Plants growing in it are not unlike animals placed among food of excellent quality, frozen so hard that they cannot bite it. The action of such alkaline matter as is obtained by burning is immediately to render soluble that which was insoluble, and so to convert the vegetable food actually stored in the ground into a form on which plants can freely feed. The true plan of clearing and preparing such land is to fire all the vegetation, standing if possible, in order to save labour, but at all events to fire it and distribute the resulting ashes over the surface of the spongy peat, which forms the soil; the operation being followed by ploughing and such other operations as will suggest themselves to every farmer.

It is known to many farmers, though not to everybody, that skilfully reclaimed peat is among the richest of all soils. Peat, indeed, and wood-ashes, properly mixed, form a manure equal to that from cows. An interesting instance of this effect is mentioned by Dr. Dana, with which these remarks may be concluded:—

"Mr. George Robbins, of Watertown, is an extensive manufacturer of soap and candles and of starch, and still better, a man who employs the refuse of those trades in enriching and gladdening his land. For four years, and it is believed his crops will compare with any of the best cultivators around him; he has not used a spoonful of manure made by any animal, walking either on two legs or on four. He keeps 11 horses, 4 cows, 100 hogs; he uses not a shovelful of their manure, but selling that, he uses peat and swamp muck, mixed with his spent barilla ashes. The proportions are, one part of spent ashes to three of peat, dug up in the fall, mixed in the spring. After shovelling two or three times, it is spread and ploughed in. The effect is immediate, and, so far, lasting. The effects of these spent ashes alone on sandy loam are excellent, it makes the whole quite 'salvy.'"

THE KILLOGIE;

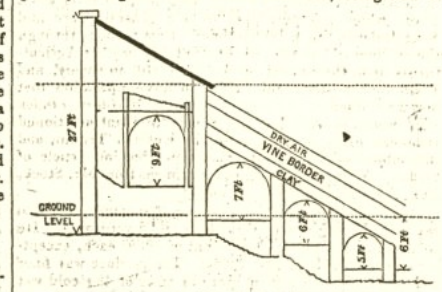
A SUBSTITUTE FOR FERMENTING MATERIALS IN HOT-BEDS, AND FOR PIPES, FLUES, &c. IN HOTHOUSES.

(*Concluded from page* 608.)

But, connected with the killogie, as applied to heating Vineries, I must say something of the construction of the Grape-house and border, for early forcing especially, but for the finer sample of Grapes at all seasons. Take up any gardening book, and under the head "Grapes" I will guarantee you to find the following prime order:—"Be sure to have the bottom under the Vine-border well drained;" and as some will, no doubt, think this quite unconnected with the killogie, and consequently foreign to the subject in hand, I can only entreat such to have patience a while, and they shall see that this is the principal part, for I mean the killogie to strike at the root of the Vine; and therefore, not contented with having it in the Vinery and under it, I must get it, if possible, under the Vine-border—taking, therefore, the above text, "Be sure to have the bottom well drained." Now, this is all very well in its way, and has done very well in its day; but as I have proved it to be a much better way to drain the top of the Vine-border, I should dispense with any drainage under, and, on the contrary, put a foot thick of clay, grout, or puddle, to keep the moisture in the Vine-border from entering the vaulted chambers under it: by this you will see that I mean the Vine-border to be very high, and regularly cellared under, for the following reasons:—When you see a man elevate the glass roof of a Vinery to an angle of about 30° to meet the rays of the sun at nearly right angles, and after securing excellent under-drainage, and some crack compost, you will no doubt think as I have done often, that such a man is doing well. Strange enough, he could clearly see the necessity of the steep roof, yet ever and anon had a mote in his eye in looking at the Vine-border, not to see the imperative necessity of holding its face equally well up to the rays of the sun. Surely there need not be any argument about this, for whoever intends to grow Grapes well, must place the Vine roots in a warm medium, at least perfectly free from chilling and excessive rains, frost, and snow, for these are assuredly fatal to fine Grape-growing; and what more simple method could be devised than raising the Vine-border high and dry to meet the summer sun? and by thatching its steep surface during winter you change the climate entirely; for as far as that compartment is concerned, there is "no winter in the year;" for when the winter rain and snow-water, so ruinous to the roots of exotics during their period of rest, are effectually warded off, and when the air under the border in the vaults is increased in temperature by means of fire-grates or ingles, such as plumbers use for out-door soldering, there is such a thorough control over the *materiel* for Grape-growing, as renders it almost entirely artificial, and places success nearly altogether dependent upon skill, and not upon seasons; and though it may be no easy task to get prejudiced persons out of the old beaten track, yet I fearlessly assert, and that from extensive observation and experience, that it is impossible to get Grapes, or, indeed, any other fruit, to its proper flavour, if the soil in which they grow is saturated with wet whilst the fruit is colouring. Again, let any one try to keep Grapes late on the Vines long after they are ripe, and I warrant he will learn to his cost that the Vine-border should be dry, for the roots will keep sucking the cold rain that surrounds them till the whole system, fruit and all, becomes affected by it. And in "early forcing," nothing can be done whilst the roots remain in cold wet earth—the roof only can dry it, and nothing else, and the fire, if necessary, which it seldom, if ever, will be, will take the chill off; it would be perfectly ridiculous to have hot-water pipes under a Vine-border where heat of such coarse quality would do, and where the supply is only trivial, and that but for a short time.

Enormous as the building and labour in erecting such a Vine-house as the above section may appear, I must tell the readers of *Gardeners' Chronicle* that there are vineries in Sir Simon Clarke's gardens containing in their cross sections as much bricklayer's work as this, and nearly as steep Vine-borders, and the crops of Grapes you have reason to know as well as I were first-rate.

But leisure fails me. In conclusion, therefore, I beg leave to say that it will be found an excellent way to warm a bed of earth, to kindle a fire under it in vaults 7 feet high; and to prevent water lodging in the Vine-border, I would give it no quarter there at all, from the time people take up their Potatoes till they begin to plant them again in March, by having wooden shutters 6 feet by 4, supported on rafters, forming a roof perfectly waterproof. No more complaints of cold wet subsoil or bad drainage,—no more talk of your Vines losing root in the winter—the earth, as well as the other elements of fire and water, for Grape-growing, are, or may be, now at your command. If, therefore, the Vines are cold or hot, rich or poor, wet or dry, the media in which they are placed, as regards both branch and root, being now of



your own choosing, the blame or credit arising from the culture has you for its author and its end.—*A. Forsyth, Alton Towers, 8th August*, 1843.

DOUBLE FLOWERS—THEIR ORIGIN.

The inclosed specimens appear to me curious, as in some degree connected with the origin of double flowers. They consist of plants of the Gentiana amarella, found in a wild state, covered with abortive buds, or rather minute double flowers. Each head consists of innumerable small petal-like purplish scales, having in their centre a tuft of still smaller green scales. A plant covered with these little heads not infrequently bears, especially near the top of the stem, one or two more perfect flowers. By examining these, a series can be shown, by which the stamens are seen to become deformed, and gradually to pass into small petals and scales. The pistil also can be traced, becoming more and more foliaceous. The change in the pistil has been effected in several flowers, whilst the stamens have remained nearly perfect. In the same manner I have observed in double Violets and some other garden flowers, that the pistil, contrary to the general rule, is metamorphosed before the stamens. In other semi-perfect flowers of the Gentiana, the divisions of the corolla and the number of the stamens, with their filaments flattened, are increased; in others, besides the five ordinary stamens, in an imperfect state, the divisions of the corolla are partially converted into stamen-like bodies: if this conversion had been effected, the flower would have become apetalous. In a Bladder-nut (Staphylea) growing in a shady wood, I last summer noticed a similar fact, namely, that the petals showed a tendency to form additional stamens. The plants of the Gentiana bearing the little tufts are generally, but not always, dwarfer than the perfect plants; their leaves are less pointed, and the entire plant is much less symmetrical. The much greater number of the imperfect flowers on one plant than are ever produced of the perfect, shows, I presume, that the metamorphic change must be determined early in the plant's life. Except in their small size, less beauty, and in the occasional presence on the same stem of flowers in different stages of monstrosity; these purple tufts seem to be essentially similar in their nature to the double flowers of Horticulturists.

The plants of the Gentiana in both states grow mingled together on a very hard, dry, bare chalk bank; but those with the abortive flowers grow on rather the barest spots, where it was surprising that anything could grow. You state in your "Theory of Horticulture," that the origin of double flowers is not well understood. Some have attributed it to excess of food; but the dry chalk bank surely was not too rich a soil; and I may mention that late last autumn, I found on an adjoining field of wretchedly sterile clay, great numbers of the Ranunculus repens, producing semi-double flowers, some having three, some additional rows of petals. The partial or entire sterility of double flowers is generally attributed to their doubleness; but is not this putting the effect before the cause? It is well known that plants (and indeed animals, as I could show by a series of facts) when placed out of their natural conditions, become, often from apparently slight and unintelligible causes, sterile. How many American plants fail in producing pollen in this country! the anthers of the Persian and Chinese Lilacs, as I observed this summer, are as destitute of good pollen as if they had been hybrids. Other plants produce good pollen, but are defective, as it appears, in their ovules, as their germen never swells. Linnæus has remarked that most Alpine plants, when cultivated in the lowlands, are rendered quite sterile. In most of these cases, we see that sterility is compatible with long life and health. Is it, then, too bold a theory to suppose that all double flowers are first rendered by some change in their natural condition, to a certain degree, sterile; and that their vessels being charged with organizable matter in excess, (which would be greatly formed by high cultivation,) it is converted into petals—the organs which are nearest in their morphological nature and position to those whose functions are checked? Is there any shadow of truth in this theory, or is it an abortive one, as are the buds of the Gentiana?—*C. Darwin.* [We can only say that this is at least as reasonable an hypothesis as any that we have seen; but the greater frequency of double flowers in gardens where soil is rich, than in fields where it is poor, offers some difficulty in the way of Mr. Darwin's speculation.] P.S.—I also send a curious Cabbage-leaf, grown into the form of a perfect funnel, like the fold of paper into which grocers put sugar. It was borne on a long footstalk from the centre of an old stalk, from which a Cabbage had been cut this summer. I remember that De Candolle describes pitchers at the end of the leaves of some Cabbages, which he compares to those of the Nepenthes. Is this leaf something of the same kind? [Yes.]

ROSES IN POTS.—No. II.

It is an excellent plan to remove all the Tea-scented, Chinese, and tender varieties of Noisette Roses, to a cold pit in October, or before the autumnal rains set in. This is not only to afford them protection from frost, but many tender varieties, especially those grown on their own roots, are liable to suffer materially from the rains in autumn. Through the winter, the lights or covering should be removed in fine weather, that the plants may have as much air as possible; and being in a state of comparative rest, they will require but little water. Where a cold pit is unattainable, such varieties may be removed to the north side of a wall or fence, and a temporary frame erected; upon this a light covering of Fern or Beech-boughs may be laid in the manner of a thatch, which will throw off the heavy rains, and form no small protection against frost, at comparatively little trouble. The front of this erection may be left open, that air may circulate freely amongst the plants to prevent damp, and the pots should be covered over with Fern or stable-litter.

In selecting plants from the ground to grow in pots, I prefer such as have grown moderately through the summer; they will be more compact, and the wood solid and better ripened than that of those which have grown very vigorously; and it is of great importance to have them potted early in the season. As before mentioned, most of the sorts will bear removing by the middle of September,—certainly the varieties of Tea-scented, Chinese, and Bourbon.

The operation of pruning may be performed at two seasons; in November for early flowering, and in March, or even April, to procure a later bloom. The first season after removal the plants will require to be pruned closer than at subsequent periods; and it is worthy of remembrance, that the flowers should be produced as near home as possible, or, in other words, that the plants may become close and bushy. The Moss, Provins, Gallica, and most of the autumnal Roses, may be pruned in close, to within three or four eyes of the base. With the exception of a few very robust growers, there is little fear of pruning these varieties out of shape or flower. But with the hybrids of Chinese it is far otherwise; they are more disposed to form wood, and should be well thinned out, and the remaining shoots left longer.

In pruning all Roses, where the shoots are crowded or cross each other, it is beneficial to cut some entirely out, that those left for flowering may stand a good distance apart; for if too many be allowed to remain, they will become drawn, and produce weak flowers. It is, in fact, much in favour of a good bloom, to have the shoots thinned during the previous summer, which assists in ripening the wood. And, as a general rule in pruning, weak growers should be cut in close, strong growers left long, and those of intermediate growth pruned in proportion. Soft, unripened wood should be invariably removed.

The hardy varieties (pruned and not pruned) may now (November) be removed to an airy situation in the garden, and plunged in the ground up to the rims of the pots from one to two feet apart, according to the size or habit of the plant. It is well with regard to Roses grown in pots that they be always kept plunged.

To obviate the disadvantages following the plunging of plants in pots, namely, their liability to root through into the ground, and the facility afforded for worms to work into the pots, I have the soil taken out of a sufficient depth, and a seed-pan with the hole enlarged placed at the bottom in an inverted position, upon which the pot is placed. It answers perfectly, and further secures an effectual drainage.

After the plants are plunged, the pots should be covered over with stable-dung, to protect the roots at the top from frost in winter, and to keep the surface of the soil moist through the summer. About March, the tender varieties may be brought from their winter residence, and treated in like manner; and such as were left for late pruning, be pruned. Where the buds push out very numerously, the strongest and those which have a tendency to grow outwards should be selected to remain for flower, and the weak ones rubbed off. The plants should be frequently looked over for the purpose of destroying the grub, which will otherwise eat into the buds, and spoil the bloom; from worked plants all suckers or wild shoots should be cut out as soon as they appear, and in