The Grape Vine

BY

JOSEPH MEREDITH

TREATISE ON THE GRAPE VINE

A

TREATISE

ON

THE GRAPE VINE

AND ON THE

CONSTRUCTION & MANAGEMENT OF VINERIES

BY

JOSEPH MEREDITH

With Plans

LONDON
J. C. NIMMO AND BAIN
14, KING WILLIAM STREET, STRAND, W.C.
1881

THE FOLLOWING TREATISE IS

WITH HIS LORDSHIP'S KIND PERMISSION

DEDICATED TO

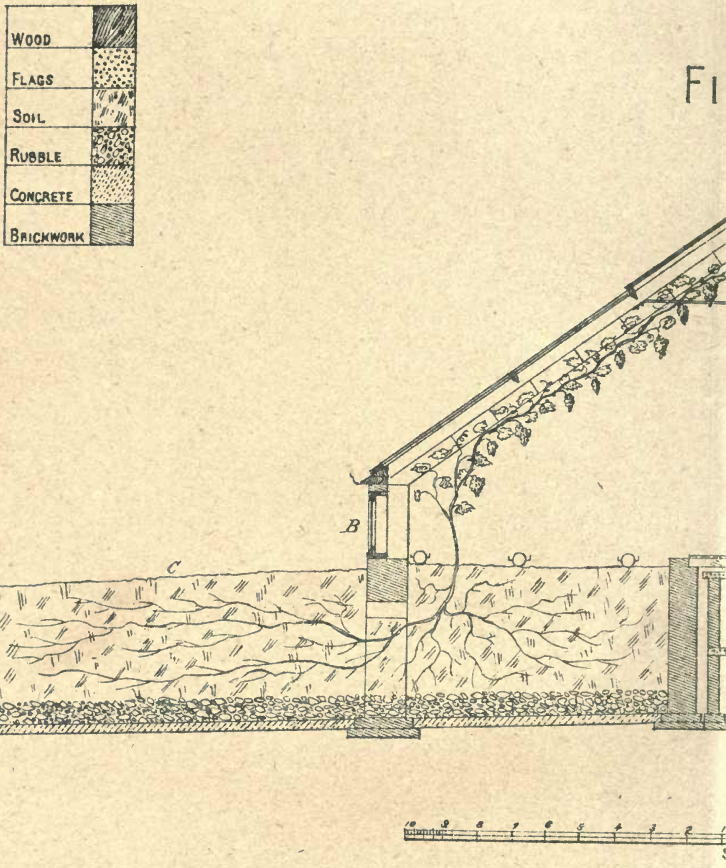
The Right Honourable the Earl of Derby, K.G., etc.

BY HIS MOST OBEDIENT SERVANT

THE AUTHOR.

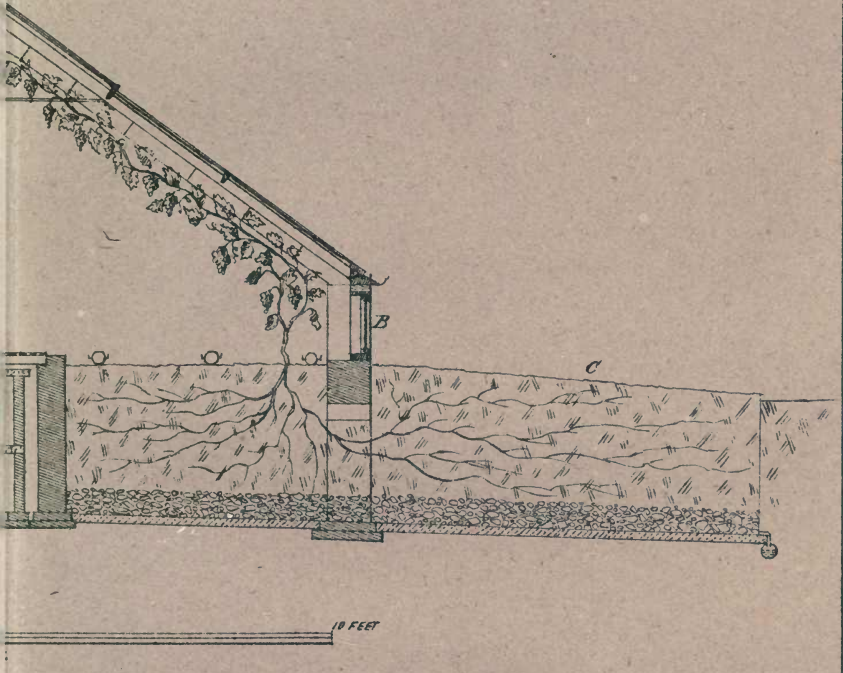
CONTENTS.

CONTENTS.



G. E. CARROLL. DEL.

I.



INTRODUCTION.

THE cultivation of the Vine is probably coeval with the history of the world. When the primeval home of man was formed, and enriched with every tree which was good for food and pleasant to look upon, the vine, clinging with tenacity to some sturdy tree, doubtless adorned the scene with its rich clusters of purple and white, and contributed its share to the banquet of which our first parents partook in the garden of Eden. We find the vine mentioned very early in sacred as well as secular history; and in later ages, its small, luscious fruit and soul-invigorating juice have formed the subject of many a stirring song, and inspired to many a gallant and noble deed.

There can be no doubt as to the special adaptability of some parts of the earth for the production of the vine, arising partly from the peculiarity of the soil and partly from the nature of the climate, combined with the comparative absence of the various causes of failure and vexation which exist in these more northern, and therefore less congenial parts. Every reader of Holy Writ associates

superlative quality and enormous size with the cluster of grapes gathered by the ancient Jewish spies at the brook of Eshcol; and those conversant with the vine-growing districts of the Continent and Palestine, know that some of the finest and most delectable fruit grown in the world is produced in countries where the science and chemistry of vine culture are but little known, and where dependence for a heavy crop rests almost entirely on a favourable combination of atmospheric influences. In such circumstances, disappointment and loss are sure to be experienced sooner or later. And hence, in most grape-growing districts, when disease seizes the vine the fruit is destroyed, and thousands of persons are thereby thrown into a state of semi-starvation, because the scientific remedial measures are not understood.

How to overcome the difficulties arising from the fickleness of our English climate, and to enable the lover of the vine to cultivate it successfully, are problems which have puzzled some of the wisest fruit-growers of the United Kingdom. All manner of theories and speculations have been propounded, and notwithstanding, the result has been that, in most cases, the professional gardener, or the amateur anxiously seeking for knowledge, has been thrown back upon his own resources, to await the time when scientific research should reveal the great truth which he was longing to understand, and which it is the object of this book to explain.

ON VINERIES.

If it be true that one fact is worth a thousand arguments, it is hoped it will not be thought presumptuous to conclude that this work will be found of some advantage to those who are seeking for information on the culture of the vine; inasmuch as it deals almost exclusively with facts, and is the result of long years of anxious thought and toil, which have, however, been rewarded by the attainment of a perfection of grape-growing recognised by Her Most Gracious Majesty the Queen and other crowned heads of Europe, the Pope of Rome, and the President of the United States of America, as well as by the leading horticultural societies of the United Kingdom and the Continent.

CONSTRUCTION OF VINERIES.

A GREAT deal, no doubt, depends on the proper construction of a vinery. I should, however, be very much puzzled to give an opinion as to which is the best aspect, or what the best form, in which to build a vinery, inasmuch as I have been very successful in growing vines in all aspects and in all kinds of houses. It appears to me, therefore, that I cannot do better than give a description of some of the houses I built at the vineyard at Garston, near Liverpool.

The diagram or section, fig. 1, is a span-roofed vinery, 65 ft. by 23 ft., which I planted on the 8th of June 1857 with black Hambro' vines, and two or three Trentham black and Buckland Sweetwater, all of which have succeeded admirably. Many of my friends can testify to my having gained a great number of first prizes for grapes gathered from the vines grown in this house. I showed a bunch of black Hambro's at the Royal Botanic Garden, Regent's Park, London, in 1865, *perfectly* coloured, large in berry, and very compact, weighing 9½ lbs., for which I was awarded the highest prize the

Society had it in its power to give. The letters *a aa* show the places where ventilation is arranged, by sashes being framed on the roof on each side of the ridge, and fastened to iron rods running horizontally, each of the rods reaching half the length of the house and meeting in the middle; there are also loose joints, fixed on the rods, and fastened to every other sash which it is intended to open. There are also small sashes, marked *b*, framed and built in the brickwork; these are opened by means of iron rods and levers. The outside borders, *c*, may be covered with glazed sashes or wooden shutters whilst the vines are being forced, which will keep out frost, snow, and rain, the effects of which I allude to in another part of this treatise. The house is heated with six rows of 4-inch hot-water pipes, as well as by a broad and well-constructed flue, running underneath a trellis path in the centre of the house, marked *d*. The flue was placed in this vinery from necessity, not from choice. I would have much preferred hot-water pipes, as I found when I had to fire sharp in hard weather, the flue got too hot, and destroyed the healthy state of the atmosphere. I, however, found that, owing to the position of the flue, a considerable amount of heat diffused itself through a portion of the borders on each side of it, which, with the assistance of the surface pipes, was very beneficial. The roof and wall plates were principally composed of the best crown Dantzic timber,

glazed with 16-oz. glass, as free as could be got from burning lenses. 21-oz. is preferable; but whatever glass is used, it should be free from specks and lenses, or they will burn holes in the foliage. The rafters were well tied together with iron rods, and wired with the best wire, about 17 or 18 inches from the glass. Some fix the wires for training seven or eight inches from the roof. This I consider bad practice, since I have found it paralyzes the vines, and assists in throwing them into a bad state of health. I may mention that the structure here referred to was an early vinery, in which I commenced forcing sometimes about the middle of November or beginning of December, but I generally depended on my pot vines for the first crops. The grapes in this house were invariably ripe from the middle to the end of May, sometimes earlier at the warmest end of the house.

Section fig. 2 is a lean-to vinery, adjoining the cottage, which was constructed with sashes in the usual way. It is 55 feet by 17 feet, and ventilated after the old-fashioned plan, with ropes and pulleys, — a system I certainly do not recommend, for this reason, that it takes so long to reduce the air and put it on. Oftentimes a great deal of mischief is done before the gardener, or amateur, can regulate the temperature. Horizontal rods, with levers and screws, are far before the old system of ropes and pulleys. This house was

heated with four rows of 4-inch hot-water pipes, with trough pipes to two of the rows; the rest of the pipes were plain. The border was about 17 feet inside, and the same width outside. It faced the east, and the sun left shining on it almost about one o'clock in the day. It was furnished with the finest sorts of black Hambro', which were allowed to break naturally in the spring. I used to grow the finest grapes in this house; the bunches were large, and the berries very fine, with a beautiful colour and thick bloom.

Section fig. 3 is also of the same dimensions as section fig. 2, and heated and ventilated in the same way. In this house I planted black Hambro', black Alicant, Meredith's Var., and Lady Down's, also West St. Peter's. Although its aspect was nearly due west, I have won many first prizes in London and elsewhere for grapes grown in it; but I must say the berries were not so fine, on the whole, as those grown in the house with the eastern aspect.

Section fig. 4 is a house I planted with a collection of white grapes, principally Muscats, which had a noble appearance when the fruit was ripe. The dimensions are 150 feet long by 26 feet wide. It is heated from a wrought-iron saddle boiler, with six rows of 4-inch hot-water pipes, and ventilated by means of iron rods and levers. I would recommend for this size of house a lantern top, in which ventilating lights can be placed;

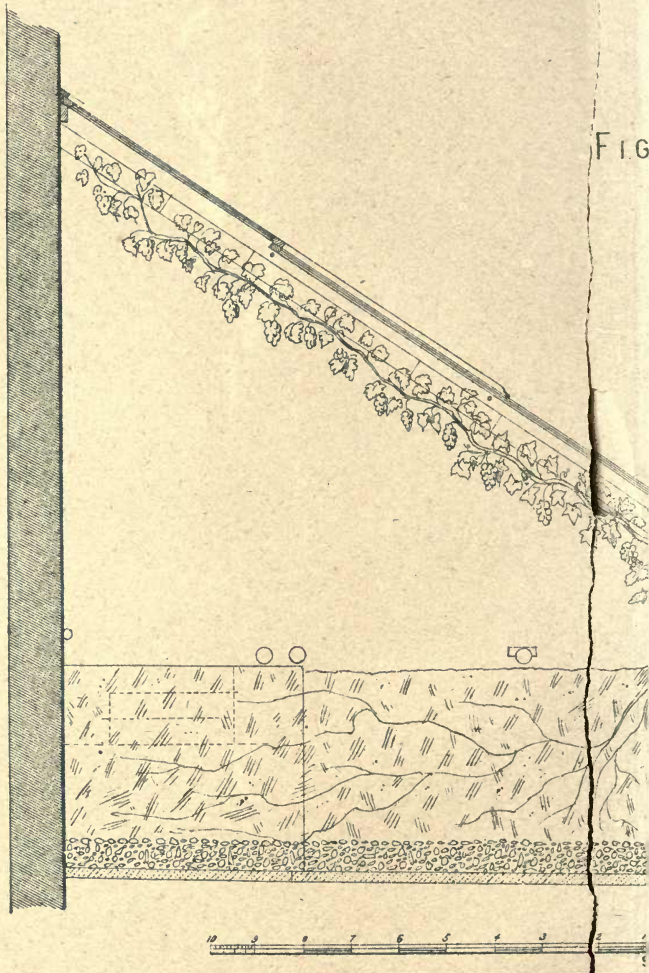
as by these means, in wet weather, very little rain can get in to injure the fruit.

Section fig. 5 I can recommend to gardeners and amateurs with confidence, having proved it myself. It is a most useful pit for pot vines, melons, cucumbers, early tomatoes, etc., and is a very inexpensive structure. The front part of the roof consists of wooden bars, and the back part of sashes, which can be made to slide either up or down for ventilation; while, in addition, there are boxes let into the sides of the front and back walls, through which ventilation may also be given. It is heated from a wrought-iron saddle boiler, and, as will be seen in the section (fig. 5), there are seven rows of 4-inch hot-water pipes, with some evaporating troughs cast on the pipes, and fitted in the rows for top heat. Both amateurs and gardeners will find a forcing pit of this description most useful. The length is 65 feet by 12 feet, and, as far as my memory serves me, the whole cost was about £150.

HEATING BY HOT WATER.

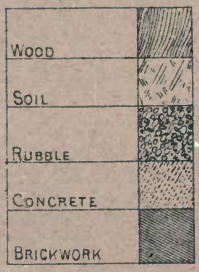
There are many opinions entertained as to which is the best form of boiler for heating hothouses. Having been extensively employed in the construction of vineries and all kinds of erections for horticultural purposes, I

FIG



G. E. CARROLL, DEL.

2, EAST.



consider the saddle boiler the most simple, and very powerful when properly set in brickwork. I recommend it should be made of the *best* wrought-iron plates, say three-eighths of an inch in thickness.

It is important, where there are several houses together to one or two boilers, to have them in all cases made to heat, independently of each other, direct from the mains, always taking care that superior stop-taps are fixed in the flow and return pipes of the different houses. The same remark applies where bottom-heat pipes are required. Makers of iron boiler-plates will, I think, agree with me in constructing the boilers of the most superior metal. This would save many from being disappointed, and serious loss in fruit and choice plants would seldom or never occur. I have known cases where, after the failure of the boilers, the houses had to be covered up with mats, bags, or anything likely to keep the cold out; and before the faulty materials could be renewed, the loss was very serious, and the fruit and plants very seldom recovered.

I have permission from the intelligent head gardener who has the management of the extensive gardens belonging to His Grace the Duke of Portland at Welbeck, Notts, to refer to his opinion of the heating apparatus which was placed in the hothouses at Welbeck under my superintendence, and I think I cannot do better than quote the words of his letter to me:—

'Your remarks on the heating by hot water for your work are, according to my experience, quite to the purpose. I remember of once listening to a lecture on heating by hot water given at Chiswick by the late Dr. Arnot, wherein he stated that the boilers on the saddle principle were perhaps the safest and most efficient of any, and the easiest understood. The great thing in hot-water heating, he said, was always to lay down plenty of piping, so that the boilers were never worked too hard to keep up the desired temperature. All the saddle boilers that you laid down (17 or 18 years ago) are as sound as ever, and working every day in high and low temperature, according to the houses, stove, or temperature, the only alterations or faults in them being the mending of a few rivets in the plates; all the pipes have been remarkably well placed and soundly stopped. You state the truth in relation to using the best iron for the plates of saddle boilers, such as the Low Moor, and thereby I believe their lasting qualities are proportionably increased. The late Mr. Ingram, when gardener to Her Majesty at Frogmore, used saddle boilers of the best iron for heating the fine new range of houses there, and I believe they are still in use, or were lately.—I am, dear sir, very truly yours,

'WM. TILLERY.'

I considered a few remarks on heating might benefit some of the readers of this book.

ON VINERIES.

DRAINAGE AND FORMATION OF VINE BORDERS.

In the Garston vineyard there are vine borders 2 feet 6 inches, 2 feet 9 inches, 3 feet, 4 feet, to as much as 5 feet in depth.

The deeper the borders are made, the more care is necessary in forming them. Where there is plenty of good composition to be had, and other necessary materials for drainage, a border may be made to the depth of 5 or 6 feet with advantage. As a rule, I recommend borders to be made about 3 feet deep. Shallow borders I do not advise, as they are apt to get too dry. Where hot-water pipes, or fermenting materials, are used in chambers or vaults underneath the vine borders, they require careful watching, as they sometimes get very dry, especially when hot-water pipes are applied. They do not require watering so often where the fermenting materials are made use of for bottom heat.

Where it is convenient, I recommend the construction of vine borders nearly altogether above the level of the garden walks. They may adjoin the range of vineries, and be made to assume a terrace-like appearance, more especially in cold and damp situations. I have done this many times, and with great success. The majority of vine borders are on a level with the walks, while many are even below it; in the latter case

they form a sort of cesspool for draining the land around them. Where the substratum is a cold, wet swamp, the houses and borders should not be on a low level. Where the formation is chalk or gravel, the borders may be made about three parts below the level of the walks, which will prevent evaporation going on too rapidly.

I hold it as being very beneficial so to put a vine border together, that the electricity of the atmosphere can act the important part of decomposing the constituents of the vine. This will strike all interested in vine-growing as being a most important matter, and more particularly those who have studied the important discovery made by Sir Humphry Davy in the year 1807, when, by means of a galvanic battery (of his own construction), he made known to the world the metallic base of potash, which opened the field to horticultural and agricultural chemistry.

I have too often seen the amateur and inexperienced gardener select the vine borders, both inside and outside, as seed-beds for lettuce, cabbage, turnips, potatoes, and annuals. Is it possible under such management for nature to assist the cultivator as she would if these were absent? How many have gone to the expense and trouble of building vineries, selecting the choicest soils and materials for the vines, and, when completed, begin to impoverish the borders with vegetables and flowers!

forgetting at the time, or at all events little thinking, that a vine border cannot be trenched and sweetened so easily as a border in the kitchen garden. The vine is a great feeder, and does not require any other plant to assist it in devouring the good food that every well-made vine border contains.

Some gardeners will say, 'I can easily replace all the constituents which these plants have taken away from the border;' and others, 'My employer insists upon it.' In the latter case, the employer ought to take the blame on his own shoulders, should the productions of the vinery not turn out to his satisfaction, which they cannot possibly do. The vine border ought to be kept sacred for the purpose for which it is made.

Precautions necessary in dry seasons.—Some years ago, I made arrangements for the proper development of the vine, which I carried out with, as I thought, the greatest care. It occurred to me, that if brick and mortar rubble were placed in the borders, and if other materials calculated to keep the border open were used, in layers, it would be very successful; but, although great care was taken, the vine suffered very much in consequence of the dry summer.

Grape-growers must be prepared for any emergency. If a border is made very porous, and is only 2 or 3 feet deep, the roots of the vines will suffer, should the summer happen to be very dry. Some may say, 'Water

well outside;' but perhaps after watering is finished, rain comes down in torrents, which may continue for some days, or even weeks, while root action begins with renewed vigour; and what is the consequence? The bunches begin to grow very rapidly, and the berries swell to a great size. The cultivator is led to believe he is going to have marvellous fruit; but by and by he discovers he is mistaken. The fruit is fine in berry, but red when it should be black, full of water, and not sufficient sugar and flavour in it to make it fit for table. It is difficult for some to guard against the two extremes. The question then comes to be, What is the next best thing to do? Those who have the means may have glass lights for their borders. I have seen Mr. Speed of Chatsworth use roofing-tiles with good results; Mr. Hill of Keele and many others use wooden shutters, which are much cheaper; but these deprive the borders of the light and warm sunshine, unless they are lifted off (which can easily be done) when it is warm in the middle of the day. Sashes are, no doubt, the cheapest and most useful, as they can be used for frames when not required for the borders.

I have occasionally found that fermenting leaves and manure, when applied to the surface of the vine borders, have generated fungus, especially if left too long without being turned over. The pest may thus get down to the roots, and throw the plants into a bad

state of health. In such a case, it is best to take them out and make a new border, and replace them with well-grown plants, as a great deal of time is lost in trying to get the old vines into healthy condition. I am here assuming that the plants are badly infested with fungus. I have come to the conclusion that it is the wisest plan to have the coverings for the borders always at hand, ready for use when required. If care is taken with the roots of the vine or any other plants, great good must be the result, and perfection of growth will be the issue. Those who have not much to do, and plenty of assistance at command, may watch and assist nature in such a way as would surprise the greatest philosopher.

It has been my fortune to find out by long experience, that good results cannot be expected unless the cultivator studies with great care, and applies his different manures in such a way that the various constituents of the vine, or, in other words, the different materials forming the food of the plant, are not too much in excess of each other. Of course we know turfy sods form the bulk of the vine border; but I particularly refer to the food of the plant in a condensed form — the inorganic matter. A friend of mine had once immense faith in the influence which the electricity of the atmosphere exercised on the soil in which the vine grows. He assured me he was the cause of Mr. Philip

Frost, gardener to Earl Fortescue, Dropmore, near Windsor Castle, winning the first prize at Chiswick, about 26 or 27 years ago, by operating upon the vine border (an old one) in the following manner. He constructed a very powerful galvanic battery after Sir Humphry Davy's plan; and in order to make the experiment less expensive, he collected the electricity from the atmosphere adjacent to the vinery. After the zinc plates had been put in the vine border at various depths, the wires were arranged and the circuit of electricity completed. This was followed by a slow sustaining action of decomposition, which went on until the grapes were ripe; and the result was, that through their skilful management they succeeded in winning the first prize.

The words, *sustaining action of decomposition,* I value much; their meaning gives me perpetual interest and pleasure. In agriculture, as in horticulture, every farmer and gardener who ploughs and digs deeply, and manures his land judiciously, without giving it too much or too little, will not regret the careful study of this subject, as he may rest assured the results which will follow will amply repay him for the care and trouble he has taken. Most people interested in agriculture know that successful gardeners make good farmers: this arises through their knowing how to check the powerful action of decomposition at the right period of the plant's growth.

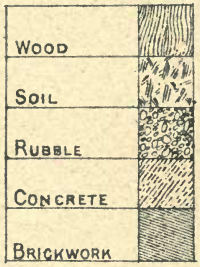
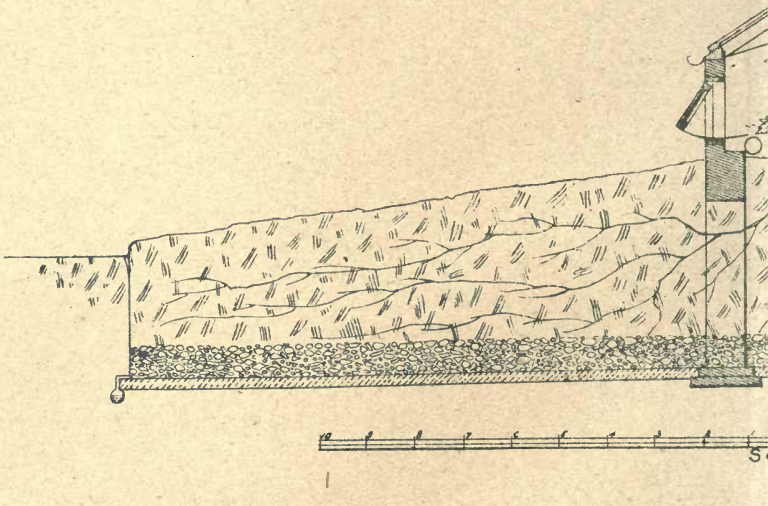
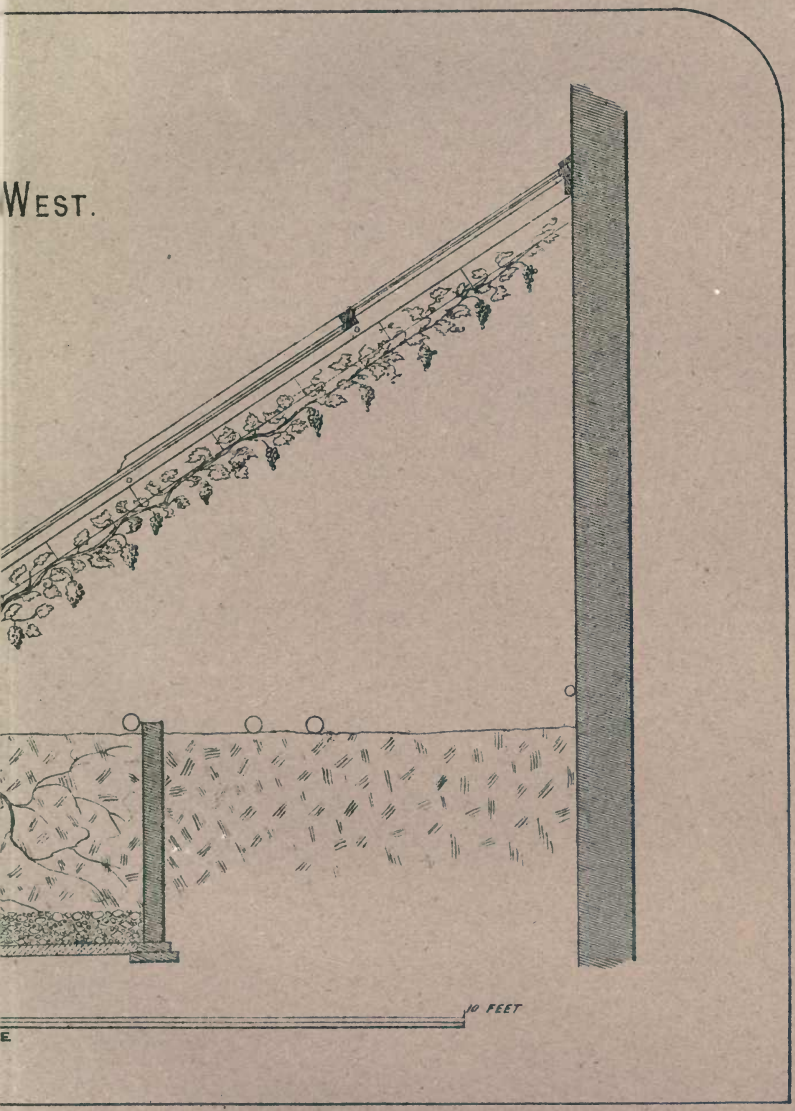


FIG.



G.E. CARROLL, DEL.



ON VINERIES.

PROPER TIME FOR PLANTING VINES.

Various opinions are entertained as to the best time for planting vines. I have planted in every month of the year; in fact, I may say I have planted all the year round. I prefer planting good strong vines in a growing state, after they have been properly prepared for the purpose. If the gardener or amateur has not the convenience to prepare the vines he wishes to plant, it is better and cheaper to procure them from a respectable nurseryman.

It does not always happen to be convenient to plant the vines in a growing state; but if not, they can be planted whilst in a dormant condition with great success. I do not advise any one to plant stunted or tardily-grown vines. Where it is convenient, I would always recommend that plants should be selected from a well-growing and clean stock — I mean, they should be in a free-growing condition. Of course they should be marked, and the nurseryman extra paid for allowing this to be done. It is money wisely spent.

When I am building a vinery, I endeavour to arrange to have the rafters about 4 feet 6 inches to 5 feet from centre to centre. This gives plenty of room for two vines, one under the rafter, and one under the middle of the sash. I think it much better to take a moderate crop off two vines than to crop one too heavily; by

these means a fine crop of grapes can be produced without each vine being overloaded. Some cultivators will contend that it is not necessary to plant so thickly, acting on the principle that, if you have two canes from one plant, the roots will be in proportion to the quantity of wood and leaves produced, and that the quantity of fruit may be taken off in the same proportion. This may be partially true. Still, I have not succeeded by such means so well as when I planted two vines where many only plant one.

In the case of the Muscat of Alexandria, only one vine should be planted to each rafter, as these grapes require all the light they can get to colour them.

Some amateurs and inexperienced gardeners plant vines three, four, and even five years old. It is very bad practice and a great waste of time, the roots, as a rule, being cramped through having been kept too long in pots. I prefer vines one or two years old, depending, however, in a great measure on how they *have been grown and prepared for planting.* These cost more money, but I have always found that it is money well laid out.

GROWTH AND MANAGEMENT AFTER PLANTING.

After the vines are planted, they must be grown in a very careful manner. They should be allowed to start

in the spring of their own accord, simply protecting the young buds and shoots from frosts for three or four years. I am assuming that the house is required for early (but not *very* early) forcing, in order that the grapes may be ripened about the first, second, or third week in May, depending on the sun and weather. The fourth year, they may be started about the last week in December or the first week in January; the fifth year, about the last week in November or the first week in December, and they may be expected to be ripe some time in May. For the earliest and latest crops, I recommend all who have the convenience to force them in pots, and from vines planted out in pits. By so doing, the gardener or amateur is enabled to keep the permanent vineries in splendid condition as to health, etc. The vine at five years old may be allowed to carry a full crop, that is, if proper attention has been paid to its growth. It may have on from 10 to 15 bunches, according to their size and the length of the rod. It is best to estimate, as nearly as possible, by the weight of the bunches.

A succession vinery may be prepared in the same way to come in a month or six weeks later, depending on the demands made on the cultivator; and so on with any other vinery the gardener may have under his charge. This he can arrange according to the requirements of his employer, the extent of the establishment, etc.

ON VINERIES.

MANAGEMENT OF THE VINE WITH REGARD TO TEMPERATURE, PRUNING, DRESSING, ETC.

The vines should be pruned as soon as the wood is thoroughly ripened and the leaves fall off. Before falling, the latter should have a beautiful yellow tint. After this is attained, those which do not fall off naturally may be removed by the hand, and the vine pruned back to one or two eyes. I prefer leaving one eye instead of two, as it keeps the fruit near the main stem, and consequently close to the nourishment or food of the plant, which ascends up the main channel. After pruning, I prepare the following dressing:—1 lb. of the best powdered sulphur, 1 lump of lime weighing about 2 lbs., 2 quarts of good tobacco-water, to which clay and water are added until it is of the consistency of paint. I then make a paint-brush by tying bits of mat together, as I find this softer than an ordinary painter's brush, and not liable to injure the buds, and I coat the plant all over with the mixture. The bark ought not to be peeled off the vine, as is too often done by gardeners and amateurs, because it weakens the constitution of the plant, besides looking, as well as being, an unnatural practice. My opinion is, that when the bark is removed, the sun overheats the sap as it rises in the stem, and has a tendency to bring on shanking, red berries, etc.

If the removal of the bark be really necessary, for the purpose of getting rid of bugs, thrips, red spider, etc., I recommend the cultivator to tie moss on the stems of the vine, which, in a great measure, is a good substitute for bark. As already indicated, plants should not be introduced amongst vines where it can possibly be avoided, as I know well from experience that no one can keep vines in a healthy condition where this is practised.

Where there are the means of giving the vines bottom-heat, it may be used a fortnight before the heat is turned on the top, assuming that the surface of the border is forked up, and all ready for watering (which I ought to have mentioned should be done before the heating is commenced). The water should be of the temperature of 65° to 70° for two or three weeks; then, beginning with the temperature of the top heat at 50° at nine o'clock at night, it must not be lower, if it can be avoided, than 48° at five o'clock the next morning. From this time it should rise gradually until it reaches about 60° to 65°, and a little air admitted as the temperature increases. If it is a dull day, it may remain at this until night is drawing near. Air must be taken off as gradually as it has been put on; and if it is not stormy, a little may be left on all night. If the day is sunny, the temperature may rise to 75°, with air on, of course.

Care should be taken that when air is given it is

done by degrees, and taken off or reduced in the same way. I know it is very irksome to some young men to have to jump up from their meals every time a gleam of sunshine appears, but it is necessary if perfection is their aim, and also to watch all night when the weather is boisterous and frostily inclined. After about a fortnight of the above treatment with regard to temperature, both top and bottom heat may be raised a few degrees, paying strict attention to the air as recommended above. After another fortnight, the temperature may be raised to 60° at nine o'clock at night, and ought not to be allowed to fall lower than 57° to 58° at five o'clock the following morning. By this time the vines will require disbudding, which should be done carefully, and the buds left about 18 inches apart. When coming into flower, the temperature should be raised to 65° at nine o'clock at night, and to about 63° or 65° at five o'clock next morning; on dull days the atmosphere may rise to 72° or 75° with air, and if sunny, to 85° or 90° with plenty of air.

Muscats may be treated in the same way, but must have 3° or 4° more heat, both night and day. Thinning may be done, as advised in another part of this treatise.

ON VINERIES.

BARBAROUS PRACTICE OF CUTTING OUT THE SURPLUS SHOOTS OF VINES WHEN THEY ARE IN A GROWING STATE.

I consider this very bad cultivation. It is invariably done to give light to grapes whilst they are colouring, especially to Muscats, which require plenty of light to enable them to come to perfection.

I will assume there has not been sufficient time for the gardener or amateur to look over the vines as often as two or three times a week, in order to pinch off the young shoots, both laterals and tendrils. The vines consequently get into a wild state of growth, and all at once the amateur or inexperienced gardener begins to slaughter away, until he fancies there is sufficient light. The result is, that the bunches of grapes are exposed suddenly to the sun. The skins of the berries are very tender through allowing so much surplus growth, which previously kept every ray of the sun from them; and as a matter of course, scalding begins to take place. This treatment has also a great tendency to bring about rust, and is often the cause of a bad and unnatural colour, and shanking wholesale.

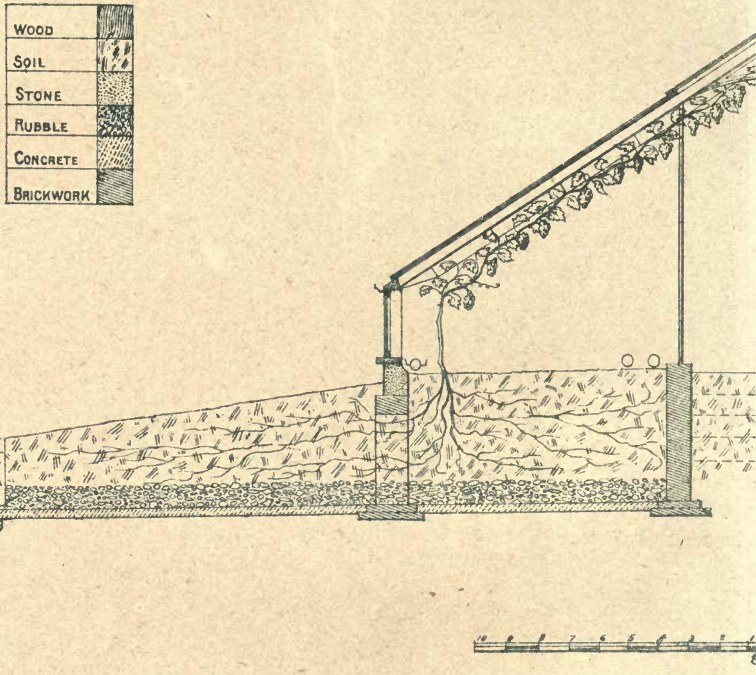
Pruning vines excessively whilst in a growing state weakens the constitution to such an extent, that they do not get over the shock for several years. My firm

opinion is, they never properly recover, especially under the management of amateurs and inexperienced gardeners; at all events, this will occur in those cases where summer pruning has been carried to excess, amounting to slaughtering instead of careful gradual pinching. After this excessive pruning has been finished, I have heard some gardeners say, 'Now I have let daylight in amongst them.' Indeed, when I was younger, I have said and done it myself; but as time went on, experience taught me better.

The shoots of vines which are in a very young state, and in a free-growing condition, should be kept frequently pinched,—a process which does not injure or check the vine's growth. I find it much better to have fine leathery foliage than a number of small tender leaves shading the fruit; as it will be found the sun has great power over the latter, causing them to flag or droop, and interfering with the colouring and ripening of all descriptions of grapes. When capillary action is interrupted to such an extent, it paralyzes the vines, and at the same time shows a great want of knowledge of good cultivation. If care and strict attention are exercised, the above difficulties will soon be overcome.

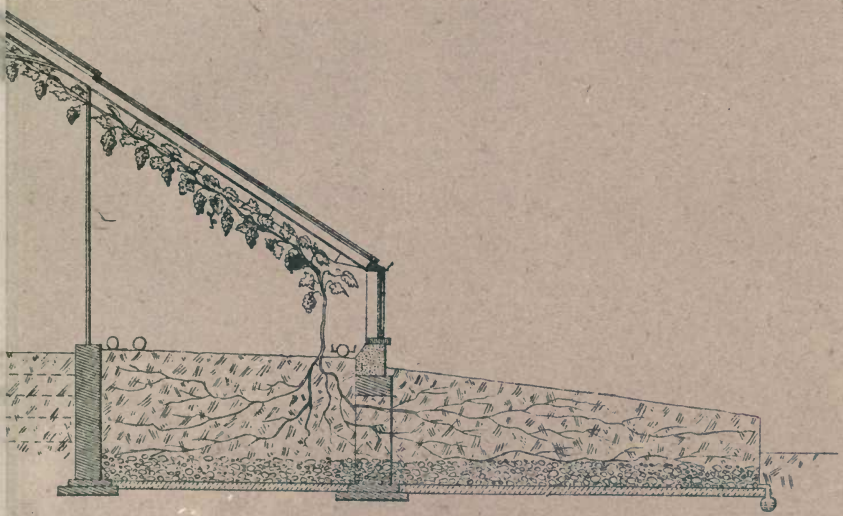
For the benefit of those who have not had an opportunity of studying the subject of capillary attraction, I will take the liberty of making a quotation from a well-known author:—

FIG



G.E. CARROLL, DEL

4.



10 FEET

LE.

ON VINERIES.

'Capillary, *kap-pil-laré* (*a capillaris*, Lat.), resembling a hair; small, minute. In anatomy, applied to the minute vessels by which the terminals, arteries, and veins communicate with each other; and in botany, to the fine, hair-shaped fibres of a plant; S. a fine duct or canal. In surgery, applied to a linear fracture of the skull, unattended with any separation of the parts of injured bones.

'In natural philosophy, capillary attraction is that property of a fluid by which it rises above the level of the tubes of small diameter, in consequence of the attraction of the matter of the tube being greater than the power of gravitation.'—CRAIG'S *Dictionary.*

The above should be studied carefully by all amateurs and gardeners, after which they will probably think with me, that it is most important that the greatest care should be exercised in pruning and pinching off young shoots when in a growing state.

During my absence, on one occasion, my young men allowed some of the vineries to grow wild, or rather the vines in them, and then began to let daylight in amongst them, thinking they were doing perfectly right. On my return home, to my great disappointment, the sun had begun to scald the grapes so much that I thought I should have lost the whole house of fruit. Indeed, so great was the injury, I feared I should lose the vines also; and as it was, they did not recover the shock for

several years. I may mention, the sun was not so severe on the thick-skinned varieties. Accordingly I strongly recommend those who cultivate vines not to practise the barbarous system of summer pruning; indeed, it ought not to be done at any time of the year.

MANAGEMENT OF THE COMPOST-YARD.

The compost for vines is often too much neglected by most inexperienced gardeners and amateurs. I consider it a wise plan to have different varieties of turfy sods stacked up and carefully preserved from too much wet, so that they will always be in a fit state for use when required. If this important matter is neglected, it will go very much against the interest of the cultivator; because, if the compost is left to the last moment when he wants it for use, in all probability it will not be in a fit state for the plants. It is well known by experienced gardeners, that if soils are made use of when in a wet state, disappointment and failure are frequently the result. I advise that each variety of sod be kept by itself, and a span roof constructed of wooden shutters, so as to throw off heavy rain and snow. If the sods should be too much decayed before being required for vine borders, pot vines, etc., they ought to be mixed with some rich turf, about two inches thick, from a deer or sheep pasture. Differ-

ent kinds of manure may be stacked up in the same way as recommended for the sods. In my opinion, the heaps of soils, as well as the manures of various soils, should be turned over two or three times during the year, and the former, when they appear too dry, watered with liquid manure, but not to excess. The cultivator, however, must use his own judgment as to the quality and quantity. The great matter is to make sure of all the principal inorganic constituents necessary for the proper development of the vine and its productions.

It is generally very difficult to get good turf and other soils near large towns without paying a high price; yet by keeping a sharp look-out, it is astonishing what may be done even under disadvantageous circumstances. Where a great quantity of compost is required, it forms a costly item, as it is difficult to be obtained without paying a fabulous price for it. A very worthy gentleman once said to me, 'Ah! Meredith, you may buy gold too dear.' By those who have only three or four moderate-sized vineries, the matter is more easily accomplished. Sometimes the gardener or amateur may be able to secure a quantity where turf is got out of a park or pasture field in which improvements are being made. Every land agent or bailiff and gardener knows, that if an old vine border, or soil out of an old kitchen garden, is spread over the space where the turf has been taken from, and properly seeded down, well rolled, and protected from

the cattle until it is thoroughly established, they will prefer this to the old pasture for years after.

The gardener or amateur only requires the turf 2½ to 3 inches thick. The horticulturist should seize every opportunity of having the compost-yard supplied with good materials, as bones, blood, night-soil, etc., because without such materials first-class cultivation cannot be well sustained. These should be mixed together in a tank, and allowed to remain there for some time, when the mixture may be used in the shape of liquid manure for watering the vines, but of course very much diluted with water, depending on the strength of the compost. Charred marl, old bricks, rubble, and charcoal—all these should be at hand.

If wooden shutters cannot be had, it will be necessary to make the soil form span roofs, so as to keep the compost-heaps from getting too wet and sour.

CULTIVATION OF VINES IN POTS.

The cultivation of vines in pots has been a favourite study of mine for many years, and I may say I have met with a large amount of success. Where there is not sufficient convenience to enable the gardener or amateur to grow the fruiting vines, they can be procured from most nursery establishments. As already remarked, I am of

opinion that vines for fruiting in pots can be bought cheaper than they can be grown by gentlemen's gardeners and amateurs, because it is seldom sufficient room can be spared for their development.

I think it a pity to commence forcing well-established vines before the beginning of January. The latest succession of grapes, in gardens where there is no stint of glass, may be produced from vines in pots; and by so doing, growers will be able to do full justice to their permanent vines. Every practical gardener knows how detrimental it is to leave grapes on permanent vines after the month of December. The French generally cut all their late grapes in the month of November. I paid a visit to the late Baron James de Rothschild, at Ferrière, and at the Bois de Boulogne, near Paris, a few years ago, in the month of January, and found that all the grapes had been cut in November, each bunch with a few inches of wood to it, which were placed in bottles containing water and two or three lumps of charcoal (to keep the water sweet), and covered with some kind of luting to keep out the air. I have used Portland cement with success.

Those who prefer growing the vines themselves may strike the vine eyes in any forcing pit where a temperature of 70° to 80° top and bottom heat can be obtained, of course varying it and giving air according to the weather. Well-ripened eyes should be selected, and, cutting slant-

ingly, about half an inch of wood left on each side of the bud, thus—

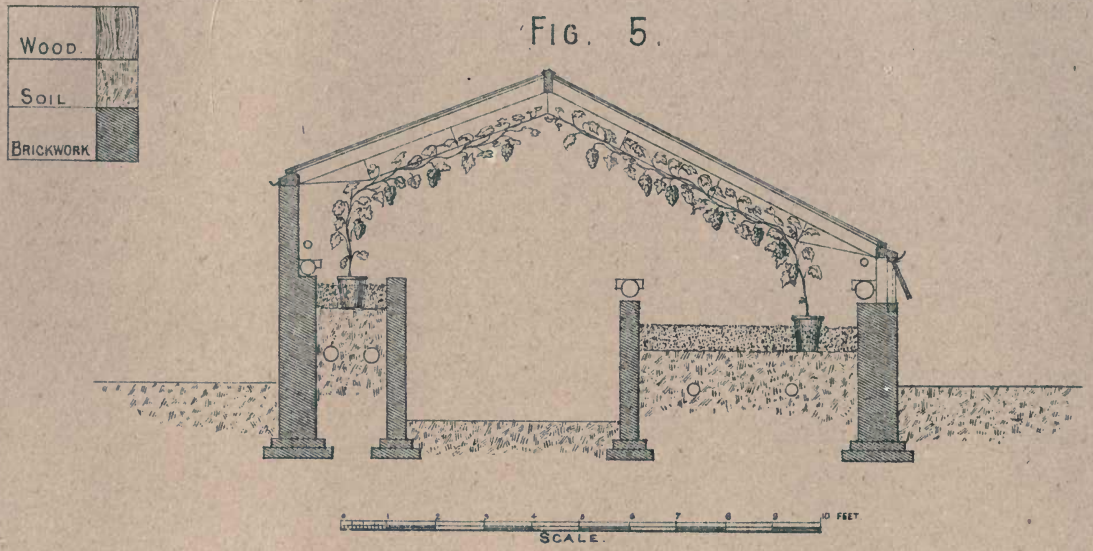
The following directions should then be observed:—After a sufficient number are prepared, put them firmly in 2½ to 3-inch pots, one eye in a pot; then plunge in bark or oak leaves — cocoa-nut fibre is very useful for this purpose. Select well-decayed leaf mould, friable loam, and a little silver sand for striking the eyes in. Two parts leaf mould, four parts friable loam, and one part silver sand, constitute a good composition for young vines to root in. After the eyes are plunged, begin with a bottom heat of, say, 60°, and the top heat 55° to 60°, with very little air, as the latter will keep the surface of the soil in the pots from becoming mouldy for the first fortnight. Afterwards raise the temperature, as advised above, by degrees. As the sun makes its appearance, give air, a little at a time, and take it off in the same way, as night approaches. With careful attention to these directions, the vines will be ready to shift into 6 or 7-inch pots in four or five weeks. Use the compost in the same proportion as before. Immediately after they are re-potted, plunge again into bottom heat, and take care they do not receive a check whilst being shifted. The soil should be of the same temperature as the bottom

heat they came out of. In about three or four weeks they will be ready for another shift; and this time the soil may be a little stiffer, with a small quantity of old mortar-rubble added to it. They may now be put in the pots they are intended to fruit in. The size of fruiting-pots may vary from 10 to 20 inches in diameter, as it may seem convenient to the cultivator; the depth being in proportion to the diameter. Assuming they have received their final shift, plunge them in a gentle bottom heat about 65°. As often as the surface becomes green and sour, which it sometimes does, stir the soil on the top with a sharp peg or iron skewer; be very watchful about the watering, and see they don't get either too much or too little. When the vines have grown to the length of seven or eight feet, and of a good thickness, and it is found the pots are nearly full of roots, they may be taken out of the bottom heat. Tie them to wires underneath the roof of the house or forcing pit, say about seventeen or eighteen inches from the glass, until the wood is *thoroughly* ripened (I am now assuming they have been grown in a perpendicular position). When the canes are well ripened, lower the temperature of the house by degrees to that of the atmosphere outside, which will probably take a month from the time they are ripened. They will now be ready to be placed outside to rest. I recommend plunging them in old bark or coal ashes, and placing them against a north wall—that is to say, on the side of a wall which

faces the north. Dry fern packed tightly round the pots is a very good material to use, as it keeps the roots from drying too quickly, and prevents them from receiving a sudden check. I have succeeded in ripening grapes in sixteen months from the time the eyes were put in pots to strike; and I won the first prize for grapes on pot vines, treated in this way, at Chiswick, near London. (See list of prizes and remarks in the *Gardeners' Chronicle*, in the month of June 1853.)

The readers of this article will perceive the necessity of ripening the vines, for the first succession, as early as possible. They should have two months' rest at least previous to the first or second week in October. After this they may be taken into the forcing pit, or house, which should have been well cleansed previously, and painted if necessary. If sufficient attention has not been paid to the instructions given above, it will be found very difficult to get the vines to break or burst their buds. In order to get grapes ripe in pots by the end of March or the first week in April, it is necessary to commence forcing them gently in the first week of October. I have ripened them in less time by forcing hard, but they were never so fine. This was effected by plunging the pots in half-spent bark or oak leaves, which give a gentle bottom-heat,—say from 60° to 65°,—taking care only to have a slight circulation of top heat in the pipes or flues, with a little air on night and day, for the first fortnight

FIG. 5.



G. E. CARROLL, DEL.

or three weeks; after which, the house, or pit, may be closed, excepting in sunny and mild weather. By adopting this suggestion, the roots may be got a little in advance of the top or canes; they then break more freely, and succeed better. I advise to begin with a temperature of 50° at night, and 55° to 60° on dull days, with a little air on if not stormy. If it be sunny weather, the thermometer may be allowed to rise from 5° to 10° higher, taking great care to give air very carefully, and by degrees, as the temperature rises. In about a fortnight the temperature may be raised to 65° on dull days, with a little air on if not stormy; and 5° to 10° higher on sunny days, giving air as advised above. The bottom heat may be increased a few degrees, taking care to have a free circulation of air. If the weather is stormy and cold, no doubt there will be sufficient air through the laps of the glass and other crevices. The cultivator must be entirely guided by the weather, so far as giving air is concerned; in fact, he ought to study nature, which should be his principal guide.

If the sun should come out suddenly, and prove too hot, every effort must be used to give a little air, although it does happen to be stormy, as there is often a great deal of damage done to the crop in such weather at this stage of the vine's growth. If it can possibly be avoided, however, the thermometer should not be allowed to rise above 75° or 78° with air,—giving and reducing the latter

gradually and with caution. Syringe all dry surfaces, and keep water in the troughs, which should be cast on the pipes, so that a sustaining moisture may be kept up when required.

Assuming now that the vines are in full leaf, and the bunches making their appearance, the temperature may be raised, and kept on dull days from 72° to 75°, with a little air on, allowing it to rise, when the sun is shining, to 80° or 85°, and even as high as 90°; but the house must have a circulation of air, without a cold draught. Sprinkle all dry surfaces on sunny days at different times, as may appear necessary. In dull weather there will not be so much evaporation; and therefore so much damping down, as it is generally called by gardeners, will not be needed. In wet weather, the evaporating troughs may be allowed to go dry for a few days together. With careful watching, the amateur will soon be able to know what to do in this respect. The night temperature may now be kept from 65° to 68°. It should be at this at nine or ten o'clock in the evening, and the thermometer should be found to stand not lower than 63° about four or five o'clock next morning. Begin to give air gradually as the sun becomes powerful, and reduce it in the same way as the sun goes down. So soon as there are signs of the vines coming into flower, three or four more degrees of heat may be kept up both day and night, and the evaporating

troughs should be allowed to go dry; but this must be done gradually, especially if the weather should be rainy and dull; if otherwise, a slight sprinkling in the middle of the day will benefit the vines, and assist materially the setting of the fruit. Make sure that the atmosphere is neither too dry nor too wet. The small berries are at this stage in a very tender state; and if, by any neglect, they are kept too hot and dry, they will get rusted, through which the fruit will be disfigured, both before and after it is ripe. When the fruit is the size of small peas, it will require thinning. A discerning eye will soon perceive which to cut out, and which will be likely to make the larger fruit. Thin carefully, and in such a manner that when the bunch is coloured, and has finished its last swelling, it will not, when laid on a flat surface, or on the dessert dishes, give way in the shoulders and berries. This is, of course, only to be acquired by practice and careful observation. With regard to the number of bunches to be left on the vine, this must depend on their size, and the health and vigour of the plant. I advise any one cultivating the vine, whatever the variety may be, to take the weight into careful consideration. Frequent observation, from time to time, will set the gardener and amateur right in this respect.

I consider a vine four or five years old, if it has been well grown, may be allowed to bear from fifteen to

twenty-five pounds weight of fruit, depending on the variety as well as the health and strength of the plant. It is easy to understand the weight mentioned above may often be produced in four, five, six, or seven bunches. Nothing further need be said, I think, relative to the cropping of the vine than this, that it seems necessary to study and cling closely to nature. It can only be by careful attention, and taking especial pains, that we can arrive at perfection in the cultivation of the grape vine.

Everything appertaining to the sound basis on which Sir Humphry Davy worked should be well studied. Notice the time when he discovered the metallic base of potash (*potassium*), which was the principal cause of the field being opened to horticultural and agricultural inorganic chemistry. No sooner did he accomplish this, in 1807, than a German chemist—evidently trying to steal a march over him—by experimenting on soda discovered that the metallic base of it was sodium, by the same process as Sir Humphry Davy discovered the metal called potassium. After this, Davy discovered all the principal alkaline bases by the same means as he made use of for potash.

If the inexperienced gardener or amateur will carefully study and follow the above instructions, I have no hesitation in saying that he will meet with success, and I hope to his satisfaction. I have dwelt rather long on this branch of the subject; but I think it an invaluable

auxiliary, and ought to be understood by all who are seeking for knowledge on the cultivation of the pot vine.

GROWING AND CROPPING VINES FOR EXHIBITION.

It is thought by many cultivators, that very light cropping is the principal cause of success. A few years ago I tried the experiment on many of my vines, and left only two, three, or sometimes four bunches on each vine, thinking I should have some of them very fine. I was very much disappointed; they were not, on the average, so fine as if I had cropped in a moderate way. The bunches certainly were large, fine to look at in the opinion of some people, but not good in the eyes of first-class judges; consequently they were not awarded the first prize. Notwithstanding, I have many times seen similar large bunches, with their unripe and uncoloured berries, obtain a first prize, whilst beautifully finished bunches with large berries and fine bloom have only obtained a second prize, or else been ignored altogether. From the extensive experience which I have had, I have found it best to crop moderately, and not to go to the extreme either way. Fifteen, eighteen, to twenty-five pounds of fruit is sufficient for the vine, according to the health and vigour of the plant, which may vary in length from fourteen to

twenty-five feet, according to circumstances. I advise cultivators to calculate by the weight as nearly as possible, rather than to limit the vine to any uniform number of bunches. Some employers will insist upon their gardeners having heavy crops; and I have even known them keep on the vine every bunch that has shown itself. The consequence is, that the vines are ruined in a few years, and the houses require to be planted afresh. The cropping of young vines in pots is rather different from that of permanent vines, as the former are more of an auxiliary, and are generally intended to come in very early, or very late, so that the permanent vines may not be too much distressed by early forcing. Where very late grapes are desired, they are very useful, as it saves the constitution of the permanent vines. All who know much about the cultivation of the vine will agree with me in stating, that it is very injurious to allow it to carry a heavy crop of fruit late in the season. Back walls of vineries, or peach-houses, may be planted with strong fruiting canes, which may be fruited with success until the front or permanent vines are established. It does not so much matter if fruit is allowed to hang late on vines which are only intended to serve for a few years as auxiliaries.

THE INFLUENCE WHICH CHANGE OF TREATMENT HAS UPON VINES.

Although one practical man may succeed another in the same situation, and go on steadily with the vines which his predecessor had to manage, it does not follow that his treatment will be successful. He may make changes which will not suit the vines, until in a few years they dwindle away to such an extent that they are not worth keeping in the houses or forcing pits, as the case may be.

I well remember the present Mr. George Cunningham telling that when his father, who was the best grape-grower in the neighbourhood of Liverpool in his day, became by reason of blindness personally unable to prune, and direct the management of his once celebrated vines, they gradually became so weakened in constitution that they had to be pulled up and thrown away.

I have noticed the same thing happen in numberless instances during my long experience. This is brought about in various ways. Some give the nourishment to vines in a different way from those who have preceded them; some prune differently, and keep up a different kind of temperature. My advice to all cultivators is, that as soon as the vines begin to go back, or, in other words, to show signs of weakness, root them out and plant fresh ones. A gardener should, however, exercise great care

in this, as it is more than likely his employer will expect him to be much superior in his productions to his predecessor; whereas, if the vines are taken up for the purpose of transplanting, he will probably be without grapes for two or three years. But this can be obviated by having vines in pots, and planting strong fruiting canes against the back walls of the vineries. Another important matter to be attended to is the exact situation of the roots, so as to know where and how to feed them. What becomes of a man, woman, or child when the doctor does not understand their constitution, or know how to administer the right food, etc.? They dwindle away and die; so with the vine. When I became head gardener to the late Duke of Sutherland, at Clieveden, I succeeded a gardener who had had the management of a very old vine, and I confess I could never find out where to feed its roots, and ultimately it died, or rather became useless. I then planted good, strong young vines, which soon filled up the gap.

I consider lifting and transplanting old vines a great loss of time.

WATERING OF VINE BORDERS.

I advise that all vine borders should be thoroughly examined, inside as well as outside, to see if they re-

quire water, previous to beginning to force them. I have invariably found, that unless great care is exercised in pricking up the surface of the borders, the water will not percolate regularly down through the soil. The cultivator must be the best judge as to how much water to give the border. I would recommend, when borders require water, to do it thoroughly; I strongly object to watering by driblets, which never reach the roots. I recommend gardeners and amateurs to get an instrument made of steel, pretty much the shape of a cheese-trier or joiner's auger, about three feet long. By applying this in different parts of the border periodically, it will be seen which part requires water most, as I have found in my experience that it sometimes varies in this respect. The amateur and gardener will easily understand, after the steel trier is used and the soil drawn out, that when the earth falls off it easily it is time to prick up the surface of the border, and water thoroughly with water, say from 70° to 75°, and, if necessary, a little liquid manure in it. This advice mostly refers to inside borders. I have found that, in very dry seasons, the outside borders require equal care and attention, especially in the south of England, or indeed almost any place where the substratum is a chalk or gravelly formation.

COLOURING AND SHANKING OF GRAPES.

It is very important that grapes, whether they be black, white, or grizzly, should be grown to their natural colour. All who peruse the *Gardeners' Chronicle*, and other horticultural periodicals, may have seen from time to time that much has been written, *pro* and *con*, on this subject. Having tried many schemes, I will state what I believe to be the principal causes of failure in the colouring of grapes. Bad ventilation, insufficient heat, too much moisture, too much heat, sour and stagnant borders, or borders which have been made too rich—borders that are made too porous are very bad—a want of moisture at the roots, cold rain and snow if allowed to percolate into the borders when the stems and roots are sometimes in a temperature of from 85° to 90°. In the last-mentioned case, the same effect is produced in the vine as would be upon an individual who had his head and shoulders in a warm bed, and his feet and legs out through the window, exposed to frost and snow. Scalding the roots with hot stable manure, or drying the border too much with hot-water pipes or flues, is sure to produce bad colour as well as shanking. Cold draughts, or a sudden change of temperature, are also very injurious. This is often caused by harsh firing, or the fire perchance going out after making it up at night, and a sharp frost

setting in before morning. If vines are subjected to this treatment, the grapes are certain to shank and be of a bad colour. The fires should be carefully made up at night before retiring to rest. It may be the gardener makes up his fire all right, as he thinks, about nine, ten, or eleven o'clock at night, as the case may be, the weather being then mild, with no sign of frost or cold winds. He bids good-bye to his vines until next morning, when, as is generally his custom, he looks at the thermometer, and to his surprise he finds Mr. Frost in the vinery,—I do not mean Mr. Frost at Dropmore.[1] Excessive sulphuring of the hot-water pipes and flues, and harsh firing afterwards, will prevent the grapes from colouring, and will materially assist in bringing about shanking. All this will be readily understood by those who study nature as far as practicable. I wish particularly to impress upon the minds of all who take an interest in the subject, the necessity of strict attention to the above precautions. If they do, I have no hesitation in saying that they will produce grapes which will be an ornament to the dessert-table, and meet with the approbation of every one interested in their cultivation.

---

[1] Mr. Frost of Dropmore is a first-class grape-grower, and is head gardener to the Earl of Fortescue near Windsor Castle. This place is celebrated for the finest *Auricaria Imbricata* in Great Britain and Ireland; also for splendid *Pinuses*, which have been more than fifty years under Mr. Frost's management.

ON VINERIES.

GRAFTING AND INARCHING.

I would advise the gardener or amateur, wishing to graft vines which are permanently established in the border, to study the healthy condition of the vine he is going to graft upon. If the vine is growing in a bad border, great success cannot be expected. It is best to let the vines be started three or four weeks, to enable the sap to rise before putting the graft on, which is done in the same way as grafting an apple-tree. Care must be taken that the grafts have been in the vinery from the time of beginning to force. I recommend the cultivator to be careful not to graft a weak variety of vine on too strong a stock. For instance, I would not put white Frontignan on a Syrian or Trebbiana. Foster's Seedling, for example, would, in my opinion, make the best stock in such a case. Care is necessary to graft or inarch on a stock a little stronger in constitution than the variety from which the graft is taken. I consider Black Prince would make a good stock for the black Frontignan to be grafted upon. A little careful study will soon make the amateur and inexperienced gardener familiar with the proper method of grafting and inarching.

I have been very successful in inarching when the young vines were about two to three feet high, planted in 7 or 8-inch pots. The following directions should be

observed:—Take a sharp knife and cut a bit of wood out of the side of each plant; then, placing both vines together, so as to make the bark of each to meet, tie carefully together with matting, cover with a little clay, and a little moss over this, occasionally damping to prevent the clay from getting dry. It will be found in a few weeks that the plants have united, after which the matting, etc., may be separated. I prefer this to the other method, whenever convenient to the cultivator.

EXTENSION SYSTEM OF VINE-GROWING.

I have read a considerable amount of correspondence, which has appeared from time to time in the different horticultural periodicals, on this subject, and I have tried it myself, but I cannot yet be persuaded that it is wise to adopt it as a rule.

It gives a fine appearance, and it is pleasant to have an opportunity of seeing grape vines loaded with clusters of fruit, under the rafters and sashes of an extensive and handsome structure. I would therefore advise those who take a fancy to this method of cultivation to limit themselves as to space, otherwise it is just possible the vines may be found receiving nourishment from their neighbour's property, and, as a matter of course, the grapes may thus be grown partly at their neighbour's expense.

I have known roots of vines grow through the border made for them, across a large kitchen garden, then through and underneath the foundations of the garden wall, crossing the vegetable slip, then underneath a broad walk, through a considerable width of shrubbery border, and into the park beyond, where they were feeding on the constituents of a rich, turfy sod.

The success of the vine grown on this rambling system will depend in a great measure upon the climate, drainage, and soil. I have been given to understand that the noble vine at Hampton Court has for many years received its nourishment from the vicinity of sewers, drains, and foundations composed of bricks and mortar, showing clearly that the vine roots are not under the gardener's control, and that therefore he cannot be responsible for the small bunches it sometimes bears.

CAUSE OF CANKERING AT THE BASE OF YOUNG VINES IN POTS AND IN BORDERS.

I have occasionally been disappointed with young vines. When they have attained a considerable thickness, they begin to canker at the base of the stem. When such is found to be the case, the plant may be thrown away, and replaced with another. I invariably traced this to excessive watering. Sometimes it was

attributable to bad drainage, and occasionally it arose from a flat crock being placed over the hole or holes at the bottom of the vine-pot. In such cases, if the vine should be in the hands of an unskilful gardener, who waters carelessly, and does not take the trouble to examine the soil in the pots, or test the drainage, before giving the plant water, decay very soon appears. Little does he think of the mischief his want of proper care and attention is causing. Stagnation at the roots, which is mostly brought about through excessive watering and bad drainage, will kill any plant. A tank or pond of stagnant water does not suit the lily so well as a gentle stream of water; neither does too much water suit the vine.

PACKING GRAPES FOR LONG JOURNEYS.

There are several ways of packing grapes for travelling. I recommend that very large bunches should be packed in very dry, sweet wheat bran. Smaller bunches may be packed in stiff cartridge paper, as close as possible without squeezing the berries. After tying each bunch neatly, pack the bunch or bunches tight together in a box with clean, dry, chopped wheat-straw, taking care to fill up every crevice, which may be done with the fingers; and before putting the lid on, the chopped straw should be gently pressed down, so that if the box does happen to

get knocked about on the journey, the grapes will not often get injured, and will arrive at their journey's end with nearly all the bloom on.

I have sent grapes in the latter way to the Pope of Rome; the late Emperor of the French; the Duke of Brabant at Brussels; the Emperor of Germany, when he had his headquarters at Versailles during the German and French war; the late Emperor of the French when he was confined at Wilhelmshoe; Her Majesty at Osborne House, Isle of Wight; the late Baron James de Rothschild in Paris, Ferrière, Berlin, and Hamburg; besides many other important personages residing a long distance off. They always arrived in good condition, which I have letters by me to prove, if it were necessary.

CULTIVATION OF VINES IN FORCING PITS CONFINED TO THE INSIDE.

It is a good plan to use forcing pits for the vines, where they can be spared, as in this way very heavy crops can be obtained both early and late in the season. This method will also prove a great saving to the permanent vines, and with the assistance of the pot vines, grapes may be had all the year round. They can be fruited heavily three, four, or five years, and, if then exhausted, thrown away, and young ones planted.

Before beginning to force them, the soil on the surface should be occasionally renewed. Vines planted in pits should be treated in the same way as pot vines, so far as temperature, etc. is concerned. This is dealt with in another part of this work.

SELECTION OF VINES FOR GENERAL PURPOSES.

There are hundreds of varieties of vines, in this and foreign countries. I have thought it sufficient, however, to enumerate only a few which I have found from my own experience to be most useful :—

EARLY HOUSE.

Black Hambro'.
Foster's Seedling.
Buckland Sweetwater.
White Frontignan.

SECOND EARLY.

Black Hambro'.
Muscat of Alexandria.
Snow's Muscat.
Black Prince.

THIRD HOUSE.

Muscat of Alexandria.

LATE HOUSES.

Meredith's Alicant.
Lady Down's.
Barbarossa.
West St. Peter's.
Muscats.
Gros Colman.

GENERAL COLLECTION.

Black Hambro'.
Alicant (Meredith's Var.).
Barbarossa.
Black Prince.
Muscat, Snow's Black.
Mill Hill Hamburg.

GENERAL COLLECTION—*contd.*

Lady Down's Seedling.
Madresfield Court.
Mrs. Pince.
Black Frontignan.
West St. Peter's.
Black Damascus.
Trentham Black.

WHITE.

Muscat of Alexandria.
Buckland Sweetwater.
White Frontignan.
Foster's Seedling.
Royal Muscadine.
Trebbiana.
White Tokay.

MILDEW ON THE VINE.

(*Odium Tuckerii.*)

Mildew is a fungus, and imparts a whitish appearance to the leaves, bunches, and stems of vines. 'It robs the plant of its juice, and interferes with its respiration. There seems to be every reason to believe that the fungus is communicated to the plants from the soil. Every specimen of these fungi emits annually myriads of minute seeds, and these are wafted over the soil by every wind, vegetating and reproducing seed if they have happened to be deposited in a favourable place, or remaining until the following spring without germinating. These fungi have the power of spreading, also, by stooling or throwing out off-sets. They are never absent from the soil, and at some period of their growth are annually to be found upon the plants liable to their inroads. They are more observed in cold, damp,

and muggy seasons, because such seasons are peculiarly favourable to the growth of all fungi.'—*Cottage Gardener's Dictionary.*

Mildew is generated in vineries through a close, damp, chilly atmosphere, combined with an insufficient circulation of air and heat, caused by the temperature being kept too low. The practice of growing a variety of plants in the house with the vines is another and invariable cause of mildew. The plants require continual watering, and a somewhat close atmosphere and low temperature, which is altogether unsuited to the vine. The two cannot be grown together. Mildew often makes its appearance in summer-time, when there happens to be a continuance of cold, wet weather. At such times it is almost certain to appear, unless a brisk heat, with a dry atmosphere and a free circulation of air, is kept up. I have been able to prevent this disease from making havoc amongst my vines without having recourse to the use of sulphur on the foliage, stems, and fruit. Where this is resorted to, it necessitates the grapes being rinsed in water before they can be sent to table; as a matter of course, the bloom will be injured. To prevent the bloom from being destroyed, therefore, I advise that when mildew makes its appearance, sulphur should be applied to the pipes or flues, as recommended in the case of red spider. The same treatment of course will answer for both pests, although the one is an insect and the other a fungus. It may be observed that, as

soon as the fungus is killed, it assumes a brown appearance. These harsh measures must not be resorted to, however, until the grapes are about stoning, or just as they are finished stoning. After the destructive disease is destroyed, great care will be necessary in giving ventilation. A brisk temperature should be kept up, not exceeding 85° in the sun, and air allowed to circulate freely. It is also advisable to have air on night and day, except in boisterous and cold weather.

I have never had great difficulty in keeping my vines free from this pest. It cannot exist long in a sulphurous atmosphere if the remedy above directed is applied. I should warn my readers, however, that the fumes of sulphur will seriously injure all tender plants which happen to be in the vinery, such as ferns and other delicate foliage plants, and will also stain and disfigure any flowers which may be developed. All such should therefore be removed before the sulphur is applied.

GUMMING IN THE STEMS OF THE BUNCHES OF GRAPES AND SHANKS OF THE BERRIES.

This, in my opinion, is caused through excessive moisture at the roots after the fruit is ripe. To prevent it, it is necessary to employ glass lights, shutters, slates, tiling, etc., to protect the borders from cold, rain, frost, and snow.

The two extremes of temperature in the house and in the border will bring about this exudation of matter. I suffered serious losses before I got lights and shutters. Those who are interested in horticulture, and have studied nature and the constitution of the vine, will soon understand that, as the border gets saturated with cold rain and snow, the sap and juice in the roots will beat a retreat and take shelter in the warmth of the house, where the heat is kept up for the purpose of expelling moisture and preserving the grapes.

HOW TO KILL AND KEEP IN CHECK RED SPIDER ON VINES.

(*Acarus tellarius.*)

Red spider makes its appearance in some quarters every season, and many gardeners and amateurs have the greatest difficulty in dealing with this destructive little pest. Many times my readers may have noticed the red spider on numberless trees, strawberries, violets, and other plants surrounding the vineries. This insect, I may say, is one of the greatest enemies we have to battle with, and therefore I shall be as careful as I possibly can in describing how to kill and keep it in check. In order to kill the old spiders, it would be requisite to apply the fumes of burning sulphur,

but this would destroy the vines. Growers have, therefore, to be very careful how they use sulphur. As soon as the grapes have nearly finished stoning, I mix unslaked lime with sulphur of the best quality and water, in the following proportions:—One medium-sized lump of lime to a bucketful of water and 2 lbs. of sulphur; stir and mix it all together, making it the thickness of paint; then with a whitewash brush paint about two-thirds of the surface of the hot-water pipes or flues. I have adopted another plan with success, viz. pouring cold water on the pipes and flues, and then dredging them with as much powdered sulphur as can be got to stick on the pipes, but only a slight scattering on the flues. Care must be taken that the flues are not made too hot, as they are liable to set the sulphur on fire, which would destroy both fruit and foliage. Choose a still night for the operation. If the atmosphere is moist and dull, so much the better; the fumes then stay longer in the house, and are therefore more dense. I advise to begin about four o'clock in the afternoon to push on the fire, getting the pipes very hot by the time the sun has gone down, so as to raise the temperature the first night to 85° at eleven or twelve o'clock at night; but this temperature must not be exceeded. Examine the leaves carefully next morning with a magnifying-glass. This will enable you to find out whether the spiders are destroyed or not; if not, repeat

the process the following evening, raising the temperature, however, to 90°. If the enemy still remains, try again the third evening, keeping the temperature the same; and if these directions have been adhered to, it will be found that few insects will remain alive. The temperature must be carefully watched, so that it does not get higher than 90°.

All this is rather tedious for young gardeners and amateurs, but I have had to do it myself before I could keep the pest in check. Either of the above methods will, no doubt, frequently succeed in destroying it (and syringing may keep it in check to some extent), but both injure the beautiful bloom which every one is desirous of having, whether the grapes be black, white, or any other colour.

N.B.—Take care that there is no moisture in the house when sulphuring for red spider.

THRIPS (*Andonidum*).

Thrips are among the worst pests to which the vine can be subject, and the destruction they effect is something fabulous. They are generally brought into vineries by the introduction of Azaleas and other plants.

To keep vines clear from thrip, bug, and other insects, it is necessary that the plants should be kept apart; if they

are not, the gardener will be sure to meet with endless trouble. When once they get fairly established in the vines, it is far better to pull the latter up, renew the border, and plant fresh ones, taking care, of course, first to wash and clean the house thoroughly, and paint all wood and iron work three or four times over, as insects creep into every crevice and increase very rapidly. If these recommendations are not attended to, there will be neither pleasure nor success with the vines.

Some gardeners, in order to get rid of this pest, begin, after the vines are pruned, to strip off all the bark; and I have seen some go so far as also to scrape the vines, which I consider a most unnatural operation. Besides this, I have seen a mixture applied, in which soft soap and turpentine predominated. I have also known inexperienced people dress the vines all over with linseed oil, the consequence being that the oil penetrated the stems until it almost killed them; and four or five years were spent in the endeavour to bring the vines round again into a state of fruitfulness, with no result. It is hardly necessary to state that oil, turpentine, and soft soap penetrate the stems of the vine to such an extent that they stop the flow of sap altogether, and consequently the plant dies. In my opinion, the bark ought not to be stript off, nor should the stems be afterwards scraped. It will be easily understood that the scorching rays of the sun act very powerfully on

vines deprived of bark—in fact, the bark is their natural clothing. Loose bark hanging a foot or two from the stem may, of course, be cut off; but the vine should not be scraped nor the bark peeled off, as is often done. Notice how noble our forest trees look with their beautiful bark, protecting the rising and descending sap. I have seen horses eating the bark off trees, but as soon as the bark is removed the tree begins to die.

Where the thrip is established, it may, with great care and watchfulness, be kept in check. This is effected by sponging carefully with tobacco-water and a little soap —1 oz. of soft soap and 1 quart of tobacco-water to two gallons of rain-water; boil the soft soap and the tobacco-water together, then add rain-water, making in all two gallons of solution. I have often found the thrip in small groups underneath the leaves, and also, as the season advances, on the tops of the foliage. In sponging the infected leaves, however, great care is necessary, as the least drop of the solution falling on the grapes will spoil the bloom and unfit them for table. I recommend smoking with tobacco paper two or three nights in succession. If this be done on a still night, it will kill the young thrip, and also tend to keep the old ones in check. There is another species of thrip (*Andonidum vitiæ*), which sometimes appears on the grapes about the time they are making their last swelling; it can be perceived more plainly on the Muscats and some

of the other white varieties. It centres itself in the flower of the berry, but cannot be detected by the naked eye until the fruit is beginning to ripen. By smoking gently two or three evenings in succession, this species will soon be got rid of. If allowed to feed on the surface or skins of the berries, it will cause them to have a rusty appearance.

RUST ON GRAPES.

This may be brought about in various ways, but I believe the principal causes to be too hot and dry an atmosphere when the vines are coming into bloom, and sulphuring too soon for red spider. Carelessness in the use of the scissors, rubbing against them, and similar treatment, will disfigure grapes, and render them unfit for exhibition, and consequently not fit for table.

To prevent rust, I have adopted the plan of not allowing the temperature of the vinery, just after the grapes are set, to rise above 80° on sunny days, with air, and about 60° to 63° at night; in dull weather, 65° to 68° with air on. Air should always be on, excepting in stormy, cold, chilly weather. Try by all means to avoid draughts.

Should the atmosphere of the house appear dry, sprinkle gently with a fine rose, after which you will have

a genial and nice growing atmosphere. Endeavour to have an atmosphere similar to that which prevails after a slight shower followed by warm, genial sunshine. This will prevent rust. I may mention here that I once applied, without sufficient thought, a mixture of sulphur and lime over the pipes by way of paint, for the purpose of killing red spider. Unfortunately I left it on until the next season, and thinking there was little or no strength in the sulphur, I commenced forcing in the following spring, without first scraping off the mixture which remained on the pipes. As soon as the grapes were in flower and setting freely, I had occasion to raise the temperature considerably, when, after the berries had attained the size of peas, I found all the tenderest-skinned varieties, such as the black Hambro', and the white and black Frontignan, rusted, and the delicate shanks of the grapes and also the stalks of the bunches stained, which made them unsaleable and unfit for the table. Alicant, Lady Down's, and the thick-skinned varieties stood best.

CAUSE OF EXUDATION UNDERNEATH THE LEAVES OF THE VINE.

To prevent this from taking place, great care must be exercised in the ventilation. The airing of the

house must not be neglected, nor the atmosphere kept too moist in dull weather. Where there has been a very rapid flow of sap in the vine and its foliage, with a powerful microscope it may seem that there has not been sufficient foliage to elaborate the sap, as I have invariably found, where there has not been sufficient foliage, the vines have suffered to a great extent. It is also my opinion that, if the roots run away in cold clay, especially where the drainage is defective, it produces warts on the vines. The inexperienced gardener and amateur must study nature very carefully, which will be of great assistance to him not only in the cultivation of the vine, but in every branch of horticulture.

It will be found, after sulphuring for the purpose of killing the red spider and mildew, that the warts on the foliage will all be turned brown and black. After this has been effected, I have not seen them appear again the same season.

HOW TO KILL MEALY BUG.

This tiresome pest is well known to all gardeners. It increases at a most rapid rate, — so much so, indeed, that if the cultivator has not sufficient means at his disposal to enable him to keep it under, it becomes very disagreeable to those who have to handle the flowers it

happens to be on, and still more so to those who have to eat the grapes, or other fruit which has been infested by it; and it thus becomes a perfect nuisance.

If spirits of naphtha be applied carefully with a fine camel's hair brush, the least touch will kill the insect. After using the spirits, I recommend sponging the plant with a little soft soap and water. If these precautions are repeated once a week or fortnight, as may seem necessary, it may be kept under control. I would also advise to give the house containing the fruit or plants a good cleansing once a year at least, and a coat of paint, or two coats if necessary.

CAUSE OF AIR ROOTS.

I am of opinion that where too many of these are seen, it is a sign of too much moisture being kept up in the vinery. What would cause them to increase at a rapid rate on the vine would be there being too great a difference between the temperature of the outside border and the atmosphere of the house,—in other words, not sufficient root-action in the outside border. I would advise the amateur to use a bottom-heat thermometer, which will always enable him to find the temperature of the inside as well as the outside border; both of which

should be as nearly as practicable the same. It will easily be understood by practical gardeners, that too much confined moisture in the atmosphere of the vinery will bring down roots from the vines, however good the condition of the borders may be.

WEEKLY CALENDAR OF OPERATIONS.

JANUARY.

1*st Week.*—Grapes that still remain hanging on the vines must be kept perfectly dry and well aired. These are better off the vine if there is sufficient room to put them in bottles, as recommended in another part of this book. They ought to hang in a dark room where the temperature is about 45° to 50°. Look frequently over the bunches to remove decayed berries.

Considerable care is necessary in maintaining a genial atmosphere for vines now breaking. The principal evils to guard against at this season of the year are too much moisture and the want of proper ventilation; as it is impossible for the vine, or indeed any other hard-wooded plant, to form a healthy leaf in an atmosphere saturated with an excess of moisture, and deprived of a free circulation of air. It should therefore be the object of the gardener and amateur, at this season of the year, to keep a moderately moist atmo-

sphere in the house, and a free circulation of air. The outside border should be examined, and raised to a temperature of 65° to 70°. In order to exclude snow, frost, and heavy rains, use lights or wooden shutters, or any other materials convenient to the cultivator. The day temperature should range from 63° to 68°, allowing a rise of 8° or 10° in sunshine, and from 55° to 60° at night. At all times have air on at night, except when stormy and cold.

Succession vineries should be pruned and dressed as the crops are cleared off, and no time should be lost in whitewashing the walls. Wash and paint all wood and iron work, and make ready for starting in succession as the fruit is required. Watch carefully the thinning and stopping of vines in pots, ventilation, top-dressing, etc.

2d Week. — The shoots in the early vinery will now have grown considerably; and if sufficiently advanced in length, their points should be pinched off, taking care to leave two joints above the bunch. Tie them very cautiously in their proper position, not too tight, as the breaking of a shoot would interfere very much with the symmetry of the plant, as well as injure it. The moisture should be gradually reduced as the foliage developes—see 1st week's calendar. The succession-house should be brought forward gently. If the weather is mild, it will render fires necessary by day only. Keep the paths and dry surfaces sprinkled, and the vines

syringed occasionally, in order to promote the regular swelling of the buds. In pruning, those who are desirous of growing their own vines should reserve a sufficient number of the best ripened eyes for propagation. They keep best with their ends plunged in old cocoa-nut fibre or old bark.

3d Week.—Reduce the moisture in the early vinery as the vines come into bloom, as it is essential to the dispersion of the pollen, and consequent setting of the berries, to have a comparatively dry heat at the season of flowering. The night temperature, when the vines are in bloom, should be from 65° to 68° or 70°, and 72° to 75° on dull days, or thereabout; and if it is sunny weather, the thermometer may run up to 78°, 80°, or 82°. Take care to have air on; bear in mind here what is one of the causes of rust mentioned in a previous page of this treatise. Such varieties as Muscats may have 4° or 5° more heat. See that the outside borders are well protected from the cold weather, as a sudden check at the roots, when the vines have arrived at this stage, will prove very disastrous.

4th Week.—As succession vineries are brought into work, they will require the same progressive treatment as stated in the previous calendars, starting with a night temperature of 45° or 50°, according to that outside.

ON VINERIES.

Keep the vines well syringed, and all dry surfaces well damped. Take care to prune all vines directly the fruit is cut. Pay strict attention to the watering and top-dressing of the roots; also ventilate with care.

FEBRUARY.

1*st Week.* — Maintain a steady temperature in the early vinery, and take every advantage of sunny days by giving air by degrees early in the day; reducing also by degrees will prove beneficial to the vines, and save fire heat. In the case of the black Hambro', as soon as the crop is thoroughly set, any surplus bunches left previous to their setting should be cut off at once, and the berries carefully thinned on the remaining bunches, when grown sufficiently to show which are likely to swell off; but Sweetwaters, Muscats, and others require time, or many berries will be found apparently set, which, through imperfect fertilization, never swell at all. In thinning, avoid handling the bunches or rubbing the berries with the head, hands, or scissors. Stop all lateral shoots in succession vineries, selecting only those to remain growing from the main stem; also tie the shoots in, to admit as much light as possible.

2*d Week.* — It is now high time to treat with the

late vineries, and where it is desirable to have grapes fresh and plump, after Christmas a house should be devoted to this purpose. If the kinds selected are the true varieties,—Meredith's variety of black Alicant, Lady Down's Seedling, Mrs. Pince, black Muscat, Madresfield Court, Muscat of Alexandria, Barbarossa, and several others, which can be found in my vine catalogue, and in those of other nurserymen,—the desired end can be easily attained. I may add that the grapes should be thoroughly ripe by the first or second week in September, so that they may keep well through the winter months. Bring on successional houses gently. Pay every attention to the regulation of fire heat, and a free circulation of air. The bunches in the early vinery will now require thinning, which should take place as soon as the berries are as large as small peas. Keep the atmosphere moderately moist by filling the evaporating troughs, and sprinkling the paths, border, and walls. Whilst thinning, leave the berries which have the thickest stalks, etc.

3*d Week.* — In the early vinery, finish thinning the bunches as soon as possible. I have sometimes thinned before the bunches have come into flower; but I don't advise the inexperienced gardener or amateur to do this, unless he is perfectly confident the vines are in good condition as to health, etc., having previously fixed on the number to remain, in determining which their

strength and capabilities must be carefully considered. It is always better to have a moderate crop than to be too greedy in this respect, as it tends very much to weaken, and ultimately ends in the ruin of, the vine. Now that the fruit is set, more moisture is necessary, which can be easily accomplished by frequently sprinkling the paths, border, and all dry surfaces in the house as before directed. On sunny days, as the air is being reduced, keep a sharp look-out with regard to damping; a slight circulation of air must also be kept up, and every advantage taken of sunny weather to save fuel. The temperature on sunny days may be from 83° to 85°; on dull days, 72° to 75°—with air in both cases. Night temperature, 63° to 65° at nine P.M., and not lower than 60° at four or five o'clock the next morning. In boisterous and very frosty weather, it would be as well to have a sofa in the vinery, as it would not be safe to leave the grapes during the night. I have sat up all night scores of times watching the temperature in bad weather, just as anxiously as a captain of a ship with a valuable cargo. Let the air be given and taken away by degrees. Some, without thinking, introduce a large quantity into the house at once, and the vines are consequently exposed to a sudden chill. Fancy ourselves perspiring in a hothouse, and then going out into a frosty atmosphere. Vineries now starting will require frequent syringing and a genial growing atmosphere maintained

till all the buds are fairly on the move. Notice previous advice.

4th Week.—Where a stock of vines is required, either for planting or fruiting in pots, this is the most favourable time for propagating them. Take care to select from well-ripened wood. In making cuttings, leave half an inch of wood on each side of the eye, removing the bark from the lower side by a clean cut. Place the buds in 2½ to 3-inch pots, the eye uppermost, barely covering it with the compost. Dry, turfy loam, leaf mould, and a little silver sand, is the best material to start with. The pots will then require plunging in a bottom heat varying from 60° to 70°, which may be raised in two or three weeks 5° higher. See article on the cultivation, etc. of pot vines.

MARCH.

1st Week.—Strong young vines, the first year of bearing, when left any considerable length, are difficult to get to break regularly. Bend them carefully backwards in a circular position, so as to allow the eyes at the lower part of the vines to break evenly with those at the top, after which they may be trained in their proper position. The succession vineries must have the re-

quisite disbudding and training and other houses brought forward. The outside borders may require adding to; if so, especial care must be taken to attend to this. If there is no other means of warming the vine border, use fresh stable manure, which will cause a moderate warmth. Cover this over with wood shutters to throw off snow, rain, and frost. First, second, and third houses will require warmth in this or *some other* way. See instructions in another part of this treatise.

2d Week. — During the cold winds of this month, some difficulty will be experienced in managing the admission of air, as its direct action on the leaves of the vine is very injurious. Notice article on the shanking and colouring of grapes. Keep up, in all cases, a moderate amount of moisture, except when the plants are in bloom; damp slightly if the day is hot, and the atmosphere appears very dry. Attend to disbudding, stopping and tying in the shoots of the vines now breaking.

3d and 4th Weeks.—During bright weather, some of the tenderest of the vines in the early vinery may get scorched. In this case, keep the foliage as hardy as possible by proper attention to ventilation. The same conditions are very likely to bring out red spider, particularly in the earliest vinery, where forcing has been carried on for some time. The best way to keep this

insect in check is to paint the hot-water pipes with powdered sulphur of the best quality. See article on red spider in another part of this treatise. Keep a steady heat in the early vinery, where the grapes are now stoning, not neglecting to maintain the necessary degree of moisture by frequent sprinklings. Pinch off all lateral shoots as they appear, so that nothing may retard the final swelling of the berries. Attend to directions in previous calendars as regards the successional houses. Vines now breaking will require syringing very frequently as the season advances. To prevent the later vineries from breaking too rapidly, be sure to give the house plenty of air by night as well as by day, at the same time taking care that frost does not reach the buds. Carefully examine all inside borders, and see that they are well watered when required, using water about the same temperature as that of the house, say from 65° to 75°, according to circumstances. See article on the watering of vines with liquid manure, etc.

APRIL.

1*st Week.*—As soon as the berries in the early vinery show indications of colouring, gradually reduce the moisture, so that by the time the grapes are properly coloured, the air may be brought to a comparatively

dry state. I do not advise the sudden withdrawal of this necessary element during the colouring process, as I find a certain amount of moisture necessary to the final swelling of the berries and healthy action of the leaves. It is a very important matter to keep up a circulation of air by night as well as by day, except when stormy and cold. Pay every attention to the succession-houses by stopping and regulating the shoots as they advance, and keep up a progressive temperature in conformity with the daily increase of light and heat.

2d and 3d Weeks.—The sun will now have considerable power, and the coverings of the vine border may be partly removed, except where the crops are in an advanced state. The best plan is to take them off and allow the sun to reach the borders; and, before it goes down, to replace the coverings so as to keep in the warmth. This should be repeated every sunny day as long as necessary. Borders not covered should be carefully pricked over with a fork, to allow the heat of the sun and warm rains to penetrate them; whilst rain and snow, as well as frost, ought to be excluded. As is well known, we have very often exceedingly changeable weather in April. Keep the syringe at work, upon young vines breaking, three or four times a day, especially if it is sunny and dry, and endeavour by a moderate moist temperature to obtain a uniform growth. On sunny days, give

air freely, and, as a rule, very early in the morning. It is advisable to give it as soon as daylight appears—even if it be as early as half-past two o'clock A.M., unless the weather is chilly and draughty. Notice what I advise about air in another part of this book. In order to avoid scorching, it is necessary to have the foliage perfectly dry before the sun acts powerfully upon it. Attend to the thinning in succession-houses. This should at all times be done with especial reference to the age and constitution of the vines; and therefore, although no certain rule can be safely laid down to regulate the weight of fruit each should carry, it will be wise at all times to leave on too few rather than too many bunches. See article on this in another part of this book.

I have seen young vines ruined in a few years through cropping them too heavily the first, second, third, and fourth years, so that caution should be used for the first three or four years. In fact, care must always be exercised in the cropping of vines. Gradually reduce the temperature in the early vinery after the crop is ripe, as no artificial heat will then be necessary, further than keeping the house dry and airy, to prevent the grapes from damping in wet weather. This moderate temperature will also help to keep the fruit in a fresh state for the table for some time. Attend to succession vineries, as previously directed.

4th Week.—The principal part of the work in the early

vinery will now be drawing to a close, and what remains will consist in carrying out the directions given in the previous calendars, as everything now will be at work. The requisite attention should be paid to each advancing crop, according as the state of its growth demands. Keep a strict watch on the red spider. If allowed to become established on the foliage before the grapes are cut, it will seriously compromise the chances of next year's crop. It is therefore of the utmost importance to attack the pest vigorously when detected, so that its ravages may be stopped before the period of ripening, when the means of eradicating it cannot be so well applied. It may be kept down by carefully sponging the leaves with a little soft soap and rain-water. Of course this will require the greatest care.

MAY.

1*st Week.*—It will have been observed, in a former calendar, that I recommend, where very late grapes are required, that the vines should be retarded from breaking in the spring; yet it must be borne in mind that, after they have once started into growth, the treatment must vary according to the weather. See article referring to late grapes grown in pots. The most important part

of the vine's growth is comprised between that period and the setting of the fruit; and it is important for the formation of sound, healthy foliage, and perfect bunches, that artificial assistance be given during that stage. Black Hambro' and the more hardy grapes will require a temperature varying from 63° to 65° at night, and 80° to 85° on sunny days; dull weather, 72° to 75°; Muscats a few degrees more both night and day. As they approach the time of setting, pay attention to former calendars and other parts of this treatise. After the grapes are set, the temperature may be kept a few degrees lower.

2d Week.—Remove, as the weather permits, any fermenting material which may have been kept on the borders of the early houses. This must only be done by degrees, as it would be serious for the roots of the vine to receive a sudden check; they might get too dry, or cold rains and snow might come. Late as it is, I have seen it occur even at this time of the year; therefore it is necessary to be prepared for every emergency. After the grapes are all cut in the early vinery, syringing may be applied in order to keep the foliage healthy up to the end of the season.

3d Week.—Observe the directions given in the latter part of last week's calendar.

4th Week. — Vines for the latest crop must be kept damp by frequent syringing, to encourage the growth of young wood. Although the nights may be warmer than they were a week or two past, it will be necessary to apply a little fire heat to late vineries now in bloom.

Stop the lateral shoots made on the vines in the succession-houses, after thinning the crop, so that nothing may interfere with the swelling of the fruit. As the season advances, air in larger quantities must be given, taking care always to have a little on at night, except in cold and stormy weather. During hot, sunny days, keep the paths, walls, and all dry surfaces frequently sprinkled. This will assist to keep in check the ravages of red spider, which increases rapidly in dry, hot weather. Pay attention to article on red spider in this treatise.

JUNE.

1st Week.—Carry out the routine treatment of succession vineries as advised in former calendars. Artificial heat is still necessary both for grapes nearly ripe, and also for the latest houses, until the vines are out of bloom; and should it be wet, dull weather, fire heat will be necessary, paying attention to proper ventilation.

2d Week.—The vines in the earliest house must not be neglected because the fruit is all cut, but syringe them frequently, giving all the air possible; and should the wood not be sufficiently ripened, continue a little fire heat, with plenty of air until it is so. Should the borders, either inside or outside, be suffering for want of water, let the latter be applied sparingly, or it will induce too much growth, and unfit the vines for early forcing in the following season. In thinning the later crops, the largest bunches may be tied out a little, but as a rule I never tie out my bunches. The berries may be left thinner in late grapes, so as to admit of a circulation of air through the bunches in the dull winter months.

3d and 4th Weeks.—Take care that succession and late vines are supplied with a sufficient amount of heat and moisture to keep them growing at a healthy rate. Grapes intended to be kept through the winter should be thoroughly ripe by the first or second week in September, as it is necessary for the berries to contain a considerable amount of sugar, to keep them fresh and plump until they are required for the table. As most people know, it takes a considerable quantity of sugar to keep preserves.

ON VINERIES.

JULY.

1*st Week.*—In vineries where the crops are swelling, let the state of the borders be frequently examined, especially those that have been covered up for some time. If the soil is dry, let the surface be carefully loosened with a fork, and watered properly, taking care to water with liquid manure, not too strong, at a temperature from 70° to 75°. Examine the bunches of swelling crops, and remove the small berries, which only spoil the appearance of the bunch if allowed to remain.

2*d and* 3*d Weeks.* — One of the most important things to be attended to is to keep insects in check, and if possible, to kill them all. Where this has been properly attended to for the last few months, the bloom of the grapes will remain uninjured, and the appearance of the fruit will, by this time, be considerably advanced. It is essential that the foliage of the late vines should be kept in the highest state of health to the latest possible period. Attend when necessary to the watering of inside borders; and if those outside (which may be covered with lights or shutters) require it, by all means attend to them with this necessary element, which may contain all the constituents of the plant in solution; but do not administer them in an excessive quantity. Let the temperature of the liquid be about the same as above.

4th Week. — The information in the last two or three calendars will answer the purpose for this week.

AUGUST.

1st Week. — As the grapes in the late vineries finish stoning, the borders, both inside and out, should, if it is necessary, have a thorough watering. They should be very carefully tried, seeing that it will not do to apply water when it is not required, as the issue would very likely be red bunches, shanking, etc. See article on shanking, etc. All grapes properly ripened and matured by the end of the first or second week in September not only keep better, but are considerably superior in flavour to those ripened much later in the autumn. A slight mulching of leaves or dung is very useful during summer in preventing excessive or sudden variation in the state or temperature of the soil, and the cracking of the ground, and consequent injury to the roots, in hot, dry weather. The vines in earlier vineries, on which the grapes are beginning to ripen, should be gradually inured to a free admission of air, always taking care to avoid draughts.

2d Week. — When ripe grapes are hanging on the vines, a gentle fire should be used in damp weather, so

as to expel the moisture. Take care to put on a due proportion of air, in order to allow the evaporation to escape, and to keep the moisture, as much as possible, from collecting in the bunches, or the thin-skinned varieties of grapes will soon decay. It is a mistake to have greenhouse or any other plants, occasionally requiring water, under vines.

3d and 4th Weeks.—Pay every attention to the stopping of any young shoots, as there will not be sufficient time for them to ripen before the vines require pruning, and they only tend to keep the bunches too dark, and thereby encourage damp. I may add here that it is not wise to stop too closely the lateral shoots of vines which may be growing vigorously, as many of the eyes in the main stem, or rod, are liable to burst in such cases.

SEPTEMBER.

1st Week.—Continue fires to vineries containing ripe grapes, merely sufficient to keep out damp; beyond which, however, in this case heat is not necessary, as, when once ripe, the cooler they are kept, consistently with keeping the leaves healthy, the longer they will keep without shrivelling. Remove decayed berries before

they infect the adjoining ones, and stop immediately any laterals or shoots that may make their appearance after this.

2*d Week.*—Where vines are intended for very early forcing, they should be pruned and dressed and prepared immediately for their work, if not already done; I mean the pot vines more especially. If the house requires painting or whitewashing, have it done at once, as cleanliness is half the battle. See article on pot vines.

3*d and* 4*th Weeks.*—Should the foliage of the ripe grapes be too thick, and tend to create damp, so as to prevent the grapes from keeping, the leaves may be taken off as fast as they turn yellow. This will admit more air to the fruit. Get everything in readiness for starting the early vinery about the beginning of November; that is, if there are no pot vines for the first crop, and the early permanent vines are obliged to be forced. Keep fires to houses containing ripe fruit; for which see former directions.

OCTOBER.

1*st Week.*—Attend to the pruning and dressing of vines in succession-houses; whitewashing, painting,

sweeping boilers and flues, so that the houses will be in a sweet and wholesome state, perfectly free from insects, and ready for forcing when required.

2d Week.—If grapes are required to be ripe by the middle of March ensuing, the pot vines must be at once placed in the forcing pit and tied to the wires in a horizontal position, so that they will break evenly. Plunge in a nice, genial bottom heat. Take every advantage of the sun; we get precious little of it in Lancashire. See article on vines in pots.

3d and 4th Weeks.—Where grapes are now thoroughly ripe in late vineries, they will require a little fire heat daily, to keep the houses dry, and prevent the berries from becoming mouldy. Where, however, they are fully ripe, no more fire heat should be employed than is sufficient to effect that end, as the berries will remain longer without shrivelling in a moderately cool and dry atmosphere than in one overheated.

NOVEMBER.

1st Week.—All the vineries from which the fruit is cut will by this time be converted into greenhouses, unless there is sufficient accommodation otherwise, in

the shape of plant-houses and frames. Vines and other plants cannot be well grown together. Vines require to be kept cool and dry, and plants want very nearly the same treatment; frost, however, must be carefully excluded. If plants are to be kept through the winter in vineries, great care should be taken to keep them free from insects. As the leaves of the vines ripen, let them be removed, pinching them off at the apex of the leaf, and leaving the foot to fall off, which it will do freely as the wood becomes ripe.

2*d Week.*—Go on syringing the vines in the early vinery two or three times a day with tepid water; if the weather is wet and gloomy, damping dry surfaces in the house will be sufficient. If the nights are warm, much fire heat will not be needed, yet sufficient heat and a circulation of air will be required to prevent the atmosphere becoming stagnant, which brings about mildew, — in other words, the vine disease in the vineyards abroad, and in the hop-fields, wherever they may be.

Proceed with cleaning and putting the succession vineries in a fit state for forcing.

3*d Week.*—Those who prefer forcing vines in pots should, in order to forward them as much as possible, plunge them in a slight bottom heat, with a night temperature from 48° to 50°, on sunny days from 65° to 70°,

and from 55° to 60° on dull days; and if the weather will allow it, always have a little air on, and treat them as permanent vines. With this exception, they may be kept a few degrees warmer.

4th Week.—The cold weather will now render it necessary to have fires in the early vinery; but keep up a moderate heat until the buds begin to swell,—about 45° to 48° night temperature, 55° on dull days, 65° on sunny days, except in cold, chilly, and stormy weather. Syringe as often as the atmosphere is dry. This will, of course, depend mostly on the weather; sometimes the fire heat will have to do with this if it has been neglected. Late grapes will require keeping cool and dry. Don't let frost get to them, look out for any decayed berries, and give plenty of air on all occasions when opportunity offers.

DECEMBER.

1st Week.—Lose no time in putting any forcing-houses in order for immediate work. When the time for starting them respectively arrives, prune all vines at once; and, when the crop has been taken off, dress them with the mixture previously recommended. See that all whitewashing and painting is done which appears necessary;

remove all filth and insects which may remain; cover outside borders from cold, wet weather, and study nature as closely as possible.

2d Week.—The shoots in the early vinery will be getting forward, especially the vines in pots, where they have been started according to directions given in this book. Notice previous directions about the keeping of late grapes. Be sure and keep a cool and dry atmosphere, and cut out all dry berries, and take off all leaves which have turned entirely yellow.

3d Week.—If the vines in the earliest house are in full leaf, the temperature should be increased to 55° or 60° at night, and 65° or 72° on dull days, with a little air. Sunny days, 80° to 83°. Notice what has been advised in other parts of this treatise.

4th Week.—Great care and attention must be exercised in giving air during frosty weather, as this will injure the young and tender foliage. Keep up a moist atmosphere; but as the leaves mature, discontinue syringing. Succession vineries will want the usual damping, with a temperature according to their stages of growth. Look over late grapes, and remove all decayed berries and yellow leaves.

COMPLIMENTARY LETTERS.

St. James's Palace, S.W.,
4th January 1869.

Sir,—Before leaving Osborne I had the pleasure of sending you two photographs of the grapes as taken for Her Majesty. I am sorry to say I do not think they have done them justice, but they were not able to do them out-of-doors on account of the weather.—I remain, Sir, yours faithfully, W. Cullen.

Mr. Meredith.

Kensington Palace, *9th December* 1870.

Colonel Airey is desired by Princess Mary Adelaide to return Mr. Meredith Her Royal Highness' best thanks for the magnificent grapes he kindly forwarded to her through Mr. Chamberlain on her birthday.

Cabinet de L'Empereur,
Palais de St. Cloud,
20 *Août* 1864.

Monsieur,—L'Empereur a reçu à Vietry les raisins que vous lui avez fait parvenir par l'intermédiaire de M. Smith. Ils ont été trouvés beaux, excellents, et d'autant plus remarquables qu'ils étaient précoces. Sa Majesté a été forte sensible à cette gracieuse attention de votre part; Elle me charge de vous remercier et de vous offrir comme un faible témoignage de la satisfaction sa médaille jointe à cette lettre. —Recevez, Monsieur, l'assurance de ma consideration distingué. Le Sinateur, Secrétaire de l'Empereur, Chef du Cabinet,

Mocquard.

Mr. Meredith.

COMPLIMENTARY LETTERS.

CAMDEN PLACE, CHISLEHURST, KENT,
10 *Janvier* 1871.

LE COMMANDANT DUPERRE, Aide-de-Camp du Prince Impérial, a l'honneur d'informer M. Merédith que les magnifiques raisins qu'il a eu l'attention d'envoyer à l'Impératrice, sont parvenus à leur destination.

Le Commandant Duperre est chargé de transmettre à M. Merédith les remerciments de sa Majesté.

---

76 VIA DEL BABNINO, *7th April.*

MONSIGNOR STONOR presents his compliments to Mr. Joseph Meredith, and begs to inform him that he presented this morning to the Pope the box of grapes, which only arrived yesterday in Rome.

His Holiness was graciously pleased to accept them ; and requested Mgr. Stonor to write and thank Mr. Meredith for them.

Although so long on the road, the grapes were in very good condition.

CROMWELL ROAD, 14*th November.*

LADY DERBY wishes she could sufficiently express to Mr. Meredith her thanks for his great kindness. She received from Mr. Wills, late yesterday, the magnificent present of grapes sent her by Mr. Meredith, and which indeed deserved any prize. Lady Derby returns her warmest thanks for this most beautiful and excellent fruit. She is, however, still more desirous to express how much she is touched by Mr. Meredith's kind remembrance of her, for which she is indeed truly grateful.

OSBORNE, 22*d January* 1869.

MY DEAR SIR,—I received the box with the handsome present of grapes you sent me, in very good condition. I must say you adopt an excellent system of packing; for there was scarcely a berry injured, nor even the bloom displaced, notwithstanding the knocking about

they must have gone through before they reached here. The box having gone to Ryde instead of Cowes, was carried from there to Osborne on the shoulders of a railway porter,—distance of seven miles. You will be pleased to accept of Mrs. MacPherson's best thanks for the grapes. I daresay you will have many of your vines showing good buds by this time. We are experiencing better weather here at present than you and I had the day before Christmas near the Swiss College. My wife and family join me with kind regards to you, and wish you *much success* at the shows with your splendid grapes.—I am, dear Sir, yours very sincerely,

JOHN MACPHERSON.

MR. MEREDITH.

VERULAM, WALLASEA,
BIRKENHEAD, *7th September* 1869.

MAJOR WALTER tenders Mr. Meredith his warm congratulations at his success at Hamburg. The Queen's Prize is a worthy trophy, and abundantly earned by Mr. Meredith's triumphant success in grape culture.

J. MEREDITH, Esq., Garston.

PENNANT HOUSE, BABINGTON,
To JOSEPH MEREDITH, Esq. *3d October* 1874.

DEAR SIR,—I received the grapes quite perfect, and certainly I never beheld any finer grown or more beautiful in colour, and the flavour is most delicious. Indeed, you have carried the growth of grapes to perfection such as was never done before, and have made yourself an European name standing higher than any other grower.

The gold medal awarded to you in Belgium is a great honour, and adds another triumph to the awards given to you in so many other places.

Believe me, I show them to my neighbours with great pleasure. Accept my assurance of esteem and best wishes of, dear Sir, yours truly,

JOSEPH MAYER.