

localities. Readers of the FLORAL WORLD who enjoy the blessing of a kind climate, would confer on us a great favour if they would look round and make lists of plants they find thriving in open gardens, selecting such as are not usually met with in places less favourable to vegetation.

But some of our friends will ask us to name a few subjects, to serve as a guide to them, that they may take note of really interesting subjects. Now, we should be particularly interested to know where thriving open-air examples of the following are to be found:—*Abutilon vitifolium*, *Aralia Sieboldi*, *Berberis Nepalensis*, *Colletia horrida*, or any other *Colletia*, *Desfontania spinosa*, *Escallonia rubra*, and any other *Escallonia*, *Embothrium coccineum*, *Grevillea rosmarinifolia*, and any other *Grevilleas*, *Grislinia littoralis*, which should not only live, but bear berries, *Ilex latifolia*, and *I. balearica*, *Pittosporum crassifolium*, and any other *Pittosporum*, *Veronica Andersoni*, *Daphne Indica*. This is of course only a skeleton, or rather a suggestive list, capable of indefinite enlargement, as our friends may see fit to contribute information on the subject. Such plants as agaves, yuccas, and puyas deserve to be noted, for they are not everywhere hardy, and certain kinds, as, for example, the variegated forms of *Yucca aloifolia* and the variegated form of *Agave Americana*, are of the utmost value in the embellishment of the garden. Does the heliotrope exist anywhere in Britain as an *established* open-air shrub? We should not be surprised to hear that in some such spot as Torquay an old heliotrope might be found clothing a warm wall, and making the summer air rich with its fragrance.

We have selected to illustrate these remarks a very fine tree for a kind climate. This pittosporum is a robust habited shrub, with thick dark-green leaves and showy red flowers. In the Scilly Isles it would, no doubt, thrive "like a weed!" It reminds us of the very desirable species of the same genus, namely, *P. tobira* and *B. undulatum*, which produce delightfully scented flowers, and are so nearly hardy that they would need no aid of glass in a genial nook of the south-west.

S. H.

ON GRAFTING AND BUDDING.

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THE changes which have taken place at Chiswick afforded so favourable an opportunity of procuring specimens and sections of the grafted portions of fruit-trees of different kinds, that it seemed to me desirable to use the opportunity to make up for the Horticultural Society a case of specimens illustrative of grafting, which might be placed alongside of the cases of Economic Entomology for similar purposes of instruction.

I have been the more induced to do so from the circumstance that Mr. Barron, our able superintendent, informs me that he finds

the theory and practice of grafting to be so little understood by the young gardeners who come to complete their education at Chiswick, that it is rarely that any of them are able to graft successfully until after the erroneous notions with which they come impregnated are eradicated and corrected. It seems that the drawings and woodcuts which are given of the process of grafting, by the most eminent writers on the subject, almost always convey an erroneous impression on the very point on which success entirely depends. The woodcuts of the slips and grafts prepared for adhesion turn the attention more to an equality of dimension, and to a correct fitting of the outside of the bark of the one to the outside of the bark of the other, than to an exact apposition of cambium of the one to that of the other, on which, in point of fact, adhesion and grafting absolutely and solely depend.

It appears to me that the exhibition of the specimens I have obtained for the Society's case may serve to bring before the eye the true merits and virtues of grafting and budding, as well as their disadvantages, in a form that may be useful.

I may observe that the specimens of which the collection consists have been obtained from Chiswick, and from Mr. William Paul. The specimens received from Chiswick consist of a selection of sections of fruit-tree grafts of all kinds and ages. The vast number of old fruit-trees at Chiswick, now condemned and about to be rooted out, furnished an almost unlimited supply of this material. Those from Mr. Paul are of buddings of roses of various ages, which I selected from the desire to show the difference of the effects of budding and of grafting on the part operated upon.

The Members of this Committee know very well that, in all instances of transfusing a part of one plant into that of another, whether by grafting, or budding, or any other mode, the only point at which transfusion or union can take place is the single outer circle of vessels which lies between the bark and the wood, in which the passage of the sap alone takes place, and by which the connection between the roots and the leaves, and the consequent deposit of wood and growth of the tree, alone take place.

I am afraid, however, that the more general impression is, that a branch grafted on to another, is united to the stock on which it is grafted throughout its whole surface; that it grows together as two parts of an animal body united by the first intention—as, for example, part of a finger cut off and immediately clapped on again. The examination of the specimens which I have brought together will serve to correct any such misapprehension. They show that there is no union whatever at any part of the wood of the scion applied to the wood of the stock, except at the single outer ring of the alburnum, already mentioned. Indeed, a small film of a brownish substance is deposited along every part of the applied surfaces, except the outer ring, where the union takes place; and some of the specimens which I exhibit show isolated deposits of wood and woody fibre enveloped in this brown deposit, which I imagine to be ooziings of woody matter something analogous to what is called proud flesh in the animal body.

But what I wish particularly to point out is that in every instance the inner part of the applied surfaces where the union has not taken place, both of the scion and the stock, is in a more or less advanced state of decay. In no instance is this absent; it is an inherent necessity in the very process of grafting that the seeds of decay be shut up along with it. In fact, one inevitable ingredient in the manufacture of grafts, concomitant, co-existent, and inseparable from it, is the simultaneous manufacture of an ulcer in its heart. Exactly the same thing takes place in budding, although on a smaller scale—the larger the extent of the cut surfaces applied to each other, the greater being the extent of future decay; and of course in budding this space is small in comparison with that in grafting; and, of course, too, the smaller the amount of exposed surface or cut wood, the less will be the amount of ulcer or decay subsequently manifested in the heart of the branch. I was about to say that the smaller the amount of this surface, the greater would be the skill of the operator; but this would imply that the decay in the heart of the branch was injurious to the plant, and was, if possible, to be avoided; and I am not sure that we are to take this for granted. Of course, if we want a perfect tree complete of its kind, doing all its functions in the best manner for itself, and the general purpose it is to serve in organic nature, we must say that it would be better without the decay in the heart of the graft, and that that decay must be looked upon as a blemish. But that is not what we want in every case of grafting: in fruit-trees, we do not want a normal amount of fruit, we want an excessive amount; in rose-trees our demand for flowers is not limited to nature's natural bounty; like Oliver, we come back for more, not once, but many times. Now it is well known that one of the surest means of inducing an excessive production of flower and fruit, is to weaken the vitality of the plant. It is no uncommon thing to hear people say that a plant had killed itself by its excessive flourish the previous year, whereas it was not the flourish that killed it, but the plant, knowing that it was going to die, made a desperate effort to propagate its species before its life was extinct. Now, if the implanting of decay in the heart of a tree is injurious to the health of that tree, it may have the effect of inducing something of this excessive effort at propagation. I have heard it said that grafted trees always bear better than ungrafted; but as to that we have plenty of practical men who can speak with authority. It is to be observed, too, that the decay of which I speak is limited in its extent and slow in its progress. It is shut up and almost hermetically sealed in by the deposits of wood which have taken place subsequently to the union of the graft; and although I have called it an ulcer, it is only so in the sense of being a source of decay; there is no active or malignant principle at work; it is merely the gradual decay of a perishable body which is situated in the heart of the timber.

It may be asked, too, whether this decay in the heart really does any damage other than weakening the branch or stem at the point where it exists; for it cannot be disputed that to that extent at least it must be injurious. Is the heart of the stem of a tree of any

use to it except for the support and solidity which it gives it? We see old piped trees flourishing away after all the heart is gone, and nothing left but a thin rind. True, the flourishing is not so vigorous as in a younger and more solid tree. No great sturdy arms are thrown out; and the foliage is limited to a few clustered scrubby twigs. But it does not follow that this weakness of growth is due to the tree being piped. In such cases, we must remember, that tree has generally been growing in the same ground for, perhaps, hundreds of years, exhausting all the ingredients of the soil which are suitable for elaboration into its sap and fibre—and that if we remove the tree, and plant another of the same kind in its place, it grows no better than the old one, seeming to show, at all events, that it is not the mere absence of pith and heart-wood in the old tree which has caused the declension in its vigour of growth.

The principles of physiology, therefore, would rather seem to say that in all those cases (such as fruit-trees, roses, etc.), where the acquisition of solid timber (whether for the support of the tree or for the uses of man) is not the principal object, grafting, although attended by decay, is not attended with consequences injurious to the purposes for which the tree is cultivated. But where timber is the object, as in forest-trees, the case is different. The decay imbedded at the base of the stem gives an element of weakness to the tree at the very point where the leverage of the wind is strongest, and exposes it to be snapped off by the root. I do not think it can be said to be injurious to the growth of the timber in other respects; for immediately above the graft the timber is deposited in a solid and continuous stream; and I see no reason why the tree, in all other respects, should not be as good as an unworked plant. Still we all have a prejudice in favour of seedling trees; and I think that the liability of grafted plants to breakage from wind is quite a sufficient reason why we should continue to retain it.

NOTES ON WINTER GREENS.



BRUSSELS SPROUTS.—Universally as this fine vegetable is esteemed, many amateur gardeners make mistakes in its management, and hence produce buttons far inferior to those to be seen in the baskets of the London greengrocers. Now, although tastes differ, we can safely say that this is the best winter green we possess, and especially worthy of being extra well grown, because the result of good culture will be handsome produce in such plenty as to prove that the liberal system is the most profitable. A short essay will suffice for all we have to say, but we wish it to be understood that every word is of importance.

The object of the cultivator should be to secure strong plants as early in the summer as possible. Therefore, the seed should be sown on a well-prepared seed-bed in February, or early in March, and the plants should be put out as soon as large enough to be

March.