

tions as we have to build up a science which will have a marked influence on the welfare of the country.

"What, then, are the lines along which this science is to be built? First, we must recognize more plainly the possibilities within the plant—its plasticity and its ability to change; second, we must learn to look more carefully outside of the plant; that is, at its environment and the effects this may produce; and, third, we must discover the principles whereby the grower of plants shall be able to bring about such perfect harmony between the plant and its environment that an approximately ideal organism will result. This means that our aim should always be toward making two blades of grass grow where only one grew before.

"The foundation of this work is physiology, involving a study of the phenomena of life itself. Here we learn the possibilities of future development, and here hinge the vital questions relating to nutrition and heredity. The pathology of the future, therefore, will not stop at the mere correction of conditions involving the loss of a crop or part of a crop. It will put within the power of the intelligent grower knowledge that will enable him to forestall injuries by furnishing conditions best suited to the development of the plant. We must bring to our aid many lines of work. Plant breeding will enable us to attain ideal forms. Selection will make it possible to fix these forms within certain limits. Nutrition goes hand in hand with breeding and selection. Chemistry and physics play important parts, and in the study of pathological phenomena themselves other branches of science will be brought to bear. Thus, the highest aim of the investigator in his field will be, not to deal with effects only, but to study causes, for it is only by such means that the greatest good can be accomplished."

The amateur horticulturist may be alarmed at such a passage as the one just quoted. He may think that there is too much "science" in it for him, that successful gardening is a matter of an abstruse character, and that a special training is necessary. This is a mistake. All he has to do is to treat his plants as he would treat a domestic pet,—take a pride in it, study its habits and follow a few simple rules. Let us next take an excerpt which deals with one of the most beautiful and attractive flowers of our gardens:

The Real Rose.....Longman's.

Let me say, very strongly and emphatically, that the rose as it is seen in the majority of gardens is a very different thing from the rose as it should be, the rose as it is. That this should be the case is to some extent remarkable. When

a man settles down in a house of his own with a plot of land about it, whatever may have been his bachelor contempt of the pettifogging gardener, he usually develops some interest in the production of flowers, and acquires a corresponding knowledge of the general principles of horticulture. From this interest and from this knowledge the rose is almost invariably excluded—the rose, which is the queen of flowers and, beyond all dispute, the most beautiful flower that grows. It has been truly said that there is only one more lovely thing in creation than a beautiful rose, and that is a beautiful woman. The married man, having presumably permitted himself sufficient opportunity to test his æsthetic appreciation of the latter, might reasonably have been expected to devote some attention to the less perfect of Nature's two masterpieces. But he prefers, as a rule, to pay his homage to inferior and vastly more troublesome beauties. The rose is treated as an ordinary flowering shrub and left to do as it lists, while he pricks and potters among his stocks and his wall-flowers and his cabbages and his chrysanthemums—the complete outfit, in short, of the suburban garden. The case of the chrysanthemum grower is the most difficult to understand. You have a man who leaves his roses crying out for a comparatively trifling amount of attention, mixing his soils, potting and repotting, snipping and disbudding and fiddling, expending hours upon hours of hardly spared time, and all to produce in the end a flower which, at its very best, can no more stand beside a good rose than a sparrow by a peacock. The floral sovereign, in the meantime, being left to itself, produces a great quantity of superfluous wood and an astonishing number of insignificant blooms in clusters—flowers which are very well in their way, and, so long as they develop no worse fault than mere diminutiveness, not ineffective in the distance, but quite incapable of comparison with the same variety when properly grown.

The reason for this neglect of the rose, it seems to me, is frequently attributable to the fact that a man's original stock is not procured on his own initiative, and he thereby loses that sense of parentage which he feels in regard to other flowers. When he takes a house he finds, among the other contents of the garden, an assortment of rose plants of a more or less antiquated and uneven appearance. These become year by year more bushy and cumbersome, and the blooms they bear more minute and clustery, until at length he gets impressed with the idea that they are something quite distinct—not merely different varieties, but a different family altogether—from those which

produce the specimens he sees in the florists' windows or the buttonhole of some enthusiastic grower. These, he imagines, are obtained from plants of some special and peculiar kind, requiring some special and peculiar treatment, which he has neither the time nor the inclination to give. It is a most mistaken impression.

After spending more years than I need enumerate in close association with the queen of flowers, I have come to the conclusion that the difference between shabby clusters and good blooms rests mainly upon two points. There are many others which can be observed with benefit, and must be observed if exceptional flowers are desired, but only two which are absolutely necessary to success. You can leave the trees unmanured, you can cut their sun to a few hours a day, you can let your bulbs or what-not remain among the plants, you can take no notice of blight and grub and mildew—all things which are better attended to, but are not essential—but you must prune properly and you must disbud.

By proper pruning is meant cutting down the healthy shoots of the previous year to five or six eyes, and cutting all the weak and dead and very old wood right out. Some people object to cut their plants low, on the ground that it diminishes the foliage, or is contrary to nature, or for some other reason equally trivial. If you left nature to do its work in precisely its own way, our gardens would soon become hopeless tangles; while, as for foliage, you would get abundance if you cut to the crowns. Disbudding, in the limited sense in which I have used the term, means merely removing the numerous small buds which usually surround the central calyx, as soon as they appear. Nothing is lost by doing so. If the large flower is eventually cut, the small buds are necessarily taken with it; and if it is allowed to remain upon the tree, they come at best to a crabbed maturity beneath its fading petals. The very general neglect of an operation so trifling and so important as this is difficult to understand. No chrysanthemum grower, however small his stock and lukewarm his interest, would think of failing to disbud. The habit once acquired, it becomes a mechanical process almost unconsciously performed, and must not be confused with the far more drastic measures of the exhibitor, who removes not only his buds but all his more weakly shoots in order to throw adventitious strength into a few especially vigorous ones—a practice which is quite unnecessary for the purposes of the ordinary grower.

By attending to the two points above noted the amateur may obtain very good results even

with the stock which happens to be already in his garden—results, at any rate, far surpassing any which he will have been in the habit of securing if he has given his plants no attention at all—and we should see fewer of the perfectly lamentable questions which sometimes appear in gardening papers, such as “What is best to do for green centres?” When a man has sunk so low as to get green centres in his roses, he had better make up his mind to relinquish the attempt to grow them. When selecting a place for roses, the most important consideration to be held in view is to give them adequate shelter; it is more important than sun, more important than soil. Roses will grow with any aspect except due north, where nothing will grow; they will grow in heavy clay or light gravel, but they will not grow in a through draught. Some people put a rose in a windy corner that would kill a cabbage, and then blame it for a delicate weakling because it refuses to flourish. In truth it is not a delicate plant. If your climate is reasonably genial and you have a quiet corner in your garden, you can grow any variety in the nurserymen's catalogues, even the most tender. Nor is it the case, as many suppose, that the best roses can only be produced upon standards. The latter stock is useful to place at the back of a border, or for other similar decorative purposes, but the highest quality of individual blooms is, beyond question, obtained upon dwarfs. When a man grows for exhibition, it is quite likely you will not find a standard in his garden.

The exhibition rose is to some extent an artificial production, obtained by drastic disbudding, by the use of highly concentrated manures, and by dressing the blooms—not that the latter practice reaches a degree at all approaching that which prevails in the exhibition of some other flowers, notably chrysanthemums. It cannot, therefore, strictly be called the real rose with any more justice than the produce of an uncared-for bush. But the difference between an ordinary good bloom and one of exhibition standard is far less than that between the flowers of a plant left to itself and of one sufficiently nurtured. Any man with a plot of land behind his house and without any special horticultural knowledge can, by the expenditure of an altogether insignificant amount of trouble, obtain specimens of the queen of flowers which will completely satisfy the æsthetic eye, and not improbably arouse the emulation of his neighbors. The rose is full of gratitude. No human mistress could repay a little care and a little thought and a little love more abundantly.