled with sweet, rich juice. The Stone is nearly round, and small in proportion to the size of the fruit.

The tree has much the appearance of the Bigarreau, but the leaves are rather smaller than that variety. It bears a very good and even crop, though not so abundant as the Tartarian or May Duke Cherries: and when planted against a west or south-west wall, which is probably the aspect best suited to it, ripens its fruit at the end of August, after

most other kinds, except the Morello, have ceased to supply the table: and if kept till full ripe, becomes more delicious to the taste; in the present year (which, however, has been remarkable for its lateness,) they were in this state on Mr. VACHELL'S tree, in the middle of September.

LX. *On the Cultivation of the true* Samphire, *or Crithmum maritimum. In a Letter to the Secretary. By* John Braddick, *Esq. F. H. S.*

Read August 6, 1816.

Dear Sir,

In compliance with your request, I send you a statement of the method adopted by me for cultivating the *Crithmum maritimum*, or *Rock Samphire*.

I must premise that the plant I am about to treat of, is very different from the Samphire which is usually sold in the London markets; that is an annual, which grows in salt-marshes, and is called *Salicornea herbacea*, or *Marsh Samphire*. My plant is perennial, and grows in the clefts of rocks on the sea shore: this latter, when cooked or pickled, is crisp and aromatic to the taste, constituting a wholesome condiment; whilst the former, from its fibrous stringy quality, is, when used for food, extremely hard of digestion.

I caused a plant of the true Rock Samphire to be taken from the west coast of the island of Portland, with about a ton of the soil and chips of the white rock in which it grew; these, at an expense of about sixty shillings, I had transported by water to Thames Ditton and placed in my garden, in a sheltered situation, screened from the morning sun, in imitation of the native site of the plant. The ground had been freed by drainage from stagnant water to the depth of

five feet below the surface, which I considered essential to the well-doing of the plant. It has continued to flourish with me for some years, and has never failed to produce for the use of my family an ample supply of young shoots, which are cut twice in a season. The only culture which it requires, is the protection of a little long litter lightly thrown over it in the winter; and in the spring, when that covering is removed, I give the surrounding soil a sprinkling of powdered barilla: this I do to furnish the plant with a supply of soda, since in its native place of growth it possesses the power of decomposing sea-water, from which it takes the fossil alkali and rejects the muriatic acid.

Any of the Bridport captains, whose vessels come to Downs' wharf, near Hermitage bridge, will bring the plant and its native soil from the island of Portland to London, for a moderate charge; the best time to procure it being between the first of February and the end of March.

I am, Dear Sir,

Your most obedient Servant,

JOHN BRADDICK.

Thames Ditton,
August 4, 1816.

LXI. *On the* Cultivation *of* Asparagus. *In a Letter to the Secretary. By Mr.* Daniel Judd, *F. H. S. Gardener to* Charles Campbell, *Esq. at Edmonton.*

Read June 4, 1816.

Sir,

Having laid before the Members of the Society a specimen of *Asparagus* raised by me, and as it has been pronounced by those who saw it to be the finest they had ever seen, I presume that an account of my method of cultivating it will not be unacceptable to the Society. It is as follows:

I select some of the finest and earliest heads, as they make their appearance in the spring, for seed; these should be tied to stakes during the summer, to keep them upright, for the better ripening of the seed; in doing so, care should be taken not to drive the stake through the crown of the plant, which would injure it for the ensuing season. In autumn, when the seeds are ripe, they should be washed out of the berry, if they are to be sent any distance; but for home sowing I prefer keeping them in the berry till the time of sowing, the pulp being a great nourishment to the seed, which ought to be kept in a dry place during the winter.

The seed should be sown in the month of March or beginning of April, a rich piece of ground being first prepared for the purpose, in drills drawn with a common hoe, deep enough to admit of the seed being buried about an inch

and a half below the surface; and these drills, 18 inches apart, to admit of cleaning without damaging the plant. The seeds should not be sown too thick. If the summer proves dry, a good watering about once a week or fortnight will be of great benefit.

The next season prepare a piece of good land, unincumbered with trees, and that lies well for the sun; give it a good dressing of well reduced horse-dung from six to ten inches thick, all regularly spread over the surface; then proceed with the trenching (if the soil will admit) two feet deep; after this first trenching it should lie about a fortnight or three weeks, and then be turned back again, and then again in the same space of time; by this process the dung and mould become well incorporated: it may then be laid in small ridges till the time of planting. This work should all be performed in the best weather the winter will afford, that is, not while it rains, or snow is lying on the ground, as it would tend to make the land heavy and sour; all this is to be particularly attended to, as the preparation of the soil is of more consequence than all the management afterwards. At the time of planting, I always spread over the ground another thin coat of very rotten dung, and point it in half a spade deep, making my beds three feet wide only, with two feet of alleys, so that three rows of grass, one foot apart, are all I plant on each bed; I find this to be the best method, as by this plan there is not the least trouble in gathering, whereas you are obliged to set a foot on one of the wide beds, before you can get at all the grass, to the great injury of the bed and the buds under the surface.

My time of planting is when I observe the plants are

beginning to grow, which is the best time for the plants to succeed; if moved earlier, as is the practice with most people, they perhaps have to lie torpid for two or three months, which causes many of them to die, or if not, they in general shoot up very weak.

After having got my plants up, I strain the line and cut down a trench, sloping in the usual way for planting Box, and make choice of all the finest plants, putting them in, one foot apart, and one inch and a half below the surface; after this is done, I let the alleys and beds lie level till autumn, then dig the alleys out deep enough to get from four to six inches of mould all over the bed, and over this lay a good coat of dung, and fill in the alleys with any long dung I can get.

The next season, instead of digging out the alleys, I lay on a coat of good rotten dung, three inches thick, and fork it evenly into the beds and alleys, and so on every season after, never digging out the alleys any more, as it is known the Asparagus plant forms a fresh crown every season; and sometimes it happens that in a few years the crown will increase almost into the alley, so that by digging out this, you must inevitably spoil that plant; if this is not the case when the beds are in good condition, the roots will be sure to work out at the sides into the alleys, and by digging out the latter, these roots must be cut off, and you will often see them exposed all the winter before dung can be got to fill them up; rather than be treated in this way, they had better be without any thing all the winter, as Asparagus does not suffer generally by frost. The first two years I have a very thin crop of Celery plants or Lettuce upon the beds,

but nothing afterwards, nor do I plant any thing in the alleys after the same period, for I think the Asparagus is injured thereby.

The third season I begin to cut, but not generally. The fourth and fifth season, the beds are in full bearing, and may be cut from plentifully, but I never make a practice of cutting very much after the first week in June. I then begin to let it run; in fact, I never cut the very small grass at all. Asparagus being so valuable a vegetable, some persons continue to cut indiscriminately till the latter end of June, but this practice is of very great injury to the next year's produce. Five beds, as above-mentioned, which had been planted five or six years, were very weak when I first had the care of them, but by following the practice above detailed, they are not only improved, but almost equal to any I have now got.

I ought to observe, that I do not desist altogether from cutting, but keep taking what makes its appearance by the side of the standing grass till the latter end of June.

I remain, Sir,

Your humble Servant,

DANIEL JUDD.

Edmonton,
June 3, 1816.

LXII. *On the* Treatment *of the* Cactus Opuntia, *or* Prickly Pear; *under which it will perfectly mature its Fruit in the open air of England. In a Letter to the Secretary. By* JOHN BRADDICK, *Esq. F. H. S.*

Read September 3, 1816.

DEAR SIR,

IN conformity with the request made by yourself and Mr. WILBRAHAM, when you were last at my cottage, I now give you an account of the mode which I have adopted for the *culture* of the *Cactus Opuntia*, or *Prickly Pear*, in the open ground in my garden.

Remembering to have eaten of the fruit of this plant with pleasure some years ago, while shooting in the woods of Virginia, I was desirous of growing it here; and knowing from experience, that although the summer heats in that climate are much greater than with us, yet the winters are far colder, I was led to conceive, that the plant in question might be brought to endure the severity of our climate so as to live throughout the winter in the open air, and afterwards to produce its flowers and fruits in the summer. Upon consulting MILLER's *Dictionary*, and inquiring amongst my friends, I found that the plant would live out of doors in England, but that it had not hitherto been known to ripen its fruits when so treated; I therefore determined to try what culture would do with it. Having heretofore observed

that the plant in its wild state delighted in a dry soil amongst rocks near the skirts of the sunny sides of the forests, I in consequence planted it in the compost described below, placed in a sheltered situation, open to the sun.

The first plant that I turned out has lived in the open ground of this country for six or seven years, during which period it has endured one exceeding hard winter, and several trying springs; and in all, except the two first years, it has never failed to ripen its fruit and seeds, so that it may be now considered decidedly naturalized. It is now growing vigorously; and although the present season has been exceedingly unfavourable, yet I doubt not but it will produce a plentiful crop of flowers, and ripen its fruit fit for the table during the course of the next month.

In countries where the fruit of this plant is abundant, it is considered very wholesome; the taste of it, however, is not agreeable to all persons till after they have eaten it several times, when they become very fond of it.

The compost used by me for growing the Cactus Opuntia, is the following: one half is carbonate of lime, for which lime-rubbish from old buildings will answer; the remaining half consists of equal portions of London clay and peat-earth, having the acid neutralized by barilla: these are intimately blended and sifted. One square yard of this compost I conceive to be sufficient for one plant, which must be placed in the middle of a small artificial hillock, raised eighteen inches above the surface of the ground, which ground should be rendered perfectly dry, if not naturally so, by under draining. Neither the leaves, flowers, nor fruit

should ever be suffered to touch the ground, but they should, as constantly as they are produced, be kept from the earth by placing stones, pebbles, flints, or bricks under them, in imitation of artificial rock-work.

I am, Dear Sir,

Your most obedient Servant,

JOHN BRADDICK.

Thames Ditton,
July 11*th*, 1816.

LXIII. *Account of an original Plant of the* Moss Rose de Meaux; *with Physiological Observations by* Thomas Hare, *Esq. F. L. S. &c. Assistant Secretary.*

Read September 3, 1816.

As it appears to have been generally understood, that the *Moss Rose de Meaux*, which has so recently become an object of attention, was first introduced into this country from France, the following particulars of an original plant which occurred in the county of Somerset, seem worthy of being recorded.

In a shady and neglected part of a garden, belonging to Mr. Penny of Taunton, a common Rose de Meaux had for a long time flourished near a common Moss Rose.

Fifteen years ago, a healthy young sucker of this Rose de Meaux, corresponding in all its characters with the parent stock, was accidentally observed to be clothed with moss, in every respect like the common Moss Rose. In the course of successive years, it received due attention from the possessor, who regarded it as an elegant variety, without having any suspicion of its being unique; and as it had excited the admiration of visitors, several were presented with layers, one or more of which, was about six years since transported to Guernsey, where it was highly esteemed. Thus it may be reasonably conjectured, that the plants imported from Paris about three years since, by Messrs. Lee and Kennedy,

and very generally believed to be the first of the kind ever seen in this country, may have been the progeny of those removed from the west of England to Guernsey; since it was stated, that no others than those sold to Messrs. LEE and KENNEDY had been seen in France.

As the Rose de Meaux has never been known to mature seed in this country, it is not to be concluded that the individual plant of Mr. PENNY's garden received its new character by impregnation from the farina of the common Moss Rose which grew near it; for although it may be alleged that generative organs have been seen in both these Roses, yet they are always too imperfectly developed to admit of the production of seed.

The accession of Moss to the Rose de Meaux, is not more extraordinary than the numerous variations which the genus Rosa at large has experienced by soil, culture, and local situation. I have in many instances observed the offsets of the most double and high-coloured Belladonna, or Maiden's-blush Rose, produce semi-double and almost single Roses, of a pure white; while suckers of the semi-double white, have been known to produce the Belladonna perfectly characterised; and shoots of the common Moss Rose to produce unmossed flowers.

The moss-like excrescence so frequently produced from the nidus of the Cynips Rosæ, on the branches of the common Dog Rose, and which has been called the Eglantine Sponge, or Bédéguar, seems to have suggested the idea of some naturalists, that hymenopterous insects, by piercing the epidermis in many places, might promote considerably the mossy character of Roses, which, in their general habits,

exhibit nothing of the kind: but the filaments of the Eglantine Sponge are essentially different from the moss, investing those varieties of Rose, which are known to us with that particular appendage.

It has occurred to me, that the moss of Roses may possibly be no other than an altered form of those glandiferous processes, with which their peduncles and calices are furnished; for where resinous matter exists largely, superabundant moisture, as a stimulus, and shade, as a cause of relaxation, may increase the elastic power of a plant throughout; and thus the pores of its exterior coverings more readily allow the egress of that resinous matter which forms so considerable a part of the moss of Roses, each main fibre of which appears to proceed from a pore, subdividing into many fibrillæ: or in other words, the glandulæ appear, by the new stimulus communicated to them, to form secondary processes, which abounding with resinous exudation constitute the moss of Roses.

In opposition to this idea, it may be remarked that Roses have been frequently known to lose their mossy character, on being removed from an open situation in which they had previously flourished, to a shady one; the moss becoming elongated, and proceeding from a reduced number of pores. But as the same cause often operates to the production of dissimilar effects, I humbly imagine that this circumstance serves to corroborate rather than to invalidate my conjectures.

The stem and branches of the earlier offspring of the Somersetshire Rose, had much more the common character of plants which had grown in the shade, than those which have been imported from France, namely, a more humid

and green appearance, as if the gum-resin contained in them, and which is so abundant in the generality of Moss Roses, were more diluted and aqueous.

The moisture which is common to shady situations, may serve so far to increase the volume of natural fluids in ordinary Moss Roses as finally to destroy their mossy investment, by over excitation of the living powers. Their juices are usually viscid, and of a medium quantity. To the support of these properties, neither a particularly dry soil nor a high temperature appears favourable.

The climate of England seems more genial than any other, to the healthy growth of Moss Roses; for it is well known, that in the south of Europe, they are neither so successfully cultivated nor maintain so permanently a genuine mossy character, as in this country; and under a tropical sun, they fail altogether. This latter circumstance may probably be accounted for by the fact, that vegetable, like animal bodies, in a state of growth, are endued with an elastic property, ultimately resulting from series of reticulated tubes, the destruction of which, whether partially or wholly, is fatal to the offices of life. The total absence, therefore, of moss on Roses which grow in tropical climates may be occasioned by an insufficient supply of moisture, owing to the violent heats of those regions, promoting a rigidity of fibre, and a consequent prevention of the determination of resinous matter to the surface of the plant.

LXIV. *An Account of a Method of forcing* Vines *and* Nectarines; *practised by* Joseph French, *Esq. of East Horndon, in Essex. By* George Anderson, *Esq. F. L. S. &c.*

Read October 1, 1816.

On the 23d of September I paid a visit at the request of a friend, to Mr. French, a farmer of eminence at East Horndon, to see his method of forcing by means of dung-heat; and I am induced to transmit the observations I made upon the spot, to the Horticultural Society, being of opinion that it will prove an important discovery in the art of forcing.

Mr. French's garden is situated on elevated ground, greatly exposed to the east and north winds; the soil too, is heavy and cold. With these disadvantages to contend with, he succeeds uniformly in producing an abundant crop, by the plan which he follows; even in the present unfavourable season, whilst the neighbouring Noblemen and Gentlemen's houses are nearly unproductive, his trees are profusely covered with the finest fruit, now ripe. He has two forcing-houses, a *Vinery*, and a *Nectarine* house; and I shall proceed to describe his method of treatment as accurately as an interview of a few hours has afforded me the means of doing. It is extremely simple, and will be best understood by a reference to the annexed section of his Vinery.

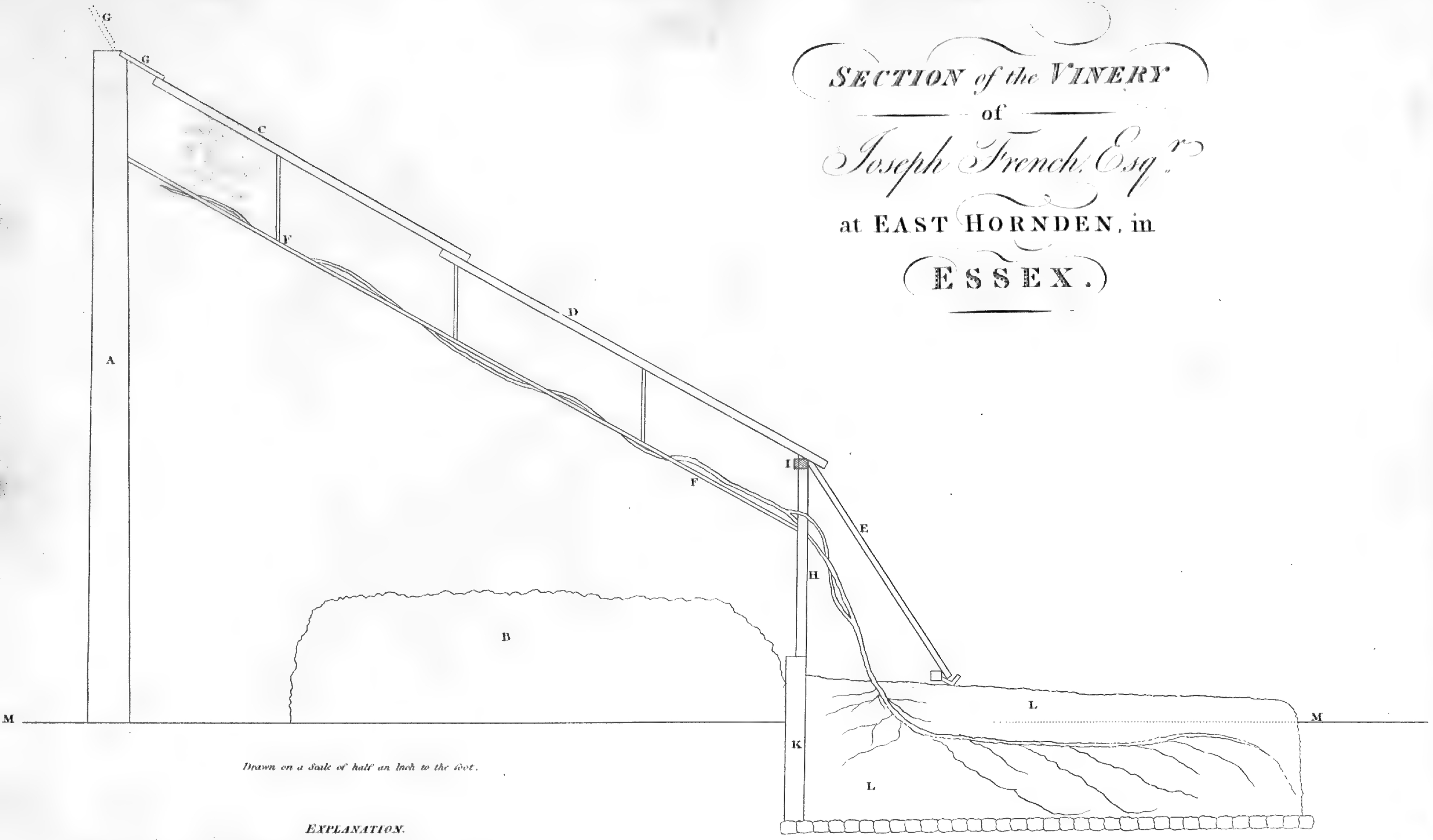
About the beginning of March, Mr. French commences his forcing, by introducing a quantity of new long dung, taken from under the cow-cribs in his straw yard; being

principally, if not entirely, cow-dung, which is laid upon the floor of his house, extending entirely from end to end, and in width about six or seven feet, leaving only a pathway between it and the back wall of the house; the dung-bed is represented in figure B of the section.

The dung being all new at the beginning, a profuse steam arises with the first heat, which, in this stage of the process is found to be beneficial in destroying the ova of insects, as well as transfusing a wholesome moisture over the yet leafless branches; but which would prove injurious, if permitted to rise in so great a quantity when the leaves have pushed forth. In a few days the violence of the steam abates as the buds open, and in the course of a fortnight the heat begins to diminish; it then becomes necessary to carry in a small addition of fresh dung, laying it in the bottom, and covering it over with the old dung fresh forked up: this produces a renovated heat, and a moderate exhalation of moist vapour. In this manner the heat is kept up throughout the season, the fresh supply of dung being constantly laid at the bottom, in order to smother the steam, or rather to moderate the quantity of exhalation; for it must always be remembered, that Mr. French attaches great virtue to the supply of a reasonable portion of the vapour. The quantity of new dung to be introduced at each turning, must be regulated by the greater or smaller degree of heat that is found in the house, as the season or other circumstances appear to require it. The temperature kept up is pretty regular, being from 65 to 70 degrees.

Mr. French contends, that the moist vapour which is transfused through the house is essentially beneficial, not only

SECTION of the VINERY
of
Joseph French, Esq.r
at EAST HORNDEN, in
ESSEX.



Drawn on a Scale of half an Inch to the foot.

EXPLANATION.

A *The back wall constructed of clay.*

B *The dung bed extending the whole length of the house & about 2 feet high.*

C & D *The upper sashes. E. the front or lower sash set more perpendicular than the others on purpose to receive the morning & early spring rays of the Sun.*

F *Trellis for training the shoots upon about 14 inches from the glass.*

G *Flap of deal board hung upon swan-neck hinges for giving air to the house.*

H *Perpendicular posts one under each nailer for supporting the plate* I.

K *Brick wall to keep up the mould* L.

L *The mould wherein the trees are planted extending in width 2 feet within and 6 feet outside of the house; underneath is a layer of broken tiles or stones to prevent the roots from extending lower.*

M *The level of the ground.*

because it discourages the existence of insects, and destroys their ova, but it likewise facilitates the setting and swelling of the fruit. I ought to observe, that I am not offering any opinion of my own in the present statement, but merely recording, as faithfully as possible, the remarks made to me by a person of ingenuity and observation, whose extraordinary success is, in my mind, the best test that can be given of the merits of his practice.

The trees are planted in a bed of rich mould, represented in Figure L of the section; the roots are at liberty to extend horizontally underneath the plate which supports the front sashes, to the outside of the house as far as the extremity of the bed, but are restricted from pushing downwards by means of a layer of broken tiles rammed down underneath the bed of compost.

The vinery is 54 feet long and 12 feet wide, very rudely constructed by one of the workmen on the farm, who was not bred a carpenter; many of the sashes are those of melon frames; all of them are fixed; that is to say, none of them are made to slide, the only means of giving air being the doors, and flaps of deal board which run along the top, the whole length of the house, as represented in figure G. These are thrown open, by means of swan-neck hinges on the upper side, fixed on the coping plate of the wall; this Mr. FRENCH considers an excellent method of allowing air to escape from the top of the house, where the hottest must accumulate, and the top being divided into convenient lengths, an option is reserved of giving much or little vent, as circumstances require. I observed many orifices and crevices between the sashes and door frames, through which air must find a passage

either inwards or outwards; but although he admitted this to be a disadvantage, and allowed that a forcing-house ought to be air-tight, yet he attaches little importance to it; so long as he obtains a sufficient heat at so small an expense, he can afford this waste, and no doubt reasons thus, "if my houses yield me as much good fruit as the trees ought to bear, (which unquestionably they at present do,) what occasion is there for me to do more, to improve what is already perfect, as far as respects the return I obtain from them?"

Nor does he find occasion to watch his houses with care; he often leaves them for several days together unregarded; being absent on his other avocations.

The Grapes in his vinery were counted this season; they amounted to between six and seven hundred full-sized bunches, covering equally the whole glazed surface of the house from the ground to the back wall; the weight of fruit is estimated at about eleven to twelve hundred weight. There were three bunches of the Damson Grape growing close to each other, which, together, we computed to weigh ten pounds.

The Vines are not trained horizontally, but nearly vertically in one direction, and parallel with the inclination of the roof in another. They are supported on a trellis of laths, suspended from the rafters, as described in the section, about 14 inches below the glass, intersected by cross laths forming the trellis work.

The expense of forcing, independant of the cost and repairs of the house, is confined to the labour of turning and removing the dung; Mr. French finds that one man can

perform this to both houses in one day, being about two shillings and sixpence each fortnight to attend 114 feet running of forcing; the labour of pruning and training, which he takes upon himself, must be added to this.

Mr. FRENCH has pursued this method of forcing nearly fifteen years with uninterrupted success; he adopted it in consequence of failing in his attempts to force by fire heat, having had his trees destroyed by the red spider, which disappeared on the introduction of dung, and has never since molested him.

The Nectarine house is very similar in construction to the vinery. It is 60 feet long, and about 12 wide; the quantity of fine flavoured fruit on it, is as great as the trees ought to bear. Mr. FRENCH assured me, that the fruit which set, exceeded that which was on the trees when I saw them, more than six-fold; we guessed the present crop to amount on a moderate computation to one hundred dozen. The young wood exhibits abundance of fruit-buds for the ensuing season. I could not discover the smallest appearance of mildew, red spider, coccus, or of any destructive insect in either house. Nor could I help admiring the healthiness and vigour of the trees; they were trained on trellis laths similar to those in the vinery, and the treatment in forcing was exactly the same, except only that part of this house is divided off, into which no dung is admitted, in order to obtain a later crop for succession. This house, like the other, is of rude construction, and far from being air-tight; but in spite of these impediments, it succeeds most surprisingly.

LXV. *Account of a New* Pear, *called* Williams' Bon Chretien. *In a Letter to the Secretary. By* William Hooker, *Esq. F.H.S.*

Read December 3, 1816.

Dear Sir,

I beg leave to lay before the Horticultural Society, an account which I have obtained, at your request, of a variety of *Pear*, specimens of which were communicated to the Society in August last, by Mr. Richard Williams of Turnham Green, and much approved.

This Pear, which has been called by Mr. Aiton, in his Epitome of the Hortus Kewensis, *Williams' Bon Chretien,* appears to have sprung up from seed, in the garden of Mr. Wheeler, a schoolmaster at Aldermaston in Berkshire, about twenty years ago, and was suffered to remain, in order to prove the value of its fruit. Subsequently grafts have been extensively dispersed, and many trees are now in Mr. Williams' nursery and other gardens around London I have added the following description.

The trees of this variety are of vigorous growth, and fertile habit; their branches remarkably erect and straight, until bent by the weight of fruit, Leaves broad, deep green, very sharply serrated. Fruit of an irregular pyramidal and somewhat truncated form; large, being from 3 to $4\frac{1}{2}$ inches in length, and 2 to 3 inches in width at the widest

Williams' Bon Chrétien.

part near the head. The Eye is inserted on the summit, and never sunk in a hollow cavity, as in the other varieties called Bon Chretiens. The Stalk is very gross or fleshy, about $\frac{3}{4}$ of an inch in length. The Colour of the fruit is pale green, spotted over with a mixture of darker green and russet brown, becoming yellowish, and faintly tinged with red on the side next the sun when fully ripe. The Flesh is whitish, very tender and delicate, abounding with juice, which is sweet, and agreeably perfumed. Ripens in August when trained to a west wall, but on standard trees it is from three weeks to a month later.

This Pear I would recommend to the notice of the Horticultural Society as superior to any of its season with which I am acquainted. It immediately succeeds the Jargonelle, and is earlier than, as well as much superior to, the Doyenné or White Beurrée, and resembles in flavour the Summer Musked Bon Chretien. Its merits over the latter variety are, that on standard trees, as well as when trained, it seldom fails to produce fruit in abundance.

The figure which accompanies this, was taken from specimens which ripened on a west wall, and may be considered an average size; but I have seen fruit of this variety weighing from ten to twelve ounces.

I remain, Dear Sir,

most respectfully and sincerely yours,

WILLIAM HOOKER.

York Buildings, New Road,
November 30th, 1816.

LXVI. *Upon the Advantages of Propagating from the Roots of old ungrafted Fruit Trees. By* Thomas Andrew Knight, *Esq. F. R. S. &c.* President.

Read December 3, 1816.

The progressive influence of debility and decay upon old varieties of fruit trees is now so generally admitted, that it is wholly unnecessary to advance facts or arguments to prove it: the general law of Nature appears to be, that no living organized being shall exist beyond a limited term of years; and that law must be obeyed. It is nevertheless in the power of man to extend the lives of individual vegetable beings far beyond the period apparently assigned by nature; and parts of the same annual plant may be preserved through many years, perhaps through ages, though it cannot be rendered immortal.

I have quoted in a former communication* the statement of Columella, that cuttings from bearing branches of the *Vine* did not afford durable trees, and this fact appears to have been known at an earlier period; for Virgil, whose practical knowledge of planting and grafting was probably very limited, and who therefore may be supposed to give the opinion of some previous writer, has directed the planter not to choose cuttings from the upper branches of trees:

"Neve flagella
"Summa pete aut summa destringe ex arbore plantas."
Georg. lib. II. 299.

* Horticultural Transactions, Vol. i. page 60.

As the roots of trees elongate like the branches, by parts annually added to their previous extremities, it appears probable that the powers of life would become expended as soon in the points of the roots, as in the bearing branches. Experience however warrants a different conclusion.

I obtained plants from some detached parts of the extremities of the roots of old ungrafted Pear and Apple-trees, and as soon as these were large enough to afford grafts, I selected other grafts of similar size from the bearing branches of the same trees, and some of each were inserted in similar stocks, and in several instances two in the same large stock; and wherever inserted, the grafts which had been taken from the bearing branches proved by no means able to contend with their more hardy vigorous rivals. The latter produced thorns like those of young seedling trees; and although other circumstances lead me to believe that trees raised from roots in the manner above-mentioned will not live as long as seedling plants, I am nevertheless confident that they will live very long, and afford much more hardy and productive trees than can possibly be obtained from the bearing branches. Similar experiments with the same results were made with grafts of a Plum tree.

Duhamel has stated the original tree of the Chaumontel Pear to have been alive and in health later than the middle of the last century; and as the tree was not then very old for a Pear tree, it is probably still living. If plants could be obtained from its roots, they would prove a valuable acquisition to the gardeners of France, and one of still more value to the English gardeners; for we possess no winter

Pear of so much merit and long duration, which succeeds so well without the protection of a wall.

I am not by any means satisfied that the original tree of the Ribston Pippin is not now growing in England; and that the seed from which the first tree sprang, and not the tree itself, came from France; for I have never seen any plate of it, nor description of any Apple very like it, in any foreign Catalogue. A cutting from the root of the supposed original tree might, I conclude, readily be obtained, and no effort to preserve so valuable a variety ought to be omitted. Coe's Golden-drop Plum, if it be an English seedling, is most amply entitled to the same care; and the possessor of the asserted original tree may prove his claim to the honour of having raised it (which I have heard questioned) by raising trees of the same variety from its roots.

No further care or trouble is necessary to ensure success, than to obtain cuttings of the root in the Autumn (November,) about a foot long and not less than a quarter of an inch in diameter. These should be planted so deeply, that not more than half an inch in length of each cutting should appear above the soil. I have usually placed the cuttings under an east or west wall, and have perfectly succeeded with those of the Pear, the Apple, the Plum, and Cherry, the only kinds of fruit-trees which I have hitherto subjected to such experiments.

The Vegetable Marrow.

LXVII. *A Description and Account of the Cultivation of a Variety of* Gourd *called* Vegetable Marrow. *By* Joseph Sabine, *Esq. F.R.S. &c.* Secretary.

Read December 3, 1816.

One of the subjects on which the Society had called for information in the printed account of Desiderata, distributed at the last Anniversary, was a description of the different varieties of *Gourds* best adapted to culinary purposes.

To enable me to satisfy this enquiry, I collected the seeds of every sort of Gourd or Pumpkin which I considered likely to answer my purpose, and put out the plants I raised from them separately in a large quarter of my garden. The season was not propitious to my wishes, and the large sorts did not attain that maturity which was necessary to enable me to ascertain their value. I was not however altogether unsuccessful, for from two packets of seeds received from different quarters, I raised plants whose produce I have proved to be of a superior quality, and consequently to be deserving of notice. These are called *Vegetable Marrow;* the plants did not differ from other Gourds in any points, except in their yielding a large produce. The fruit is of an uniform pale yellow, or light sulphur colour; when full grown it is about nine inches in length, four inches in diameter, of an elliptic shape, the surface being rendered slightly uneven by irregular longitudinal ribs, the terminations

of which uniting, form a projecting apex at the end of the fruit, which is very unusual in this tribe.

It is useful for culinary purposes in every stage of its growth; when very young it is good if fried with batter; when large, or about half grown, it is excellent either plain boiled or stewed with rich sauce; for either of these purposes it should be cut in slices. The flesh has a peculiar tenderness and softness, from which circumstance it has, I suppose, received its name, much resembling the buttery quality of the Beurré Pears, and this property remains with it till it is full grown, when it is used for pies. It is, however, in its intermediate state of growth that I conceive it likely to be most approved. Compared with all the other kinds which I had growing, its superiority was decided; there were one or two which, in cooking, might be considered nearly as good, but these are bad bearers, and more difficult to cultivate, so that I consider the Vegetable Marrow without a rival.

I have been able to obtain but very imperfect accounts of the origin of this particular Gourd. It was certainly new in this country within a few years, and I think the most probable account, of the many I have heard, of its introduction, is, that the first seeds were brought here in one of our East India ships, and came probably from Persia, where, I am told, it is known, and called *Cicader*. Its cultivation is easy; the plants must be raised in pots in a hot-bed, and put out on ridges or mounds of dung in the same manner as summer Cucumbers; it being desirable to have them as forward as possible, they should be put out early and

protected by glasses till all danger of their suffering from frost is past.

Great caution is necessary in the production of the fruit from which the seed is to be taken; if any other kind of Gourd has been grown in the neighbourhood, no reliance can be placed on the goodness of its seed, for, like all others of the tribe, under such circumstances, it will sport into varieties without end.

LXVIII. *On the Advantages of* Blanching Garden Rhubarb *for culinary Purposes. By* Thomas Hare, *Esq. F.L.S. &c. Assistant Secretary.*

Read May 7, 1816.

The advantages derived from *blanching Garden Rhubarb* for culinary purposes are two-fold, namely, the desirable qualities of improved appearance and flavour, and a saving in the quantity of sugar necessary to render it agreeable to the palate, since the leaf-stalks when blanched are infinitely less harsh than those grown under the full influence of light in an open situation. The following accident led to the observation of this fact.

Early in the spring of 1815, a trench was dug in the Chelsea Botanic Garden, a part of which ran through a bed of Rhubarb; and the mould, according to the common practice, was thrown up in thick heaps upon the sides of the trench. At a period somewhat later than that at which the leaves of the Rhubarb usually begin to appear, the Rhubarb, which had been deeply covered on the sides of the trench, was observed to be heaving up the mould in large clods, and at length developing its natural character. The stalks which had thus become blanched were submitted to the ordinary treatment for the table, and were found to possess the peculiar advantages which have just been noticed.

LXIX. *On the Introduction and Cultivation of a Variety of* Azalea Indica. *In a Letter to the Secretary. By Mr.* WILLIAM ANDERSON, *F.L.S. &c. Curator of the Botanic Garden, Chelsea.*

Read June 4, 1816.

SIR,

As it may be desirable to be made acquainted with the manner in which I have treated the *Azalea Indica*, and also to obtain a concise history of it since it came into my possession, I send you the following account of it, for the Members of the Horticultural Society.

In August 1810, I received a beautiful variety of that plant from China, it being the only survivor out of several which had been taken on board, owing to the bad weather experienced when off the Cape of Good Hope.

Upon examining it, I found that there was much salt both on its stems, and in the mould in which it was planted; I therefore plunged it several times into a tub of water, in order to extract the salt; I then cut off all the dead branches and covered the wounds with our President's vine-paste, which is described at page 102 of the first Volume of the *Horticultural Transactions*; and, without shifting, plunged it into an American border, well sheltered, but much exposed to the sun, where it remained until the end of October, being in the latter part of the time protected by a hand-glass from receiving too much wet, as I supposed this plant, like its brethren, would be impatient of moisture. In consequence of this treatment, it very soon made a shoot two

inches long, and in October was making side shoots; I now removed it to a light shelf in the green-house, which was both high and dry, where it remained growing during the winter, and in February following its main shoot was fifteen inches high; in March I shifted it into a large flat garden pot, for the purpose of laying down the side shoots, and returned it to its situation in the green-house until June, when it was placed in a cold frame facing the sun, that I might better attend to its propagation; in this situation I obtained from it, by September 1811, seven established plants from layers, and in October put three of them on a high shelf in the hot-house, and the remainder, with the parent plant, on the shelf in the green-house. The plants put into the hot-house did not survive the winter; but those in the green-house, although they did not grow much, continued in good health.

Having procured a further supply by laying down two of the young plants, I put some of them in loam, some in sharp sandy peat, and others in a mixture of both, when the whole of those in loam, and part of those in the mixture went off; but as those in sandy peat survived, I judge this to be the most proper soil for them; but even in this many of them will go off, and I therefore recommend every possessor of this fine plant to increase it as much as possible, which may very readily be done either by layers or cuttings; in the former way, lay down such shoots as are nearest the ground when they are neither too young nor fully grown, that is, when the bark begins to turn brown; keep the top of the shoot about an inch out of the ground with its leaves on, and put about an inch or an inch and a half of the shoot (from which the leaves should be taken,) under ground; the bark

should be scratched off on the under side by the nail, it should be pegged down, and covered with fine sandy peat; the layers will be rooted in about two months, when they should be cut off from the plant, and be allowed to remain for eight or ten days, at the expiration of which period they should be put into separate pots, and for some time kept close; afterwards you may expose them gradually to the air.

To propagate them by cuttings, at the latter end of March, take the tops of the young shoots about half an inch long, cut off two or three of the bottom leaves, and put the cuttings thus prepared, about an inch apart, into fine sand or fine sifted sandy black mould; cover them close with a small glass, and place them in a cucumber heat; the soil should be moist when they are put in, and the pot large enough to allow half an inch clear when the glass is on, to admit the necessary waterings, although very little will do; they will root sooner than the layers, and make the best plants, but I have never been able to strike more than three out of five, for they are very subject to damp off.

The roots of this plant resemble those of the tender heaths, and the treatment of both is very similar; I must however observe, that a spare supply of water is of great importance in the successful cultivation of the Azalea Indica.

If the foregoing particulars are deemed worthy the attention of the Horticultural Society, it will afford me great satisfaction in having communicated them.

I remain, Sir, your very obedient Servant,

WILLIAM ANDERSON.

Chelsea Garden,
June 3rd, 1816.

LXX. *On a Method of* Improving *the* Productiveness *of* Fruit Trees. *In a Letter to the Assistant Secretary. By* George Henry Noehden, *LL.D. F.L.S. &c.*

Read January 7, 1817.

Dear Sir.

In communicating to you the translation (see Appendix) of a small tract, which has been sent to our President, from Germany, on a method of improving the productiveness of fruit trees, you will allow me to accompany it with a few remarks. The author of the tract in question, who is a clergyman in Saxony, founds his proceedings upon the principle, that a certain control, to which the sap in trees may be subjected, will have the effect of producing a greater degree of fruitfulness than would exist, if it were left to its natural course. He did not, indeed, set out with this hypothesis, when he made his experiments, but he was, in the process of these, ultimately led to it. He obtains his purpose by making annular excisions of the bark, on the branches of fruit trees, or, as he calls it, *ringing* the branches, that is to say, cutting rings in the bark. The notion, that barrenness in fruit trees arises from too free and strong a flow of the sap, and that, by diminishing and checking this, fruitfulness may be attained, is by no means new, but pretty generally current. It is obvious, therefore, if a mode could be found out of modifying and regulating the sap, that the means would thereby be afforded of rendering almost

every tree fertile. This, however, is a problem, which has hitherto not been solved, though we may perhaps acknowledge, that some steps have been made towards it. It may be, that the Society, on looking at the translation alluded to, will think the attempt of Mr. HEMPEL, who is the writer of the tract, to be of this description, that is to say, to have contributed towards the solution. The manner of proceeding, which has been recommended by different persons, is various; all agreeing in this point, that the flow of sap ought to be checked. Old HENRY VAN OOSTEN, the Leyden gardener, whose book appeared, translated from the Dutch into English, in the year 1711, in a second edition, mentions several means to be resorted to. One is, to transplant the tree frequently. Another, to bore a hole in it, and drive in an oaken plug, which, he says, is the old way. But as the most effectual he considers the repeated pruning of the tree, in summer, by which, as it causes the tree to bleed, the current of the sap is naturally weakened. Pruning would otherwise be deemed to add to the strength of the tree, if it were done, before the sap is in motion; but in practising it from the month of April, when already much of the sap has been wasted, you tame, as he says, the luxuriance of the tree by the wounds you inflict upon it. He rests upon the idea, that a superfluity of sap produces nothing but twigs, and moderate sap produces fruit. Some of the modern gardeners are afraid of pruning a luxuriant tree; but while they entertain these fears, they are thinking of winter pruning, or early spring pruning. MARSHALL, in speaking of Pear-trees, (page 156, 4th edit. of the *Introduction to Gardening,)* observes, that their

luxuriance may be checked, and fruitfulness promoted, by stripping off pieces of the bark, from the stem and the branches. He notices, likewise, the practice of making notches, cross-wise, in the bark, for a similar purpose. What is thus recommended for Pear-trees, may be applied to all other fruit-trees, under similar circumstances. Care should be taken, in cutting the notches, that they do not reach the pith. Nicol (in his *Forcing and Fruit Gardener*, 4th edit. page 240) suggests the expedient of cutting the roots of a luxuriant tree. That training has an effect upon fruitfulness, by operating as a check upon the sap, is generally conceded. Our old friend Van Oosten already was aware of this, though he does not seem to have made much application of this remedy; for, page 11, he says, "A bough that is bent, commonly bears much fruit, but small, except it be bent from the beginning. The reason is clear, the pith of the wood runs crooked, and so its sap does not flow violently." Another method of checking the sap is mentioned in a paper published in our *Transactions*, Vol. II. page 222. The whole seems to lead to this conclusion, that luxuriance in trees and fertility are at variance: and that the vigour which produces shoots and branches in abundance, is subversive of what we value more, namely fruitfulness. The growing principle must be moderated, to answer the gardener's purpose. This may perhaps also be inferred from the circumstance, that aged trees, or such as are in a weak, or even sickly state, are often very productive. I will not presume to account for those facts; but as facts, I believe, they must be admitted. Whether it is the abundance of the sap, or the rapidity with which it moves, that proves an obstacle to the formation, of

fruit, future observation may perhaps be able to decide. If we were to suppose the quickness of the sap's motion to be in fault, it might appear, that owing to a disproportionate activity, time was not allowed for the separation and decomposition of those particles by which the fruit is formed. Some circumstances seem to point out the abundance of the sap as the cause which is to blame; for several of the remedies above-mentioned are directed against this fault, and are said to be efficient to the purpose of fertility. It may be added, that transplanting is beneficial to many vegetables, besides trees, and improves their fecundity and good quality; and this is most readily accounted for by a modification of the growing principle thus brought about. Moreover, it is sometimes found, that by confining the roots, for example, by narrow vessels, or by what is commonly called under-potting, the plants prove more fruitful; continued observation and attention may, at last, bring us to satisfactory results.

In adverting to the particular method, practised and recommended by the author before us, let me remark, that his practice of *ringing* trees, coincides exactly with that described by JOHN WILLIAMS, Esq. in a Paper read before this Society, May 3d, 1808, and printed in the first Volume of our *Transactions*, page 107. Mr. WILLIAMS does not call it *ringing the bark*, but *making annular excisions in the bark*, which is the same in meaning. Both, however, follow nearly the same plan, in cutting circles on the bark; with this difference, that Mr. WILLIAMS has only applied the operation to Vines, and Mr. HEMPEL to several other sorts of fruit-trees, though the former intimates, that he thinks it may be

applicable to fruit-trees in general. It is curious that both authors seem to have been impressed with the idea, that they were the discoverers of that method, and it is interesting to see, how they both meet in the same road. The German writer observes, that the proper size of his bark-ring is a *quarter of an inch* in width; Mr. WILLIAMS relates, that he made his annular excisions first half an inch broad, but he found, in the succeeding year, that the Vines which had undergone that discipline, did not push freely, and seemed to be injured. The alburnum had been too much exposed. He, therefore, reduced the rings to *between one eighth and two eighths of an inch* in width, which is very nearly Mr. HEMPEL's dimension, and the trees did well. Those Vines were in the open air; to such as were in a forcing-house, and sheltered from the weather, it did not seem prejudicial to make the excision wider, for the bark also was in those houses more quickly reproduced. Mr. WILLIAMS lays a particular stress upon the entire removal of both the outer bark, or *cortex*, and the inner, *liber*, in making those rings; for if you leave any part of the latter, the bark forms soon again, and all your trouble is lost. Mr. HEMPEL likewise inculcates it as a precept, that both the outer and inner bark must be entirely stript off, so as to leave the wood, or *alburnum*, perfectly bare. They both state, that the fruit in consequence of *ringing*, or *annular excision*, becomes much larger; and Mr. WILLIAMS adds also, better flavoured, and that it ripens more quickly. He explains these effects by Mr. KNIGHT's theory of the downward circulation of the sap; Mr. HEMPEL attributes them to a retarded motion. There is a very important consequence, which the latter

gentleman states as resulting from his operation of ringing, namely, that you may force young trees to show fruit, before they otherwise would do. This really is exercising great power over nature, if experience should bear out that position. One might doubt it, as it is an opinion commonly received, "that in young trees, which have sprung from seed, a certain period must elapse, before they become capable of bearing." Thus our President thought, according to what he has expressed in the *Transactions of the Society*, Vol. I. page 39, where he adds, that he believes that period cannot be shortened by any means. Pruning and transplanting, he says, are both injurious; whether he will be induced to attribute a more favourable influence to the operation of ringing, must depend upon the degree of confirmation, which Mr. HEMPEL's assertion may receive from farther experiments.

I remain, Dear Sir,

your obedient Servant,

GEORGE HENRY NOEHDEN.

Albany, Piccadilly.
December 16*th*, 1816.

P.S. SINCE I wrote the foregoing Letter, I have, through the kindness of our worthy Secretary, Mr. SABINE, received some additional information, which I will beg leave to subjoin. Mr. SABINE observes, that the mode of stripping a portion of bark, in the shape of rings, from the branches of trees, for the purpose of curing their barrenness, has been known and practised, for some time, in England, and commonly been denominated, by gardeners, *circumcision*. But he intimates,

that it had been confined to Pear-trees, and also states, that the ring was generally cut rather wide, and that the branches, though they bore fruit, were essentially injured by the operation, and ultimately perished. This effect unquestionably ensued from the misapplication of the remedy, in taking off too great a quantity of the bark, and thus reducing the tree or branch, to a state of exhaustion, instead of merely checking, and moderating its vigour. It seems, therefore, to have been only a practical manipulation, known among gardeners, of which the reason and general principle were not understood. This is, moreover, apparent from its having been usually applied to no other than Pear-trees. Perhaps the frequent barrenness of these trees, arising from a superabundance of sap, was the cause why they, in preference to other trees, were subjected to that operation. I have mentioned, that Mr. Williams tried it upon Vines, but though he hints at it, as no improbable idea, that other trees might perhaps be equally benefitted by the process, he was not aware of its efficacy in general. We know, at present, on the authority of experience, that it has answered with Pear-trees, Plum-trees, and Vines; and combining this with general reasoning, I think, we cannot be wrong in concluding, that it will, in a similar manner, be advantageous to all fruit-trees, whose unproductiveness is judged to be owing to an exuberance of sap. The unskilful way, in which it has been practised upon Pear-trees, involving frequently the destruction of the tree, rendered the expediency of recurring to that remedy problematical; and it seems that no person in this country, before Mr. Williams, reflected upon the means of preventing the injurious consequences, which were apt to

follow. Yet the cause appears obvious; but so does many a truth, when it is once discovered.

The dimensions, which both Mr. WILLIAMS and Mr. HEMPEL assign to their rings, as best answering the purpose, nearly approach to one another: and they may be taken as rules to go by. But it is not to be said, that no deviation from them should be allowed; on the contrary, it may be advisable to vary, according to the comparative strength of the tree, and the quantity of sap, with which it may be presumed to be filled. The ring should never be cut so wide as to defy the effort of the tree, in again covering the wound, during the season; for that deduction of fulness, which is adequate to make up the loss of the bark removed, seems just to place the treee in that medium of vigour, which is favourable to the production of fruit. Mr. SABINE has farther favoured me with an account of a Pear-tree at Kew, which I will transcribe in his own words. It will be seen, that the remarks made before, are applicable in this instance. The partial decay of that tree is attributable to the manner in which the operation has been performed.

"There is a Pear-tree," says Mr. SABINE, "against one of the walls in the kitchen garden, belonging to His Majesty, at Kew, which underwent this operation about 15 years ago. The part operated on was near the root; and as it was a principal arm, about one half of the whole tree became influenced by the operation. This half has uniformly borne fruit, the other half has been nearly barren. The portion of stem, which was laid bare, is about six inches wide, and it has not been again covered by bark. That part just above the ring is considerably larger than the part below it. The ends of the branches appear in much decay, and there are

but very few young shoots thrown out from the sides; whilst on the other part of the tree, the shoots, as usual, proceed from the extremities as well as from the sides of the main branches. I apprehend from the present appearance of the whole, that the portion of the tree, which by the separation of the bark, has been deprived of supply from the root, can-

not survive many years."

LXXI. *Notice on the Effect of* Watering Fruit Trees *early in the Spring. By* James Sowerby, *Esq. F.L.S. &c.*

Read January 7, 1817.

In the spring of the year 1815 the drying March winds as they are called, were considered very injurious to the early blossoming Apple, Pear, and other fruit trees. I was repeatedly told, both by my neighbours and those from Norfolk and Suffolk, that just as the fruit was beginning to set, these drying winds caused it to fall off, like the leaves in autumn, so that the expected produce was early lost; and that this happened continually to their great loss and inconvenience.

Now, as I was so fortunate as to preserve the little fruit at Mead Place, I presume others may do the same; and indeed, from the reward, which appears to me more than proportionate to the labour, I feel confident that the hint I am about to give, however trifling it may appear, may be useful.

As these winds have generally succeeded the blossoming of my trees, which by the way, are planted in a very bad soil, the whole used to be blown off about the time for the setting of the young fruit; I thought it probable that a large supply of water at the roots, would strengthen and save the fruit; this was given, the effect was seen in twenty-four hours, the young fruit then resisted the attack of these winds, and a large crop was produced.

By these means not only were the trees enabled to produce their fruit in abundance, but also to increase the size considerably; under such treatment, a tree which in 1814 produced a very few Pears of about half a pound each, in 1815 produced a great number nearly double that weight.

LXXII. *An Account of seven double* Herbaceous Pæonies, *now cultivated in England. In a Letter to* George Anderson, *Esq. F.L.S. &c. By* Joseph Sabine, *Esq. F.R.S. &c. Secretary.*

Read November 5, 1816.

My dear Sir,

Our recent investigation of the species and varieties of *Pæonia*, enables me to give some account of the *double-flowering* plants of that genus, which may be interesting to the Horticultural Society; for though some of the subjects of this Paper are well known, yet I apprehend they are not generally well distinguished from each other; and others will perhaps be quite new to many of our Members.

Some of the single Pæonies are highly deserving the attention of the horticulturist, but I purposely confine myself to the description of the double flowering varieties, that I may not interfere with the account of the former, which we shall shortly receive from you in a Monograph of the genus, which you intend to present to the Linnean Society, and from which the scientific names herein given are extracted.

The confusion and intricacy in which this tribe of plants has been involved, may well be conceived, when it is known, that although many of the herbaceous ones have been very old inhabitants of our gardens, and but few of very recent introduction, yet the number of them in the best collections

near London did not exceed sixteen, whereas our enquiries have extended it to thirty, seven of which have double flowers.

Two varieties of the *P. officinalis*, one with double red, and the other with double white flowers, were known to the older botanists and gardeners of this country, both being described in Johnson's Gerrarde in 1636, and by Parkinson in his *Paradisus* in 1656; for though the latter calls his second plant the double-blush, yet his account of it proves that he meant to describe the same plant as his predecessor; their origin, I conceive, must have been in the latter part of the preceding century. Camerarius, who published his *Hortus Medicus et Philosophicus* at Frankfort in 1588, mentions the recent introduction at Antwerp of the double-red Pæony, which he calls *P. fœmina polyanthos*. Lobel, in his *Icones*, dated Antwerp 1581, having given a figure of it; and Tabernæmontanus, in his *Eicones*, printed at Frankfort in 1590, gives a representation of both these varieties, whence we may conclude that the double-white was produced subsequently, though almost immediately, after the double-red Pæony. A third intermediate variety, with flesh-coloured flowers, was produced in the next century, for we find that Morison, Professor of Botany at Oxford, who died in 1683, was acquainted with it, as it is described in the third Part of his History of Plants, which after his death was edited by Jacob Bobart, in 1699.

The *double-red Pæony, (P. officinalis rubra)* is the most common; few gardens are without it, and it generally is one of those which decorate the small borders of the labourer's cottage; the colour is extremely brilliant, and the flower is altogether the most splendid of the tribe, though, from being

so frequently seen, it has lost much of its estimation; yet we may judge how highly it was prized when first produced, since CAMERARIUS informs us that the first plant introduced into Antwerp, near 259 years ago, was sold for twelve crowns.

The *double flesh-coloured Pæony*, (*P. officinalis carnescens*) opens of a deep rose-colour, progressively becoming paler, and at length turns to a flesh colour; the centre and bottom of the petals remaining red in stripes or rays, whilst the edges are nearly white, which circumstance has caused it to be called by some gardeners the *Variegated Pæony*.

The *double-white Pæony, (P. officinalis albicans)*, opens of an uniform flesh colour, and undergoing a change similar to the preceding, the whole flower at length becomes perfectly white.

The alteration which the inflorescence of these two last plants undergoes, has occasioned many accounts of further varieties. I have heard of flesh-coloured flowers which do not change, and of white flowers, which were so at the first opening; but I have sought for and purchased the plants so named in vain.

A detailed description of the above three is unnecessary; they all flower in the end of *May*, they have but little scent, and that not agreeable; the outside petals of the flowers are, in shape and size, like those of the single plants; the inside petals, which are the converted stamens, are narrower, and fill up the whole internal space, except what is occupied by the sterile germens. The plants are easy of cultivation, and will succeed in any situation except that of deep shade, but do not like frequent removal; the only particular to be attended to in planting them is, that their tuberous roots should not

be cut or broken; it is therefore best, when an increase is required, to take up the whole root before it be divided, instead of separating it in the ground by the knife or spade.

It is singular, notwithstanding the beauty of these flowers, that among the publications in later years of coloured representations of plants, no figure of any of them has appeared, the small cuts of the ancient writers I have before referred to, being the only ones I am acquainted with.

The fourth sort is the *Double-fringed Pæony* (*P. paradoxa fimbriata,*) which probably originated in the Dutch gardens; it was known to Morison, who, in his *History of Plants*, Vol. ii. p. 455, called it *P. flore pleno purpureo papaveraceo;* and to Miller, who in his last edition of his Dictionary, 1768, has named it *P. Tartarica*, and says it was raised from seeds imported from the Levant; it was established in the Hammersmith Nursery before the time of the present proprietors of that extensive collection, and is there called *Pæonia fimbriata.* Messrs. Loddiges of Hackney introduced it into their garden from Holland many years ago, as the *Double purple Pæony*, and have latterly named it *Pæonia humilis*, it having been noted by Wildenow as a double variety of that species; but this is an error. From these two gardens it has been distributed, though not very generally, into private collections, but it has been so little noticed, that its representation has not been given in any recently published work; two figures only of it are known to me; the first is in the plates which accompany Morison's work, where, though in small, it is well represented; the second is in Miller's Figure of Plants, 1760, No. 199, Vol. ii.: this is so badly executed that no one could possibly

know it to be intended for the plant, except by the inscription. The whole plant is of lower stature than any of the three preceding ones, and comes into blossom later; its flowers are also inferior in size, but more numerous, and are considerably elevated above the leaves by long footstalks; they are of a bright crimson colour, inclining to purple, the outer petals being broad, as in the single plant; but the interior are very narrow, like a fringe (whence its name), sometimes partly shewing themselves in their unconverted state of stamens, much elongated, with their anthers on the top, the whole assuming a purple colour. The cultivation and habits of this are exactly the same as those of the preceding sorts.

For the three remaining plants we are indebted to the skill of the Chinese, who from a white flowering species, which is a native of their northern Tartar dominions, have produced varieties of great excellence; they have not only effected an impletion of the flowers, but have converted the white or rather pale blush petals of the original in two instances into a beautiful rose colour.

In 1808, through the intervention of his friend Mr. John Livingstone, Mr. Whitley of Fulham imported a plant which he was led to expect was the Yellow Moutan, it proved to be the herbaceous plant I am now about to describe, having named it Whitley's *Double White Chinese Pæony (P. albiflora Whitleji,)* in order to record its introduction. This comes into flower in the beginning or middle of June; in habit and growth it much resembles the single ones of the species, except that it rises from the ground later in the spring; it grows to the height

of three feet, having two or three buds on each flowering stem. The buds and the external petals when open, are tinged with red, so as to give them an appearance of flesh colour, whilst the internal petals, which are narrower than the others, are of a sulphurous yellow, going off nearly white; some few of them (not more than two or three) being marked on the top with a bright red stain; the germens are also tipped with a red stigma, which is perceptible when the flower happens not to be very double. The scent in this as well as in the single ones of the species is strong, being thought by many to resemble that of Elder flowers. In the Botanist's Repository, Vol. x, plate 612, a figure of this plant was given on its first appearance in this country. Of the correctness of the representation I cannot speak favourably, and in the account of the plant which accompanies the plate, the statement that it was raised from seeds by Mr. Whitley is erroneous.

The *double Sweet-scented Chinese Pæony, (P. albiflora fragrans,)* was introduced from China by Sir Joseph Banks in 1805, and the plant has since been cultivated in the Royal Gardens at Kew. By many who are ignorant of the existence of the two plants, this has been confounded with the preceding; like that, it rises from the ground late in the spring, but is more upright in its growth, and of a more slender habit, with narrower leaves, bearing its flowers in cymes of two or three buds each, though sometimes its footstalks are uniflorus. The flower is of a delicate rose colour; the outside petals are large, the inside ones smaller, being very peculiar in their formation, for those which are situated nearest the natural petals are the shortest, whilst

The Double Sweet Scented Chinese Peony.

those which are placed next the centre are the longest; this causes, as it were, a pyramidal elongation of the interior of the flower, having an hollow in the centre, surrounded by the longer internal petals. The scent of the flower is very agreeable, being much like that of the Rose. It is the latest of all the tribe in flowering, not opening till the end of June. The engraving of the plant by Mr. Hooker, which has been executed by order of the Council of the Society, is a very accurate representation of it.

The last plant I have to record is Sir Abraham Hume's *Double Chinese Pæony, (P. albiflora Humei,)* which was imported in 1810 by Captain Welstead from China, and by him presented to Sir Abraham Hume, in whose garden, at Wormleybury, it has flowered for the last three years. Although it has not the advantage of the sweet scent of the Kew plant, yet it has a very pleasant odour when first gathered. It rises from the ground at the same time as the single varieties of *P. albiflora,* growing to the height of about three feet, with leaves much longer and broader and more rugose than any other of the species, the flower-stalks bearing cymes like the rest. The flower-bud is very thick and large, and as it swells, it seems as if a dingy yellow had been infused into the red of that part of the back of the petals which is in sight, whilst some dark marks extending longitudinally over them, give an appearance as if the flower would be striped.

The flowers open in the middle of June as large as those of the Double-red officinal, exactly agreeing in colour with the sweet-scented variety, but of double the size. It is so full that the outside petals are not seen, the inside ones are of different

sizes more or less broken and divided, thin and delicate in substance, in which point, though perhaps the only one, it is superior to the Double-red officinal. Sir ABRAHAM HUME'S *Double Chinese Pæony* has been figured by Dr. SIMS in the Botanical Magazine, Vol. 42, plate 1768, and there called *P. edulis Sinensis*; the colour of the flower is however more brilliant than his artist has represented it.

These three last mentioned plants are at present scarce, and bear a high price in the nurseries around London; they are not so readily propagated as some others of the genus, their roots being less capable of division; but I have known them strike freely from cuttings of the stems, which if made after the flowers are past, will throw out roots, and ultimately become good plants, though they are small and weak at first. They are perfectly hardy, and seem to thrive best when planted in a dry situation in good light loam, to which a small portion of sand has been added. Of their beauty, those only who have seen large plants in flower can adequately judge; no collection, however small, should be without them, and when more common, they will be the grandest ornament of the herbaceous garden in the month of June.

Believe me, my dear Sir,

Your very sincere Friend,

JOSEPH SABINE.

North Mimms,
October 29th, 1816.

P. S. Whilst the foregoing Letter was under revision for the press, the friend to whom it was addressed was, by a fatal accident,* lost to this world. The Horticultural Society

* He was killed near his own house on the 10th of January last by a fall from his gig.

will long regret him ; he was a most zealous promoter of its welfare, to which he contributed abundantly both by his attention to its interests in its Council, and by his intelligence and skill in the science which it was established to promote.

How severely his loss will be felt by those to whom he was endeared by the closer ties of friendship, the deep affliction which the writer of this short tribute to his memory has suffered by his death, will testify. Attracted to each other by similarity of pursuits, we had of late years passed together many hours of pure and unalloyed happiness, now alas ! never to be renewed. His impartial consideration of, and correct judgment in, all objects of science which he investigated, rendered his society most valuable ; and to these he added the mildest temper and the most obliging disposition, a mind well stored with information, and every quality which can make the possessor respected, esteemed, and beloved.

JOSEPH SABINE.

12*th February*, 1817.

LXXIII. *Brief practical Observations on the* Cultivation *of the* Cucumber, *in the Royal Gardens at Kew, during the Autumn and Winter Months. By* William Townsend Aiton, *Esq. F. L. S. &c. Gardener to His Majesty.*

Read January 7, 1817.

A regular supply of *Cucumbers* being annually required for the royal tables, seeds of a suitable kind were sown this year on the 12th and 20th of August; the compost for the several shiftings was previously prepared as follows: of light loam, a few months from the common, one third part; the best rotten dung one third part; leaf mould and heath-earth of equal parts, making together one third part; the whole well mixed for use.

The seed pans were sown and placed in a one-light box, on a well prepared hot-bed; when the cotyledons or seed leaves became nearly of full growth, the plants were potted out two into each pot, known to gardeners about London by the name of upright thirty-twos. When these pots became filled with roots, the plants were again shifted into larger ones called sixteens, and removed from the seed-bed into a three-light frame, with a sufficient bottom heat to allow a considerable portion of air being given day and night, both in the front and back of the frame. About the middle of September the plants having again filled their pots with roots and become stocky, were taken from the frame to the stove and after a few days received the last shifting

into larger pots of the following dimensions: at the top fourteen inches over: the bottom ten inches across and twelve inches deep, all inside measure: each pot at equal distances apart having three side drain holes near the bottom, and a larger one in the centre of the bottom, and containing about three pecks of solid earth.

The Cucumber plants were fruited this season in a pinery. On the front edge of the back flue of this stove a fascia boarding six inches deep was affixed the whole length of the building, forming all along a trough or inclosure for a reserve of compost after the exhaustion of the mould in the pots had taken place. The pots were now placed in regular order upon the mould trough over the flue, at three feet apart, and remained permanently in this station for succession. A setting of the second sowing was placed upon the end flues of the house; underneath each pot was set an upright circular garden pan, six inches deep and fourteen inches diameter, which being filled with earth, the pots were plunged therein about two inches deep, and the drain holes being sufficiently covered with mould served as outlets to the roots.

From this time the fire-heat of the stove was kept day and night at 60° to 65° FAHRENHEIT'S thermometer, varying only a few degrees when the sudden influence of sun or steam produced an additional glow of climate. The plants being now established and vigorous, required stopping for laterals and fruit; and these second and third lateral shoots in their turn were stopped also, and the blossoms from time to time set, as usual, for succession of supply.

Waterings were necessary, only when the surface of the earth was evidently dry, and light sprinklings of soft water

tempered in the stove were occasionally given over the leaves of the plants and path with good effect.

Steam from a well regulated flue was considered always favourable to the cultivation, but applied sparingly on account of its scalding effect upon the leaves when the vapour proved over-heated.

For the mildew, flower of brimstone coloured leaf-green by a little soot, has been applied with the best success in all stages of the disease, and copious fumigations of tobacco were used for the destruction of the several species of the Aphis tribe.

Under this simple practice Winter Cucumbers have been produced abundantly in the months of October, November, December, and part of January, in all the gardens of His Majesty, during a series of years.

The Old Apple.

LXXIV. *Some Account and Description of* Ord's Apple.

By Richard Anthony Salisbury, *Esq. F.R.S. &c.*

Read January 7, 1817.

For the following account of this most excellent *Apple*, I am chiefly indebted to Mrs. Ann Simpson, the sister of Mrs. Ord; the flowers and fruit however have been described from very perfect specimens sent to me by that lady.

About forty years ago, the late John Ord, Esq. raised in his garden at Purser's Cross near Fulham, an Apple tree, from the seed of the New-Town Pippin imported from North America; when this tree began to bear, its fruit, though without any external beauty, proved remarkably good, and had a peculiar quality, namely, a melting softness in eating, so that it might be said almost to dissolve in the mouth. The late Mr. Lee, of Hammersmith, often had grafts of this tree, and he sold the plant so raised first with the name of Ord's Apple, and subsequently with the name of *New-Town Pippin*.

This seedling tree is now of large dimensions, its trunk being 4 feet 4 inches round at a yard above the ground; but it has of late years been very unhealthy, and scarcely borne any fruit worth gathering, its roots having no doubt penetrated into a stratum of unfavourable soil.

Mrs. Ann Simpson being as fond of gardening as her late brother-in-law Mr. Ord, with whom she resided, was induced to sow some Pippins of this tree raised by him;

and two of the healthiest seedlings of this second generation were planted out to remain, in the kitchen garden, which are now about twenty years old. One of these trees began to bear fruit very soon, which is not unlike that of its parent in shape, with a thin skin; and being a very good Apple, grafts of it have been distributed about the Metropolis, with the name of *Simpson's Pippin*. The other seedling of the second generation, was several years longer in bearing fruit, and when it did, the Apples were quite of a different shape, being long, with a thick skin and poor flavour, and so numerous as to be all very small. Of late years however, they have gradually improved so much in flavour, as to become a remarkably spirited juicy Apple, attaining a good size, which has probably been promoted by thinning them, though a full crop has always been left upon the tree; and they are now greatly esteemed by all who taste them.

The older *Branches* spread horizontally or nearly so; those of one and two years old are of a dark purplish brown colour, sprinkled with whitish spots not observable in the other seedling. *Buds* broad-oval, especially the *blossom-buds;* and the scales of the latter do not fall off till after the petals have dropt, which with some other characters mentioned below, may perhaps account for its bearing so abundantly. Old Leaves of a darker green than in many varieties. Young Leaves pubescent, especially underneath, more obtusely serrated than in the other seedling. *Stipules* very narrow. *Peduncles* hardly an inch long, very woolly when in flower, and thus, no doubt, protected from the frost. *Young Fruit (Germen of Linnæus)* obovate, very woolly. *Calyx* very woolly; its leaflets horizontally recurved during the blossoming season

narrowly wedge-shaped. *Petals* pale blush colour with a darker tint where exposed to the light in their unexpanded state; horizontally incurved; oval, with a very short claw; obtuse, finely nerved. *Filaments* 15 to 20, half as long as the petals, quite smooth. *Anthers* orbiculate, emarginated both at their base and top, splitting towards the stigmata. *Styles* often apparently only four in number, but in this case two will generally be found united into one; and the young fruit has the natural quinary number of cells, woolly, up to about as high as the filament. *Stigmata* broader than the styles, hemispherical, soon exsuding in abundance a viscid liquor, to which the pollen adheres; this accounts for so many blossoms setting. *Fruit* in perfection for eating, from Christmas to the middle of March. *Skin* thick and always of a green colour while on the tree, but tinged with copper-coloured red, and several darker spots on the sunny side; after the fruit has been gathered some time, the green colour changes to a yellowish cast. Its *shape* is oblong-ovate with the base and top depressed. *Size* of larger specimens from $2\frac{1}{2}$ to 3 inches long, by about $2\frac{1}{4}$ broad at the bottom. Eye small, depressed, and closed by the dead leaves of the calyx now incurved; and it is surrounded by some irregular ribs, the natural number of which is 5. These *embossures* of the French have been observed by Mr. Hooker, who, I believe, knows Apples better than any of us, in almost every young Apple. *Flesh* not so firm as that of the Ribston Pippin, and of a charming flavour mixed with a slight perfume; when quite ripe, of a pale yellowish tint. *Core* longer than in many Apples, very much striated, and in every specimen I have examined, truly unilocular at the centre, its axis separating into five parts

adhering to the dissepiments, the two sides of each cell or core *(parietes loculorum)* having evidently in an earlier state grown together, and marked with ragged scars where they had been torn asunder, by the swelling of the whole fruit. *Seeds* dark-brown, obovate, somewhat triangular, and not differing, that I can find, from those of several hundred other varieties.

I have no doubt that the *Ord's Apple* would be greatly improved by proper cultivation in a kind fertile soil and better climate, and I venture to recommend it strongly for the warmer districts of Hampshire and Devonshire, but more especially to our neighbours across the channel in Normandy. In the northern counties of England, and by our Caledonian brethren who wish to taste its fruit in perfection, I fear it will require either a wall, or be trained as a very low espalier, not higher than three feet, in a warm and sheltered exposure, such as is afforded by a large and high range of buildings.

I believe that both this, and many other fruits might be more perfectly ripened and improved by covering the trees with mats every cold night; the mats should be put over the trees while the sun is still on the ground, at least half an hour before it sets, and they should not be removed the following morning till an hour after it has risen, or longer if the night has been frosty or chilled with rain and wind.

This should be done always in wet weather, whether there are intervals of sunshine or not, for there is a certain degree of warmth imparted to the earth by the light, even in cloudy and gloomy days; and Dr. Wells' important book on Dew proves, that the warmth of the earth is prevented from radiating out of it back again into the higher

regions of the atmosphere, by a very slight covering. By following this practice on a Green-gage tree in Yorkshire, during the unusually cold and wet months of August and September last, the crop of fruit ripened very tolerably, while on other trees against the same wall, most of the Plums remained unripe, cracked, and sour to the middle of October. All our early Radishes have long been produced for Covent Garden by a similar expedient, only substituting straw for mats.

LXXV. *Observations on the Expediency of giving to Horticulture a Scientific Form, by arranging its Objects under a System.* *By* George Henry Noehden, *LL. D. F. L. S. &c. &c.*

Read February 4, 1817.

It must have been remarked by other Members of this Society, as it has been by myself, that the Horticulturist sometimes appears to disadvantage, by not accurately knowing the name of a fruit, or similar production, when submitted to his inspection: and what is worse, he seems to be destitute of the means of arriving at that knowledge; his only resource is hearsay, and a sort of traditionary information. This degrades him, in a manner, from the character of a scientific man, to which his pursuits might otherwise furnish him with just claims. It is very striking, when we compare his situation with that of the Botanist, to whom it can rarely happen that a plant is presented, without his being able to ascertain its denomination; even an object quite new he can at once refer to his system, and mark out for it a place, to which, on scientific grounds, it is entitled. Nor is that apparent ignorance solely to be ascribed to such as have only a superficial acquaintance with Horticulture; it also extends, more or less, to those who have long made that pursuit a subject of their attention, and have added to reflection and theory many years of practical experience. This is indeed a lamentable deficiency; for it is not only the inconvenience of being uncertain about names

that is to be regretted, but this very defect implies, at the same time, the probability, that the qualities of those objects, with whose names we are not accurately acquainted, may be equally unknown to us. The knowledge of names is justly considered as the first step in science, without which we cannot make any successful advances. For it is by means of proper denominations, that the individual objects are discriminated, that we are enabled to consider them without confusion, and assign to them with exactness, their qualities and attributes. Hence nomenclature is so important in science; and to establish it on correct and well defined principles, is not only meritorious, on the part of those who wish to promote any science, but an essential and indispensable duty. The names must be founded upon a judicious distinction of the characters, observed in the objects; and this very act of discrimination is a scientific process. When we once have gained a suitable nomenclature, we are able to survey the whole field of the science, and acquire a command over the objects, comprehended under it. We have them distinctly before us, and can safely and unerringly pursue our investigations. But this is not to be done, when the nomenclature is left in an unsettled and ambiguous, and even a neglected state. When, on the contrary, it is duly adjusted and fixed, it affords another valuable advantage; by means of it, a scientific arrangement of the various objects, with which we are concerned, may be made. Such a system consists of divisions, and subdivisions, and is formed by certain characteristics in the objects. These characteristics are the marks, according to which every object finds its appropriate place, in the

system; and by these we are directed to the division, or subdivision, where it is to be looked for. In the lowest subdivision the individual name will be seen. That such is the nature of the systems which LINNÆUS has contrived, is well known. They yield easy means of recognition, and thus fairly open the avenues of science; their excellence can only be unndervalued by the ignorant. Botany, and the other branches of Natural History, are in possession of those benefits; but we are differently circumstanced in Horticulture. That the latter is capable of being regarded as a science, few persons who are, in any degree acquainted with it, will be disposed to deny. Both the number and variety of the objects which it embraces, and the utility and importance of the researches, to which it may give rise, qualify it for such a mode of treatment. Unfortunately, however, we have as yet had no LINNÆUS to distinguish, sort, and arrange the mingled mass, and, by an aptly combined method, to subject the whole to rule and order. It admits of no doubt that such a proceeding is practicable; and if it be so, it ought to be adopted. If it were but for the facility of acquiring the names of the objects, and thus learning to distinguish them properly, one from another, this alone would be to us of infinite value, and as satisfactory and useful to the practical gardener, as to the theoretical Horticulturist.

It is not my purpose, at present, to enter into a detail of my ideas upon this subject, and to show, in what manner such a design may be carried into effect; that may, perhaps, be done at a future time. Some months ago, a paper was transmitted to our President, by the Pomological Society

of Altenburg, exhibiting a *System of Pears*, that is, a classification, under which the different sorts of that fruit are arranged. It seems to be the intention of that Society, to project similar systems for the other fruits. In such a task, two requisites are to be considered; first, that of making the divisions and subdivisions; and secondly, that of fixing the characteristics, by which the fruits are to be discerned. The latter will be the most difficult point to attain; it will require sagacity and judgment, and extensive knowledge. What has been done by the Altenburg Society, appears to me neither sufficiently scientific, nor comprehensive; yet credit is due to its Members, even for the imperfect attempt, which they have made. It proves, at least, that they have felt the defect which exists, and have been inclined to do justice to that faculty of the human mind, which always seeks to dispose, in a certain order, the objects of knowledge. Their system is designed as a copy of the Linnean method, and contains Classes, Orders, Genera, and Species; also Families, as a subdivision of Species. The limits of those divisions are, in my opinion, not separated and defined, with adequate strictness; but greater objections will perhaps be made to the characteristics which have been assumed as the elements of the arrangement. For instance, those derived from the colour and flavour of the fruit, may, I apprehend, prove too precarious and uncertain to be relied on. The core and seeds are left entirely out of the consideration. If our Society were to take this matter in hand, it might perhaps, with the particular advantages it possesses, not be unsuccessful in its endeavours, and to a certain degree, effect the desired

purpose. For under the direction of such a President, as it is our good fortune to have at our head, and by the co-operation of so many Members, distinguished by experience, as well as by science, much indeed might be accomplished.

LXXVI. *On the* Management *of* Orange, Lemon, *and* Citron Trees, *at Wormleybury, Herts. By Mr.* James Mean, *Gardener to Sir* Abraham Hume, *Bart.*

Read January 7, 1817.

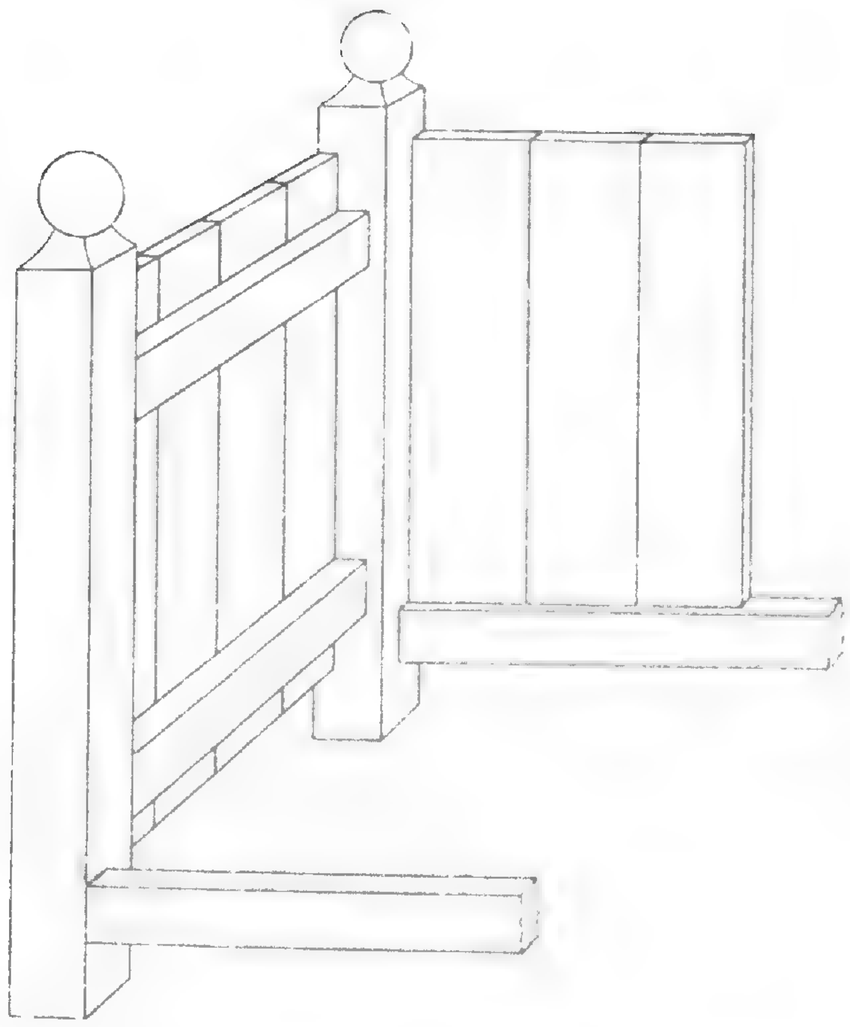
To have fine and healthy *Orange*, *Lemon*, or *Citron* trees, the soil in which they are planted is the first and most important consideration. The following mixture is the best I have tried, and I have every reason to be satisfied with it. Well prepared rotten leaves, two to three years old, one half; rotten cow dung, two, three, and four years old, one fourth; mellow loam, one fourth; with a small quantity of sand or road grit added to the compost, which ought not to be sifted too fine.

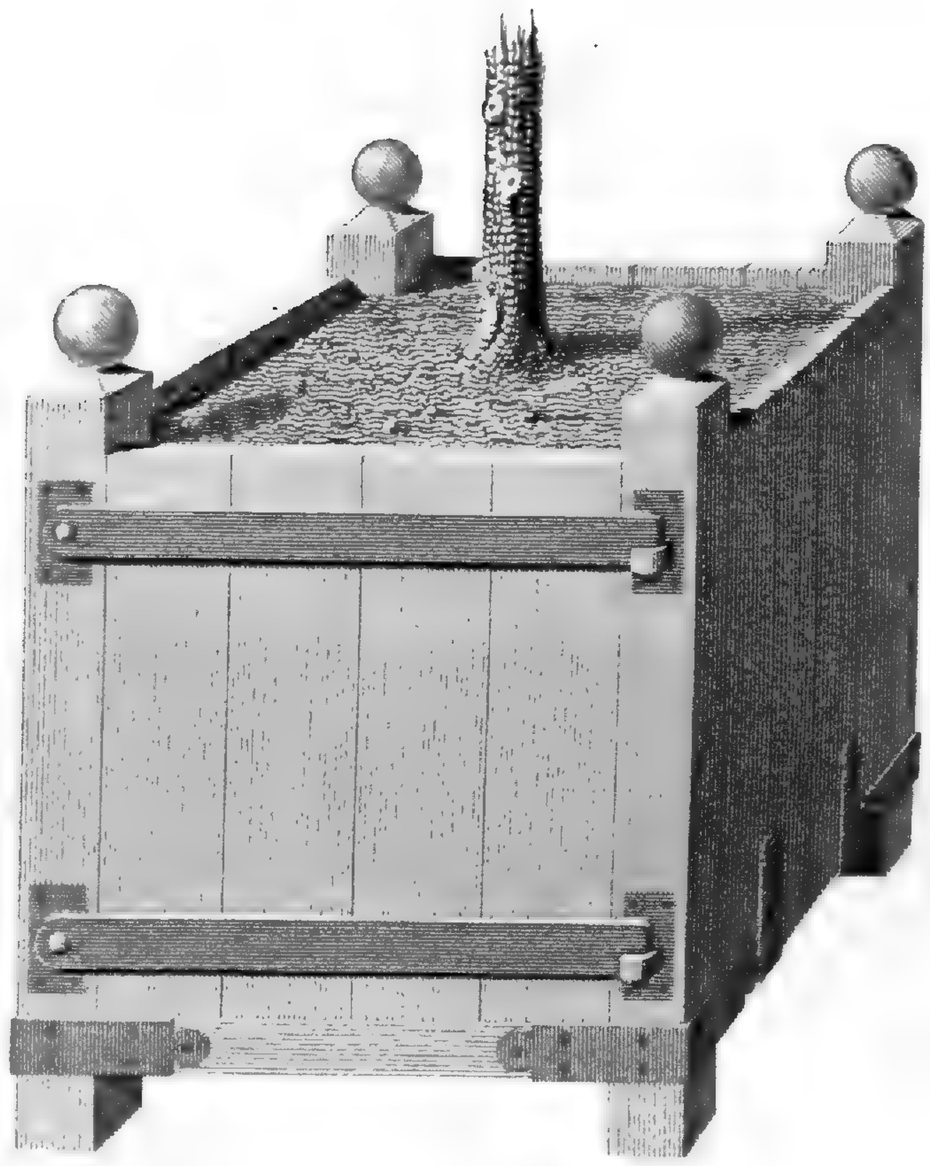
The next thing required is a well prepared drain for the bottom of the tubs or boxes, which I thus form: I first place pieces of plain tiles over the holes, then some chips of oak two inches thick; on these, three or four inches of rotten leaves, and some dry sheep's dung, which makes a rich bottom for the roots to feed on when they get into it; in our large boxes I add, over the oak chips, some pieces of turf from loam, which help to keep the drain in a free and open state for many years.

The watering of the trees should be done with great caution, as too much or too little is equally injurious. When I think, from the appearance of a plant, that the water does not freely enter by the middle or sides of the

tub, a sharp iron rod, about three feet long, is made use of to penetrate to the bottom of the earth, and to form a channel for the water. Sir ABRAHAM HUME has lately had boxes made for the large trees, after the model of those at the Thuilleries and Versailles, which are constructed in the following manner: two of the opposite sides are fixed, the other two are moveable, but kept in their places by a couple of iron bars with hinges, which are fastened on one side, and on the other are hooks for these to catch in, according to the annexed sketch, that the state of the roots may be readily examined, the old earth taken out, and the fresh put in at pleasure. Another material advantage gained in these boxes is, that I am able to shift the plants by sliding them into others, while in shifting tubs the roots are generally materially injured, or the tubs destroyed in getting the plants out safe.

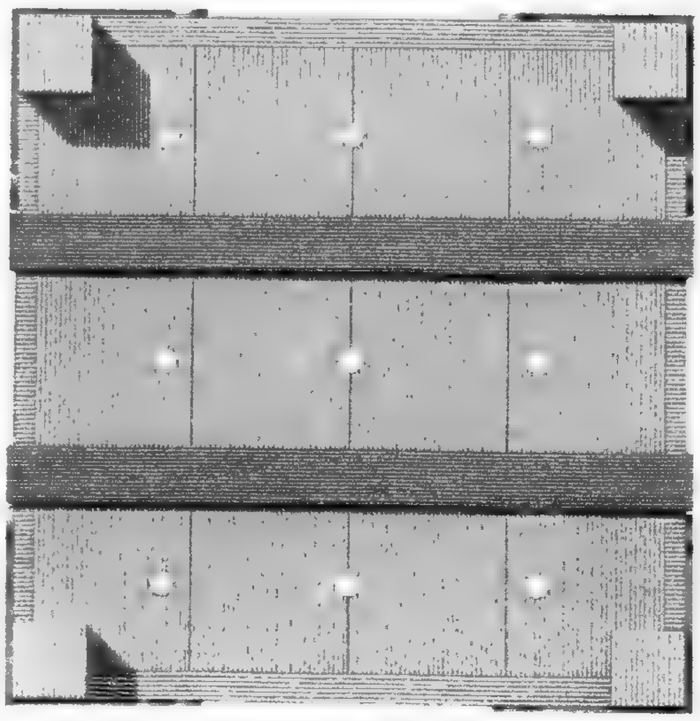
Early in March I give all the plants a good top dressing with rich compost formed with rotten leaves and a small quantity of loam, and water them freely while the trees are in flower. In May, during sunny weather, I apply a copious washing with the engine; then shut up the house close for three or four hours, which producing a strong steamy heat as high as 70°, effects the destruction of the red-spider; the stems and leaves also are occasionally wiped with a wet sponge to remove other insects, and dirt; this always seems to add vigour and richness to the foliage. The healthy appearance of the trees at Wormleybury I consider to be owing in great part to their never being taken out of the house in summer; for one unseasonable or frosty night is apt to change their leaves; and if they be much shattered by violent rain or high winds, little less than three years is





Box for an Orange Tree, used in the Orangery of Sir Abraham Hume, at Wormleybury, Herts.

Bottom of the Box.



Scale of Feet.

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Drawn & Engraved by J.B. Taylor.

required for the recovery of a luxuriant foliage, as they, particularly the Orange trees, are very slow in producing new leaves.

In regard to the necessity of thinning the fruit, lest the trees should exhaust themselves, it appears to me to depend on the state of the trees; if they are flourishing, I never observed that it was at all required, either here or at Bromley Hill, where the Orange trees belonging to the Right Honourable Charles Long are very fine, and loaded with peculiarly large fruit.

The house in which the plants are kept is built with brick piers, and had formerly a tiled roof, which was replaced a few years since with one composed entirely of glass, and a new flue was carried round the two ends and front. The house is 18 feet high and is devoted entirely to Orange, Lemon, and Citron trees; before the alteration it was very close and damp. I consider the prevention of damp, as much as the exclusion of cold, essential to the perfection of the plants; the house is therefore always well warmed in winter by the flue.

I find Lemon and Citron trees do better than Orange trees; they are in all respects hardier, and consequently preferable to plant in the borders of the house for the purpose of being trained to trellis on the walls.

LXXVII. *An Account of some* Specimens *of* Apples *which were imported this Season by the Horticultural Society from Rouen in Normandy. Drawn up by* WILLIAM HOOKER, *Esq. F. H. S. January* 11, 1817.

Read February 4, 1817.

THIS collection of the *Norman Apples* has come before the Society under the disadvantages of an unfavourable season for ripening fruits, and of very injudicious package, having been inclosed in paper which had become wet, and had imparted an unpleasant flavour to many of the fruit. If we are to consider these as specimens of the best French fruits, their comparison with the production of our own country may afford reason for exultation; for there is none among them of equal merit with the Margil, the Ribston Pippin, the July Flower, or the Ord Apple; but allowing for the disadvantages already stated, many of the varieties possess considerable merit, particularly the Reinette grise, the Reinette de Canada, the Vert Anglois, the Pomme Poire, and the Reinette blanche.

The Gros Rambour, which was stated to have been sent, (though not received) is a fruit of great merit for the kitchen.

The Nonpareille, the Reinette Franche, and the Pigeonnet, (Pigeonnet de Rouen of POITEAU and TURPIN's new edition of DUHAMEL, called in this country the French Pippin, Orleans Pippin, Arabian Pippin, &c.) though amongst the

very best and most generally cultivated Norman Apples, were omitted.

TABLE, OR DESSERT APPLES.

No.

1. *Pomme d'Api.* The *Api Rouge* of DUHAMEL, POITEAU and TURPIN, also of AITON. Very pretty. The Pulp tender and juicy, and the flavour singular but not pleasant.
2. *Vert Anglois.* Middle sized, or rather small; flat ovate. Skin thick and green, like the French Crab. Requires keeping. (Excellent 31st January.)
3. *Reinette rouge.* Not the Reinette rouge of DUHAMEL. A beautiful small scarlet Apple of a conical form. Over ripe.
4. *Pomme Pigeon.* Pigeon of DUHAMEL. Handsome, but insipid and unpleasant.
5. *Pigeon Cœur de Bœuf.* Same as No. 4.
6. *Drap d'Or.* Not the Drap d'Or of DUHAMEL. Middle size, or rather small, roundish, compressed at both ends. Eye open. Skin yellowish, in some specimens tinged with dull pale orange red, streaked with russet. Flesh firm, juicy, and good.
7. *Reinette de Canada.* The Newtown Pippin of the shops. The Grosse Reinette d'Angleterre of DUHAMEL; but not the Reinette de Canada of POITEAU and TURPIN. Quite ripe, and excellent.
8. *Reinette grise.* Well known in our shops under this name. Fine specimens, not quite ripe. (Excellent 31st January.)
9. *Pomme Poire.* A rather small (but not Pear-shaped) Apple, roundish, flat; very dark green, rusty, somewhat

resembling the Nonpareille in appearance. Not near ripe; promises to be a fine late Apple.

10. ***Reinette blanche.*** Small, conical, pale green, spotted with dark green or brown. Not ripe. (Very good 31st January.)

KITCHEN APPLES.

11. ***Fleur de Mai.*** Large, irregular, conical; green, rusty. Much resembling the Apple which BIGGS calls the Leather Coat. Middling.
12. ***Palestine.*** Rather large, roundish-ovate. Eye open. Green, streaked with dull pale red, and spotted with blackish-brown. Requires keeping. Boils well.
13. ***Bayeux.*** Large, roundish oval; deep red, with streaks and spots on the sunny side. Tolerably good.
14. ***Calville blanche.*** The Calville blanche of DUHAMEL; well known. Pleasant flavour; rather spicy.
15. ***Reinette de Caux.*** The Grosse Reinette rouge tiquetée of POITEAU and TURPIN, is said to be called by many gardeners Reinette de Caux; and although the delineation is much larger than any of our present specimens, I am inclined to believe it is the same variety. Large, round, red, with a considerable portion of russet. Tolerably good.
16. ***Reinette rayée.*** Not unlike our Nonesuch, in form and colour. Spotted with red and blackish spots. Flesh melting, and of a pleasant flavour.
17. ***Quatre Gouts.*** Something like our Queening. Angular, yellowish green, streaked with deep red. Over ripe.
18. ***Coustard.*** Large, conical, ribbed, pale green dotted. Not unlike the Greasy Pippin of Covent Garden. Requires keeping. Fine acid when boiled or roasted.

LXXVIII. *Further Particulars of the* Elton, *the* Black Eagle, *and the* Waterloo Cherries. *By* Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read January 7, 1817.

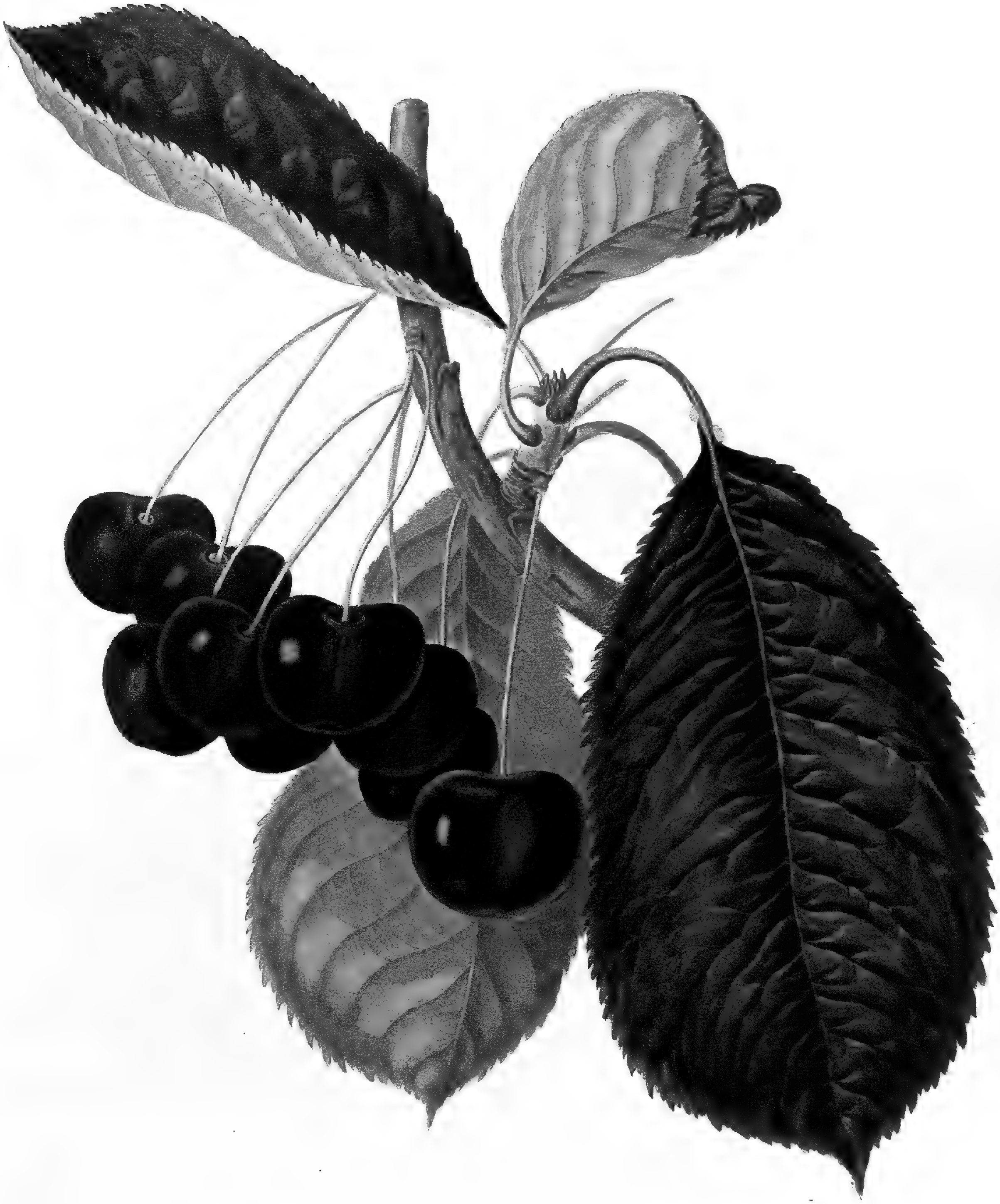
Our President having expressed a wish that any new fruits sent to the Society, should be subjected to the examination of some of its Members, in order that their merits should not rest solely on the report of the person who raised them, I have endeavoured to comply with his desire in the following notes on those varieties of the *Cherry* lately produced at Downton, which were exhibited to the Society in the last summer; I have drawn them up from the information received from the President, and from the observations of Mr. Hooker and myself on the samples we received.

The *Elton Cherry*, of which an account will be found at page 137, was figured by Mr. Hooker in the first Fasciculus of his *Pomona Londinensis*, Plate VII.; it was raised in 1806 from a seed of the Bigarreau or Graffion Cherry of the London gardens, impregnated by the pollen of the White Heart Cherry. It is of the Bigarreau tribe, much resembling its female parent in colour; the fruit is heart-shaped, and that now produced by the tree is larger than represented in Mr. Hooker's figure, ripening about a fortnight before the Graffion; the Flesh is not hard, is sweet, juicy, and of a delicate flavour. The Foot-stalk of the fruit is remarkably long, and the petals are tinged with crimson. The plant has proved to be a

plentiful bearer, and having yielded a good crop of fruit in the present unfavourable season, may justly be regarded as hardy, and likely to answer as a standard. The original tree was planted against a north-west wall, where it grows luxuriantly, and makes a most beautiful wall-tree.

The *Black Eagle Cherry* is the produce of a seed sown in 1806, the Graffion being the male, and the May-Duke the female parent: an account, with a figure, of it, will be found at page 138. The tree was planted against a wall, of an east-north-east aspect, where it grows very freely, and will probably answer well as a standard. It resembles the May-Duke in habit, and ripens its fruit about a fortnight after that sort. The fruit is between heart-shaped and round, being flattened somewhat at top and bottom. It is quite black; very rich and high flavoured; the flesh is tender, and bleeding; the stone small, and the stalk short.

The *Waterloo Cherry* was first exhibited to the Society in 1815, and received its name from the eventful battle which was fought a few weeks previous to its ripening; some account is given of it at page 208. It was raised from a seed of the Graffion impregnated by the pollen of the May-Duke. In habit it resembles the latter, but the buds are stronger, and the leaves larger, and more pointed than those of its male parent. It has hitherto been planted against a north-west or south-east wall, but as it grows freely, and its blossoms are hardy, it will probably succeed as a standard, and promises to be as productive as the May-Duke. The fruit ripens some days later than that of the Black Eagle Cherry, which it generally exceeds in size, and is more pointed at the end. The Stalk is also long and slender, which readily distinguishes it from



The Waterloo Cherry.

the Black Eagle. Before it is quite ripe, the fruit has a dark lurid appearance, which changes to a dusky red, nearly approaching to black. The Flesh is more firm than that of the Black Eagle, being sweet and high flavoured; the stone is round and small.

LXXIX. *On the Means of* Preserving Broccoli *in Winter.*

By Thomas Andrew Knight, *Esq. F. R. S. President.*

Read February 4, 1817.

Every person, who has at all paid attention to the effects of frost in different situations in the same vicinity, must have observed, that it is much more destructive in some spots, than in others, which appear to be equally exposed to its influence. My garden at Downton occupies one of those unfortunate situations, where, owing to causes which I cannot discover, the frost is severe and destructive, and in the three first years of my residence there, not more than as many plants of *Broccoli* survived the winter, and even these were so much injured as to be scarcely fit to come to my table. I was consequently led to endeavour to discover the means of protecting my plants; and I have in the last few years so perfectly succeeded, that I have scarcely lost a single plant. I first tried the effects of laying them in, as the gardeners call digging up, and laying them horizontally in the soil (as is frequently practised), in the beginning of November; but the plants so treated, having had few roots in the succeeding spring, vegetated but feebly, and consequently the heads produced were small. In the last few years I have adopted nearly the same mode of treatment, but at a different season, and my success has been so perfect, that I can most confidently recommend the method which I have practised: and I am quite certain that my Broccoli plants

would bear uninjured a degree of cold, or rather a transition from cold to heat, (for it is that which usually destroys vegetables), which would prove highly injurious if not fatal, to the hardiest varieties of its species, the Scotch Kale.

A small trench is made in the first week of September, at the north end of each row, in which the adjoining plant is laid, so low, that the centre of its stem at the top is put level with the surface of the ground, the root being disturbed as little as possible. It is then immediately watered and its roots covered with more mould, and every plant is in succession treated in the same manner. The ground being warm at this season, and rendered moist by watering, the plants soon emit a profusion of new roots; and at the beginning of November scarcely present the appearance of having been moved. At this period, before snow is apprehended, a small hillock is raised round each plant to support its leaves, to prevent the possibility of their being broken by the weight of snow, or by violent winds during winter, after which no further care is necessary.

The growth of the plants is certainly somewhat checked by being laid down at the period above mentioned, and therefore I should not think the practice eligible, if my garden were perfectly safe, in a mild climate, from the injurious effects of a deep snow, or severe frost; but no gardens in this country, exclusive of a few on the sea-coast, are thus favourably circumstanced, and I therefore think the practice will be found almost invariably advantageous; for by the perfect protection of their stems and the entire preservation of the foliage, the plants exhibit a degree of freshness and vigour in the spring that I rarely witness in those which

have been fully exposed, even after the most favourable winter: and the weight and value of the head of Broccoli will depend much more upon the vigour of the plant than upon the diameter acquired by the stalk in the preceding autumn.

I usually sow the seeds of Broccoli for this mode of management about the end of April; but where it is wished to have the heads very large, a somewhat earlier period would probably be advantageous; and attention must of course be paid to the peculiar habits of each variety.

The Siberian, or hardy sprouting kinds of Broccoli, being more excitable, that is more easily made to vegetate during winter, than other kinds, should not be laid in till the first week of October; and as plants of these varieties produce the best formed heads in spring, when the seed has been sowed rather late in the preceding summer, I rarely order it to be sowed before the last week in May, or first week in June; and as such plants require but a small space, they are always planted in my garden within fourteen or fifteen inches of each other.

During the short but severe frost, which occurred in February, last year, the thermometer, in one of the mornings, was at 3°, and probably had been two or three degrees lower during the night; and this intense cold was succeeded by a very bright, and, for the season of the year, rather warm day; yet not a single plant of the later kinds of Broccoli was further injured than by the loss of a small part of the extremities of a few of its leaves, and the crop proved in every respect most excellent and abundant.

LXXX. *Description of the different Plants grown in the Gardens, under the denomination of* Winter Greens, *with an Account of their Qualities, of the Seasons in which they are to be used, and of their Cultivation. By Mr.* William Morgan, *Gardener to* Henry Browne, *Esq. at North Mimms Place, Hertfordshire.*

Read at different Meetings, from Dec. 3d, 1816, to April 1, 1817.

The Horticultural Society having, in their notice of subjects on which they desired information, distributed at the Anniversary of 1816, called for an account of the different plants cultivated in our gardens as *Winter Greens*, I procured the seed of all those varieties with which I had been previously acquainted, and of every other sort which I considered as coming under that denomination, and being consequently in possession of full grown plants of the whole tribe, I am enabled to lay the following account, together with living specimens of each, before the Society.

The *Savoys* do not, perhaps, strictly belong to the Winter Greens, but I have introduced them into the present collection, in order that I might be able to exhibit all the green vegetables for the supply of the table, during the winter portion of the year, that is, from the month of November to April inclusive.

The first plant I am to notice is the *Green Savoy*. This

must be used the first of the whole class, inasmuch as it is the least hardy. It is in demand, and supplies the London market, through the month of November, and until the plants are rendered useless by frost, by which it is essentially injured, and ultimately destroyed. It grows to the height of two feet and upwards, the leaves are large and rugose, the veins, which shew conspicuously underneath, being of a greenish white. The heart is large and compact, in shape like a sugar-loaf cabbage, but sometimes more globular; the heart-leaves are green on the outside part, but are blanched internally. The specimens I have exhibited are such as are usually produced in ground not over-rich; those grown by the market gardeners of London are much larger.

Except where a large consumption requires stronger plants, or great markets are to be supplied, the *Dwarf Savoy* is to be preferred. This sort possesses much excellence: it is hardier than the preceding, bearing well the attack of the first winter frosts, by which the delicacy of its flavour is materially improved; and from its small size it is better adapted to the tables of private families. Where the whole class is cultivated, this must be considered the second sort in succession. The best plants grow close to the ground, not exceeding a foot in height; they are quite a distinct variety from the Green Savoy; the leaves are peculiarly rugose, the projections being on the upper surface, and the corresponding indentations on the under part: the veins, which are rendered most conspicuous by the deep green of the other part of the leaf, are nearly white, being only slightly tinged with green; the heart is small, close,

and compact, quite green externally, and only blanched where the parts are excluded from the light.

The third and last sort of this division is the *Yellow Savoy*, the peculiar excellence of which is, that by its hardiness it enables us to continue the use of hearted cabbages till mid-winter: it does not yield to either of the others in goodness, and by many persons it is preferred, being considered much sweeter; when both the other Savoys have perished from severe weather, this will survive, and from its size is fitted to yield a succession to the Green Savoy for the market gardener's use. It is not unlike the Green Savoy in general habit, and size; but the leaves, though rugose, are much smoother and paler than the other, and the veins are green; the heart is less compact, though nearly as large, and its colour, instead of being a gradation from green to white, is a pale yellow even in the parts exposed to view. What is commonly sold for the Yellow Savoy, in the shops, is very inferior to that which is now exhibited, but the best I have seen, are in the Royal Gardens at Kew.

Approaching to the Savoy is the plant producing the *Brussells Sprouts;* indeed I can consider it as no other than a variety of the Savoy, with an elongated stem, producing, from the alæ of the leaves, shoots which form small green heads like cabbages in miniature, each being from one to two inches in diameter, and the whole ranged spirally along the stem, the main leaves of which drop off early. This spiral appearance is caused by the manner of the insertion of the leaves on the chief stem, which I believe is in this fashion in all the Cabbage tribe, but certainly in the Savoys. The top of the plant resembles that of a

Savoy planted late in the season ; it is small, and with only a little green heart, and is of little value. The Sprouts, or little cabbages, are excellent for the table, after they have been exposed to some frost ; they are not, however, sufficiently hardy to bear very severe weather, and generally perish before the spring : I consider them as the first to be used of those plants, properly called Winter Greens. Few persons possess the genuine sort of Brussells Sprouts ; my plants were raised from seed sent to me by Mr. STEPHEN JEEVES, gardener to the Honourable THOMAS BRAND, at the Hoo, where they are are grown in the highest perfection and excellence.

The plants hitherto described are those which form cabbages with hearts, and are eaten in that state. The subjects which remain to be treated of, are entirely open in their crown ; but the portions of them to be used are taken from the centre of the plants, and are the growth of the preceding autumn : those plants, of which the early shoots become greens for the table, do not afford a supply until the commencement of spring ; the dependance of the gardener, after his Savoys and Brussells Sprouts are consumed, or rendered useless by frost, rests therefore entirely on the division I am now going to notice, until the first influence of vegetation begins to operate on those plants, whose early shoots are to be gathered for the table.

The *Green Borecole,* which is called in the southern parts of Britain the *Scotch Kale,* is one of the most important of the whole. Though frequently seen in gardens, it is too little cultivated : for it is impossible to find a plant of more excellence for the table, or more easy of cultivation ; and it

is capable of enduring severe frosts. It affords the best greens, after the first sharp frost has mellowed its flavour, until the middle of February. The height depends in some measure, on the space given to the plants; those which are put out at great distances, run more to leaf, and do not grow so tall as those planted closer together; which last plan is best, because, as the part to be taken for use is only in the centre, no advantage results from a superabundance of external leaves. Its height is usually from two to three feet; but I have seen a *variety much dwarfer*, which I prefer; the leaves are of a bright light green, deeply lobed, and not very wide, slightly rugose on the upper surface, having indentations on the under surface, corresponding to the projections above, with veins of a greenish white. The chief peculiarity lies in the margins of the leaves, which are plaited in a very singular manner, and thereby widened so considerably that the actual margin of the leaf, in consequence of the plaiting, will measure three times as much as the edge of the leaf would, if only a quarter of an inch of it were taken away all round. The effect of this on the younger leaves is, to make them look completely fringed, and as if the entire surface were in that state; but on examination, the centre part of the leaf will be found to be formed as I have described it. As the leaves enlarge, this excess of margin bearing a smaller proportion to the surface, the leaves on the outside of the plant appear less fringed. The crown, or centre, of the plant cut off so as to include the leaves which do not exceed nine inches in length, is the part to be gathered for

use: it boils well, and makes a most tender, sweet, and delicious green, provided it has been duly exposed to frost. In some gardens the plant, after it it is cut off, is kept for the sake of the shoots: this practice I cannot recommend, but rather advise that the ground should be cleared for succeeding crops, and that reliance for future greens should be placed on other kinds; the side shoots being weak, and having a propensity to run to flower, are of little value, and do not grow either early or rapidly.

The *Purple Borecole*, in its formation and habit, differs nothing from the Green, the only peculiarity it has, is that of being of a deep purple colour; as the leaves enlarge, they have an inclination to become green, but the veins still remain purple. The Germans are much attached to this sort, which they call the *Brown Kale*, and dress it with a rich sauce,* and sometimes mix chestnuts with it, stewing them together. It is perhaps more capable of enduring severe weather than the Green Borecole, which circumstance, together with the singularity of its colour, will entitle it to some place in the garden, though its inferiority to the Green, in flavour, will exclude it when there is little spare room. In boiling, the purple colour is entirely discharged from the thin parts of the leaves into the water, leaving them of a dull

* *German Receipt for dressing Brown Kale.* Take a quarter of a pound of butter, put it over the fire till it is quite brown, then add one pint of veal broth to it, while it is in a hot state; season it with a little pounded mace, salt, and lump sugar. Into the broth thus prepared put the hearts and tender leaves of the Kale, after they have been washed clean; let them stew till they become quite tender, and reduce the liquor as low as you can without burning the Kale, before you serve it.

green, not bright, like the Green Borecole, but the stalks retain something of their original colour. In taste it resembles the other; but when both are served together, and then closely compared, the superiority of the Green is manifest. There are tall and dwarf varieties of this, as well as of the Green Borecole.

Besides these two, I have grown plants of *the Variegated Borecole;* they sport into varieties in the most remarkable manner, no two being exactly like each other; some are veined with purple, some with white; the leaves are variously indented and coloured, and some are much smoother than others. Many are singularly beautiful, and may be cultivated for ornament. In flavour they much resemble the Green Borecole, but seem not to be equally hardy, and therefore cannot be recommended for general use.

The Green which is cultivated in the Royal Gardens of Kew and Kensington, under the name of *German Kale,* is a variety of the Scotch Kale, of singular merit. It is frequently sold in the shops for the true Scotch Kale, and is the plant known in Scotland under the same designation that it goes by in the Royal Gardens, but is more usually called *Curlies,* or *Curled Kale,* by the Scotch gardeners. Its leaves are more pointed, and grow much longer than those of the other; their margins are not so plaited, but being still considerably so, give the plant an appearance of being fringed, but not so richly and beautifully as the true Scotch Kale. The chief difference consists in its furnishing abundance of side shoots, for the table, after the crown has been gathered. When viewed in growth, it is readily distinguished by the superior length of the stronger leaves, and its more bushy

appearance round the stem; the large leaves also have a drooping appearance, and are more numerous, and the side-shoots are not inclined to run fast to flower. It is unquestionably of a very hardy nature; for I have not observed it the least injured this winter, whilst the heads of some of the Scotch Kale have been a little damaged. It grows tall, and this disposition ought to be encouraged by early planting, for the supply of shoots is nearly in proportion to the length of the stem. In taste it is the same as the Scotch Kale, being rich and sweet, when mellowed by frost, but has something of a bitter flavour, if dressed early in the season.

The *Thousand-headed Cabbage*, which has been much extolled as an article in agriculture, may be also considered as belonging to the garden. I notice it chiefly because I know from experience, that it will withstand the severest frost, and will survive and be useful, when every other vegetable of the Cabbage tribe has been destroyed. In flavour it is inferior to all the other winter greens, neither possessing much sweetness nor richness; therefore, in private small gardens, only sufficient of it should be planted to secure a supply for the table in case of an extraordinary severe winter, or a destructive frost; but where great abundance of greens is required, or where large markets are to be supplied, a more extensive culture of it may be advisable, for its produce is very great indeed. It grows to the height of four feet and upwards, sending out from its main stem branches in the manner of a tree; from the ends and sides of these branches proceed shoots, which appear as if actually in growth, the whole winter. The leaves are of a pale green, very numerous, tongue-shaped, and entire, being narrower than those

of any other green with which I am acquainted. The whole plant has, as it were, the appearance of a large thick bush of green leaves.

The *Chou de Milan* is the latest of the winter greens, which grow with elongated stems; it is something like the Brussells Sprouts in general habit, except that the side shoots, instead of forming little cabbages with small hearts, are sprouts. The principal leaves of this plant are not very large; they are rugose like the Savoy, and form a small crown on the top of the plant, which remains open, and does not cabbage; this top may be cut off and used for the table, in February. Even if not wanted for use, the head should be taken off at that period, to forward the growth of the shoots, which come into full use early in March, when those of the German Kale are too far advanced; when dressed, they are peculiarly rich and delicate.

The remaining plants, which I have to describe, are all dwarf ones, that is, they grow close to the ground, and produce their supply from shoots formed in the spring; two of these cannot be noticed as possessing any very extraordinary merit, yet it is necessary to describe them, that the history of this class of vegetables may be complete.

The *Egyptian Kale*, or as I have heard it called, the *Rabi Kale*, has much the appearance of a Swedish turnip which has shot into a head, but the plant has no tuber whatever; the stalk is very thick, and extends about ten inches above the ground, shooting in the spring from all points; the leaves are narrow without serratures, but generally have, at the lower part, one strong indentation on each side; they

are of a dark green, like those of the Swedish Turnip, and much resemble them in flavour. This plant may be often observed in cottage gardens, but is little grown elsewhere.

The plant called ***Ragged Jack*** is very well known also in cottage, and farm-gardens; but in the seed shops it is a greater stranger, for I was not able to procure the seeds in London, last spring, except under an erroneous appellation. This plant grows short on the ground, and in the spring shoots up strongly from the crown and sides. The leaves are very glaucous, and much cut or divided; the edges are marked with small obtuse serratures, the under side is rather paler than the upper, which has a peculiarity I have only observed before in some of the varieties of the Variegated Scotch Kale; it is, that from several points on the surface of each leaf, and particularly on the larger ones, arise small pieces of leaf of similar texture and appearance with the main leaf.

The ***Jerusalem Kale*** is much superior, in quality and produce, to either of the preceding, which it agrees with in habit and growth. The leaves are long, with several deep indentations on each side; their edges are serrated, but not deeply so, the upper surface having a purplish hue, the under being a pale green, and the veins are purple, inclining to a pink colour. The whole plant, when growing, appears of a dingy purple; it is extremely hardy, and were it not, that its use, as a late green, is superseded by the next plant I have to describe, it ought to be universally cultivated. When the taller winter greens have ceased to be good, by running to flower. the shoots of this are ready to take their place, at the table.

The plant I have alluded to is called by Mr. AITON, in his Epitome of the Hortus Kewensis, the *Buda Kale;* I received the seeds originally as those of the *Russian Kale,* and I have lately learned, that from its having been cultivated in large quantities about Manchester, it is called by many the *Manchester Kale;* by some it is also called the *Prussian Kale:* but these last appellations must give way to the authorised name by which it is known in the Royal Gardens. It is the last plant of the tribe, and is perhaps as valuable in the garden, as the best of the others; it is perfectly hardy, and remains till late in the spring before it pushes to flower, thereby keeping up the supply of green vegetables for the table, until the early cabbages are ready. It is a dwarf in its habit, like the three preceding ones; but it is altogether more close and compact, and the head, when gathered, has considerable substance. The leaves are most like those of the German Kale, and have the same sort of fringe on their margins. Before the plant begins to shoot, in the spring, it appears purple, the back and edges of the leaves being tinged with that colour, which of course are more in view in their growing state than when expanded.

Having now brought my history of the winter greens to a conclusion, the account will not perhaps be considered perfect, without the addition of instructions for the sowing and cultivation of them; but as these matters are perfectly understood by every practical gardener, I shall be as concise in my statement as possible. The Savoys and the tall winter greens may be sown the third week in March, and the strongest plants put out in June, leaving the others for successive crops, if desired, to be planted in July. The

dwarf winter greens not being required to attain much size before the winter, ought not to be sown till the middle of May, nor be planted out until July. But it must be remembered, that as the Buda Kale is expected to furnish a supply much longer than most of the others, and until late in the spring, a greater breadth of ground should be allowed for this kind, and that a second plantation of it in August will always be necessary for the late gathering.

Of the above sorts of vegetables, the Savoys only are sent in abundance to the London market; with the exception of a small supply of the heads of the Scotch Kale, and the shoots of the German Kale, the rest are never seen in Covent Garden. The space which the plants would occupy, as well as the time they continue on the ground, are a bar to their extensive cultivation as a matter of profit.

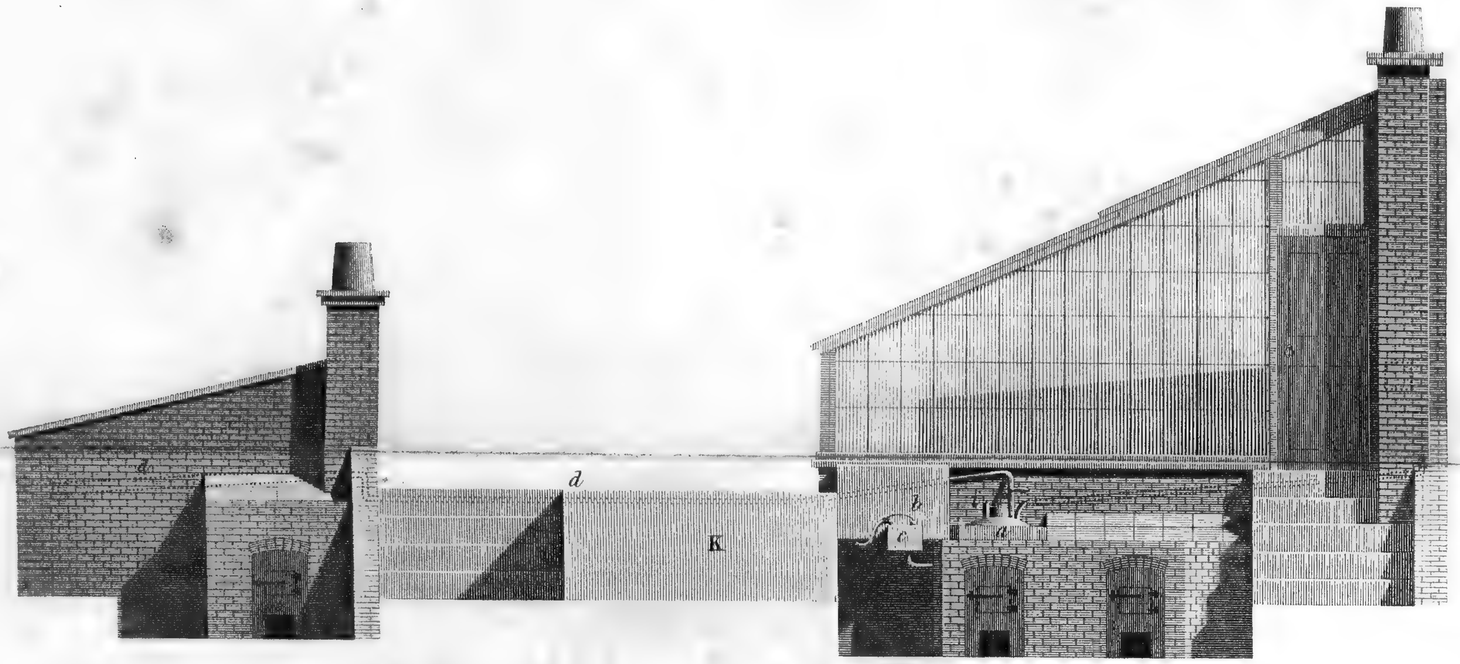
In the foregoing account I have not inserted the *Colewort*, which is mentioned in many of the books on gardening, and was, I suppose, formerly cultivated for winter use, before the introduction of the different greens which I have described. My endeavours to obtain seeds of it were fruitless, and I consider it as quite lost; from the descriptions of it which I have met with, I apprehend it to have been a variety of the common Cabbage, very hardy, and without disposition to form a heart. A great quantity of young cabbages pretty well grown in size are planted late in autumn, from the seed-bed, in the London market-gardens; these, though they are called Coleworts, are different sorts of hearting Cabbages (chiefly, I believe, the Imperial Cabbage), which are cut and sent to the market through the winter. Although those leaves of young cabbages, which are produced in the

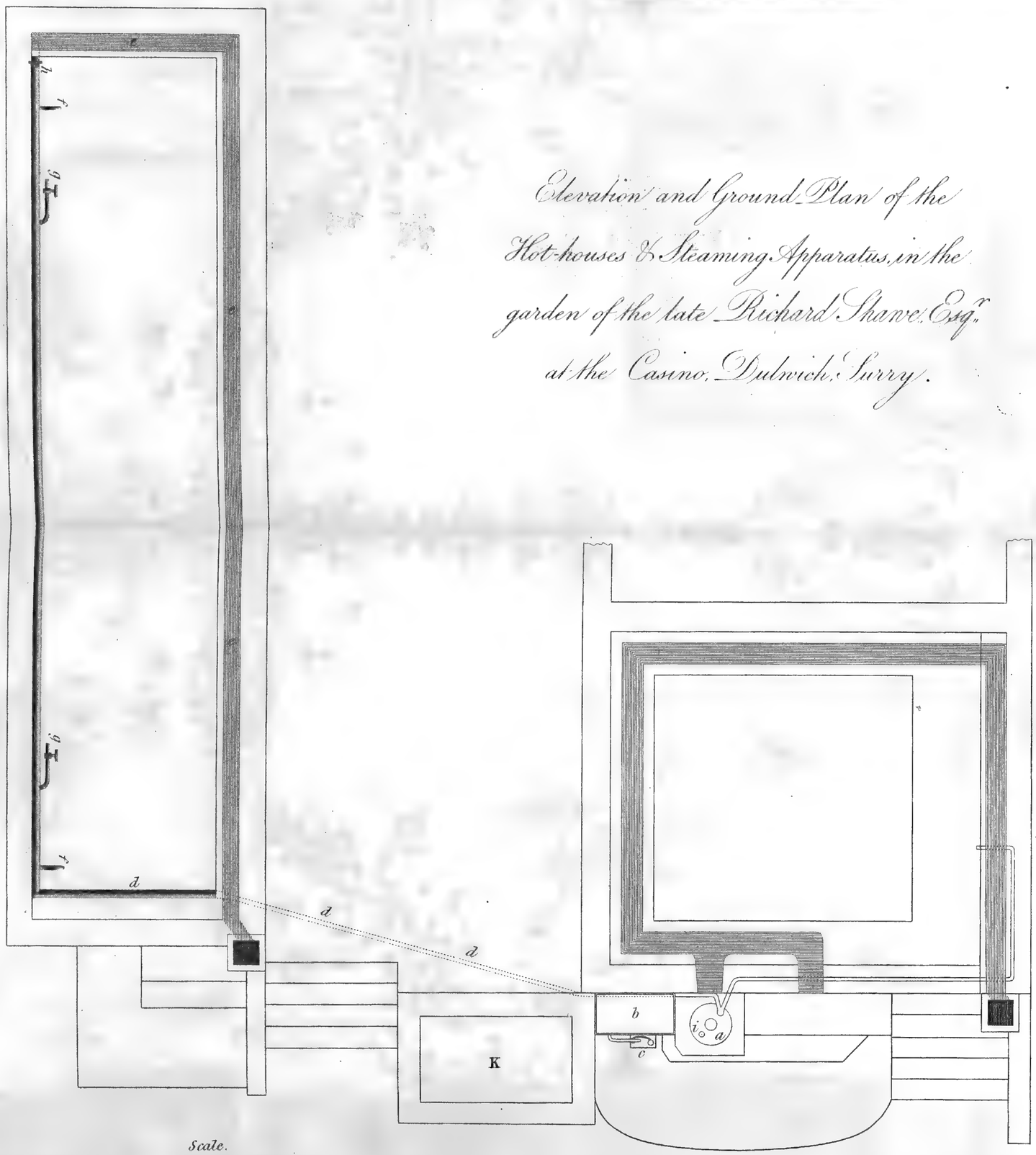
spring, are delicate and as rich as possible, yet those which have been formed in the autumn, and have stood through the winter, are so tough and leathery, when dressed, that it is surprising they are saleable; yet the absence of all other green vegetables, except Broccoli, which is too costly for the generality of consumers, causes these plants, as well as Turnip-tops, which are brought up in great quantities by the farmers' carts, in March and April, to the metropolis, to find ready purchasers.

LXXXI. *On the Application of* Steam, *and its salutary Effects in Forcing, but particularly as applied to the* Pine Apple. *By Mr.* James Brown, *Gardener to the late* Richard Shawe, *Esq. at the Casino, Dulwich, Surrey.*

Read 4th Feb. 1817.

The method of applying *Steam* to the purpose of forcing, which I have practised with great success on the Pine, is applicable to various other kinds of forcing; but as I have not had any opportunity of trying it except on the Pine and the Vine, I cannot speak with certainty of its further application; I am however fully of opinion that, under judicious arrangement, steam is congenial to vegetation in general, and in the method which I have pursued, I have combined the two-fold object of saving fuel and of improving the growth of the plants, as I work a Pine-pit, thirty-six feet in length, and also about one-third part of a stove, forty-five feet in length, with one fire, although totally detached, and eighteen feet asunder; but I have not the least doubt, that the same quantity of fire would be quite sufficient for two compartments, each from thirty to forty-feet in length. It is also a well known fact that fire-heat, when applied to Pine-pits, contributes to the starting of the succession plants at an untimely season, and that the work-





Elevation and Ground Plan of the Hot-houses & Steaming Apparatus, in the garden of the late Richard Shawe, Esq.r at the Casino, Dulwich, Surry.

Scale.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 Feet.

Drawn & Engraved by J.B. Taylor.

ing of them with dung heat is attended with other inconveniences, which are wholly unknown in the steaming process. The other advantages which this plan has over the usual methods are, giving the plants a fine heat, either in a moist or dry state, and which can be regulated at pleasure; the dry heat produced by steam differs materially from that which is caused by fire-heat, as it is at all times perfectly sweet, and has no tendency whatever to start the plants into an untimely growth, if attention be paid to applying it steadily and to the degree required: and although steam may not exterminate either the bug or scale on plants already infested with them, yet it is a certain preventative of their further increase; and in the growing season, when moisture is wanted, a fine dewing with the steam is much superior to watering them over the leaf, as, by the latter method, the water is left standing in the hearts of the plants, particularly if they be large; but when steam is used it is quickly absorbed by the leaves, and the plants, so treated, wear the appearance of health and vigour. As this process has altogether greatly exceeded my expectations, I beg leave to lay the following description of the apparatus before the Horticultural Society.*

The two divisions, in which I have tried the experiment, were originally worked by two fires; one, however, is now amply sufficient, with the assistance of steam.

The steam boiler (*a*) is calculated to hold twenty-four

* The apparatus was erected by Mr. Stodhart, who resides at Camberwell; he also made the principal part of that for growing Cucumbers by steam, at Lady Robert Manners', at Sutton, in this county.

gallons of water, with which it is about two thirds filled; a cistern (*b*) is fixed near to it which supplies a small receiver (*c*), by means of a pipe at the bottom, one inch in diameter, to which is attached a ball-cock to prevent waste of water from the cistern; the top of this receiver is the exact height at which the water stands in the steam boiler, which is supplied from it; to the boiler is attached a safety valve (*i*), to prevent any accident by too great a pressure of the steam; the pipe (*d*), by means of which the steam is conveyed into the pit, is four inches diameter, and it is carried from the boiler under ground about sixteen feet; it is then introduced at one end, and goes immediately to the front, whence it is continued to the other end, where it discharges itself into a brick flue (*e*), which may be thereby heated to any degree wanted, although at a distance of forty-eight feet from the steam-boiler. In this length of pipe there are three traps to take off the condensed steam, two of them are marked (*f*), the other is under ground. There are also two steam-cocks (*g*), fixed to a one-inch pipe about eighteen inches in length, and branching from the main pipe in a horizontal direction, but in such a manner as to prevent the steam from playing directly among the plants; at the end of the main pipe there is a stop-cock (*h*), which is to be shut when it is intended to steam the pit, the steam-cocks are then to be opened, and in about ten minutes the pit will be filled with steam, thereby producing a fine dewy moisture, the duration of which can be regulated as the season requires, but in the driest time of the year it will not be required longer than an hour; in this particular, however, for various reasons obvious

to every practical gardener, much must depend on the judgment of the operator. The tank (K) receives the water from the top of the Pinery, for the purpose of supplying the cistern with water.

LXXXII. *Observations on Mr.* Brown's *Account of his* Steaming Apparatus, *with some Suggestions for the Improvement thereof. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read May 6, 1817.

The defect of the plan above described, and of every other which I have seen, for warming forcing-houses with steam, is, that if, owing to any cause, the fire become insufficient to keep the water in the boiler in a boiling state, the current of steam ceases, and the pipes very soon necessarily cease to give heat to the house. I beg, therefore, to submit to the consideration of the Horticultural Society the expediency of enlarging the diameter of the tube from four to six inches, so constructed, and placed horizontally, that it may always be half full of boiling water, which, in the event of the current of steam failing, would communicate heat to the house, during several hours. The annexed sketch will convey my ideas upon the subject much better than any language I can employ.

If a large part of the boiling water in the boiler could be driven up into the tube, and made to pass round the house, this would act much more powerfully than the steam only, and I conceive that it might be so raised, and conveyed very easily, by the pressure of the steam in the boiler, according to the plan described in Fig. 2. In this a pipe is proposed to be fixed at the passage H (Fig. 2), and made to descend

Fig. 1.

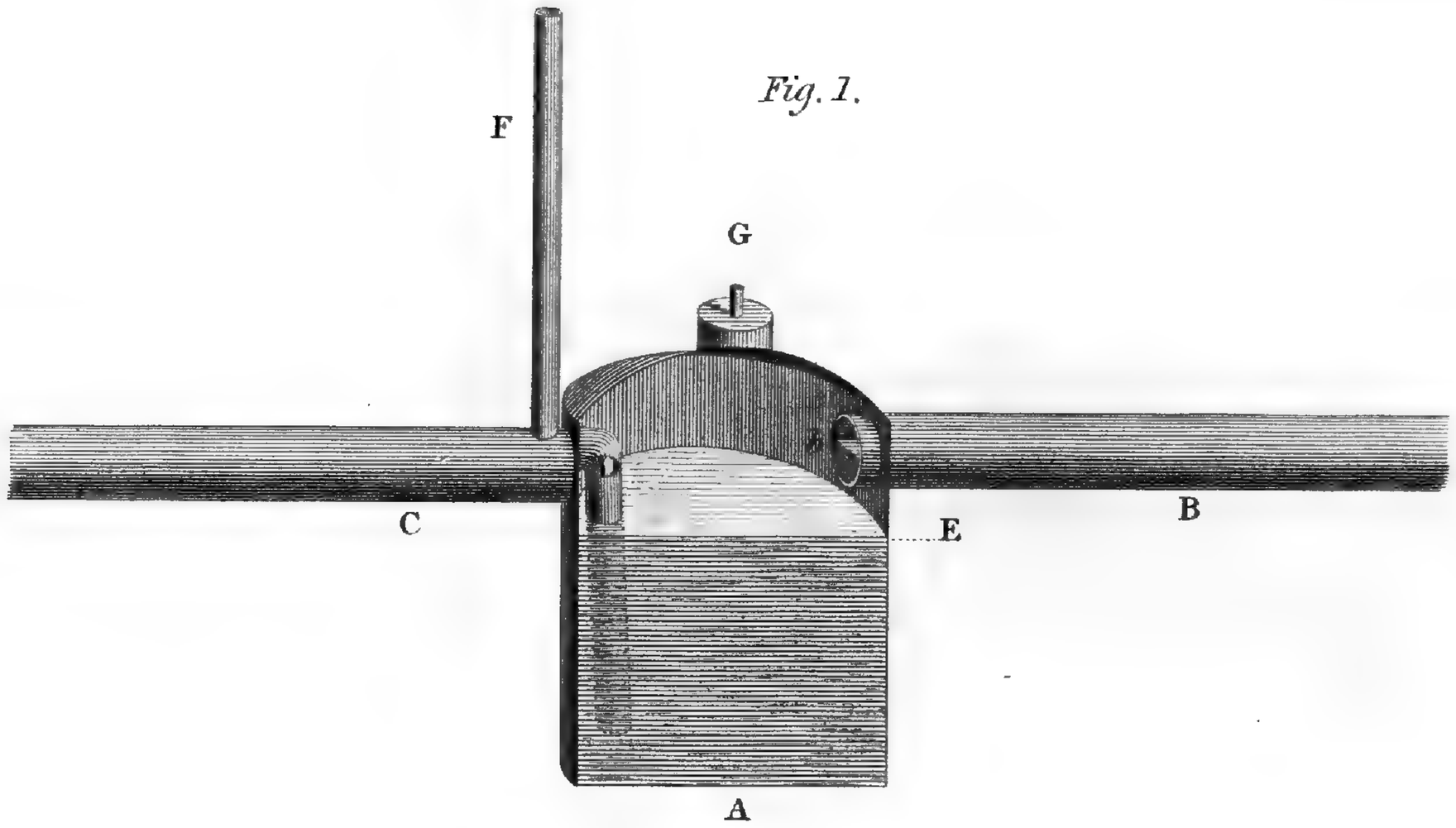
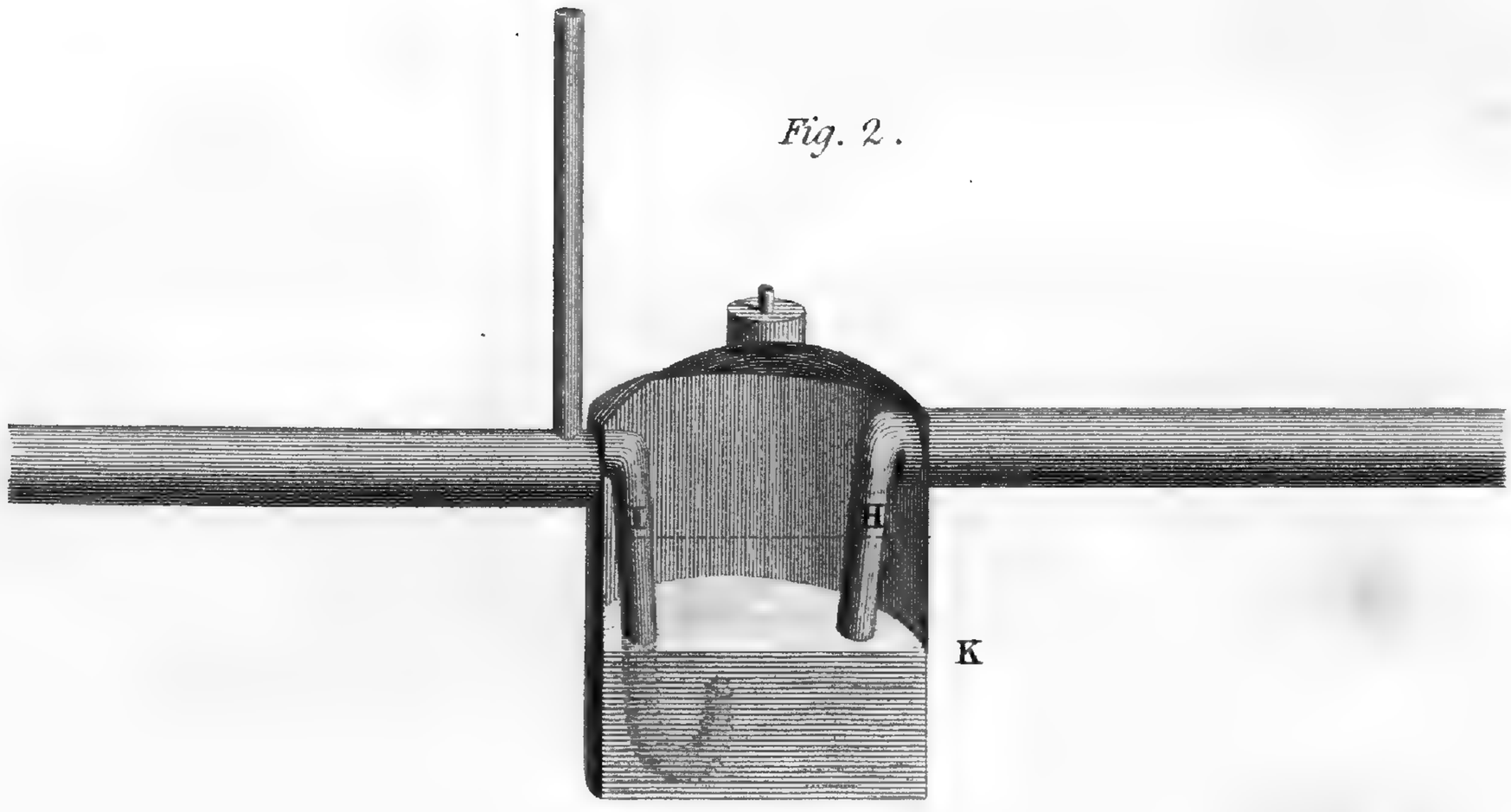


Fig. 2.



REFERENCES TO THE PLAN.

Fig. 1.

A. *Perspective Section of the boiler.*

B. *A pipe half full of Water; b. the entrance half closed.*

C. *The pipe returning, an inch lower than at the opposite side.*

D. *Pipe to convey the returning water into the boiler.*

E. *The level of the water.*

F. *A pipe going up into the open air, to act as a safety valve.*

G. *A Safety valve.*

Fig. 2.

H. *The passage for Steam or Water into the pipe* B.

I. *The pipe* D. *in Fig. 1. valved to prevent the water being driven up again.*

K. *The level of the water after part has been expelled by the pressure of the Steam.*

Engraved by J.B. Taylor

about eight inches into the water of the boiler, and a valve is fixed at the point of the returning pipe at I (Fig. 2), to prevent the water being forced up into the tube B, by the pressure of the steam. The passage for the water, to return to the boiler, is an inch lower at the end of the pipe G (Fig. 1), than at the entrance of pipe B, so that the water will fall again into the boiler through the tube I, as soon as the pipe becomes half full, but not through the pipe H (Fig. 2), till that becomes full to the height of two thirds of its diameter. Greater rapidity, and probably greater power, would be given to the current of boiling water, if a declivity of about half an inch in twelve feet were given to the pipes; and if every pipe at the junction with the next were half closed, as at the point *b* (Fig. 1), the advantage of the heated water remaining in the tubes after the failure of the current might be preserved. If this plan were adopted, the pipe D must be made to enter the furnace at the level of E. I am not at all prepared to say what would be, under these circumstances, the rapidity of the current of boiling water, but I believe it would not be less than 200 feet in a minute, and if so, it might be conveyed through a great distance. I am not aware of any possibility of danger in the adoption of either of the aforesaid plans, even without safety valves, (the greatest power of pressure being less than a pound on a square inch), though it might be expedient to employ such, whenever a possibility of their being wanted might occur.

Objections might be urged against some of the preceding inferences, by those who contend for the materiality of heat; but that hypothesis leads to nothing but error, in the application of heat in forcing-houses. If a brick flue be made of much too great thickness, I have ascertained by experi-

ment, that it will continue to absorb the heat of a moderate fire during months, without ever being hot itself, or materially raising the temperature of the house: though the air enter at a very high, and go out at a low temperature, and more heat disappear than would be sufficient to burn the plants, if the heated air were made to pass through a tube of cast iron.

LXXXIII. *Observations on the* Verdelho Grape. *In a Letter to the Secretary. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read March 4, 1817.

My dear Sir,

An account of the *Verdelho Grape* has been given by Mr. Williams, (to whom we are indebted for the importation of it,) in the *Horticultural Transactions* of 1814,* in which he has stated the vine, which produces it, to be of vigorous growth and productive habits. He has not, however, I think, spoken so favourably of it as he might have done; and therefore, as I send, according to your wishes, some cuttings of it, I will add some further account of its merits. I have found (and Mr. Williams' experience agrees with mine,) that the same degree of shade, which will render the greater number of the varieties of the Vine wholly unproductive of fruit, scarcely affects, and to no injurious extent, the fertility of the Verdelho Grape. It also bears most abundantly when planted even in small pots; and I am confident that if so planted, and introduced amongst green-house plants in early spring, its fruit might be ripened in great abundance, during the summer, after the more tender exotics were removed into the open air. The leafless stems of the vines, when first introduced, and indeed till the middle of May, would not injure the green-house plants; and

* Vol. II. page 106.

the fruit would become perfectly ripe long before the middle of October, the Verdelho being rather an early grape. I have received some from Mr. WILLIAMS, which had ripened tolerably well in the open air. No further care or attention to the vines would be necessary, during the winter than to cover the pots with mould, as the frost is rarely so severe in England as to injure the branches of the vine, and as trees, unlike animals, become patient of cold during winter, in proportion as they have been operated upon by the highest beneficial degrees of heat during the preceding summer.

There is an excellence in the Verdelho Grape, which ought not to pass unnoticed. The stones or seeds of this species of fruit, when taken into the stomach, have sometimes been productive of dreadful consequences, and probably never can be swallowed without some degree of danger; and the pulp of most varieties of the Grape, adheres so much to the seeds, as to render the disengagement of it very troublesome, and consequently to deduct, not inconsiderably, from the merits of the fruit. The tender pulp of the Verdelho Grape, on the contrary, quits at once its seeds and skin so readily as soon as it is perfectly ripe, that neither of these become to any extent troublesome; and this peculiarity, as the Grape is not large, adds very much to its value.

The science of political economy is so intricate, that it may possibly be questioned, whether the extensive culture of the Grape in the southern part of Africa, would be beneficial to the British Empire; but if it be expedient to promote the culture of any variety of the Grape there, the Verdelho Grape has probably much the strongest claims to attention, not only on account of the abundant produce of

the Vine, but because it is also well known (as Mr. WILLIAMS has stated) that it is this Grape which gives strength and body to the wines of Madeira. Of the richness and merits of the fruit, the Society have already had an opportunity of judging.

I am, my dear Sir, ever your's,

THOMAS ANDREW KNIGHT.

Downton,
February 14, 1817.

LXXXIV. *Account of a Method practised by Mr.* James Mean, *Gardener to Sir* Abraham Hume, *Bart. at Wormleybury, in Hertfordshire, for* ripening Grapes *by means of Dung-heat* under a common hot-bed frame. *Drawn up by the late* George Anderson, *Esq. F. L. S. &c.*

Read April 1, 1817.

This method is particularly applicable in cases where vines are trained to walls, and do not ripen their fruit, nor bear well. The frame must be high enough, in the sides, to admit of the vines being trained horizontally on a trellis, to keep the pendant bunches clear of the dung, and to give free room for the leaves, between the vine branches and the glass. The frames used at Wormleybury have either one or two lights; the latter are nine feet long and six feet wide; the fronts of the frames are eighteen inches high, and the backs are two feet high; the trellis is fixed nine inches from the glass, which gives sufficient space above and below. The upper board at the back of the frame, being nine inches wide, lifts up or slides off, so that the branches are laid in without suffering the injury they would sustain in their buds, if they were drawn through holes. In the first or second week in April, just before the vines begin to move you make up a common dung hot-bed, at a convenient distance from the wall, or from the place where the shoots of the vines are; lay your frame on the bed, with its back towards the vine, and fronting the sun, as it would naturally be, if placed against a south wall: the branches must then

be introduced into the frame; these you train along the trellis already mentioned, with their points directed downwards, towards the front of the frame. By these means, through the heat of the dung, and that of the sun from the glass, your vines produce an abundant crop; and it is found, that the ripening of the fruit is accelerated, by laying slates or tiles all over the dung. At the end of the season, those shoots which have borne their crop are cut entirely away, and a fresh supply introduced of young shoots, which have been making and ripening their wood on the wall; these are treated in the same manner, the wall annually yielding a successive supply of young wood to be taken into the frame.

Mr. MEAN has practised the above method, very successfully, for a number of years; and although it may not be altogether new, yet I believe he has the credit of being the first to turn it to a useful account, and I think the Horticultural Society will promote the improvement of gardening very much, by making generally known such simple and useful discoveries as the present, the adoption of which is within the means of almost every cultivator.

It ought to be observed, however, that Mr. MEAN's method is widely different from that which is described at page 245 of this Volume, as practised by Mr. FRENCH, and which is applicable to a different purpose; yet it confirms the truth of his observation, that the effluvia arising from fermenting dung are beneficial, instead of being injurious, to the Vine, in its fruit-bearing state.

Note by the Secretary.

At page 143 of the first volume of the Transactions of the Horticultural Society, the President has described a method of ripening grapes in frames, on a plan very similar to the above; but as some of the details in Mr. ANDERSON's paper appear to be an improvement on that plan, the Council have deemed it expedient to print his account, fully agreeing in the justness of the observations of their late highly esteemed member, on the propriety of giving publicity to such practices in gardening as are likely to be so generally useful.

LXXXV. *On promoting the* early Puberty of Apple and Pear *Trees, when raised from Seed. By* John Williams, *Esq. of Pitmaston, near Worcester.*

Read March 4, 1817.

Many persons inclined to become experimentalists in raising fruit trees from seed, with a view of obtaining new, improved, and more hardy varieties, have been deterred from the attempt by the great length of time requisite for ascertaining the result of their industry: for the Apple tree, when raised in the common way from the kernel, rarely affords its first blossom before it is eight or ten years old, and the Pear tree requires even a longer period, twelve or fifteen summers often elapsing, before the leaves of seedling trees are capable of forming their first blossom buds. Reflecting, some years ago, on Mr. Knight's theory of the circulation of the sap, and observing the change in the appearance of the leaves of my seedling plants, as the trees advanced in growth, I thought it might be possible to hasten the progress of the plants, and procure that peculiar organization of the leaf necessary to the formation of blossom-buds, at a much earlier age; and I conceive the following experiments tend strongly to confirm the justness of my expectations.

The facts are these: in November and December, 1809, I sowed the kernels of several ripe Pears, in separate pots, and placed them in a green-house during the winter. They began

to vegetate in the following month of February, and in March the pots were removed into my grapery, where they remained till after midsummer. The plants were then carefully removed into a bed, and planted in rows, about fourteen inches apart, where they remained till the autumn of 1811, when they were again transplanted into a nursery, at distances of six feet. Every succeeding winter I pruned away all small trifling lateral shoots, leaving the stronger laterals at their full length to the bottom of the plants, and made such a general disposition of the branches, as that the leaves of the upper shoots might not shade those situated underneath; every leaf, therefore, was thus rendered an efficient organ, by its full exposure to the light; as in similar experiments upon the Peach tree, described by Mr. KNIGHT in the *Horticultural Transactions.** At the height of about six feet, I had the satisfaction to observe that the branches ceased to produce thorns, and the leaves began to assume a more cultivated character. Several of these trees afforded blossoms and fruit last year. One seedling Siberian variety of the Apple, thus treated, yielded fruit at four years old, and many more at the age of five and six years. I consider these facts of some importance, in furthering the object of obtaining new varieties of fruit trees from seed, and confirming, were it necessary, the valuable discoveries of the President in that part of vegetable physiology, which points out the curious and wonderful processes going on in the leaf.

Two of my new Pears were raised from seed of the Swan's Egg, impregnated with the pollen of the Gansell's Bergamotte. In shape, the Pears bear a considerable

* See Volume ii. page 71.

resemblance to the Gansell's Bergamotte, and, as far as so unfavourable a season as that of last year will allow me to judge, I think, as the trees advance in age, their produce will be thought superior in flavour and size to the Swan's Egg.

Pitmaston, Worcestershire,
18*th Feb.* 1817.

LXXXVI. *Account of the Method of* growing Mushrooms in Houses. *By Mr.* Isaac Oldaker, *Gardener to his Majesty the Emperor of all the Russias, &c.*

Read March 4, 1817.

The experience of three years having fully verified the favourable report made by a Committee of the Horticultural Society,* on the merit of the plan for growing *Mushrooms*, introduced by me into this country, and understanding that a particular account of the practice will be acceptable, I beg leave to submit the following details to the consideration of the Society.

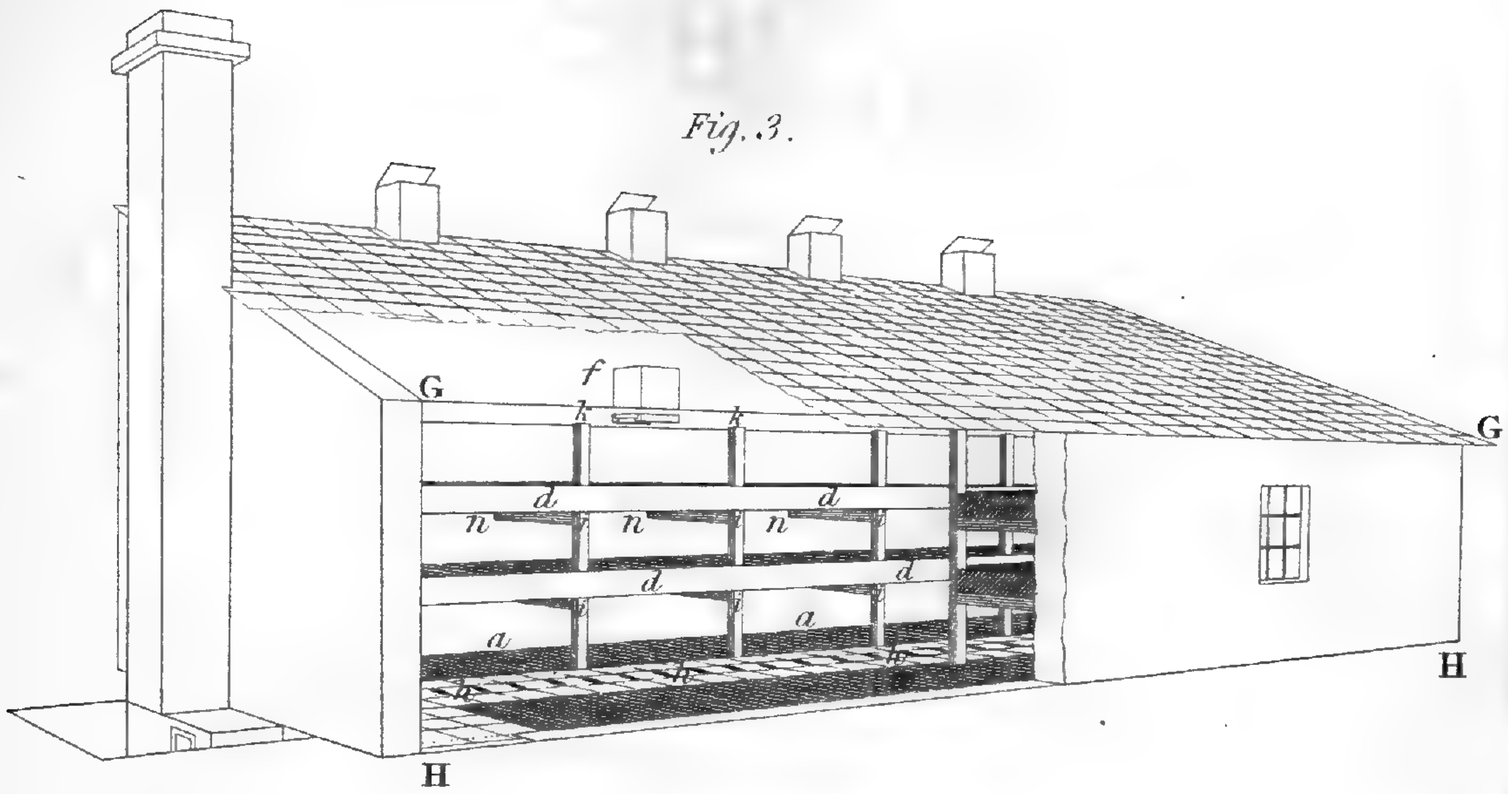
This method was practised by me, with never-failing success, in the Imperial Gardens near St. Petersburgh,

* Report of a Committee, appointed by the Horticultural Society of London to inspect Mr. Oldaker's method of cultivating Mushrooms.

The undersigned being a Committee appointed to go to Spring Grove, on Thursday, the 7th of July, 1814, in consequence of an invitation from the Right Hon. Sir Joseph Banks, to see his Mushroom beds, made there lately by Mr. Oldaker, as well as to taste the produce of them, certify, that they found them bearing in the greatest abundance; and that the flavour of the Mushrooms, cooked in four different ways, was excellent. They have therefore no scruple in earnestly recommending Mr. Oldaker's method of making and managing Mushroom beds to the public, as likely to produce both larger and more certain crops, than any yet known.

Roger Pettiward. Joseph Sabine.
John Cresswell. R. A. Salisbury.
Daniel Giles.

Fig. 3.



Perspective view of the House, part of the outside wall, & roof being removed, to shew the construction of the interior.

Section.

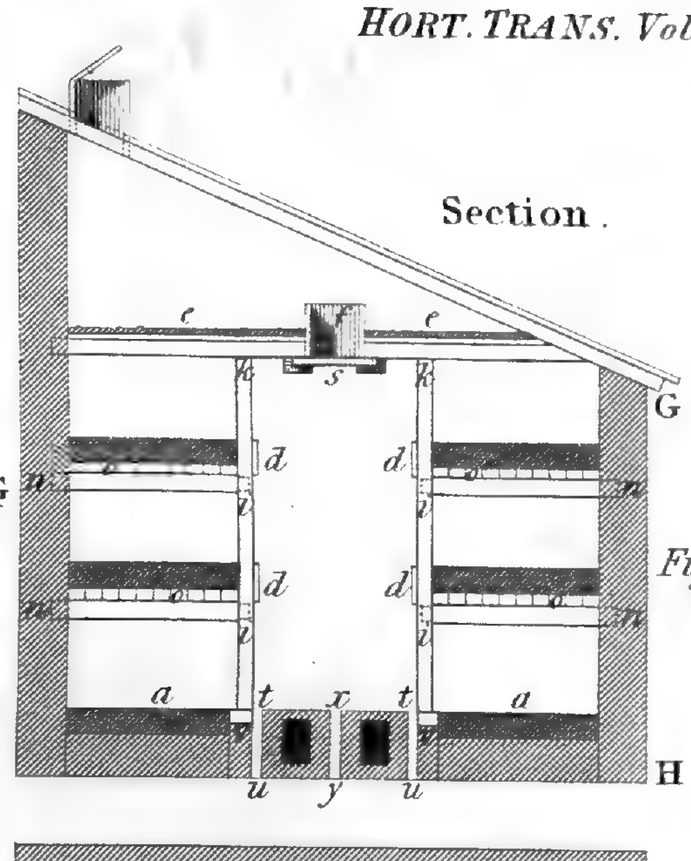


Fig. 2.

Ground Plan

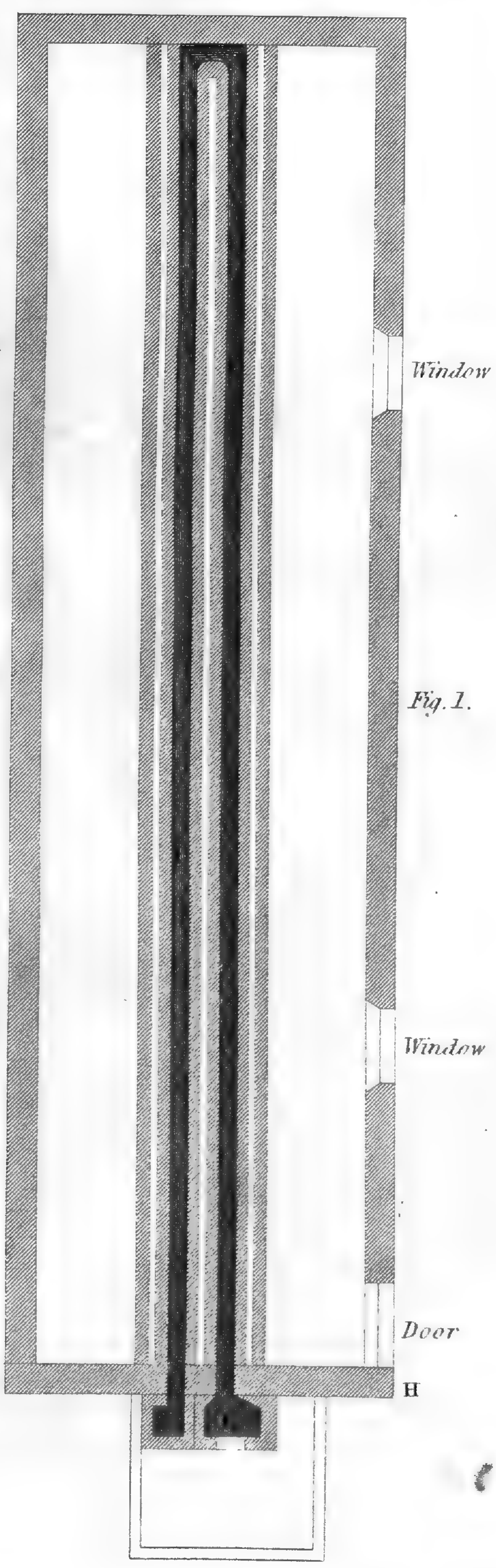


Fig. 1.

Plan & Section of a Mushroom House, designed by Mr. Isaac Oldaker.

Scale of Feet.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Drawn & Engraved by J.B. Taylor.

where I have the honour of being one of the gardeners to his Imperial Majesty.

The shed or house, used for growing Mushrooms, is found of great utility in the severe climate of the more northern parts of Europe, to protect Broccoli, and all other kinds of useful vegetables, through the winter, as well as to force Asparagus and Sea Kale, by substituting mould instead of dung, on the shelves, and for raising winter sallads of Succory, or such herbs as are used in a blanched state. Though these objects can, in England, be obtained by other methods, in consequence of the greater mildness of the winters, yet the knowledge of the application of the shed to such purposes, may be not altogether useless.

The shed is usually built against the back wall of a forcing-house; the building made at Spring Grove is so placed, and corresponds with the annexed plan and elevation; but if it should be found convenient to erect a house for the purpose, unconnected with any other building, the only variation which will be necessary, is the alteration of the covering, by making it an hipped, instead of a lean-to roof.

Description of the House. The outside walls, GH, should be eight and a half feet high, for four heights of beds, and six feet and a half, for three heights, and ten feet wide withinside the walls; this is the most convenient width, as it admits of a set of shelves three feet and a half wide on each side; and affords a space through the middle of the house, three feet wide, for a double flue, and a walk upon it. The walls should be nine inches thick, and the length of the house as it may be judged necessary. When the outside of

the house is built, make a floor or ceiling over it (as high as the top of the outside walls), of boards one inch thick, and plaster it on the upper side, *e e*, with road sand well wrought together, one inch thick, (this will be found superior to lime), leaving square trunks, *f*, in the ceiling, nine inches in diameter, up the middle of the house, at six feet distance from each other, with slides, *s*, under them, to admit and take off air, when necessary; this being done, erect two single brick walls, *v v*, each five bricks high, at the distance of five feet and a half from the outside walls, to hold up the sides of the floor-beds, *a a*, and form one side of the air flues, *t u*, *t u*, leaving three feet up the middle, *t x t*, of the house, for the flues. Upon these walls, *v v*, lay planks, *t v*, four inches and a half wide, and three inches thick, in which to mortice the standards, *t k*, which support the shelves. These standards should be three inches and a half square, and placed four feet six inches asunder, and fastened at the top, *k k*, through the ceiling. When the standards are set up, fix the cross bearers, *i n*, *i n*, that are to support the shelves *o o*, morticing one end of each into the standards at *i*, the other into the walls at *n*. The first set of bearers should be two feet from the floor, and each succeeding set two feet from that below it. Having thus fixed the uprights, *t k*, and bearers, *i n*, at such a height as the building will admit, proceed to form the shelves, *o o*,with boards an inch and a half thick, observing to place a board, *d d*, eight inches broad, and one inch thick, in the front of each shelf, to support the front of the beds. Fasten this board on the outside of the standards, that the width of the beds may not be diminished. The shelves being com-

plete, the next thing to be done is the construction of the flue, P, which should commence at the end, L, of the house, next to the door, run parallel to the shelves the whole length of the house, and return back to the fire place, where the chimney, S, should be built, the sides of the flue inside being the height of four bricks, laid flat-ways, and six inches wide, which will make the width of the flues fifteen inches from outside to outside, and leave a cavity, *t u*, on each side, betwixt the flue and the walls that are under the shelves, and one, *x y*, up the middle betwixt the flues, two inches wide, to admit the heat into the house from the sides of the flues. The middle cavity, *x y*, should be covered with tiles, leaving a space *h h*, Fig. 3, of one inch betwixt each tile, for the admission of the heat. The top of the flue, including the covering, should not be higher than the brick walls that form the front of the floor beds. The reason why the sides of the flues are recommended to be built stronger than usual, is, because they support the walk. The walk itself is formed by three rows of tiles, the outside rows making the covering of the flues, and those of the centre row are what cover the middle cavity *x y*, as abovementioned: the outside cavities, *t u*, of the flue are left open, the tiles which are placed over the flues being laid so as not to cover these cavities, which allows the heat of the sides of the flues to rise upwards.

Compost for the beds. Collect a quantity of fresh horse dung that has neither been exposed to wet nor fermentation, clearing it of the long straw, so as to leave one fourth, in quantity, of the shortest litter, when incorporated with the horse droppings; then add a fourth part of tolerable dry

turf mould, or other maiden earth, and mix it well with the dung beforementioned: the advantage derived from the mould or maiden earth, is the union of the whole into one compact solid substance, so congenial to the growth of mushrooms. If dung from the rides of a livery stable, or the round of a horse mill can be procured, and mixed with a fourth part of short litter, and added to as many fresh horse droppings as will cause a gentle warmth, when made into beds, it will be found superior for the production of mushrooms, to horse dung that is gathered from the stables.

The method of making the beds. Form the beds on the shelves and ground floor, by placing a layer about three inches thick of the prepared mixture. Then, with a flat mallet, beat it as close together as possible, next add another layer of the compost, repeating the same process as before, and so on until the beds are formed into a solid body, seven inches thick, making the surface of the beds as smooth and as even as possible. The reducing the beds into a very solid body is a most essential point; for without it, you cannot expect success: and the thickness of them must also be particularly attended to; for where there is a much greater body, the beds will be subjected to a strong fermentation, and will be prevented, by evaporation, from retaining that consistency in the dung, which is absolutely necessary for the production of a good and plentiful crop. On the contrary, if a much less quantity be laid together, the heat and fermentation will be insufficient to prepare the beds for the nourishment of the spawn; but the assistance of both, to the extent prescribed, cements the materials together, which, in addition to beating, increases

greatly their solidity. The proper vegetation of the spawn, and the consequent crop of mushrooms, depend entirely upon a moderate genial heat, and fermentation, neither too strong nor too slight. As soon as the degree of heat in the beds is a little more than that of milk from the cow (say from eighty to ninety degrees of Fahrenheit's thermometer), beat the beds a second time, to render them more solid, if possible; then make holes, with a dibble, three inches in diameter, and nine inches asunder, through the compost in every part of the beds: these holes will be a means of cooling the beds, and preventing that excess of heat from taking place, which would produce rottenness, and render them unproductive. If the beds do not attain the heat required, in four or five days after they are put together (which you will know by plunging a thermometer into one of the holes), add another layer of the compost, two inches thick, which will probably increase the heat sufficiently; if not, a part of the bed should be taken away, and the remainder mixed with fresh horse droppings, and wrought together in the same way as before, in order to produce the proper degree of heat, Beds made after this manner readily generate natural spawn in summer, and frequently in the winter months.

Of spawning the beds. In three or four days after the holes have been made, by observing the thermometer, it will be found that you have the desired degree of heat, and the inside of the holes will also have become dry; the beds are then in a good state for spawning, which should be done, while the heat is on the decline. If this operation be deferred until the heat is quite exhausted, the crop will be late, and less plentiful. Fill every hole full of spawn, which must

be well beaten into them, and then make the surface of the beds solid and level; it is of no consequence whether the spawn put into the holes, be in one lump or in several small pieces, it is only necessary that the holes should be well filled. About a fortnight after the spawn has been introduced, examine the holes, and if the spawn has suffered any damage from over heat, or too much moisture, in the beds, introduce fresh spawn in the same way as before. On the contrary, if the spawn be found good, and vegetating freely into the compost, such beds (if required for immediate production) may be covered with mould agreeable to the rules hereafter laid down, and the beds intended for succession should remain unearthed in the summer, three weeks, or a month, before you wish them to produce, and in the winter a month, or five weeks. If the spawn be introduced in hot weather, air must be admitted as freely as possible into the shed, till the spawn has spread itself through the beds; for if the place be kept too close the beds will become soft and spungy, and then the crop will neither be abundant nor of good quality.

Of earthing the beds. Such beds as are intended to be put into work, must be covered with a coat of rich maiden earth, wherein its turf is well reduced. Then spread it regularly over the surface of each bed, two inches thick; and beat it as solid and level as possible. The earth used should be neither too dry nor yet wet, but so as to become compact together, and take, when beaten, a smooth face. If too moist, it will chill the beds, and injure the spawn. On the contrary, if too dry, it will remain loose, and in a state by no means favourable to the growth of mushrooms; but when solid, it produces

not only finer mushrooms, but in greater quantities, as the earth from soils of lighter texture invariably grows them weaker, and of inferior quality, and such beds cease bearing much earlier.

Of the subsequent treatment. From the time of covering with earth, the room or shed should be kept at fifty to fifty-five degrees of Fahrenheit's thermometer, and the light must be excluded. If the heat be suffered to exceed, to any considerable degree, it will cause the beds to ferment a second time, and weaken, if not totally destroy, the spawn; but should a much lower degree of temperature, than the one prescribed, be permitted to prevail, the mushrooms will advance slowly in their growth; and if watered in that state, numbers of the small ones will be prevented from attaining perfection. In watering them, extreme caution is necessary as well in the mode of application, as in the temperature of the water, which should be nearly as warm as new milk, and very lightly sprinkled with a syringe, or a small watering pot; otherwise the mushrooms are sure to sustain damage. If cold water be used, and given plentifully at one time, it will not only destroy the existing crop, but the spawn also, and render the beds so treated of no further utility. If the beds have been suffered to become very dry, it is better to give them several light waterings, than one heavy supply. In gathering the mushrooms great care should be taken not to disturb the small ones that invariably, with good management surround the stems of those which are more early matured. The best method is to twist them up, very gently, in all instances where you can. But where you are obliged to cut them, great care should be taken to divest the beds of

the stems of those that are cut, as they would rot, to the great injury of those that surround them.

If the preceding directions are properly attended to, in the management of the beds, they will continue to bear several months, and a constant supply may be kept by earthing one bed or more, every two or three months, according to the quantity of mushrooms, required at one season. When the beds are in full bearing, if the mushrooms become long in their stems, and weak, it is certain, the temperature of the building is too high; consequently, air must be admitted in proportion to the heat.

Of renovating the old beds. As your beds begin to decline in bearing, and produce but few mushrooms, take off the earth clean from the dung, and if you find the latter decayed, destroy the beds and replace them by new ones, being careful to select any good spawn that may present itself; but if, on taking away the earth, you find the beds dry, solid, and full of good spawn, add a layer of fresh compost, as before recommended, three or four inches thick, mixing it a little with the old, and beat it as before. By adhering to this mode of renovating the old beds, a continual supply may be kept up.

Management of Mushrooms in a cellar, &c. Mushrooms may likewise be produced in a cellar, or any other vaulted place, with equal success, and not unfrequently to greater advantage as to crop, than in a shed, or other building, that is level with the surface of the earth. The same rules of management are to be observed, as directed for the shed. The peculiar advantage of a cellar, is, that no fire is necessary, and less water, the application of which so fre-

quently proves injurious, is wanted. They may be grown also plentifully, in hot-bed frames, by the same process, as is recommended for the sheds. In this latter practice, as soon as the beds are earthed, they should be covered with hay or litter under the lights, until they are in full bearing, then remove the covering to the outside of the lights, to exclude the sun and air as much as possible. In cold weather, if they advance slowly in their growth, the frames may be covered with hot dung, which will greatly encourage them. It must be recollected, that when these beds are made in hot weather, air must be admitted as freely as possible into the cellars, or frames, during the time of spawning, as above directed for the management of this part of the process, in the sheds.

Directions for breeding spawn for the Mushroom beds.

To any quantity of fresh horse droppings mixed with short litter (as recommended for the beds) add one third of cow's dung, and a small portion of earth to cement it together; mash the whole into a thin compost, and then spread it on the floor of an open shed, and let it remain till it becomes firm enough to be formed into flat square bricks, which being done, set them on edge, and frequently turn them until half dry; then, with a dibble, make one or two holes in each brick, and insert in each hole a piece of good old spawn, the size of a common walnut; the bricks should then remain until they are dry. This being completed, level the surface of a piece of ground, three feet wide, and of length sufficient to receive the bricks, on which lay a bottom of dry horse dung, six inches high; then form a pile by placing the bricks in rows one upon another (the spawn side

uppermost), till the pile is three feet high, next cover it with a small portion of warm horse dung, sufficient in quantity to diffuse a gentle glow through the whole. When the spawn has spread itself through every part of the bricks, the process is ended, and they must be laid up in any dry place for use. Mushroom spawn, made according to this receipt, will preserve its vegetative power many years, if well dried before it is laid up; if moist, it will grow, and soon exhaust itself.

Fig: 1

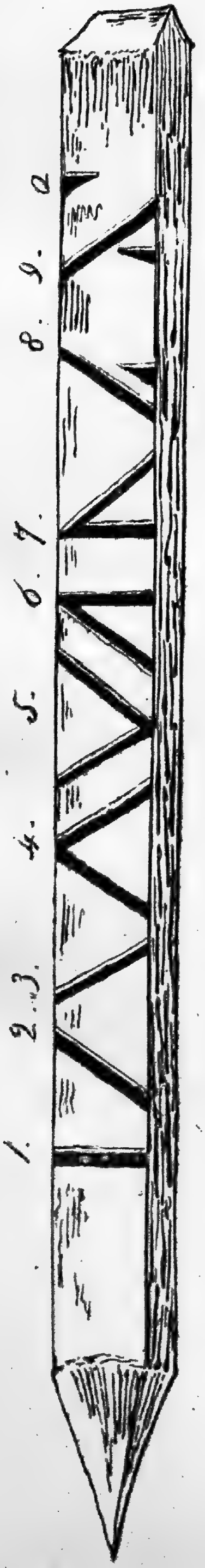


Fig: 2

Fig: 4

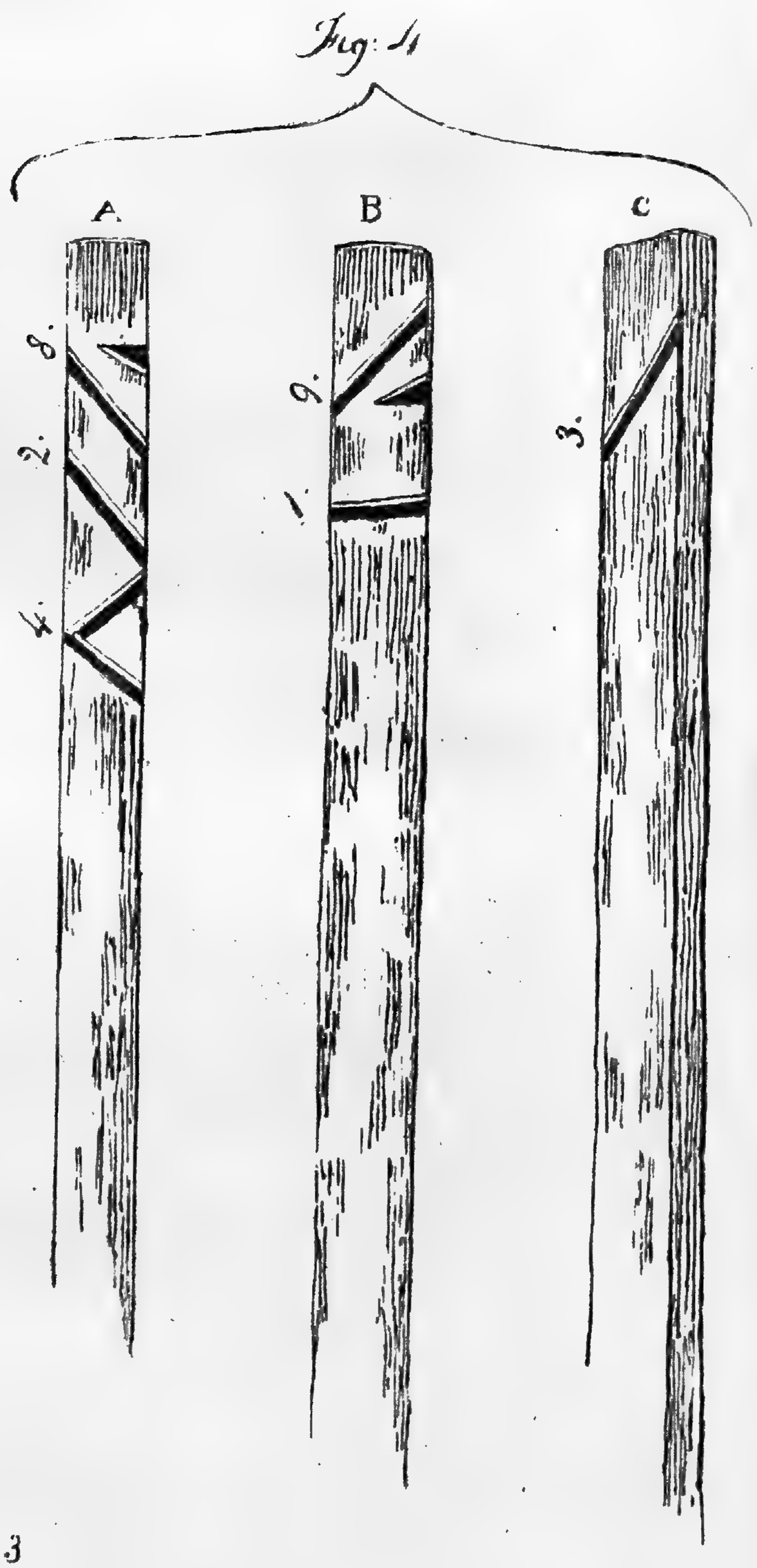


Fig 3

LXXXVII. *Description of a Method of* Numbering Marks or Tallies *for Plants. In a Letter to the Secretary. By* Alexander Seton, *Esq. F. H. S. &c.*

Read April 1, 1817.

My Dear Sir,

According to your wish, I will describe the method of *numbering marks or tallies for plants*, which have been used, for many years, by my lamented brother, Mr. George Anderson, and myself, and in which we have found the greatest convenience, both in regard to readiness in application, and ease and perspicuity in reference. If you lay this communication before the Horticultural Society, I fear it may be deemed of but trivial importance; but it may be observed, that all the arts derive their improvement chiefly from the facilities, afforded by a number of minor inventions, which seem simple, when put in practice, while we then wonder at the tardiness of their introduction. Of this there is nothing that furnishes a more striking example, than the Arabian arrangement of numbers, without which it would be difficult for us now to conceive, how our arithmetical computations could be accomplished; and yet it was unknown to those highly civilized nations of antiquity, from whom Europe has derived the basis of those sciences, which form the chief cause of its being now so eminently exalted, in power and dignity, over the rest of the world. The little device, of which I am now treating, consists merely of the application of this method of numeration, by means

of notches, cut on sticks, each notch denoting one of the ten ciphers, as in Fig. 1.

To avoid inversion, observe always to read from the blank end of the stick towards that on which the notches are placed, and this will come naturally, if it be held in the left hand. As nothing can be more easy than to cut those notches on any stick, and as the number denoted by each will be impressed on the memory by a very little practice, it is evident, that they may be used to an unlimited extent, with the greatest facility: for example, if it were required to put the number 590 on a mark, it would be done as in Fig. 2.

The only way in which the memory is apt to misgive, in this scheme, is, by confounding / & \, ⅂ & ⊢, ∧ & ∨ with each other (as a child would confound the figures 6 and 9), but this slight inconvenience will be remedied by the following key, which may be easily borne in the mind. Let us recollect that, in writing, we naturally draw a stroke from the right, at top, to the left, at bottom, thus / , and not in the opposite direction, thus, \ : now, in all of the above numbers, which differ from each other in the direction of the diagonal line, that which is in the direction usual in writing, precedes the other; thus $\underset{2}{/}$ $\underset{3}{\backslash}$ $\underset{6}{⅂}$ $\underset{7}{⊢}$ $\underset{8}{⁄}$ $\underset{9}{\diagdown}$; the other two, $\underset{4}{\wedge}$ & $\underset{5}{\vee}$, will not be confounded, on recollecting that ∨ is the usual Roman notation of 5.

In order to express more particularly the numbers, which refer to a botanical catalogue, a practice of great use to every cultivating botanist, we cut the stick in the form of a prism of four sides, whereof one is narrower than the rest: or of a triangle, with one of the angles cut off; see Fig. 3,

which is a transverse section of the stick. On the narrowest side we notch the number corresponding with that of the *genus*, in the catalogue Fig. 4, A. Its being rather more easy to cut the numbers on the smaller than on the larger surface, is the reason for preferring the former for the genus, the number of which is, in most cases, greater than that of the species. On the opposite and wider side, we put the number of the *species*, Fig. 4, B ; and if there be a *variety*, we put it on one of the intermediate sides, Fig. 4, C.*

By this simple method, in going over the garden with the catalogue in our hand, we can see at once the genus, species, and variety of any plant we wish to look for ; and in putting in plants, we have always the means ready at hand of placing the numbers with them, without the apparatus of whitened tallies, with ink, blacking, or any of those troublesome expedients in common use. The sticks themselves, which may be painted of a dark colour, and kept always at hand, are, besides, less conspicuous and unsightly than the usual large white marks with writing on them, and they are not so easily effaced.

I am, my dear Sir,
your's most faithfully,
ALEXANDER SETON.

Stamford Hill,
March 24, 1817.

* The plant marked by way of example, at Fig. 4, may be supposed to be *Narcissus Tazetta, Var. Soleil d'or.* The side A denotes the genus *Narcissus,* which is No. 428 in the catalogue; the side B has the number 19, that of the species *Tazetta*, of which the *Soleil d'or*, marked on the side C, is the third variety.

LXXXVIII. *Suggestions for the Improvement of Sir* George Stuart Mackenzie's *Plan for Forcing-houses. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read April 4, 1817.

The suggestions, for which this Society was last year indebted to Sir George Stuart Mackenzie,* relative to the most eligible manner of constructing forcing-houses, appeared to me, at first view, to be extremely interesting, though I immediately saw some defects in the plan submitted to our inspection; and I was not without apprehension, that considerable difficulties would occur in obviating those defects, without deviating from the spherical to the spheroidal form, which Sir George Stuart Mackenzie justly states to be objectionable, on account of the great nicety requisite in the workmanship. On making a few trials, to ascertain the varieties of forms which might be given to forcing-houses, by taking different segments of a sphere, I, however, soon became perfectly satisfied, that forcing-houses of excellent forms, for almost every purpose, and of any convenient extent, might be constructed without deviating from the spherical form; and I am now perfectly confident, that such houses will be erected, and kept in repair, at less expense, will possess the most important advantage of admitting greatly more light, and will be found much more durable, than such as are constructed according to any of the forms, which have been hitherto recommended.

* See page 171, of this volume.

Fig. 1.

A B. *The height of the house 12 feet.*

B C. *Its width 14 feet.*

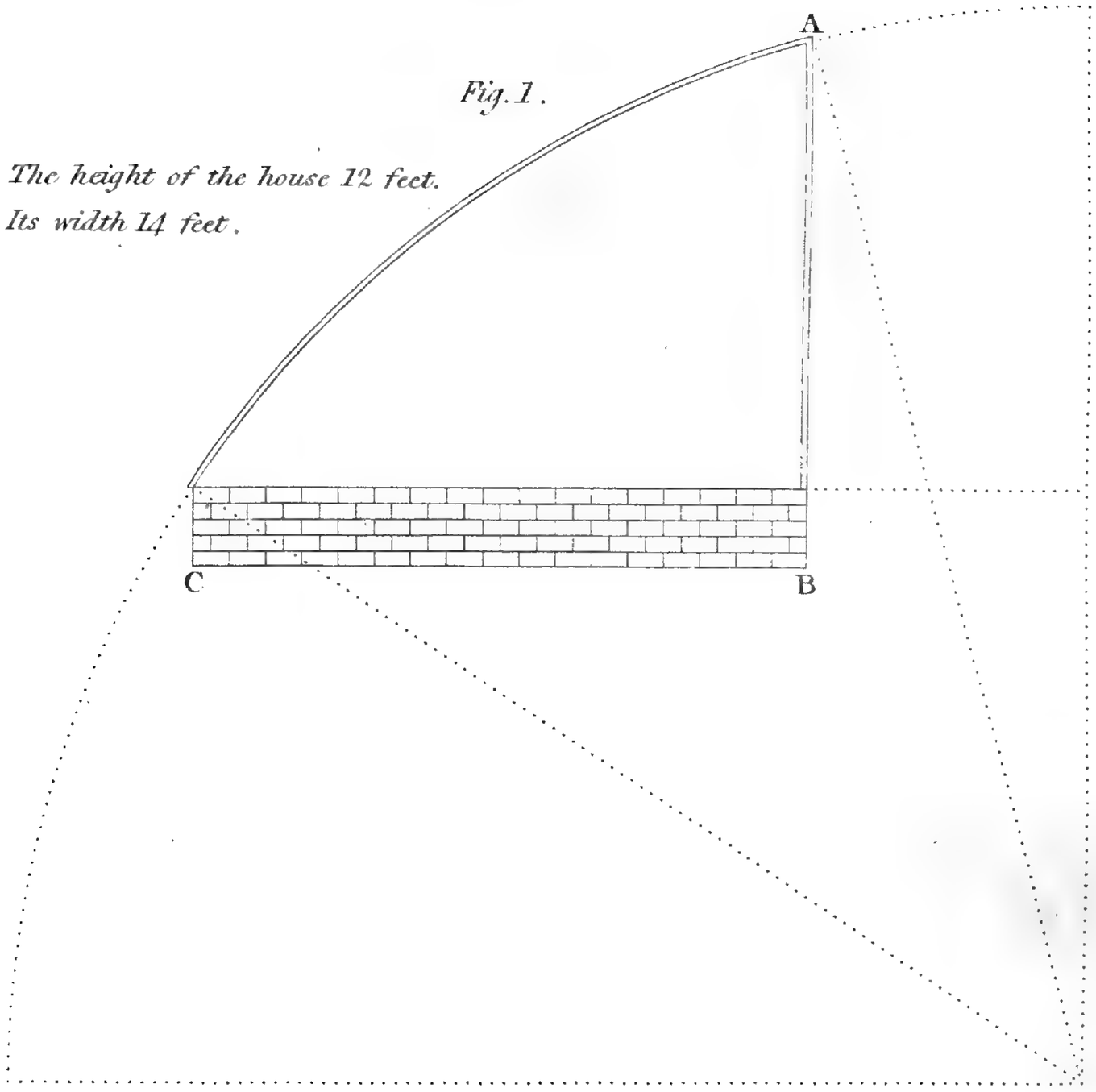
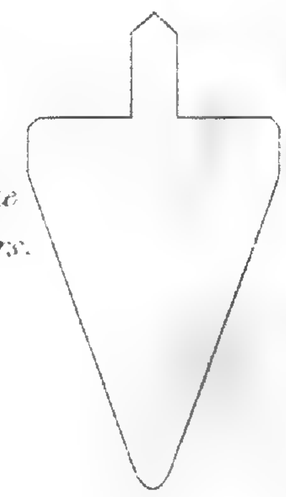


Fig. 3.



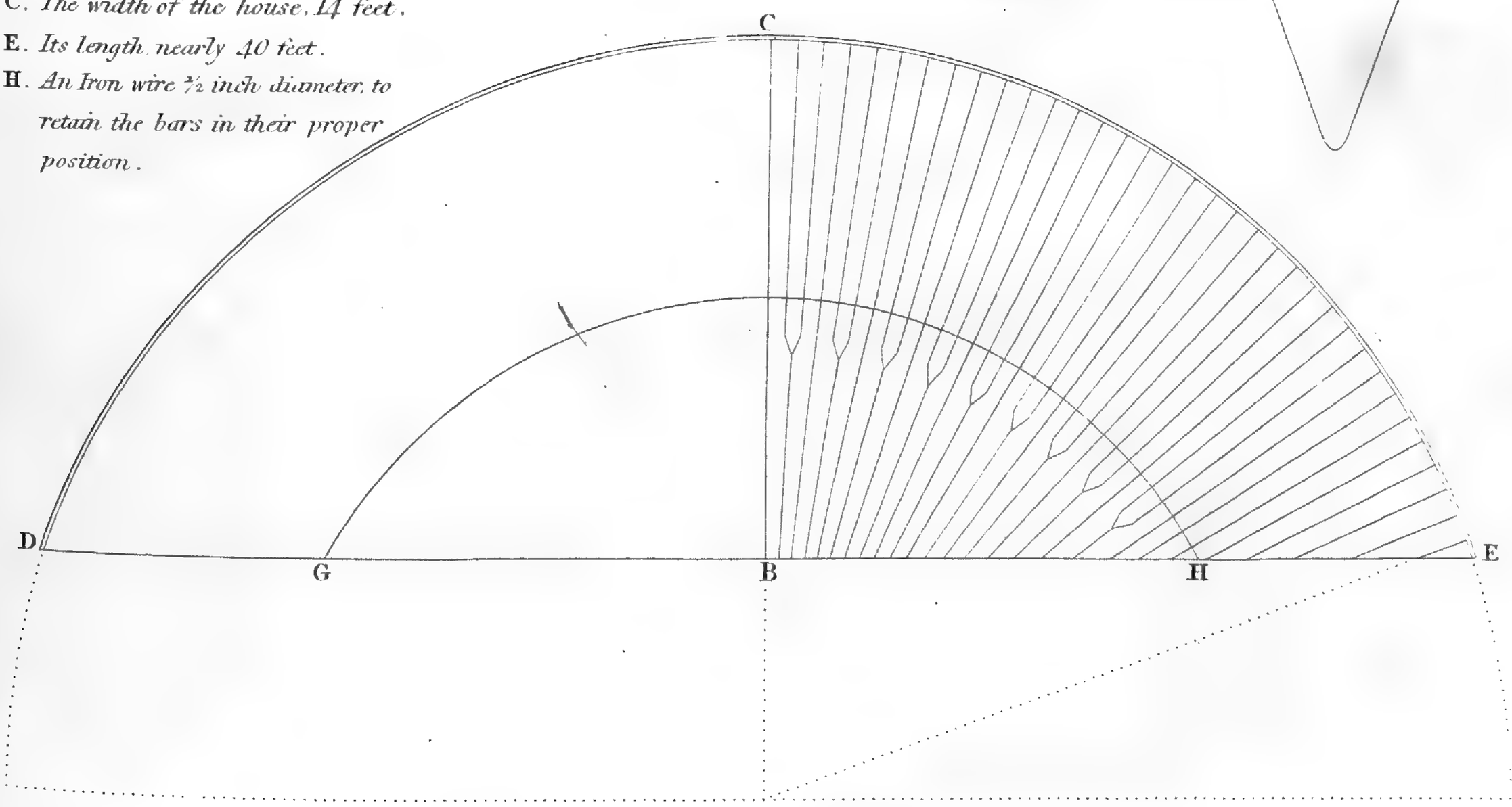
Section of the full size & form of the Iron Bars.

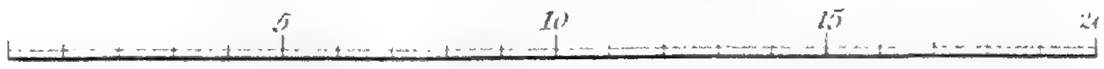
Fig. 2.

B C. *The width of the house, 14 feet.*

D E. *Its length nearly 40 feet.*

G H. *An Iron wire ½ inch diameter, to retain the bars in their proper position.*





Scale of Feet for Fig. 1. & 2.

The objections to the proportions, which are given in the *Transactions* of this Society, are, that the house would be much too high relative to its width and length; that the too close approximation of the bars at the top would give too much shade, and that the vapour condensed into water would necessarily drop upon, and injure the fruits and plants, owing to the want of sufficient declivity in the upper part of the roof; there is, I also think, a large portion of the glass, towards the bottom of the house, which stands much too nearly upright. But the whole of these defects may be readily removed by employing a small segment of a much larger sphere, as Sir GEORGE STUART MACKENZIE has suggested: and as low and as wide a forcing-house, as can be wanted for almost any purpose, may be readily obtained. Instead of the half of a hemisphere of thirty feet diameter, let the half of one of fifty feet be chosen, and from the base of this cut off thirty-five degrees, and from the summit fifteen degrees, as represented in the annexed sketch; and the following proportions for a forcing-house will be given. Its height, including eighteen inches of brick work, will be twelve feet; its width in the centre, fourteen feet; and its length very nearly forty feet: and there are very few purposes for which a house constructed according to some of the intermediate forms, between that above-mentioned, and the half hemisphere, will not be found extremely well adapted; as a front walk, where wanted, may be sunk beneath the level of the soil, or the brick wall may be made higher.

The injurious effects to be apprehended from the approximation of too numerous bars, may be easily obviated by uniting two into one, as represented in Fig. 2; and the bars

may be held in their proper position, by an iron wire of half an inch diameter passing from G to H, and attached to each bar: and if such wire be reduced to a square, where it comes into contact with each bar, and let in, to the necessary depth, it will not in any degree obstruct the descent of the condensed vapour.

I have given (Fig. 3), a sketch of the size and form, which I suppose to be eligible for the iron bars to support the glass. I imagine, that the necessary form may be easily given by the roller; and if so, I do not conceive that the expense of the iron work will much exceed half that of wood, including the greater surface to be painted.

A plate of iron two inches broad, and nearly half an inch thick, may be made to extend from D to E, Fig. 2, round the front of the house, and along the top of it, to receive the ends of the bars; and if this plate be properly secured to the brick work, I doubt whether any wood work will be wanted.

POSTSCRIPT.

August 1, 1817. I was not prepared to state, when the foregoing observations were written, whether the iron bars therein mentioned, could be easily reduced to the proper form by the roller of the iron mill; nor the price per ton at which, when rolled, such bars could be afforded by the manufacturer: but I have subsequently obtained the necessary information from the most competent authority. The bars can easily be reduced to the proper form by the roller, and could have been obtained a few months ago (the price of iron has since somewhat risen) at about fourteen pounds a ton;

provided that a considerable quantity, not less than twenty tons, had been wanted. If the bars be made of the strength proposed in the annexed sketch, each foot will contain twenty ounces of iron, and each foot of the plates, which are to receive the ends of the bars, about forty ounces; in which case the aggregate weight of the iron requisite for a forcing-house of forty feet long, in the construction of which no timber whatever is used, cannot amount to half a ton, inclusive of all that will be wanted to form cramps for securing the iron frame to the brick work.

Relatively to the expense of fitting and erecting the iron work, I am not prepared to speak with any degree of accuracy; but it cannot be very considerable: and as the curvature of the bars will be every where the same, no difficulty can occur in the application of them. It is, I think, not improbable, that iron bars of less weight that those proposed, would be found sufficiently strong, particularly if metal of the best quality were employed; and such is Mr. Loudon's opinion, to whose practical akill and extensive observation much attention is due.

LXXXIX. *On the* Fences *most eligible for* Gardens and Orchards. *By* John Williams, *Esq. of Pitmaston, near Worcester.*

Read April 1, 1817.

Amongst the various hints offered for the improvement of the science of Horticulture, I do not recollect to have met with any modern remarks on *living fences;* and as my observations and experiments tend to shew the good effects of planting Evergreen Shrubs, for *enclosing gardens and orchards,* rather than Hawthorn or Crab quick, my remarks on this subject may, perhaps, not be uninteresting to the Horticultural Society.

It is said, our ancestors took their first hints in gardening from the Dutch and Flemings; and judging from the specimens of old gardens, which existed near ancient mansions thirty or forty years ago, it appears, that they were generally enclosed by clipped hedges of Yew or Box. The Hawthorn is so nearly allied to the genus Pyrus, that its foliage affords food to the same caterpillars, beetles, aphides, and other insects, as are to be met with on the Apple and Pear. Last spring, there was an unusual number of caterpillars and small-winged beetles, which severally made their appearance in succession, and at last nearly devoured the whole of the blossoms, fruit, and foliage, so that, in many places the trees in the beginning of June, had the naked, leafless appearance of winter. I had then a strong proof of the advantages of a Holly fence, in comparison with Hawthorn.

My garden was formerly fenced in on two sides, with a Hawthorn fence, which I have removed, and planted Holly in its stead; about a quarter of a mile distant from the garden, on the same level and aspect, I have a small nursery, which is surrounded with a clipt Hawthorn hedge. The young fruit trees in this nursery have been greatly injured every spring, by caterpillars, beetles, and other insects. Last year, the trees in the garden were not much injured by these insects, but the foliage in the nursery was completely destroyed. I first observed the Hawthorn hedge full of small beetles and caterpillars, which soon destroyed all the newly expanded leaves; these insects then attacked the trees nearest the hedge, and gradually overspread the nursery, till they had completely devoured the leaves and setting fruit: so numerous were they, that the ground under the hedge and trees, was covered with their excrement, which had the appearance of coarse grains of gunpowder. Close-shorn or pleached quickset hedges appear to offer a favourable abode to caterpillars, and the parent moths make choice of such situations for depositing their eggs, in the previous summer or autumn; for I have frequently remarked, if close-shorn hedges are forcibly struck with a stick in a summer's evening, that thousands of moths fly out, and these might perhaps be destroyed by occasionally making blazing fires of dry weeds at night.

Having pointed out one of the disadvantages of Hawthorn hedges, I shall make a few remarks on the advantages of evergreen fences, for obtaining warmth and shelter.

Want of sufficient warmth has been the complaint of every English gardener from the days of Henry the Eighth,

when Horticulture began to be practised as a science, down to our own times; it therefore becomes a great object with the Horticulturist, in this moist, chilly climate, to attend to every circumstance likely to procure an increase of atmospherical warmth. The foliage of living vegetables receives heat during the day from solar influence, but the degree of heat given to a current of air passing through a hedge or plantation of trees is greatly modified by the quantity of water transpired by the leaves. The recently expanded foliage of deciduous and evergreen trees transpires a very large quantity of water in the form of aqueous vapour, and this carries off nearly all the caloric received from the action of the sun. The leaf therefore does not become sensibly warm to the touch. On the contrary, in a cloudy day in April and May, the wind seems to be actually refrigerated in passing through a thick Hawthorn hedge, and this may be accounted for on the same principle, that cool air is obtained in the houses of the wealthy in the East Indies, by sprinkling branches of trees with water in their verandas. Hollies, Laurels, and most evergreens, exhale but little water from their leaves at any other season of the year, except for about a month in June, when their new leaves are recently expanded; consequently, in April and May, when we most require warmth, and again in September and October, the leaves of these trees, when fully exposed to the sun, become sensibly heated to the touch, I should suppose, if the leaf of a laurel, so circumstanced, were suddenly brought into contact with a thermometer having a flat bulb, that the mercury would rise to 85 or 90 degrees.

I shall conclude these observations on evergreen fences, by remarking, that the Holly does not succeed well, if transplanted at any other season of the year, than the end of April or beginning of May; at this time, the buds are just breaking open into leaf, and I have rarely failed of success, in transplanting small or even very large old trees; I believe also, that it is not generally known, that the berries of this tree are not ripe till March or April. Those, therefore, who are desirous of raising young Holly plants should gather the berries at this time, and bury them in the ground till the following spring, when they may be sown in drills, where the young plants will grow to the height of four to six inches the first season.* The objection usually made to planting Holly, is, the great length of time it requires to raise a fence; however, I have not found it so: if a little care is taken to keep the plants free from weeds, during the first two or three years, till they are well established in the ground, their growth afterwards is very rapid. I hope to see this shrub generally planted in the neighbourhood of gentlemen's houses, parks, and plantations; the great protection it gives to game, and its cheerful appearance, added to its security as a fence, always growing thick with branches close to

* Sometimes none of the seeds vegetate, and when this is the case, there is reason to believe, the vital principal in the seed is destroyed by the severity of the frost. My gardener informs me, that the seeds sown in drills immediately after the berries are gathered, have succeeded better with me, than those which were buried during the summer in a heap; if this be the fact, it appears as though some fermentation takes place when the berries are buried in a considerable quantity, which destroys their vitality.

the ground, and thus smothering weeds, entitle it to so decided a preference, that it would perhaps not be going too far to recommend its legislative enactment as a fence in future enclosures, at least in those countries, where hops and fruit form a considerable part of the agricultural production.

XC. *Observations on, and Account of, the* Tubers *of the* Lathyrus Tuberosus, *with Instructions for the Cultivation of the Plant in a Garden. By Mr.* James Dickson, *F. L. S. &c. Vice-President.*

Read May 6, 1817.

The tubers, which have been exhibited and distributed at several of our Meetings, during the late winter, are the produce of a plant called by Linnæus, *Lathyrus Tuberosus*, a native of Germany, France, Italy, and Holland, in which last country it has long been cultivated in the gardens, for the sake of the tubers produced by its roots, which are there used in the desert. In Dutch it is called *Aard-aker* (earth nut), or *Muizen met staarten* (mice with tails), the tubers with the fibres attached to one of their extremities (when half concealed in a napkin, on which they are usually served up at table) bearing a strong resemblance to the common mouse. Gerrard called them *Terræ Glandes*, or *Pease Earth nuts*.*

Though the plant had been long under my charge, in the garden at the British Museum, I was ignorant of the use of its roots, till a person accidentally calling on me, and enquiring anxiously "for the little black roots which the Dutch call mice, and which grow on a plant like a pea," led to the discovery; I subsequently imported roots, and they have been many years in my gardens at Croydon, as well as in that of Sir Joseph Banks at Spring Grove, to whom I communicated them.

The plant itself has been figured in Curtis's *Botanical*

* Gerard's Herbal, page 1237.

Magazine, Vol. 4. Plate 111. It bears some resemblance to, but is much smaller than, the common Everlasting Pea. The tubers are formed on the long fibrous roots of the plant, to which they are attached, by what (in comparing them with mice) may be called their head, whilst, from the other end, which is the less obtuse of the two, proceeds a small, short fibre, resembling the tail. When two inches or upwards in length, they may be considered as fit for use; and are to be prepared in the following manner. Boil them from two to three hours, till a fork will pass through them; when sufficiently soft, dry them, and roast them gently, serving them up in a cloth in the same manner as Chesnuts, for which they are a good substitute; and persons used to them become very fond of their flavour.

The plant will grow in any ground, but a light rich soil suits it best. As the roots, if not restrained, spread extensively, as well as penetrate very deep, both which properties are inconvenient, it is advisable to form a border enclosed all round with brick work, about 20 inches deep, paving the bottom with bricks. The bed thus made is to be filled with the soil suited to them. The tubers (each of which will produce a plant) should be put into the earth, about six inches from each other, and three inches below the surface. In the first year, some tubers may be large enough, but in two years they will become fit for use, and should be taken up as wanted. The bed in which they grow should be dug in regular course from one end, leaving the smaller tubers and fibres, to produce a succession of plants, and encouraging their fresh growth by the addition of some good rich soil, every year.

XCI. *Account of a Method of Forcing* Asparagus, *practised by Mr.* William Ross, *Gardener to* Edward Ellice, *Esq. at Wyke House, near Brentford; with some Suggestions for the Improvement of the general Practice in this particular. By* Joseph Sabine, *Esq. F.R.S.&c. Secretary.*

Read May 6, 1817.

The general appearance of the forced *Asparagus*, used at table in the months of December, January, and February, is a sufficient indication of defective management in its production. When I first examined the method, practised by Mr. Thomas Hogg, for forcing early Potatoes (of which an account is given at page 144 of this volume), it occurred to me, that the same principle might be applied to raising early Asparagus, viz. that of placing the roots of the plants over a substratum not in a state of fermentation, and by introducing into the bed, the warmth necessary to force them, from hot linings to the sides; for I considered that the weak and drawn state of forced Asparagus is occasioned by the action of the dung immediately on its root.

My opinions, I think, are confirmed by the successful practice of Mr. William Ross, gardener to Edward Ellice, Esq. at Wyke House near Brentford, in whose garden, in the month of January, I observed some of the strongest Asparagus I ever noticed at that season. Mr. Ross sent a sample, at my request, to the General Meeting of the Horticultural Society, in February last, and he has

given me the following account of his practice. The pits in which his succession Pines are kept in the summer, have at bottom a layer of leaves, about eighteen inches deep, covered with the same thickness of tan, which becomes quite cold when the pines are removed. In one of the pits he spread over the entire surface of the old tan a quantity of Asparagus roots, which he covered with six inches more of tan, and applied linings of hot dung, successively renewed, round the sides, keeping up thereby a good heat. This was done in the middle of December, and in five weeks the crop was fit for use. As soon as the shoots made their appearance, and during the day time, he took off the lights, introducing as much air as possible, which gave them a good natural colour, and the size was nearly as large as if they had been produced in the open ground, at the usual season.

I observed to Mr. Ross, that I thought, the plan would be improved, if the roots were planted in mould, rather than in tan; in this point he agreed with me, observing, that he would nevertheless retain the under layer of eighteen inches of tan, which he was convinced, would be of great service, since it so readily admitted the passage of the heat, and that he should in all cases, prefer the use of a bed so constructed, to the cold dung-beds of Mr. Hogg, on which he grows the early potatoes, which, from having lain together for some time, become too compact for the heat to penetrate into them easily.

From the above observations, I hope the gardener will be able to take such hints, as will improve the practice in this part of his business. To insure perfect success, it is expedient to have good roots to place in the bed; the usual plan of taking

them from the exhausted old beds of the garden is bad. If they are past their best, and unfit to remain in the garden, they cannot be in a good state for forcing. Young roots four years old from the seed, are much preferable: they are costly, if they are to be purchased every year; but where there is sufficient space, a regular sowing for this particular purpose, should be made annually, and thus a succession of stock secured.

XCII. *Upon the proper Mode of* Pruning *the* Peach *Tree, in cold and late Situations. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read May 6, 1817.

The buds of fruit trees, which produce blossoms, and those which afford leaves only, in the spring, do not at all differ from each other, in their first state of organization, as buds. Each contain the rudiments of leaves only, which are subsequently transformed into the component parts of the blossom, and in some species of the fruit also. I have repeatedly ascertained, that a blossom of a Pear or Apple tree contains parts, which previously existed as the rudiments of five leaves, the points of which subsequently form the five segments of the calyx; and I have often succeeded in obtaining every gradation of monstrosity of form, from five congregated leaves, (that is, five leaves united circularly upon an imperfect fruit stalk) to the perfect blossom of the Pear tree. The calyx of the Rose, in some varieties, presents nearly the perfect leaves of the plant, and the large and long leaves of the Medlar appear to account for the length of the segments, in the empalement of its blossom. The calyx of the blossom of the Plum and Peach tree is formed precisely as in the preceding cases, except that the leaves, which are transmuted into the calyx, separate at the base of the fruit and become deciduous, instead of passing through and remaining a component part of it.

Every bunch of grapes commences its formation as a

tendril, and it is always within the power of every cultivator to occasion it to remain a tendril. The blossoms are all additions, the formation of which is always dependent upon other agents: and if any considerable part of the leaves be taken off the branch prematurely, or if the vine be not subjected to the influence of the requisite degree of heat and light, the tendrils will permanently retain their primary form and office; and it is very frequently observable, when much of the foliage of fruit trees has been destroyed by insects, or when the previous season has been cold and wet, that blossoms are not formed at all, or are feeble and imperfect, and consequently abortive. The state of the Peach trees and Vines, in every part, or nearly every part, of the kingdom, in the present spring, has afforded, I believe, more than sufficient evidence of the truth of the last position.

It is, I conceive, quite unnecessary to adduce arguments to prove that the buds, which are first formed in the spring, are most likely to undergo properly the necessary internal changes of structure above mentioned, and consequently to afford more perfectly organized blossoms, than such as are not formed before the middle of the summer, or till near the approach of autumn; and if this be admitted, it will not be difficult to shew, that the mode of pruning and training the Peach tree, which has been uniformly recommended, and almost as uniformly practised, is well adapted to favourable situations only. It has been derived from the practice of the French gardeners, and is probably perfectly well suited to the climate of Paris, but by no means so well calculated (I have, I think, very good reason to believe) for the colder parts of England, as that I proceed to describe and recommend.

Every tree prepares in the summer and autumn many minute leaves, which expand and form the early foliage of the following spring, and the buds in the axillæ of these leaves are necessarily (consistent with the preceding statements,) those best calculated, in cold and unfavourable situations and seasons, to generate well organized and vigorous blossoms; and in such situations, I have often witnessed the advantage of preserving as many as practicable of these, by deviating from the ordinary mode of pruning the Peach tree. Instead of taking off so large a portion of the young shoots, and training in a few only, to a considerable length, as is usually done, and as I should myself do to a great extent, in the vicinity of London, and in every favourable situation, I preserve a large number of the young shoots, which are emitted in a proper direction in early spring by the yearling wood, shortening each where necessary, by pinching off the minute succulent points, generally to the length of one or two inches. Spurs which lie close to the wall are thus made, upon which numerous blossom buds form very early in the ensuing summer; and upon such, after the last most unfavourable season, and in a situation so high and cold that the Peach tree, in the most favourable seasons, had usually produced only a few feeble blossoms, I observed as strong and vigorous blossoms in the present spring, as I have usually seen in the best seasons and situations; and I am quite confident that if the Peach trees, in the gardens round the metropolis had been pruned in the manner above described, in the last season, an abundant and vigorous blossom would have appeared in the present spring. I do not, however, mean to recommend

to the gardener to trust wholly, in any situation, for his crop of fruit, to the spurs produced by the abovementioned mode of pruning and training the Peach tree. In every warm and favourable situation, I would advise him to train the larger part of his young wood, according to the ordinary method, and in cold and late situations only, to adopt to a great extent, the mode of management above suggested. A mixture of both modes, in every situation, will be generally found to multiply the chances of success; and therefore neither ought to be exclusively adopted, or wholly rejected in any situation. The spurs must not be shortened in the winter or spring, till it can be ascertained, what parts of them are provided with leaf-buds.

XCIII. *Observations on the proper* Management *of* Fruit *Trees, which are intended to be forced very early in the ensuing Season. By* Thomas Andrew Knight, *Esq. F. R. S. &c. President.*

Read June 3, 1817.

The period which any species, or variety, of fruit will require to attain maturity, under any given degrees of temperatures, and exposure to the influence of light in the forcing house will be regulated to a much greater extent, than is generally imagined, by the previous management and consequent state of the tree, when that is first subjected to the operation of artificial heat. Every gardener knows, that when the previous season has been cold and cloudy and wet, the wood of his fruit trees remains immature, and weak abortive blossoms only are produced. The advantages of having the wood well ripened are perfectly well understood; but those which may be obtained, whenever a very early crop of fruit is required, by ripening the wood very early in the preceding summer, and putting the tree into a state of repose, as soon as possible after its wood has become perfectly mature, do not, as far as my observation has extended, appear to be at all known to gardeners; though every one who has had in any degree the management of Vines in a hot-house, must have observed the different effects of the same degrees of temperature upon the same plant, in October and February. In the autumn, the plants have just sunk into their winter sleep: in February they are refreshed, and ready to awake again; and whenever it is intended prema-

turely to excite their powers of life into action, the expediency of putting those powers into a state of rest, early in the preceding autumn, appears obvious. The natural propensity of the gardener to treat his plants as in some degree sentient beings, and as he would wish to be himself treated, which sometimes misleads him (as I have remarked in a former paper),* will in this case direct him rightly, by leading him to infer, that early rising requires early going to rest. I shall therefore state the result of a few experiments only, which will, I believe, afford satisfactory evidence of the truth of the foregoing positions.

Some Vines, which grew in pots, were placed in a forcing house, at the end of January, where they produced ripe fruit about the middle of July; and soon after that period, the pots were taken from the house and put under the shade of a north wall, in the open air. Water was subsequently given in small quantities only; and the leaves of the plants soon fell off. In August, the plants were pruned; and in September, they were removed to a south wall, where they soon vegetated with much vigour, and continued to grow till their young shoots were killed by frost.

Other Vines, of the same varieties, were suffered to remain in the forcing-house till late in August; where they were subjected to the mode of management above described, except that they were not removed from their situation under a north wall, nor pruned, before the approach of winter. These were then placed against a south wall, where their fruit ripened well in the following season, in a climate not

* See page 130 of this volume.

nearly warm enough to have ripened it at all, if the plants had previously grown in the open air.

Having raised many varieties of the Peach from seed in the year 1813, I felt anxious to secure the existence of each variety till I could ascertain its merits; and with this view, I obtained a duplicate of each by inserting a bud from every seedling plant into a stock, which I placed in the forcing-house. Late in the autumn of the year 1815, some of the young trees, which had been obtained from these buds, were removed from the forcing-house, in which their wood had become most perfectly well ripened, in the preceding summer, to the open air, and were placed as closely, as could conveniently be done, to the seedling trees of the same varieties, which had grown wholly in the open air: and thus circumstanced, the blossoms of the trees, which had been removed from the forcing-house, unfolded nine days earlier, and their fruit ripened three weeks earlier, than that upon the other trees of the same varieties.

The confinement of the roots to pots, and possibly, to a small extent, the influence of the stock (for the Peach trees in the pots grew upon Apricot shoots), may have somewhat accelerated the maturity of the fruit, in the experiment last mentioned; but the chief causes of the early maturity of the fruit in both the preceding cases were, I am confident, the perfect maturity of the wood, and the high state of excitability, which had been acquired, by a preternaturally long period of rest.

It is not, I believe, at all necessary that I should offer arguments to prove, that a Vine, which cannot be made to

vegetate at all in the winter without a very high degree of heat, is not as well calculated for very early forcing as one in which the powers of life are so excitable that it is prepared to vegetate strongly in the temperature of the open air in September, and in which the power to vegetate in a low temperature will continue to accumulate progressively till spring: but it will probably be objected that as large a crop cannot be obtained from Vines of which the roots are confined in pots, as from others. This objection, however, will, I believe, prove to be wholly unfounded, whenever a very early crop is wanted; for Vines and other fruit trees (as I have observed in former papers) when abundantly supplied with water, and manure in a liquid state, require but a very small quantity of mould. A pot containing two cubic feet of very rich mould, with proper subsequent attention, is fully adequate to nourish a Vine which, after being pruned in autumn, occupies twenty square feet of the roof of a hot-house; and I have constantly found that Vines, in such pots, being abundantly supplied with food and water, have produced more vigorous wood, when forced very early, than others of the same varieties, whose roots were permitted to extend beyond the limits of the house.

XCIV. *Account of the Method of* raising Mignonette *in* Pots, *in succession through the year, as practised in the Vicinity of London. By Mr.* George Rishon, *of the Bedford Nursery, Bloomsbury.*

Read July 1, 1817.

The demand for *Mignonette* in pots, at all seasons of the year, is so considerable, that particular attention has been given to the cultivation of this fragrant annual, by many of the gardeners who supply the London market, and as the same method may be with ease applied to raising it in private gardens, the following detail of the practice is offered to the Horticultural Society, in the hope that it may be considered useful.

To obtain fine plants, strong and ready to blow, during the winter, and through the months of January and February, the seed should be sown in the open ground the end of July; by the middle of September, the plants from this sowing will be strong enough to be removed into pots; for a week after this removal, they must be shaded, after which they may be freely exposed to the sun and air, care being taken to protect them by frames from damage by heavy rains, and from injury by early frosts, until the beginning of November, at which time many of them will shew their flowers; and they should then be removed to a green-house, or conservatory, or to a warm window in a dwelling-house, where they will branch out and continue to blow until the spring.

The crop for March, April, and May should be sown in small pots, not later than the the 25th of August ; the plants from this sowing will not suffer by exposure to rain, whilst they are young ; they must however, be protected from early frosts, like the winter crop ; they are to be thinned in November, leaving not more than eight or ten plants in each pot ; and at the same time, the pots being sunk about three or four inches in some old tan or coal ashes, should be covered with a frame, which it is best to place fronting the west ; for then the lights may be left open in the evening, to catch the sun whenever it sets clear.

The third or spring crop should be sown in pots, not later than the 25th of February ; these must be placed in a frame, on a gentle heat, and as the heat declines, the pots must be let down three or four inches into the dung bed, which will keep the roots moist and prevent their leaves turning brown, from the heat of the sun, in April and May. The plants thus obtained will be in perfection by the end of May, and be ready to succeed those raised by the autumnal sowing.

XCV. *On the Cultivation of* Strawberries *in* Forcing-houses, *during the Winter and Spring Months. By Mr.* William Morgan, *Gardener to* Henry Browne, *Esq. at North Mimms Place, in Hertfordshire.*

Read July 1, 1817.

Strawberries are in such general estimation, that a plentiful supply of them, during the seasons, when they cannot be obtained in the open ground, is one of the principal objects of the fruit-gardener's attention. The produce of out-door Strawberries is terminated, by the frosts, at the end of October, from which time, until the following June, the assistance of the forcing-house is required, to furnish the desert with this sort of fruit.

The *Alpines* are the first to be brought into bearing by artificial heat, and these must be raised from seed, which ought to be obtained, in summer, from the largest and best fruit. The berries, from which the seed is to be taken, must be gathered when quite ripe, and being dried, the seed may be cleared from the pulp, and kept for use; in January it is to be sown, and covered with about a quarter of an inch of mould, in shallow boxes or pans, three or four inches deep; these must be placed in a gentle heat, such as that of a succession pinery, or an early peach-house; when the rough leaves of the seedling plants appear, remove them to a cooler position, to harden them, for potting in May. The pots for this purpose should be six inches deep, and six

become larger and higher flavoured; no runners of course, must be allowed to grow from the plants. To insure a good supply of fruit, it is better to provide a succession of plants, in beds covered with frames; if these beds are made with leaves, place the pots on the surface of the leaves, close together, within a foot of the glass, and fill up the interstices, between the pots, with old tan, or light mould; if dung be used for the beds, the plants will suffer, if the pots are placed directly upon it, a layer therefore of old tan, or mould three or four inches thick, must intervene between the dung and at the bottom of the pots; air must be admitted, at the back of the frames, daily, until the plants are in flower, when it should be given more freely, by removing the lights, whenever the weather is fine: thus the fruit will set plentifully, and when it is set, the pots may be carried into the pine-stove, or any other forcing-house, to ripen.

The *Pine Strawberries* succeed the Scarlets, in order of time, for forcing; the directions for potting the Scarlets are applicable to this sort, except that two plants only are to be placed in each pot; the sort of runners to be preferred, and the management after potting, are precisely the same as are set down for the Scarlets. The Pines are to be taken into the house, for forcing, in February or March; they do best in a peach, or other moderately heated house, until the fruit is set, when they are to be shifted into the pinery to ripen. The leaves of this sort must not be picked off, as is recommended in the management of the Scarlets, but the system of watering is the same with both sorts. When the Pine Strawberries are ripe, the sun and strong heat will cause them to shrink, and destroy their flavour; this may

be prevented by removing the pots, which have full ripe fruit, into a cool and shaded room.

It is essential, in order to secure a good flavour to the fruit of forced Strawberries, that they have as little water as possible, when they are nearly ripe.

After the fruit has been gathered from the plants, the pots should be plunged into a shady border, giving them a good watering, and at the same time cutting off all their leaves: when thus treated, they will, in the year following, produce as good crops in forcing, as fresh potted plants; if not wanted for this purpose, they may be turned out into the natural ground, and will then bear a crop in the autumn of the same year, as described by Mr. WILLIAMS, at page 93 of this volume.

The Rowberry Strawberry.

become well known, before that time, in the neighbourhood of Aberdeen.

The general habit and appearance of the plants are those of common Scarlets, from which, however, they differ in the particulars stated below. They produce fewer leaves than the Scarlet Strawberries; they are shorter in growth, of a lighter green, and have somewhat of a glaucous appearance, when viewed in opposition to the dark green of the other kind; their leaves are also more rounded than those of the Scarlets, and the stalks of the leaves have a few hairs scattered over them, whilst the leaf-stalks of the Scarlets are quite smooth. The scape, or stem, which produces the flowers, is also a little hairy, and very short, notwithstanding which, soon after it begins to flower, it overtops the leaves, and the whole bed appears covered with the white flowers, which are the more conspicuous, as the petals are considerably larger than those of the Scarlet, though not equal in size to those of the Pine Strawberry. Each scape produces an extraordinary number of flowers, the peduncles of which are stronger and shorter than those of the Scarlets; the flowers, which have a pleasant odour, continue to open in succession, through the season, so that when the first fruit is ripe, there are numerous flowers yet to be opened, as well as berries in all stages towards maturity, on the same stem. The scapes also continue to rise successively, and thus produce a continuance of fruit; the latter-grown scapes are generally taller than the first, but are equally abundant in blossom, and fruit; they are not so numerous on each plant, as in the spring, but still

in sufficient plenty to yield occasional gatherings in the month of August, when all other Strawberries, except the Alpines, are off.

The general shape of the berries is conical; occasionally, it is cock's-comb like, but this peculiarity is only to be observed in those first ripened: they exceed the Scarlets in size, but are less than the Pines, from both of which they may be readily distinguished, though, when in an unripe state, they most resemble the Scarlets; the calyx is small, in proportion to the size of the fruit; the seeds also are small, and not so buried in the pulp of the fruit, as in the Scarlets. The berries are not perfectly ripe until they assume a dark red colour, and in that state only should the merit of their flavour be decided on. The flesh is firmer than that of the Scarlets, and from this property, probably, is found to preserve better, though it will not bruise well to mix with ice, and is therefore not preferred by the confectioners for that purpose. The Roseberry ripens as early as the Scarlet.

The management of the plants, in the open ground, is similar to that of the Scarlets; the fruit is more liable to get dirty, by lying on the ground in wet weather; but if this defect can be guarded against, the quantity as well as prolonged period of its produce, will cause it to be extensively cultivated.

It has been found, by experience, to do well in the forcing-house, where it continues to bear most abundantly, in succession, for a length of time; when wanted for this purpose, only two plants should be introduced into

those sized pots, in which three of the Scarlets are usually planted. The plants used in the forcing-house, in the spring, if turned out of the pots into an open border, flower, and bear fruit, in nearly as great proportion as those growing in the natural ground in the spring season.

XCVII. *Some farther Observations on the* Method *of* ringing *Fruit Trees, for the purpose of rendering them productive.*

By George Henry Noehden, *LL. D. F. L. S. &c. Vice Secretary.*

Read September 2, 1817.

In a former communication, the practice of ringing fruit trees, in order to cause them to bear, has been spoken of; and I have since found, in reading some of the writings of M. André Thouin, that this mode of proceeding is familiar to the French gardeners. Mr. Hempel, of whose account of this operation, a translation has been given in the Appendix to the present volume, mentions, that his father, from whom he himself learnt that method, had derived it from a French journal. M. Thouin intimates, in a passage, which will be subsequently quoted, at full length, that it has been known and approved in France, for upwards of a century. The French have likewise adapted it to another use, namely, to facilitate the process of obtaining layers, especially from hard-wooded trees or shrubs; but this application is of much later date. It will be recollected, that our President, guided by that philosophical sagacity, which is peculiar to him, arrived at this practice, by his own experiments. He gave the Society an account of it, in the beginning of the year 1812.* The subject of ringing fruit trees is incidentally touched upon, by M. Thouin, in his

* See the Horticultural Transactions, Vol. I. page 255.

Description de l'Ecole d'Agriculture du Muséum, p. 83. where he treats of the various modes of making layers, His words, translated from the French, are these : " The name of *annular cut,* or *annular section,* and of *vertical ring,* is given to a space, or blank, occasioned in the circumference of a shoot, branch, bough, stem, or even the trunk of a tree, by the removal of a stripe of the bark, from the outer cuticle down to the alburnum, not, however, including the latter. The object of this operation is, either to diminish the vigour of a luxuriant branch, and by detaining the sap in the upper parts, to force it to yield fruit, or to dispose it to emit fibres, fit to be converted into roots, for the purpose of making layers. These rings are made of different sizes, according to the nature of the branches, and the particular trees, on which they are cut, and likewise according to the object you have in view. You, generally, have them of a width of two millimetres to three centimetres. It is only a few years, since they have been applied to hard woods, with the intention of getting layers. This operation is used in the nurseries, for the multiplication of fruit-trees, and in the gardens, for the increase of exotics." M. THOUIN remarks, that the ring must be quite cut down to the alburnum, a circumstance, which has been particularly adverted to in the paper, to which I have alluded. The dimension of the rings, he says, may be from two millimetres to three centimetres, according to the subjects on which they are practised, and the purposes, for which they are wanted. If we reduce those denominations to our measure, we shall find, that two millimetres will be somewhat less than the twelfth part of an inch, and three centimetres will approach to an inch and a half; and we

may say, that M. THOUIN requires, for his different purposes, rings of a width from the twelfth part of an inch to an inch and a half. It is implied in what he says, that rings should vary in their dimensions, according to circumstances, which had also been remarked in our paper.* It is satisfactory to see an opinion, that had, in a great measure, been founded upon general reasoning, confirmed by such an authority as that of M. THOUIN, who speaks from experience and observation. The effect of ringing, in producing fruitfulness, is likewise accounted for, by him, in a manner similar to that, which was suggested in our Transactions. It was there stated, that the abundance of the sap, or the quickness of its motion, might be considered as the cause that prevented fruitfulness. The latter, indeed, may be supposed to arise out of the former. For the sap, as any fluid, will move with greater force, when it abounds than when it is scanty. But it seems, that in a state of accelerated motion it is less fit for the process of secreting and depositing the ingredients of the fruit, than when it circulates slowly; and experience has pointed out certain means, by which the quickness of the circulation appears to be diminished. Thus gardeners have found, that by twisting, or bending, the branches, or by training them in a particular manner, fruitfulness is frequently brought about; and the method of cutting rings on them, which is the immediate topic for our consideration, aims at the same end. To this may be added the use of ligatures, tightly bound round the shoots. All these operations evidently tend to interrupt, or retard, the flow of the sap; and in this way they seem to conduce to

* Page 269.

fruitfulness. It is, therefore, fair to conclude, that whatever controls the motion of the sap, is beneficial to the production of fruit. Whether the actual diminution of the sap is the right plan to be pursued, may perhaps be doubted. An eminent Horticulturist calls the sap vegetable blood, and justly considers it as that, upon which the life and health of the plant depend: but whether we are to infer that, because this vegetable blood is so important and essential, it should be increased to the utmost, and that its function would be best performed in proportion to its comparative quantity, may well be questioned. It is probably in vegetable, as it is in animal nature, that there is a certain limit, beyond which all excess is faulty. There may be too much blood made in a plant, as we know that there may in an animal, the superabundance, in each case, being created by improper nourishment; and in both it may be expedient, and perfectly consistent with good judgment, to lessen it. The chief point, however, seems to be, to regulate the course of the sap, and to check it, when it is too rapid, which it may be concluded to be, when the tree is vigorous and luxuriant, and yet barren. M. NOISETTE, a very intelligent nurseryman at Paris, and one of the editors of the *Bon Jardinier*, in speaking of the proceeding, which in such circumstances should be adopted, calls it "to curb, or subdue, the force of vegetation" *(dompter la force de la végétation au profit des fruits)*;* and M. THOUIN in another passage, where he treats of a certain mode of pruning, expresses himself thus†;

* See Bon Jardinier for the year 1817, p. 305.

† Description de l'Ecole d'Agriculture du Muséum, p. 59.

" The theory of this mode of pruning consists in *suppressing the direct channel of the sap*, and substituting for it from three to seven oblique branches, which, at certain distances, one above another, form a sort of forked passage that will only permit *the sap to rise and descend slowly*, obliging it to stop and *form a great number of fruit buds*. The experience of more than a century proves the goodness of this theory, when it is put in practice by skilful gardeners." These remarks will serve as a supplement to the former communication, on the practice of ringing fruit trees, and may perhaps be useful in farther elucidating that proceeding.

XCVIII. *Account of some* Improvements *in the Construction of* a Stove for Plants, *by which Bottom heat is imparted to their Roots, without the use of Tan.* *By* WILLIAM KENT, *Esq. F. L. S. &c.*

Read May 6, 1817.

HAVING occasion to rebuild my hot-house, I was led to consider what improvements might be made in the directions of the flue, and the construction of the pit, in order that the fire might not only sufficiently heat the body of the house, but also be so directed as to supersede the necessity of tan: for, independent of the expense, in consequence of the distance whence I had to obtain it, tan is liable to the objection of producing worms, which not only prove highly injurious to the plants, but often totally destroy them. I conceived, that this advantage might be obtained, if an air chamber could be formed under the pit, wherein the air might be confined in a state of high rarefaction, and be so regulated, as to increase and decrease the temperature, as required: for, if an artificial heat could be imparted to the substance which filled the pit, and kept up about the pots, it would be of little consequence, of what that substance consisted; and as tan is only used for this specific purpose, the heated air in the chamber would convey a warmth equivalent to that produced by it. The house being now finished, agreeably to

the conceived plan, and fully answering my expectations, after six months experience, I am desirous of communicating an account of it to the Horticultural Society, for the information of the Members, not doubting, at the same time, but some of them will be able to suggest other ideas, that may render the plan more complete. With respect to the consumption of fuel, it is not in my power absolutely to determine, whether any thing material is saved, or not, although I am inclined to believe, that much less is required; but I am prevented from making the experiment, as this house is nine feet longer, and from twelve to fourteen inches higher, than my former, containing nearly 1500 more cubic feet of air to be heated. I have found, upon trial, that coke (such as is made by the Gas-light Company) smith's coals, and cinders, mixed in about equal proportions, answer quite as well as coals alone.

As this house is constructed, the third return of the flue, *c*, which runs along the front, at the distance of forty-five feet from the fire, is nearly, if not quite, as much heated, as when the whole flue is exposed, at the distance of only ten feet; the two first lengths of the flue, *b b*, being within the chamber, under the pit, warm the air in it, and if kept closely confined, will continue warm to a considerable degree, for twenty-four hours after the fire is extinguished, producing bottom heat to the plants. I first made the chamber with only the bottom registers, *h h h*, for the purpose of letting out the air; but finding the heated air did not escape sufficiently, I have since added five more registers, *i i*, placed above the first; all, or any, of which may be opened or shut, at pleasure. This alteration, while it affords the means of moderating the heat

Pit & Air-Chamber for heating a Stove, constructed by, & in the garden of William Kent, Esq.r at Clapton.

Ground Plan of the Hot-house — The dotted lines shewing the direction of the Flues.

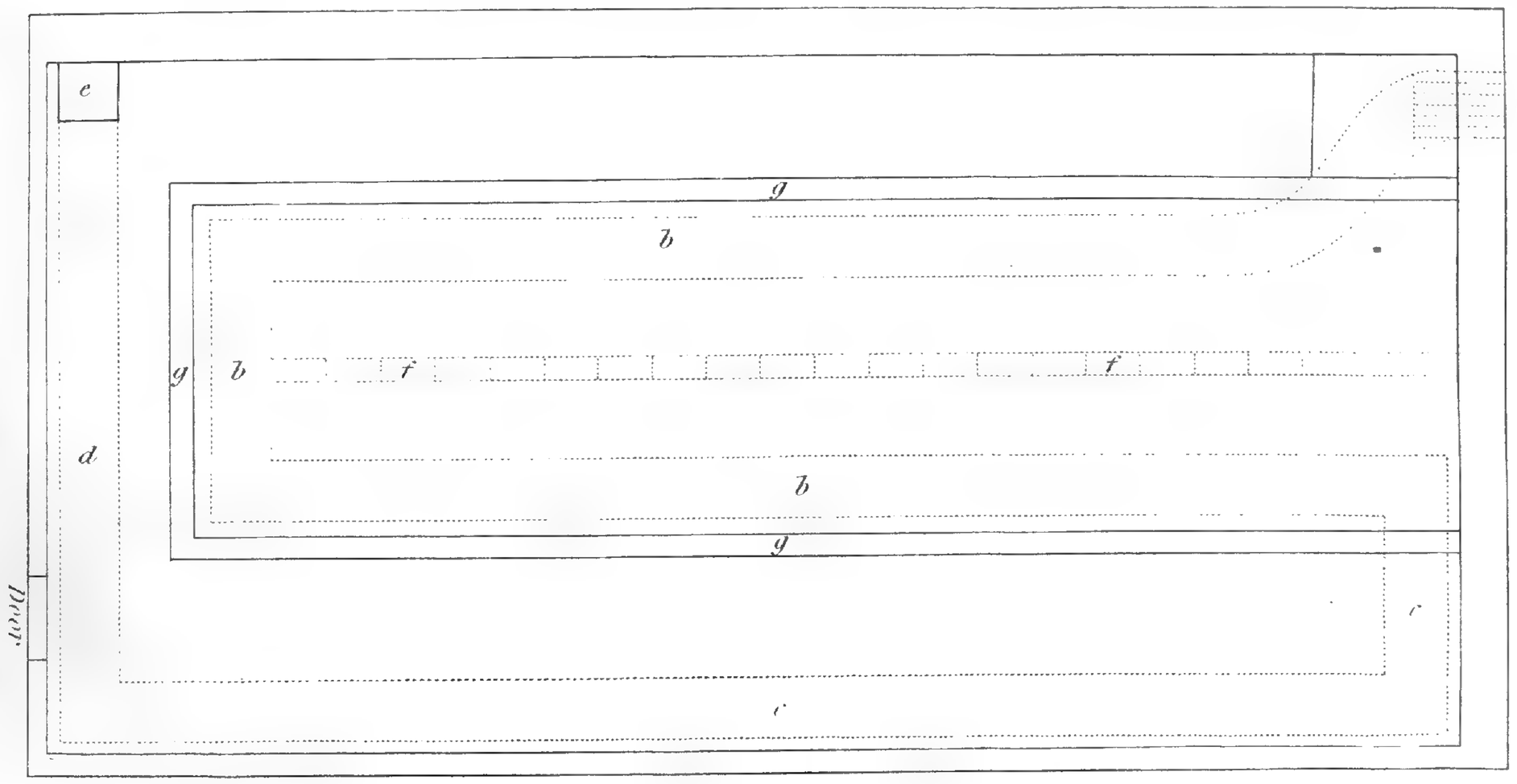


Fig. 1.

Perspective representation of the pit — with an outline of the form of the House.

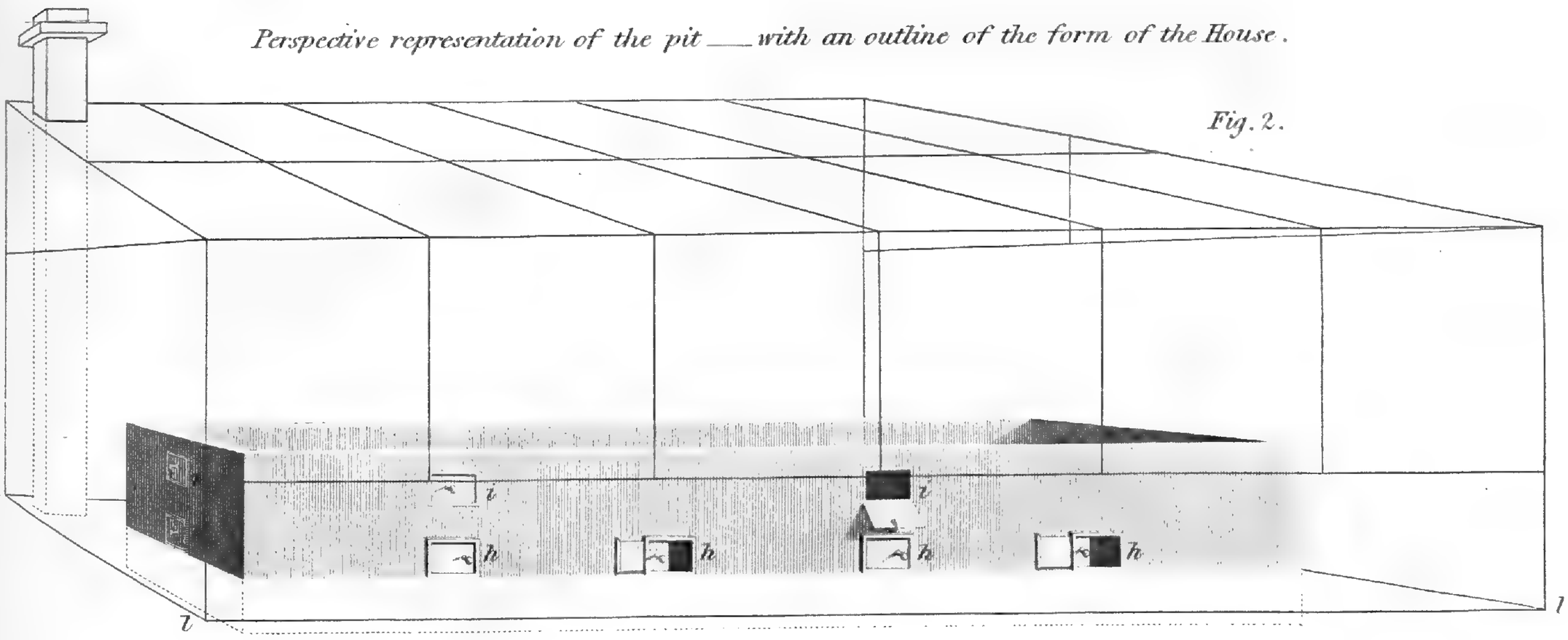


Fig. 2.

Section of the House, & of the pit & Chamber.

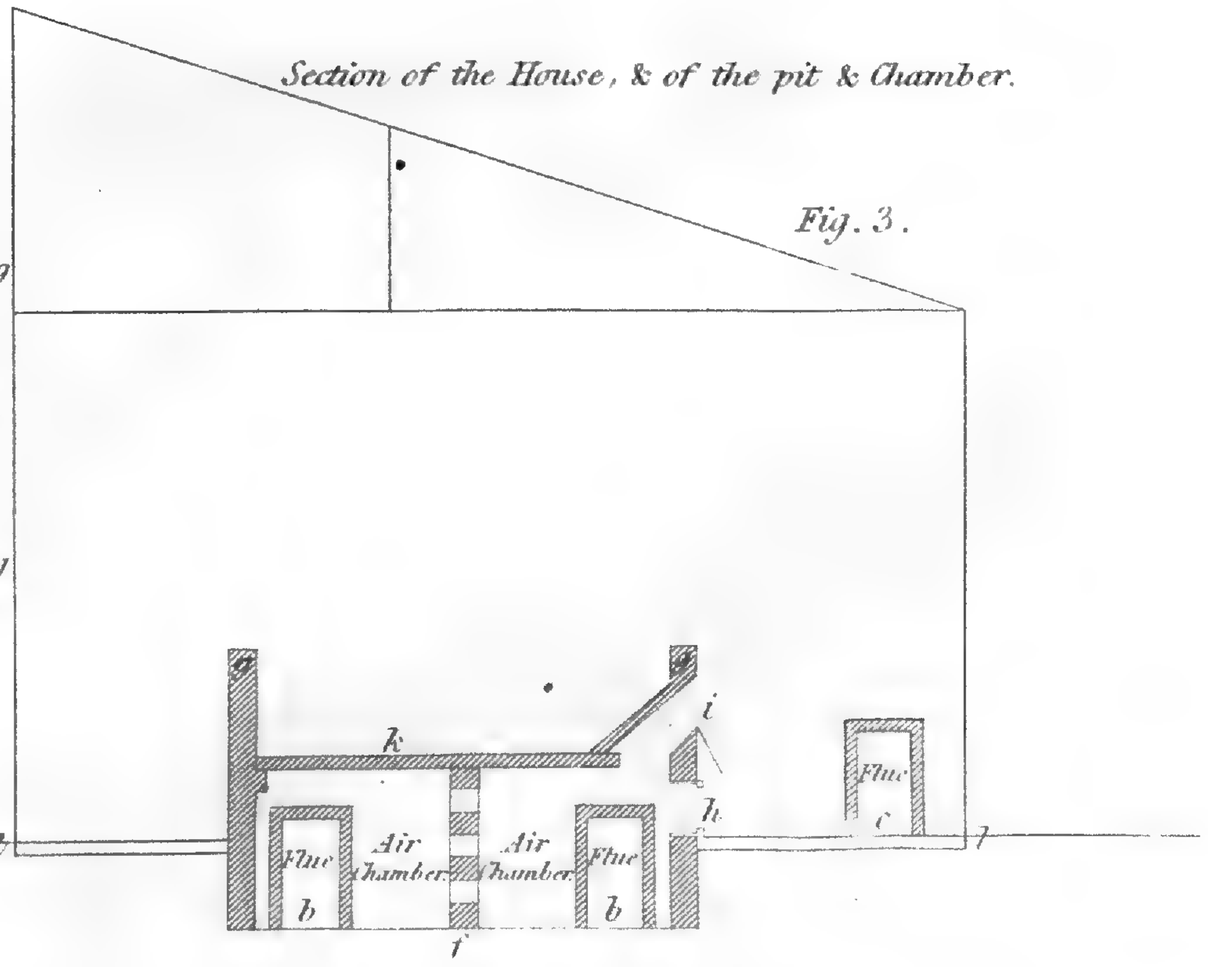


Fig. 3.

REFERENCES.

a. The Furnace.
b. b. b. The Flue within the Chamber under the pit.
c. The Flue returned out of the Chamber, and extending along the front of the house.
d. A continuation of the Flue, carried under the floor.
e. The Chimney
f. f. A four inch open worked brick partition along the centre of the chamber to support the Stones at the bottom of the pit.
g. g. The walls of the pit.
h. h. h. The bottom registers, of which there are corresponding ones at the opposite sides of the pit.
i. The upper registers, the two behind are placed alternately with those in front.
k. The stone floor of the pit
l. l. The floor of the house.

Engraved by J. B. Taylor.

in the chamber, has enabled me to increase, with facility, the temperature of the house considerably, and with a smaller fire, as it allows the current of heated air to escape with more rapidity, and the house is consequently sooner filled with it.

The pit is built, back and front, of the same height from the ground, and contains part of the chamber above the floor, into which chamber the flue is turned immediately on entering the house, and carried the whole length, and back again, as shewn by the letters, *b b b*, after which it passes along the front, *c c*, and end, *d*, all which the plan will more clearly exhibit. The bottom of the pit, *k*, which also forms the top of the chamber, is paved with stone, and is seventeen inches deep, the pit itself, wherein the pots are plunged, being filled with saw-dust. I apprehend the saw-dust will last at least for this purpose, two years; no worms will breed in it, and the labour of turning it, and shifting the pots, will be much less than when tan is used. By occasionally pouring a few pots of water into the pit, which may be done by lifting up a pot here and there, a fine steam will be raised to the roots of the plants; and by doing the same through the registers into the chamber, the whole house may be filled with steam.

XCIX. *On the* Cultivation *of* Strawberries, *in the open Ground. In a Letter to the Secretary. By Mr.* Michael Keens, *Gardener, at Isleworth.*

Read August 5, 1817.

Sir,

In answer to your letter, relative to the *culture* of *Strawberries*, I beg leave to remark, that I wish you had applied, for the information you require, to some person more competent than myself: for the knowledge I possess on the subject, has been solely acquired from my own practice, and experience, never having received instructions from persons, or books. I am, however, most willing to communicate, as well as I am able, any information to so useful an institution as the Horticultural Society.

I will commence with a general detail of my practice: this may be considered as applicable to all the varieties of the Strawberry; and afterwards, in noticing each kind, that I cultivate, I will specify such peculiarities of treatment as are exclusively applicable to each.

In preparing the soil for Strawberries, if it be new, and, as is frequently the case, very stiff, it should be trenched; but if the bottom spit of soil, as sometimes happens, be of an inferior quality, I then recommend only a simple digging, placing dung at the bottom, underneath the mould so dug; on the contrary, should the land have been kept in a high state of cultivation, or be good to the full depth, it will be advisable for the bottom spit to be brought up to the top,

placing the dung between the two spits. The best way to obtain new plants is, by planting out runners in a nursery, for the express purpose, in the previous season: for it is a very bad plan to supply a new plantation from old plants. With respect to the time of planting, I have always found the month of March better than any other. Sometimes, when my crops have failed, I have had runners planted in the autumn, for the following year, but these have always disappointed my expectations. I plant them in beds, containing three or four rows, and the plants, in each row, at a certain distance from each other, leaving an alley between each bed, the distance of the rows and of the plants in the rows, as well as the width of the alleys, depending on the kind of Strawberry planted. The width of the alleys, as it will afterwards be stated, may appear considerable; but I am satisfied that allowing this space for the workmen to stand on, when they water the plants, or gather the fruit, is beneficial, because I have observed, in other persons' grounds, where less space is allotted for this purpose, that great damage is done to the plants and fruit, by the trampling of the people.

After the beds are planted, I always keep them as clear of weeds as possible, and on no account allow any crop to be planted between the rows. Upon the growing of the runners, I have them cut when necessary: this is usually three times in each season. In the autumn, I always have the rows dug between; for I find, it refreshes the plants materially; and I recommend to those persons to whom it may be convenient, to scatter in the spring, very lightly, some loose straw or long dung, between the rows. It serves to keep the ground moist, enriches the Strawberry, and forms a clean bed for the

trusses of fruit to lie upon; and thus, by a little extra trouble, and cost, a more abundant crop may be obtained. A short time before the fruit ripens, I always cut off the runners, to strengthen the root; and after the fruit is gathered, I have what fresh runners have been made, taken off with a reaping hook, together with the outside leaves around the main plant, after which I rake the beds, then hoe them and rake them again. In the autumn, unless the plants appear very strong, I have some dung dug in between the rows, but if they are very luxuriant, the dung is not required, for in some rich soils it would cause the plants to turn nearly all to leaf. I also have to remark, that the dung used for manure should not be too far spent; fresh dung from the stable door is preferable to spit dung, which many persons are so fond of. The duration of the beds must be determined by the produce of the plants, which varies much according to the different sorts; it also varies with the same sort in different soils, so that the precise time of the renewal of the beds must be regulated by the observation of the gardener, in each particular case.

I commence my observations on the different sorts, with the *Pine Strawberry*. The best soil for it is a light loam, though no other kind of Strawberry will bear a strong loam better than this. It is likewise to be noticed, that this is of all others the most difficult Strawberry from which to procure a good crop. Particular care must be taken, that they are planted in open ground: for in small gardens they grow very strong, but seldom bear fruit, in consequence of being so much shaded by standard trees; and I have observed the shade of the Walnut tree to be much more injurious to these than to others: for under it they seldom bear at all, but run

entirely to leaf. In planting the beds of Pines, I keep the rows two feet apart, and put the plants eighteen inches from each other in the row, leaving alleys of three feet wide between each bed: these large distances I find necessary, for the trusses of fruit in my garden ground are frequently a foot long. The duration of this Strawberry, with me, is three years: the first year it bears the best, the second year the crop is very good, and the third year it is less.

The Imperial *Strawberry*, which was raised by myself, from seed, and which is described and figured, at page 101 of this volume, may be treated in a similar way, with respect to planting, distance, &c. as the Pine; but I have to remark, that it requires rather a lighter and richer soil, and is not so liable to run to leaf, when planted under trees.

The *Scarlet Strawberry* must be treated also like the Pine. With respect to distance for planting the beds of Scarlets, I put each row twenty-one inches apart, and each plant eighteen inches distant in the row, and make the alleys two feet six inches wide. The duration of this Strawberry, with me, seldom exceeds three years.

The *Hautbois*, I have always found to thrive best in a light soil: and it must be well supplied with dung, for excess of manure does not drive it into leaf like the Pine Strawberry. In planting the beds, each row must be two feet apart, and from plant to plant, in the rows, must be eighteen inches, leaving the alleys between the beds three feet wide. There are many different sorts of the Hautbois: one has the male and female organs, in the same blossom, and bears very freely; but that which I most approve, is the one, which contains the male organs in one blossom, and the female in another:

this bears fruit of the finest colour, and of far superior flavour. In selecting these plants, care must be taken, that there are not too many of the male plants amongst them: for as these bear no fruit, they are apt to make more runners than the females. I consider one male to ten females the proper proportion, for an abundant crop. I learned the necessity of mixing the male plants with the others, by experience, in 1809; I had, before that period, selected female plants only, for my beds, and was entirely disappointed in my hopes of a crop. In that year, suspecting my error, I obtained some male blossoms, which I placed in a bottle on the bed of female Hautbois. In a few days, I perceived the fruit near the bottle to swell; on this observation, I procured more male blossoms, and in like manner placed them in bottles, in different parts of the beds, removing the bottles to fresh places, every morning, and by this means, obtained a moderate crop, where I had gathered no fruit the preceding year. The duration of the Hautbois, with me, seldom exceeds three years.

The *Wood Strawberry*, is best raised from seed, which I obtain from fruit just gathered, sowing it immediately in a bed of rich earth. When the plants are of a proper size, I transplant them into other beds, where I let them continue till the March following. They are then planted in rather a moist soil, in beds, as the others, each row being two feet apart, and the plants in each row eighteen inches distant, the alley between each bed being three feet wide: in this way I produce abundant crops of very fine fruit. I have propagated this Strawberry from runners, but never with such good success as from seeds, particularly if the runners were

taken from old roots. The duration of this Strawberry with me, seldom exceeds two years.

The *Alpine Strawberry* must always be raised from seed, which should be sown in a bed of rich earth, in the spring. When the plants are of a proper size, which will be in July or August, I plant them, in rows, at the back of hedges, or walls, in a rich, or in a very moist soil: the rows should be two feet apart, and the distancc, from plant to plant, in the rows, twelve inches. My Alpines, this year, thus managed, are bearing most abundantly, so much so, that in gathering them there is not room for the women to set their feet, without destroying many. The Alpines differ from all other Strawberries in quickness of bearing, for no other sort, sown in the spring of the year, will produce fruit, under two years, whereas this yields a crop at the end of one year. Its duration, with me, seldom exceeds two years, and frequently it lasts only one year.

I remain, Sir,

your very obedient servant,

MICHAEL KEENS.

Isleworth,
July 9th, 1817.

C. *Account of a new Method of* cultivating *the* Lobelia fulgens, *practised by Mr.* William Hedges, *Gardener to the Earl of* Mansfield, *at Kenwood, near Hampstead,*

By Joseph Sabine, *Esq. F. R. S. &c. Secretary.*

Read September 2, 1817.

The *Lobelia fulgens* was introduced into this country from Mexico, in 1810: the splendour of its flowers attracted general notice, and being readily propagated, it soon became an inhabitant of the garden of every collector of curious and interesting plants. Requiring protection against frost and damp, it was kept during winter in pots, under cover of a frame, or in a house; in the spring, it was either suffered to remain in the pots, or was turned out into open borders of rich earth. Being thus managed, it threw up flowering stems, in the summer, from two to three feet in height, and if the plant was in vigour, it also produced a few side shoots of inferior strength. It has latterly been found to bear the severity of our winters, by being immersed in water, as an aquatic, and with this treatment has flowered well by the sides of ponds, and in cisterns; but it was reserved for the skill of Mr. Hedges to discover a mode of culture, under which this beautiful exotic has assumed a character of magnificence, which will hereafter make it one of the most conspicuous decorations of our flower gardens.

The following is the practice of Mr. Hedges. In October, he takes off the suckers, which are thrown up from the

roots of the old plants, and puts them into small pots, one in each pot, and keeps them in a cold frame till the middle of January: he then removes them into a cucumber frame, where the heat is kept up to 65 degrees of Fahrenheit's scale, by linings of hot dung; a Pine succession stove of the same temperature will equally suit them. In the middle of February, they are shifted into pots a size larger; and at the end of March, or in the beginning of April, they are again moved into larger pots, and in the middle of May they are a third time shifted: the pots to be used for this last shifting, are those usually called by gardeners, twelves. As soon as the plants are well rooted, after the last removal, they are carried into a Peach-house, or Greenhouse, in which they continue, till they flower, and are hardy enough to bear the open air. When they are preparing to throw up their flowering stems, and during their growth, it is necessary, that they be kept very moist, which is effected by putting pans under the pots, and keeping the pans constantly filled with water. The plants thus managed, begin to flower early in July, and the spikes continue to blow, and are covered with flowers, through the autumn. The compost, used in the pots, is formed of equal parts of brown, or yellow loam, and of leaf or bog mould, to which is added sand, equal to one-fourth of the previous composition, the whole being well mixed together.

The plant of Lobelia fulgens, which was exhibited to the Society on the 19th of last month, by Mr. Hedges, had been managed, as above directed; but as no notes of its size and height were made at the time, the following dimensions have been taken from another plant, in the garden at Ken-

wood. The base of the stem was near six inches in circumference; the heighth of the centre spike was five feet and a half; the shoots from the bottom and sides of the main stem were in number seventeen, rising together round the principal stem, to the height of about four feet and a half. Mr. Hedges states, that his plants were in the two preceding years, much taller than that now described. Some few plants were observed to be rather shorter, and to have a more bushy appearance: this is produced by stopping the centre stem, after the last shifting, by which the side shoots become more vigorous and fuller of flower, and in this state they form handsome companions to the flowering plants of Campanula pyramidalis, whose beautiful spikes of blue flowers agreeably contrast with the brilliant scarlet of the Lobelia.

CI. *Notices of Communications to the Horticultural Society, between May* 1*st*, 1816, *and May* 1*st*, 1817, *of which Separate Accounts have not been published in its Transactions. Extracted from the Minute Books and Papers of the Society.*

May 7, 1816. John Braddick, Esq. exhibited specimens of *Nuts*, gathered in the autumns of 1814 and 1815, *preserved in a good state* to this time. Mr. Braddick's method of keeping nuts fresh, for so long a period, is as follows. The nuts are placed, when divested of their leafy husks, in an empty butter firkin, which, when filled with the nuts, is closed tightly by its lid, and deposited in a cellar. The pores of the wood having been all completely stopped by the butter, the external air is prevented from passing through them, and the nuts, by being thus kept from exposure to it, retain their freshness a considerable time, to which the moisture, arising from the salt in the butter, which has penetrated into the wood, also contributes.

June 4, 1816. Mr. Braddick communicated to the Society some observations, on the advantages of *keeping Pears* and *Apples* in a cellar. The fruit, when ripe, is gathered on a dry day, and placed immediately, in single layers, on shelves made of white deal, in a wine cellar, from which the atmospheric influence is excluded as much

as possible. In this situation, it will retain its quality, and be fit for use, many weeks after the period, at which it would have decayed, or become useless, in a common fruit room: the only attention necessary is, not to expose the fruit, when wanted, to the air, until a few minutes before it is to be used. Mr. Braddick observes, that when the thermometer is under 50°, and above the freezing point, which is always the case in a good wine cellar, the juices of the fruit remain, for any definite time, without variation in their qualities; but that, as soon as the fruit is received into a warmer atmosphere, the change of temperature produces such an effect on the vital powers of the fruit, that decomposition and decay quickly follow.

At the same meeting, Roger Wilbraham, Esq. exhibited a basket of *Blood-red Potatoes*, which were, at this time, in a perfectly good state for dressing. They were of considerable size; and are much cultivated in Cheshire, where they sell at a higher price, than other sorts, being held in great estimation, in consequence of their continuing good for use, when all other potatoes are gone by.

September 3, 1816. John Knight, Esq. of Lee Castle, near Kidderminster, sent to the Society a quantity of the fruit of the *Dimocarpus Longan*, ripened by him, this summer, in a stove, erected for the purpose of growing tropical fruits. He afterwards presented the Society with a drawing, made by Mr. Hooker, of a bunch of the fruit, from which the engraving, which accompanies this Notice was made. Two species of *Dimocarpus* have been introduced

into our gardens: the *D. Litchi,* and *D. Longan.* They are both natives of the southern part of China, where they are known as the *Li-tchi,* and the *Long-yen,* and much cultivated; they have also been transferred thence to different places in the East Indies. The present is believed to be the only instance of the fruit having been brought to maturity, in Europe; and persons who were well acquainted with it in its native places of growth, pronounced these specimens quite as good, as those grown within, or near the tropics. The Li-tchi is most esteemed by Europeans: the Chinese prefer the Long-yen, considering it to possess medicinal properties as a stomachic. Both species are trees, and many varieties of each are cultivated in China, differing in the quality of the flesh, the time of ripening, and in the shape of the fruit, some being nearly globular, some heart-shaped, and others oblong, but not varying much in size. The Li-tchi fruits are, however, generally the largest, and are of a red colour, when ripe, excepting in one variety, in which the coat remains green. The small scutiform processes, on the coat of the fruit, in the Li-tchi, are more sharp, or pointed, than those of the Long-yen. The fruit of the latter is uniformly of a light brown colour. In both species the pulp is surrounded with a tough, thin, leathery coat; it is a colourless semi-transparent substance, in the centre of which is a dark brown seed, of different sizes, in the different varieties. The flavour of the pulp is slightly sweet, subacid, and particularly pleasant to the taste, in a warm climate. The fruit of the Li-tchi, dried either in the sun, or by fire heat, is frequently brought to England by the ships from China.

In this state, the pulp is shrivelled, and reduced, within the coat or shell, to half its usual size, and has a rich and sweet taste, if it has been well preserved.

October 1, 1816. Mr. Hooker exhibited some specimens of a *Plum*, of extraordinary magnitude. They were grown in the nursery of Mr. Ross, of Newington, who had called them the *Caledonian Plum;* but the title of *Nectarine Plum*, by which, it seems, they are better known, is more appropriate: for they are as large as, and, at a short distance, might easily be mistaken for, a nectarine. Their history cannot, at present, be clearly ascertained. In the flesh, they resemble the Orleans Plum; but they are more coarse, and the skin is harsh to the taste. They seem best adapted for tarts. The tree is reported to be a very good bearer.

October 15, 1816. Several samples of the *new American Peach*, described and figured in this volume of the Transactions, (p. 205), were produced at this and at the former meetings: their flavour was very good; but, from the badness of the season, they had not attained their accustomed size. It did not, however, appear, that the qualities of this fruit had been over-rated on its first appearance; the summer of the preceding year had been particularly suitable to late fruits, and this peach will unquestionably require much heat, and favourable seasons, to attain full perfection.

At this meeting, Mr. Kirke presented some *Nuts*, of a variety called the *Cosford Nut:* it is little known, but highly

Dimocarpus Longan.

merits cultivation. The nuts are very sweet, in shape and size between a common nut and a filbert, with a very thin shell, which is a great recommendation for the table. The plants are said to be great bearers.

At the same meeting, Mr. Dickson exhibited some specimens of a fungus, called the *Agaricus Georgii*, much resembling the *Agaricus campestris*, or Common Mushroom. It is frequently mistaken for the common mushroom, and is, at times, even brought, as such, into Covent Garden market; although it is known to be very noxious in its qualities, when eaten, frequently causing violent sickness. The A. Georgii grows principally in salt marshes, and near the sea coast. Its chief points of difference from the A. campestris, are, that the skin of the pileus is brown, with streaks of red, whilst that of the eatable one is white, which moreover peels cleanly off from the flesh; the skin of the A. Georgii, on the contrary, does not come off readily, but breaks short. The gills also of the common mushroom are of a bright pink colour, when young and fresh; those of the other species are paler, and when broken or pressed, give out a yellow juice. The A. Georgii appears about a fortnight before the A. campestris, in its natural places of growth, which circumstance makes it more liable to be used as a common mushroom.

November 5, 1816. A box of *Pears*, sent to the Society by Dr. Van Mons, of Brussells, was examined at this meeting. It contained several good autumn fruits, of which four were considered superior. They are stated, by

Dr. Van Mons, to be seedlings raised by himself: 1, *Napoleon:* of a moderate size, and elongated shape, bright yellow colour, with blotches of red on the side, exposed to the sun; ripe early in October. 2, *Marie Louise:* in shape and size resembling a small *Bon Chrétien;* yellow, with bright red next the sun; very rich, and ripe about the middle of October. 3, *Chardig:* a middle sized pear; its colour yellow, mixed with red: flavoured like a Swan's-egg pear, and ripe about the end of October. 4, *Charles d'Autriche:* a very handsome, large pear, of great merit; ripe in October.

At this meeting, Mr. Kirke exhibited specimens of the *Wheat-Ear Carnation.* This variety is remarkable from the following circumstance: the *squamæ,* at the base of the calyx, are multiplied, and in consequence, the base is so elongated as to assume the appearance of a small ear of wheat, in which case the flower is abortive; but a sufficient number of good flowers are always produced, the multiplication of the *squamæ* not taking place on all the flower buds. These are of a dark dingy red, and opening later than most others, continue in bloom, as long as the weather leaves them undestroyed. This plant has been figured in *Curtis's Magazine, tab.* 1622. It is found to grow better in the border of the garden than in a pot.

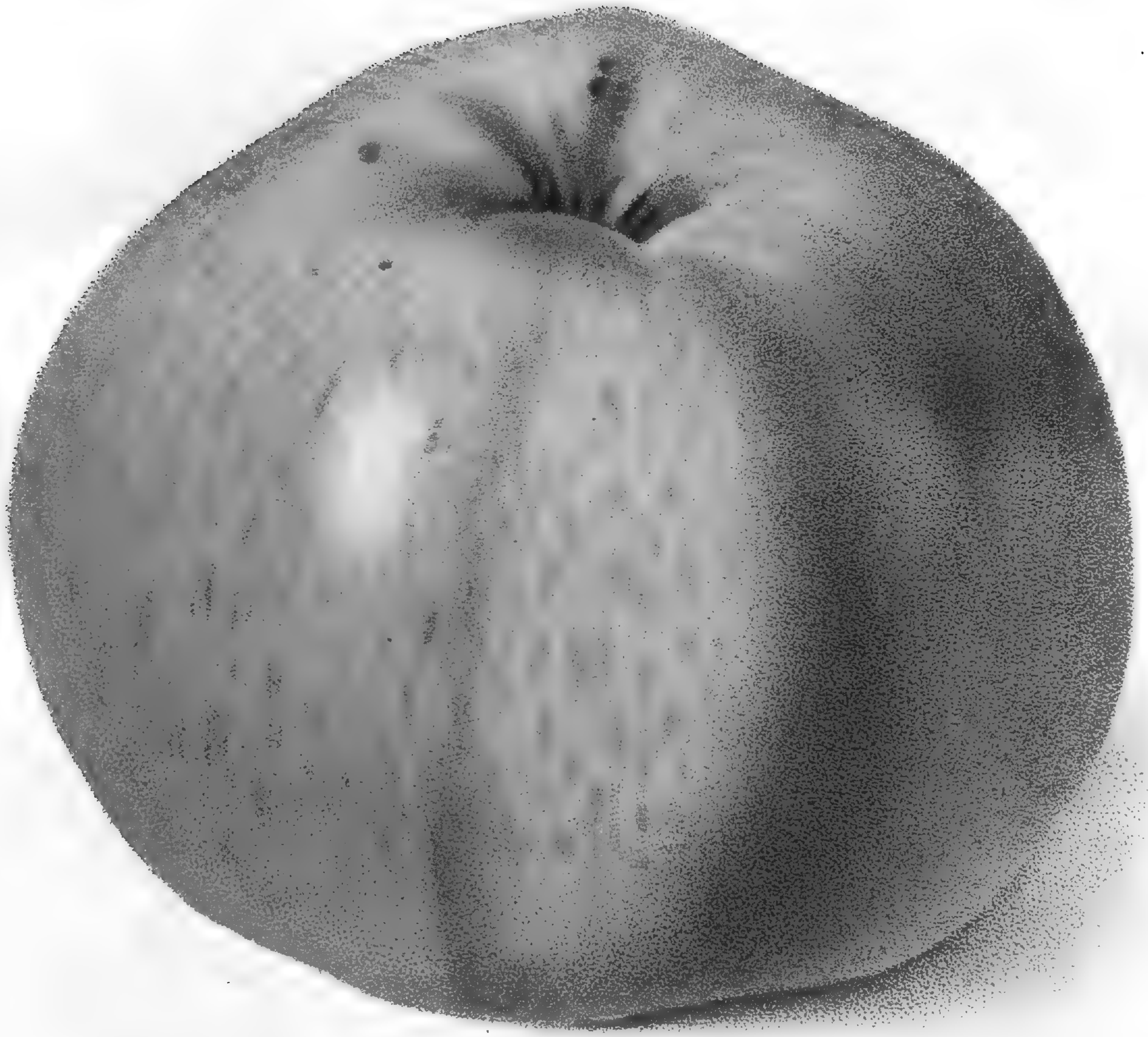
December 3, 1816. The arrival of a second box of fruits from Doctor Van Mons, of Brussells, was announced, containing several new pears of very great merit: but as they had suffered much in the carriage, particular

descriptions of them could not be taken. Those which were noticed, were: 1, *Bosc:* small, shape of a bottle-gourd, a red skinned pear; excellent. 2. *Urbaniste:* like a white Beurrée, but superior to it; very rich. 3. *Jean de Witte:* a small turbinate-shaped fruit; very good, with the flavour of the Crasanne.

JANUARY 7, 1817. Mr. LEE, and Mr. LEWIS KENNEDY, of Hammersmith, sent to the Society some *Apples*, imported from Riga, of extraordinary magnitude: one, taken as a fair sample, weighed 19 ounces, and measured full 16 inches round its centre, and 14 inches in its other circumference, passing over the stalk and eye. The apple is a native of the southern provinces of Russia, whence it was transported to Riga, where it flourishes, and is called the *Alexander Apple*, in compliment to the Emperor, to whom some of its produce is annually sent, as a present. The fruit varies a good deal in shape as well as in colour: the general form is flat, or obtusely conical, being widest at the end next the stalk. At this end it is somewhat pentangular; towards the middle it is round, and near the eye the projecting part becomes again visible, and terminates in broad folds, or embossures; some are elongated, and these are more decidedly angular. The eye is sunk in a very deep and hollow cavity. The stalk is short, and so far inserted, in a broad cavity, that it appears as if it penetrated quite to the core, being full an inch from the level of the flat part of the apple. The ground colour is a very delicate, pale yellowish

green, (like the Hawthornden apple), tinted with fine red, almost scarlet, and short dappled streaks of dark red, on the side next the sun. But the difference of colour is very remarkable, some being nearly pale all over, others having three-fourths of their skin covered with scarlet, which is placed on different parts of the fruit, according as they have grown exposed to the sun. The core is very small, in proportion to the size of the fruit, and not so hollow, as is usual in large apples. The flesh was not firm; this, however, was probably the effect of being long kept, packed: but the flavour was very vinous, and saccharine: when dressed, it was peculiarly good. The engraving is from a sketch made from one of the apples. Trees of the kind were brought to this country about twelve years since, and are in the Hammersmith Nursery, but they have not produced fruit equal in size to that imported. It will perhaps be necessary to train them to a wall, in some measure to compensate for the want of the heat of a Russian summer.

At the same meeting some *Apples*, from the Isle of Wight, were presented by Mr. WILLIAM WILKINS, of Newport. He called them the *Orange Apples*, and stated, that they have been long cultivated in the island. They very much resemble the old Golden Pippin, in appearance and size: are very rich and sweet, and fit for the table from September to January. It is stated, on supposed good authority, that the first tree of the kind was brought over from Normandy, and is now growing in the garden at Wroxall Cottage, near the Under Cliff, in the island.



The Alexander Apple.

March 4, 1817. Thomas Andrew Knight, Esq. the President, sent, for distribution, three varieties of Potatoes, which he particularly recommended to the attention of the Society: the first, a long potatoe, is for summer use; its merits declining soon after the stems become dead: the second, a small round one, is good through the winter and spring; and the third, a red potatoe, remains perfect longer in the spring and summer, than any other sort Mr. Knight has hitherto met with. These three kinds, in succession, continue to supply his table through the whole year.

April 1, 1817. Mr. Maher, in a Letter to Sir Joseph Banks, gave an account of a compost, which he has found very beneficial to pines. He mixes one bushel of sugar-baker's scum with three bushels of maiden earth (if a little sandy, the better), from some common, or old pasture: these are well blended, and frequently turned over, for six months, or more, taking especial care not to let the heap heat, or become mouldy. When he wishes to pot his pine plants, he mixes three parts of this compound with one of ordinary compost of pasture mould, leaf mould, and rotten dung.

At this meeting some French grafting wax, sent to the Society by M. Dubrieul, of Rouen, was exhibited. It was composed of the following materials: 24 parts of rosin, 16 parts of black pitch, 6 parts of mutton fat, 3 parts of white wax, and 1 part of gum arabic.

April 15, 1817. Some *Blood-red Maltese Oranges* were

exhibited, differing from those usually sent to this country: they were found, accidentally mixed in a chest with others, and thought to be much superior to the common sort. They were very large, with rough thick coats; both the flesh and juice perfectly dark, much more so than in the ordinary kind, and the juice was very abundant and rich.

APPENDIX.

I. *An easy, simple, and infallible Method to force every Fruit-tree to blossom and to bear Fruit. Translated from the German of the Rev.* George Charles Lewis Hempel, *(Secretary to the* Pomological Society *of* Altenburgh, *in* Saxony,*) by* George Henry Noehden, *LL. D. F. L. S. &c.*

Read January, 7, 1817.

In my early years I saw my father, who was fond of Pomology and skilled in that science, cutting a ring on several branches of trees, which already were in blossom, for the purpose of producing, by that means, larger fruit than usual. This was not his own invention, but as far as I recollect, derived from a French journal. Thirty years ago, when I was a boy, I practised this operation, in imitation of him, and thereby obtained larger pears and plums. In repeating this operation of *ringing* the branches, which I did merely for the purpose of getting larger fruit, I observed that the branches so operated upon always bore the next year. By this reiterated appearance I was led to the idea, that perhaps this mode of ringing the bark might be a means of compelling every unproductive branch to yield fruit. With this view, I cut rings upon a considerable number of branches, which as yet showed no blossom; and found by repeating the experiment the truth of my supposition indisputably confirmed by experience.

The application of this experiment, whereby upon every bough or branch, fruit may artificially be produced, is very simple and easy, and the mode of proceeding as follows.

With a sharp knife make a cut in the bark of the branch, which you mean to force to bear, and not far from the place where it is connected with the stem, or if it be a small branch, or shoot, near to where it is joined to the larger bough: the cut is to go round the branch, or to encircle it, and to penetrate to the wood. A quarter of an inch from this cut, you make a second cut, like the first, round the branch, so that by both encircling the branch, you have marked a ring upon the branch, a quarter of an inch broad, between the two cuts. The bark between these two cuts you take clean away with the knife, down to the wood, removing even the fine inner bark, which immediately lies upon the wood: so that no connection whatever remains between the two parts of the bark, but the bare and naked wood appears white and smooth. But this bark-ring, which is to compel the tree to bear, must be made at the right time, that is, when in all nature the buds are strongly swelling or are breaking out into blossom. In the same year a callus is formed at the edges of the ring, on both sides, and the connection of the bark, that had been interrupted, is restored again without any detriment to the tree, or the branch operated upon, in which the artificial wound soon again grows over.

By this simple though artificial means of forcing every fruit-tree, with certainty, to bear, you obtain the following important advantages:

1. You may compel every young tree of which you do not know the sort, to shew its fruit, and decide sooner, whether, being of a good quality, it may remain in its first state, or requires to be grafted.

2. You may, thereby, with certainty, get fruit of every good sort, of which you wish to see the produce, in the next year.

3. This method may probably serve to increase considerably the quantity of fruit in the country.

The branches so operated upon are hung full of fruit, while the others, that are not ringed, often have nothing, or very little, on them. This effect is easy to be explained from the theory of the motion of the sap ; for when the sap moves slowly in a tree, it produces fruit buds, which is the case in old trees : when it moves vigorously, the tree forms wood, or runs into shoots, as happens with young trees.

Though I arrived at this discovery, myself, in consequence of trying the same process with a different view, namely, to increase only the size of the fruit, but not to force barren branches, that were only furnished with leaf-buds, to bear, this latter application being before quite unknown to me : I will, on that account, by no means give myself out for the first inventor of this operation: but I was ignorant of the effects to be produced by this method, and only discovered them by repeated experiments of my own, which I made for the promotion of Pomology. Frequent experience of the completest success has confirmed the truth of my observations. Nor do I think, that this method is generally known ; at least to all those, to whom I showed the experiment, the effect produced appeared new and surprising. At all events, that method, supposing it even to be an invention of older date, has, as far as I know, not yet been fully described by any one, and published in print.

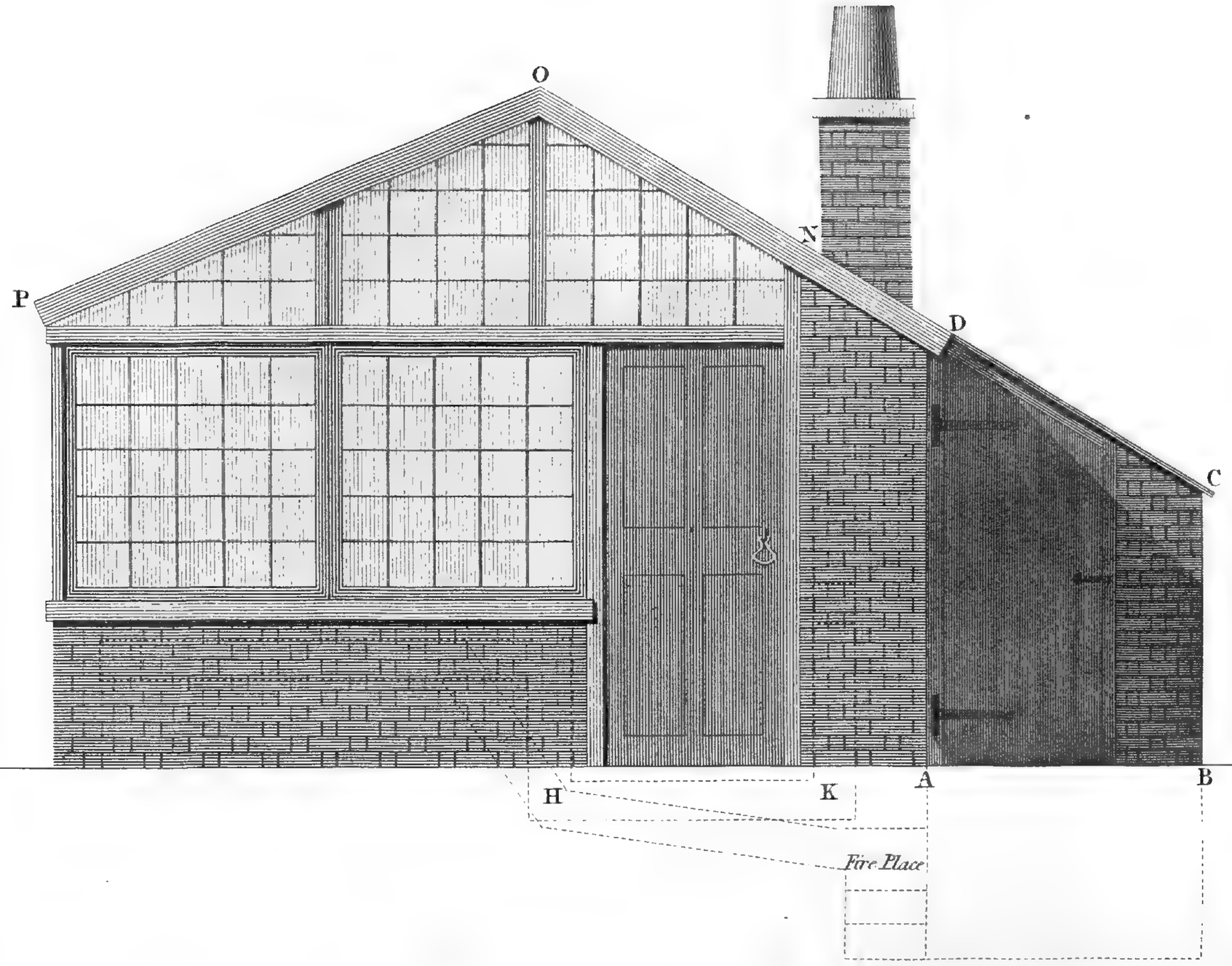
II. *Description of a Stove used for Tropical Plants, in the Garden of Sir* ABRAHAM HUME, *Bart. at Wormleybury, Herts. By* JOSEPH SABINE, *Esq. F. R. S. &c. &c. Secretary.*

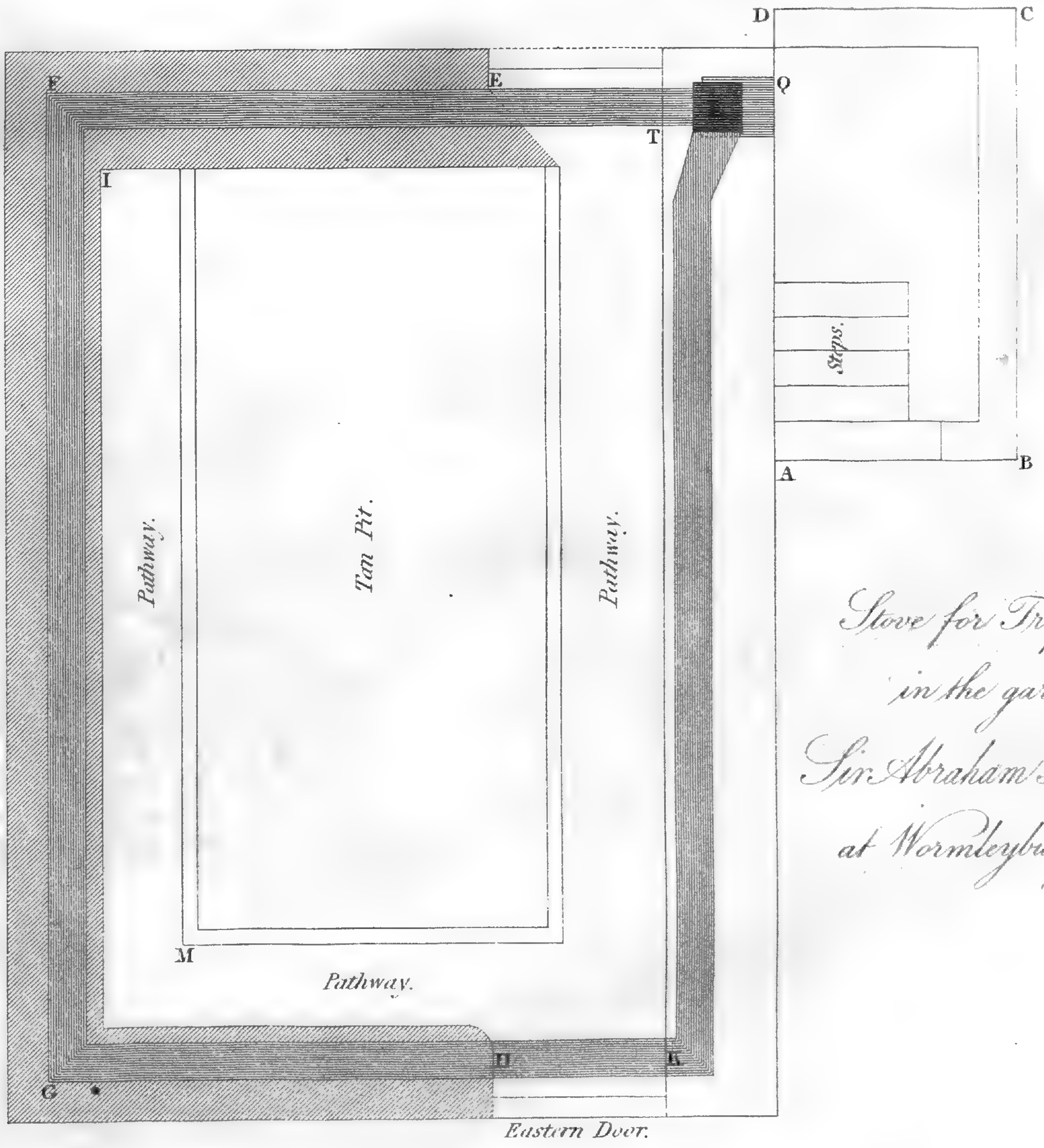
Read August 5, 1817.

I AM induced to lay the annexed plan of a stove, principally used for tropical plants, at Wormleybury, before the Horticultural Society, not that there is any thing peculiarly novel in its structure; but because it is admirably adapted to the purposes for which it was designed, and being of small dimensions (the outside measure being only 17 feet 9 inches by 12 feet six inches) the construction of a similar one will be attended with but trifling expense to those who may be desirous of cultivating a few of the plants, which are natives of the warmer parts of our globe.

The subjects of that description which any individual, unless he be a general collector, may wish to possess, are not very numerous; in such cases a small stove is much preferable to one of larger dimensions, and the peculiar success of Sir Abraham Hume's gardener, in the management of these exotics, is a proof that the diminution of size is no impediment to the well doing of the plants; and the temperature being always at from 65 to 70 degrees of Fahrenheit's scale, shews that a sufficient heat may be maintained in that space.

The annexed plan and elevation, with the following details, will, I hope, be a sufficient guide to any intelligent workman, in the construction of a similar building. There are doors at each end; the fire is made in a shed, ABCD, at the back; the flue is carried from the stove, Q, through the wall, QT, under the chimney, L, and pathway, T, whence it rises to the height of the tan-pit; the end of



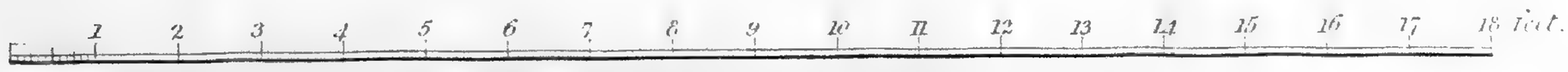


Stove for Tropical Plants,

in the garden of

Sir Abraham Hume, Bart

at Wormleybury, Herts.



the tan-pit and the wall, EF, form the sides of the flue at this part; it then passes along the front wall, FG, of the house, and along the eastern end, GH, and dips under the pathway at H, rising again at K, to a level with the tan-pit; and being continued along within the wall, KT, goes into the the chimney, L, over the fire-place. The passage, or pathway, does not go entirely round, being only at the front, IM, on one side, MH, and at the back, HT, close to the wall, which is carried up flush to the top of the house; but this was done because, at first, a return was made in the flue at this part of it; the thickness might now, however, be reduced above the flue, so as to admit of plants standing there, and of a shelf above it. On the side, GH, and front, GF, by the path-way, the plants stand on a frame work over the flue; on the other side, FE, where the pit joins to the brick work of the flue, plants are also placed, but here would be an excellent position for a cistern for aquatics. A small shelf is erected across the gable, on each side, from the doors to the front windows, along which, at a convenient distance from the sloping sashes, another shelf is fixed, and wires are carried horizontally under the glass of the roof, on which creepers are trained; the tan-pit is four feet deep, and measures over the surface, in the inside, 12 feet 6 inches by 5 feet 9 inches. Of the five sloping lights in the front, OP, two only are moveable; the back slope, ON, is glazed, a most essential point for the welfare of the plants, which are not in consequence drawn forward, in search of light, but grow in an upright direction. The upright front lights slide, and one of the end divisions takes out, to facilitate the removal of large plants.

III. *A short Account of the Works of the Reverend* JOHN VOLKMAR SICKLER, *an eminent Pomologist, in Germany. By* GEORGE HENRY NOEHDEN, *LL. D. F. L. S. &c. Vice-Secretary.*

Read August 5, 1817.

IN the pursuit of the objects for which the Horticultural Society is instituted, we do not confine our attention to what is going on at home, but carry our views also to foreign countries, in order to collect whatever may be rendered serviceable to the science. For this reason, communications have been opened, not only with different parts of Europe, but also with the other quarters of the globe, from which it is expected, that considerable benefit will ultimately be derived. While we learn what others are doing in Horticulture, we are enabled to compare their progress with our own, and in particular instances, where they may be superior to us, to gain instruction. The foreign and corresponding members which have been established, are likely to prove highly useful in communicating such information; but, besides these channels, it will be desirable to procure intelligence in any other way that may present itself. I will, therefore, not omit to impart to the Society, some account that I have obtained, concerning the labours of an eminent Pomologist in Germany.*

* I owe this information to Dr. Sickler, the son of the individual in question, with whom I have had the good fortune to become acquainted lately, since his arrival in England. Dr. Sickler is a distinguished classical scholar, who has been sent for by His Royal Highness the Prince Regent, from Germany, to unfold some of the ancient manuscript rolls, found in Herculaneum.

This person is the Reverend JOHN VOLKMAR SICKLER, pastor, or clergyman, at Kleinfahnern, in the Dutchy of Saxe Gotha, between the towns of Erfurth and Langensalza. He was born in the year 1744, at Güntersleben, near Gotha, and has during 46 years, that he has been in his present situation, devoted his leisure hours to Horticulture, and particularly to Pomology. His example encouraged others to attend to their orchards, and contributed greatly to the cultivation of fruit, both in his neighbourhood, and the adjoining country. He himself had formed three nurseries for fruit trees, one of which contained no less than 8000 grafted trees. This nursery, from which he supplied different parts of the country, and even distant places, was entirely destroyed in the year 1806, by the French, after the battle of Jena. Ney's corps bivouacked in it: and after his departure, scarce a vestige remained of what the place had been before. Another nursery of Mr. Sickler's upon a smaller scale, in which there were 1500 grafted trees, had a similar fate with the former. It was destroyed by the Cossacks, after the battle of Leipzig, in the year 1814. He has at present the satisfaction of seeing about 1200 full grown, and productive fruit trees on his own land, planted and reared by his own hand. This meritorious Horticulturist has published a great work on Pomology, consisting of no less than 48 volumes, 8vo. each volume containing about 30 sheets of letter press, and many engravings: the title of it is 'the German Fruit Gardener' *(Der Teutsche Obstgärtner)*; it treats of all the productions of fruit trees, that grow in Germany, affording a comprehensive survey of the cultivation of fruit trees, in general. The number of plates, many of which are coloured, exceeds 1200. The work was begun in 1792, and carried on to the year 1806: it was published at Weimar. Besides this great work, Mr. Sickler has written many small *tracts* on Pomology. He is likewise the author of a General Farming Dictionary *(Allgemeines ökonomisches Lexicon,)* in 14 vol. 8vo. and of a Botanical Dictionary *(Botanisches Wörtebuch)* in one vol. 8vo.

IV. *On a Mode of training Fruit Trees, described by* M. NOISETTE: *By* GEORGE HENRY NOEHDEN, *LL.D. F. L. S. &c. Vice-Secretary.*

Read September 2, 1817.

THE art of training fruit trees belongs to modern gardening, and has of late years been much attended to: it was formerly little understood. As the productiveness of the trees is much influenced by this operation, its importance must be admitted, and every improvement which is made in it, must be considered as an acquisition to Horticulture. M. NOISETTE, of Paris, whom we have the satisfaction of counting among our Corresponding Members, has in the *Bon Jardinier*, for the year 1817,* (of which he is one of the joint editors,) described a mode of training, that may be applied to standard trees. Though it may, perhaps, not be quite new, it will, I think, not be unacceptable to the Society to hear a short report of it. A frame, or stand of a given height, and circumference, is constructed, either round the tree which is to be trained, or by the side of it. If it is to encompass the tree, the circular form is most obvious. The stem then stands in the middle, and the shoots and branches are laid flat on the top or roof, which is horizontal, and covered with cross sticks, or laths, as a trellis. In this manner, for instance, M. NOISETTE trained a cherry tree (see Fig. 1.) The appearance of such a frame, when the tree is in foliage and blossom, or fruit, must be rather interesting: it affords, as M. NOISETTE says, the picture of a well garnished table. He made his frame only 3 feet high: but, I presume, it is optional to make it of greater height, so that it may serve for an arbour.

* Page 305.

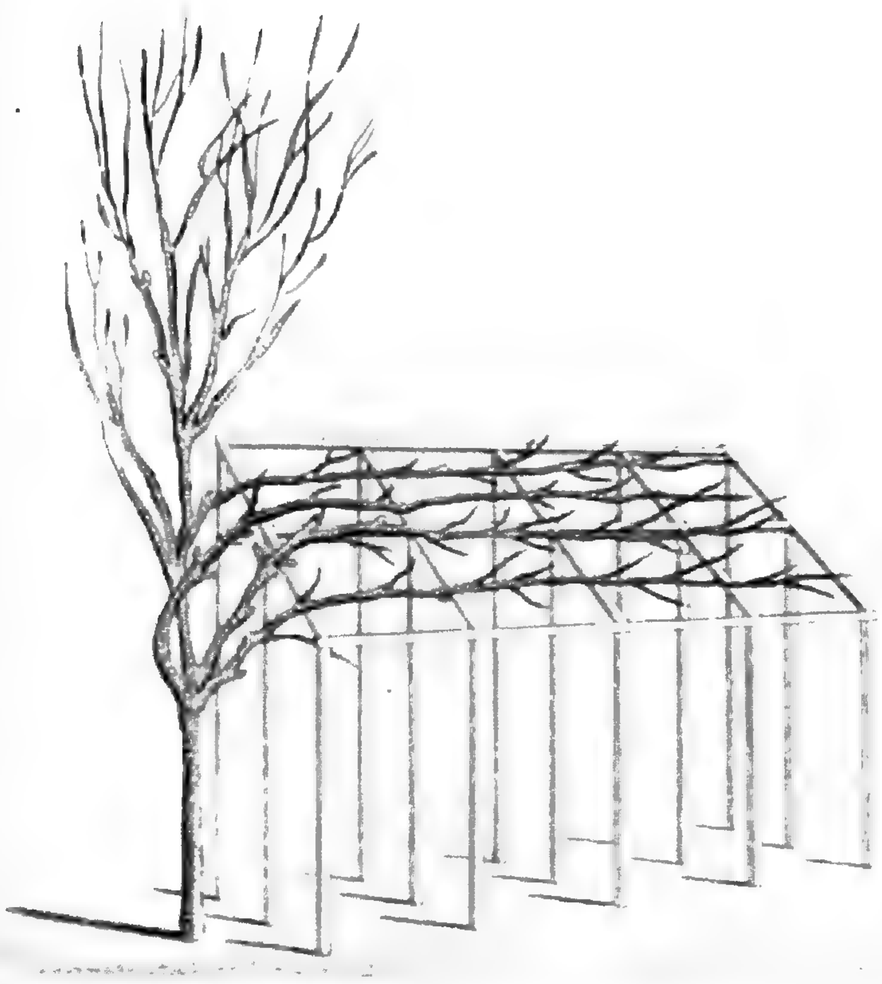


Fig. 2.

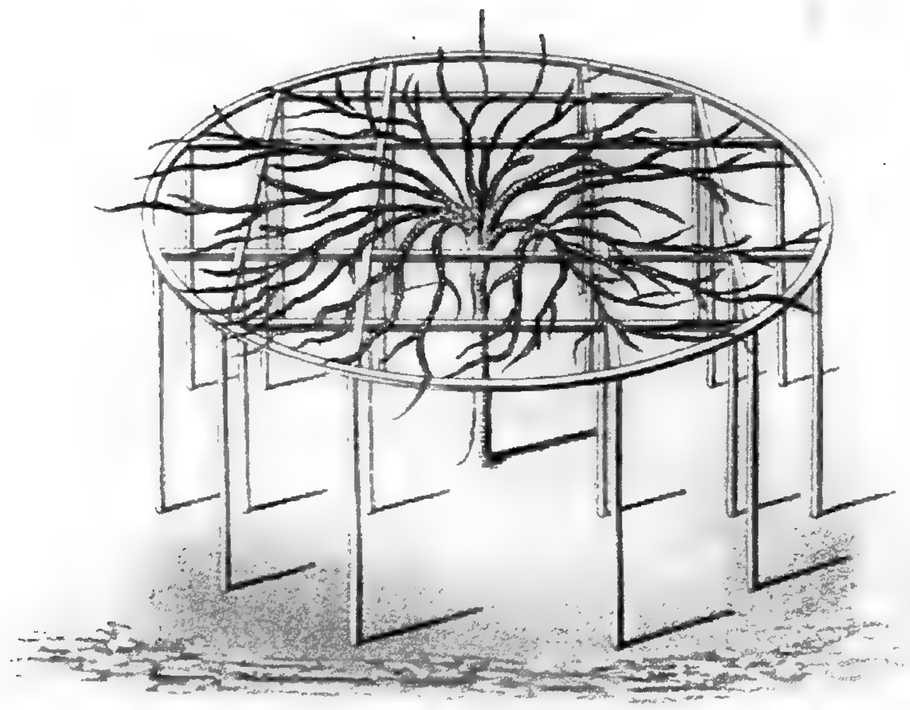
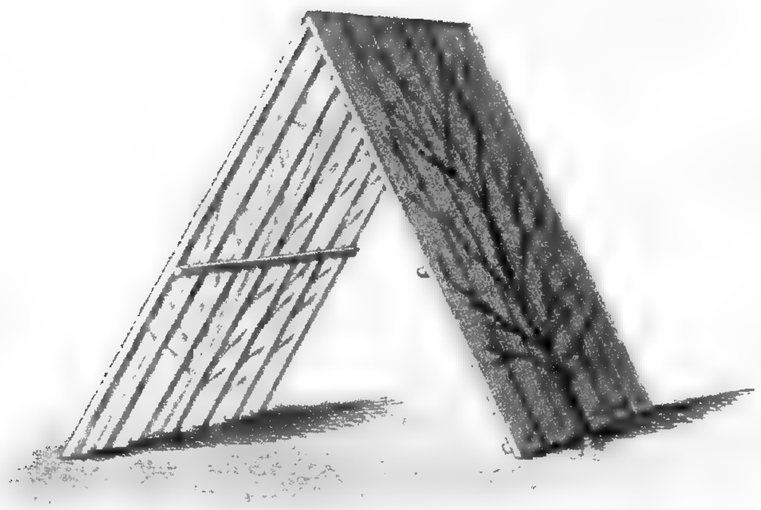


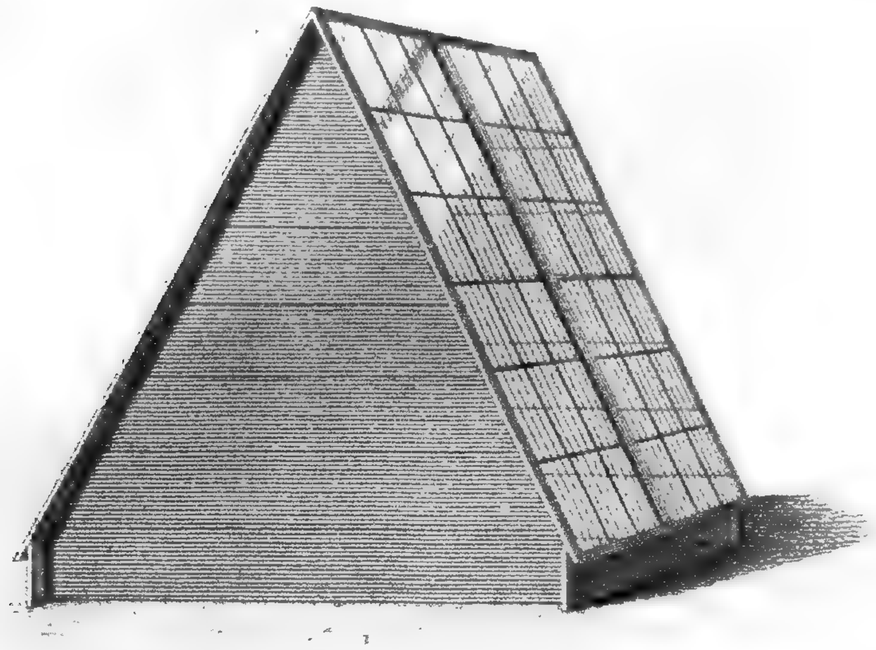
Fig. 1.

Method of training Fruit Trees, practised in France.

Fig. 4.

Fig. 3.





Engraved by J. Taylor.

or a like purpose. He seems to have chosen half standards, but there is no reason, why full standards should not be treated in a similar manner. The essential point is to lay the branches in a horizontal position. For by training them in this way, the current of the sap is forced to assume a direction, in which it cannot move with the same quickness as it would in its natural channel, which is from the root straight upwards: and the diversion favours the process of forming fruit, by inducing, as has elsewhere been intimated, a slower motion of the sap, and thus affording time for the secretion and deposition of its particles. Another example of training is exhibited by an apple tree, also of a low size (see Fig. 2). Here M. NOISETTE has placed the frame by the side of the tree: and it is oblong, with a slanting roof, or top, having the appearance of a shed. On the roof the branches are laid parallel to one another, which, though the roof is inclined, gives them a horizontal position. The circular frame has the advantage, that you can conveniently lay down all the branches, which cannot well be done with the lateral frame. M. NOISETTE has left part of the apple tree to its natural liberty, training only one side of it, which, under particular circumstances, may be beneficial to the tree, but will not ensure an equal quantity of fruit. Trees, which are trained by M. NOISETTE's method, are easily protected from the injuries of wind, and weather. If they are of a low size, they are not so much exposed to the influence of either: and it is practicable to cover them, when they are in fruit, or blossom. Besides those frames, M. NOISETTE has also what he terms *Oblique Espaliers*, (see Fig. 3). in contradistinction to which he calls the former *Horizontal*. They consist of two sides, joined at an angle of about 50 or 56 degrees: on these sides the trees are trained, namely, one to each side. The branches, therefore, rest upon inclined planes instead of being placed horizontally. That inclination will be instrumental to the increase of fruit, in as much as it bends and moderates the course of the sap, though it is probably

not so efficient as the horizontal position. This sort of espalier, it seems, he chiefly appropriates to peaches and nectarines. The sides, which form the inclined planes, he says, may either be filled up with trellis or lattice work, or with planks. The latter he recommends for cold situations, as being calculated to retain, or reflect, the heat of the sun; but this refinement perhaps is of little use. The espalier may be placed according to the aspect that is desired, either south and north, or east and west; and the same frame may, in this manner, ripen fruit sooner and later, as may be required. Not to lose the space of ground between the two sides of the frame, M. NOISETTE advises to make use of it for growing strawberries, or such vegetables as will bear the shade, For this oblique espalier he has, besides, invented a case or cover (see Fig. 4), which, where it is turned to the trees, has glass lights, so that the trees may be protected, and placed in nearly the same situation, as if they were in a peach-house. And what is more, they may even be forced, by making a hotbed round them, when the cover is put on. These contrivances, which certainly are ingenious, it must be recollected, are of greater importance in France, and on the continent, generally, than they would be in England, where the use of garden walls and forcing-houses is common: but to all those who cannot command these advantages, they will appear worthy of attention.

List *of* Drawings *of* Fruits *executed by* Order *of the* Council, *between May* 1, 1815, *and May* 1, 1816.

1. Hughes' Golden Pippin.
2. Ord's Apple.
3. The Moor-park Apricot.
4. The Black Eagle Cherry.
5. The Black Tartarian Cherry.
6. The May Duke Cherry.
7. Reynolds' Golden Drop Gooseberry.
8. Wilmot's early Red Gooseberry.
9. The Black Prince Grape.
10. The Claret Grape.
11. Le Rasin des Carmes Grape.
12. The Black Rock Melon.
13. The Vermash Nectarine.
14. The Acton Scot Peach.
15. Braddick's American Peach.
16. The Brown Beurré Pear.
17. The Crasanne Pear.
18. The White Beurré Pear.
19. The Black Jamaica Pine.
20. The Catherine Plum.
21. The Green Gage Plum.
22. Precoce de Tours Plum.
23. La Royale Plum.
24. The Yellow Antwerp Raspberry.
25. The Pine Strawberry.

List *of* Drawings *of* Fruits *executed by* Order *of the* Council, *between May* 1, 1816, *and May* 1, 1817.

1. The Court of Wick Pippin.
2. Fearn's Pippin.
3. The Hawthornden Apple.
4. Kirke's Golden Reinette.
5. The Margil Apple.
6. The Scarlet Nonpareille.
7. The Ribston Pippin.
8. Robinson's Pippin.
9. The Syke-house Apple.
10. The Florence Cherry.
11. The Waterloo Cherry.
12. Knight's Yellow Crab.
13. The White Dutch Currant.
14. The Verdelho Grape.
15. The Dutch Medlar.
16. The Nottingham Medlar.
17. The Black Mulberry.
18. The Cob Nut.
19. Grimwood's Royal George Peach.
20. The Little Crasanne Pear.
21. Gansel's Bergamotte Pear.
22. Williams' Bon Chrétien Pear.
23. The Imperatice Plum.
24. The Pear-shaped Quince.
25. The Large French Walnut.

LIST OF THE MEDALS

PRESENTED BY

ORDER OF THE COUNCIL OF THE HORTICULTURAL SOCIETY OF LONDON.

To May 1, 1816.

To the Right Honourable Sir Joseph Banks, K. G. B. P. R. S. &c. the Gold Medal, for his unremitted and important services to the Society, from its first institution. June 5, 1811.

To Philip Augustus Hanrott, Esq. of Lincoln's Inn, the Silver Medal gilt, for his gratuitous services, as Solicitor to the Society, in obtaining their Charter. June 5, 1811.

To Thomas Metcalf, Esq, Partner of Mr. Hanrott, the Silver Medal gilt, for the like gratuitous services. June 5, 1811.

To Mr. Arthur Biggs, Gardener to Isaac Swainson, Esq. the Silver Medal, for his exhibition of Apples, produced in his master's garden at Twickenham under his superintendance. June 5, 1811.

To Mr. William Fordyce, Gardener to the Comtesse de Vandes, the Silver Medal, for his success in flowering and fruiting a new and valuable plant, the *Alstræmeria edulis*, the roots of which are used as Potatoes, in St. Domingo. November 5, 1811.

To Robert Batty, M. D. the Silver Medal gilt, for his drawing of the design for the Society's Medal. May 12, 1812.

To the Right Honourable William Lord Bagot, the Silver Medal gilt, for many fine specimens of the *Mespilus Japonica*, in fruit, sent to the Society. May 4, 1813.

To Mr. John Wilmot, of Isleworth, the Silver Medal, for his Account of the Method of destroying Slugs in Gardens, printed in the Transactions of the Society. June 1, 1813.

To Mr. John Maher, Gardener to Daniel Beale, Esq. the Silver Medal, for his various exhibitions of fruit, produced in his master's garden at Edmonton, under his superintendance. November 2, 1813.

To Mr. Michael Keens, of Isleworth, the Silver Medal, for the production, from seed, of a Strawberry, an Account and Figure of which is published in the Transactions of the Society, February 1, 1814

To Thomas Andrew Knight, Esq. the President, the Gold Medal, for his various and important Communications to the Society, not only of Papers printed in their Transactions, but of grafts and buds of his valuable new Fruits. March 1, 1814.

To Mr. Thomas Hogg, of Pine-Apple Place, Paddington, the Silver Medal, for his Account of a Method of raising early Potatoes, printed in the Transactions of the Society. March 1, 1814.

To Mrs. Ann Simpson, of Fulham, the Silver Medal, for the production, from seed, of two very excellent new Apples, which were exhibited to the Society. May 17, 1814.

To Mr. Joseph Kirke, the Silver Medal, for a very fine assortment of Apples produced in his garden at Brompton, and exhibited to the Society. November 1, 1814.

To Richard Anthony Salisbury, Esq. the Secretary, the Gold Medal, for his various Communications, and for his unceasing attention to the duties of his office, and to the interests of the Society. December 6, 1814.

To Monsieur Van Mons, of Brussels, the Silver Medal, for several new Pears sent by him, and exhibited to the Society: some of which proved very excellent. January 3, 1815.

To John Braddick, Esq. of Thames Ditton, the Silver Medal, for the introduction from America, of a new Peach, an Account and Figure of which is published in the Transactions of the Society. December 5, 1815.

To Mr. Joseph Kirke, the Silver Medal, for the very fine assortment of Apples produced in his garden at Brompton, and exhibited this season to the Society. December 5, 1815.

To Mr. John Maher, the Silver Medal, for his exhibitions of various Fruits, produced this season, in the garden of Daniel Beale, Esq. at Edmonton, under his superintendance. December 5, 1815.

To Miss Elizabeth Knight, the Silver Medal, for having raised the Black Eagle Cherry, an Account and Figure of which is published in the Transactions of the Society. December 13, 1815.

To Mr. Stephen Jeeves, Gardener to the Honourable Thomas Brand, the Silver Medal, for his Account of his Method of growing Mushrooms, printed in the Transactions of the Society; and for the plants of Brussels sprouts, which were sent by him to the Society. February 6, 1816.

To Sir Christopher Hawkins, Bart. the Silver Medal, for his exertions in bringing into notice, and distributing plants and grafts, of the July Flower Apple. February 6, 1816.

List *of the* Medals *presented by* Order *of the* Council *of the* Horticultural Society *of* London, *From May* 1, 1816, *to May* 1, 1817.

To Joseph Sabine, Esq. the Secretary, the Gold Medal, as a token of the high sense entertained by the Society of the very great assiduity and intelligence manifested by him, as well in the formation of the Bye Laws, as in arranging and settling the long and very intricate Accounts of the Society. June 4, 1816.

To John Cresswell, Esq. the Silver Medal gilt, for the service he has rendered the Society by his assistance in the arrangement and settlement of the Accounts. June 4, 1816.

To the Reverend James Venables, Vicar of Buckland Newton, in Dorsetshire, the Silver Medal, for his communication on enriching the soil of gardens by fresh vegetable manure, printed in the Transactions of the Society. June 4, 1816.

To Thomas Reynolds, Esq. the Silver Medal, for his attention to the Interests and Views of the Society in the frequent and large presents and exhibitions of flowers, fruits, and plants, made by him at the meetings of the Society. November 5, 1816.

To Walter Calvert, Esq. of Hunsdon, in Hertfordshire, the Silver Medal, for his attention to the wishes of the Society in presenting them with specimens and grafts of the Florence Cherry. December 3, 1816.

To Joseph French, Esq. of East Horndon, in Essex, the Silver Medal, for his communication of his successful method of forcing Grapes and other fruits in houses by means of dung only, without fire. January 7, 1817.

To Mr. Daniel Judd, Gardener to Charles Campbell, Esq. of Edmonton, the Silver Medal, for his Paper on the cultivation of Asparagus, published in the Transactions of the Society, and for his other communications. January 7, 1817.

To Mrs. Thomas Pendarves Stackhouse, the Silver Medal, for having raised the Waterloo Cherry, an account and figure of which are published in the Transactions of the Society. January 21, 1817.

To Mr. James Mean, Gardener to Sir Abraham Hume, Bart., the Silver Medal, for his Paper on the management of Orange, Lemon, and Citron trees, printed in the Transactions of the Society, and for his other communications. February 4, 1817.

To William Townsend Aiton, Esq. Gardener to his Majesty, the Silver Medal, for his Paper on the cultivation of Winter Cucumbers, printed in the Transactions of the Society, and for his constant and obliging attention to the Society and to its officers. February 4, 1817.

To Mr. James Brown, Gardener to the late Richard Shaw, Esq. at the Casino, Hearn Hill, Dulwich, the Silver Medal, for his Paper on the use of Steam in forcing-houses; ordered to be printed in the Transactions of the Society. April 1, 1817.

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