RURAL and SUBURBAN

INCREASING HARDY PERENNIALS BY DIVISION

One of the charms of the hardy flower garden is the fact that the grower can, by a wise system of planting, be assured of a display of beautiful flowers throughout the spring, summer and autumn, and even in the winter there are subjects that never fail to please those who can find accommodation for them. By observing due care in planting the different subjects, disposing them in such a manner that in their grouping a succession of flowers shall be assured, the hardy flower garden may become a source of the greatest possible pleasure for many months, and life be made less trying to the busy worker.

An important point in connection with the planting of hardy perennials, and one to which prominence should be given, is the fact that the first cost is practically the only one. These subjects increase and multiply, some of the vigorous and robust plants attaining unduly large proportions in a couple of years. In many gardens it is the practice to renew the hardy border every third year. Thus the quarters devoted to them can be trenched, and heavy dressings of manure—so important to the well-being of many of the stronger-growing subjects—dug in for the future good of the plants.

At the present period, when most of the plants have ceased to flower and the late-flowering kinds have been cut down by recent frosts, an excellent opportunity is afforded of dealing with them forthwith. Many of the better hardy perennials divide most successfully in the autumn division of the old roots is that the divided pieces invariably become well established by the succeeding spring, and are consequently better able to give a good account of themselves in the flowering season that follows.

In the present instance my remarks are confined to the Fleabane (Erigeron), a subject which provides an abundant supply of decorative material for a considerable time in the summer, and is most attractive when properly grouped in the outdoor garden.

It may be well to mention a few of the more important hardy perennials that may be divided at the present time, as this will assist the beginner in dealing with some of the old and improverished plants that have rendered a good account of themselves in the past. Among the more popular subjects are the Michaelmas Daisies, also known by the name of Starworts or perennial Asters; the Japanese Windflower (Anemone japonica), Alkanet (Anchusa), Sea Holly (Eryngium), Globe Thistle (Echinops), Leopard's-bane (Doronicum), Shellflower (Chelone), Bellflower (Campanula), Cinquefoil (Potentilla), Bergamot (Monarda), Creeping Jenny and Loosestrife (Lysimachia), Campion (Lychnis), Torch Lily or Red-hot Poker (Kniphofia or Tritoma), Sunflower (Helianthus), Crane's bill (Geranium), Globe Flower (Trollius), Meadow-sweet (Spiraea), Golden Rod (Solidago), Cone Flower (Rudebeckia) and a host of other equally useful and attractive subjects. Quite a large number of hardy perennials should be divided in the spring, and a few of the better things are the perennial larkspurs (Delphiniums), Scabious (Scabiosa), Feverfew (Pyrethrum), hardy herbaceous Phlox and other subjects of a similar nature. From the list of subjects mentioned above it will be seen that the late autumn affords an excellent opportunity for increasing by division of the old roots quite a large number of invaluable hardy flowers.

The grouping of the different subjects, however, is a matter of the highest importance if the ultimate results are to be all that the grower desires. They should be disposed so that one group of flowers succeeds another in close proximity thereto, and the color effects must always claim proper consideration. Failure to observe these simple rules may otherwise create some inharmonious associations of colors and, very possibly, something most incongruous. In grouping the respective subjects full consideration should be given to their character of growth and ample space should be allowed for each plant to display its real beauty in association with other plants.

The size of the border has an important bearing on the grouping of the subjects. In large borders each group should be proportionately large, but for ordinary purposes three to six plants in a group, according to the character of the respective subjects, may be a useful rule to follow. Three plants arranged in triangular form succeed very well; but where a larger number of plants are employed, a somewhat irregular arrangement generally answers better.

When lifting hardy perennials for division it is well to lift them so as to prevent damage being done to the roots as far as possible. The fork or spade, or whatever tool is used, should be got down well under the plant, so that the latter may be lifted intact. Where the old plants are very large, it may be necessary to insert the tool at intervals round the plant to ease the roots, and thereby ensure less damage being done. Fig 1 represents the Fleaban (Erigeron), which has many interesting varieties. This subject is fairly representative of most of the hardy perennials, and serves to illustrate the character of plants that divide quite easily. The old plant gives every indication of making quite a large number of useful pieces with which to perpetuate its kind. The outer portions of the old plants are the pieces that should be replanted, these being the youngest and, therefore, the most vigorous for the purpose. Fig. 2 serves to illustrate the character of the divided pieces of the old plants. All the outer pieces with roots and adhering should be retained, and the inner portion of the old plant, which is invariably exhausted and of little use, should be thrown on the rubbish heap. Those who desire speedy results should plant the larger of the divided pieces; these should flower very satisfactorily in the following summer. Smaller pieces may be used for ordinary purposes. The very smallest pieces should be planted in prepared soil in a cold frame, and transplanted in the spring. It is astonishing what a large number of plants may be obtained from one old specimen by these means.—D. B. CRANE.

THE BOG GARDEN AND ITS FORMATION

Of the many phases of open-air gardening, none, perhaps, is fraught with greater possibilities, and none, certainly, possessed of greater charms, than the bog garden if well and rightly conceived. It is in this type of garden that we see plants grow, flourish and blossom that too frequently are met languishing for the moisture they love in the open border. Indeed, one of the great charms of bog gardening is that the plants thrive and grow apace, and that nothing droops or dies, simply because the subjects are rightly placed and constantly provided with the moisture so essential to their well-being. But in the bog garden, as in all else, there is just the possibility of the strong crowding out the weak—just the possibility that by one false step, made unwittingly, a plant may be introduced that may prove a nuisance for years. Hence, at the outset, there is the same need for discretion and for that close, intimate knowledge of the subjects chosen for the work, of their slow or quick growth as well as their ultimate development, as there is in any other phase of gardening work.

The host of plants benefiting by constant supplies of moisture during a hot season may tempt some to introduce those that intrude their presence in all directions, or that quickly choke or overrun others whose finer attributes render them far more desirable for such a place. Of such as the former many examples might be given though one, the Epilobiums, will suffice for all purposes. Here we have a small group of rapidly increasing plants that appear to grow all the year round, sending out such vigorous stolons or underground shoots or stems which, springing up some distance from the original, soon make their presence felt in their new homes. For such as these, then, welcome as they are in the wild garden, there is no room—there should certainly be no place—in the bog garden we have in mind, and no quarter should be given to the smallest seedling which might appear. Thus it will be seen that, in our opinion, a bog garden should not be a sort of dumping-ground for any and every moisture-loving plant; rather should it be a spot—an adjunct to the garden proper if you will—to be enriched and beautified with the choicer subjects of other climes as well as those of our own land, subjects which, revelling in moisture, know no happier place than the natural bog.

But some may say, very few gardeners are possessed of or include a naturally boggy spot, hence, if we would grow such things as delight therein, an artificial substitute must be arranged. In connection with this not infrequent question arises the all-important point as to whether the abode for such plants must be made watertight. The correct answer depends not a little on the available supply of water and equally on the nature of the subsoil. Where a retentive, plastic clay soil exists, a veritable driblet or trickle of water will maintain the soil in a state of semi-saturation, sufficient, indeed, for all purposes. On the other hand, where the subsoil is of sand or gravel, a slight excavation of this will be required to admit of the introduction of well-tempered clay, than which nothing is so good or so natural. A lowering, too, of the ultimate surface soil is desirable in those instances where a light soil obtains, to admit of the water from the rainfall finding its way into the bed.

In all large gardens in hilly districts, the forming of an artificial bog garden or bed is quite an easy matter. The ideal condition for such is, when a fountain basin exists on the terrace lawn, with the overflow tumbling into a rock garden pool a few feet below, and in turn trickling away into the woodland lower down, where it can be used to advantage for the purpose we have in mind. In just these happy circumstances, many years ago I spent much time in adding beauty to a phase of gardening not then common, and where the founder of the garden delighted on occasion to roam An opening in the wood gave all that was desirable, and with sun and warmth varying degrees of moisture a large area was furnished with the plants varying from such carpeting subjects as Anagallis tenella, Sibthorpia europaea, Linnaea borealis and Pratia angulata to the giant Royal Fern, Osmunda regalis, of several feet high and through.

There are also peat-loving and loam-loving plants, handsome Lilies as paradlinum and superbum that reflect their greatest beauyt in the woodland bog garden, while dozens of others, Primulas, Trilliums, Sarracenias, Parnassias, Dodecatheons, Cypripediums in variety, Saxifraga Hirculus, Marsh Marigolds, Orchises, Pinguiculas, Droseras and the like may all be grown to perfection in a few square feet of bog. There are, of course, Primulas such as P. japonica and Saxifragas such as pelata that are not quite suited to the smallest of these bog beds, unless, indeed, they be given place at the outer margins where the chief supply of moisture enters. Just what is suited to any and every case will, of course, depend entirely upon circumstances. Happily there are plant giants like the Gunnera, Osmunda and Spiraea, together with the miniatures I have already named, that make bog gardening possible in large and small gardens alike, and where the plants of our own marshes and woods may, with others from the higher mountains of Europe and elsewhere, jointly play their part in making this aspect of gardening one of the most fascinating of the year.

THE IMPROVEMENT OF SANDY SOILS

In farm management the maintenance of soil fertility is always a most vital problem, and on lands sufficiently fertile all that is necessary to prevent deterioration is to hold the crop-producing power of the soil at the same level. Adequate fertility in soils, however, is not very common, and generally the first question is how the fertility may be increased. The methods of soil improvement are largely determined by the soil character. Light soils, for instance, are usually much more difficult to improve than similarly located heavy soils. A consideration of this subject, together with the results secured in the improvement of the sandy soils in South Jersey by means of growing forage crops, has recently been presented by E. B. Voorhees and J. G. Lipman, of the New Jersey Experiment Station.

In discussing the general character of light soils, the authors point out that unimproved sandy or sandy loam soils can not furnish as much food or supply as much moisture to growing crops as the clay and clay loam soils are capable of doing. Attention is further called to the fact that the coarseness of sandy soils prevents them from readily retaining the plant food applied to them and the moisture they receive. The fertilizers given are easily washed downward into the subsoil by the rains, and dry weather soon robs these soils of the moisture. Extremely open or coarse sandy soils are considered amenable to profitable cultivation only when the rainfall is abundant and well distributed, the subsoil sufficiently compact, and the water table near enough to the surface.

In treating of the physical properties of sandy soils, their relation to moisture, heat, and air is discussed. It is shown that owing to their great permeability sandy soils may be tilled early in the spring, when heavier soils are still too wet to be worked. They are earlier and warmer than heavy soils because they are drier. On the other hand, these loose and open soils quickly lose their water by both percolation and evaporation, and at the same time on account of their limited capillary power, are unable to replenish this loss rapidly by drawing upon the water supply of the subsoil. In the heavier and more compact types of soil capillarity is much more active.

The openness of light soil admits air freely, and thus intensifies the chemical and bacteriological changes going on in the soil. Under these conditions plant food is made available more quickly and the rock particles weather more effectively than under the conditions obtaining in a heavy soil, but these processes are carried on so rapidly that the humus burns out too fast and the losses of plant food are too great.

Chemical studies of the sandy soils reveal for the most part their poverty in plant food. Some soil samples examined contained as much as 98 per cent of pure quartz. Lime was found in small quantities, magnesia and potash in traces only, and the proportion of organic matter was also very low.

It is stated that the bacterial activity of soils is directly influenced by the supply of air, moisture, and warmth, and by the chemical composition. Well-aerated or open soils favor the development of bacteria requiring large quantities of air for their growth, and these species cause an intense decomposition of the humus. This is offset to a great extent by the rapid loss of water from these soils, as the bacteria cannot multiply when the soil moisture falls below a certain point. In the heavier soil not so well aerated and not so readily affected by dry weather the changes in the development of bacteria are not so sudden, and therefore the supply of plant food, and especially of nitrogen, is much more uniform than in the open sandy soils.

For the improvement of sandy soils it is recommended that thorough aeration be discouraged by methods of tillage, by applications of fine-grained materials or of substances readily pulverized, and by additions of large quantities of humus-forming matter, such as green crops or barnyard manure. Sufficient humus in the soil prevents the too ready access of air and increases the moisture-holding capacity of the soil. Although sandy soil are quite poor in plant food, this condition does not preclude the possibility of their improvement. Prosphoric acid and potash may be supplied at a comparatively small cost, and the humus may be furnished in either animal manures or green manures. In considering this phase of the work the authors show that the use of animal manures is not indispensable. They regard horse manure as too expensive for general farm crops, because it is not always handy and also as injurious in some cases through the introduction with it of weeds and fungous diseases. The experiments they conducted were made with a view of showing that the humus content of sandy soils could be increased by means of green manuring and the use of fertilizers alone. Systems of green manuring were found particularly effective in this connection on account of the relatively greater need of nitrogen and humus in light soils and their greater power to convert green crops turned under into available plant food. Leguminous crops, such as crimson clover, soy beans, vetches, etc., are recommended for this purpose because they add both humus and nitrogen to the soil. The limitations of green manuring enumerated are the use of large quantities of water by the crops, the need of an abundant supply of phosphoric acid, potash, and lime in the soil, and the drying effect of the green crops when plowed under. Where the rainfall is sufficient the disadvantages of green manuring are largely reduced.

With reference to the activities of germs in the soil it is stated that by increasing the amount of humus in sandy soil its water-holding capacity is increased and thereby a more uniform bacterial development and a more uniform supply of available plant food assured. The increase of humus in sandy soils encourages the growth of bacteria as a result of the greater content of organic matter and of moisture, and their development is discouraged on account of a less thorough aeration of the soil.

The nitrogen-fixing or nitrogen-gathering bacteria associated with the growth of leguminous plants find the conditions existing in sandy soils evtremely favorable for their development and for the fixation of large amounts of atmospheric nitrogen. The facility with which the air circulates in these soils favors the formation of nodules on the roots of leguminous crops. It is pointed out that the nodule bacteria take considerable quantities of nitrogen or oxygen from the air surrounding the best conditions for the growth of the organisms are created. It has been observed that in compact, fine-grained soils, where the air does not penetrate so readily in greater depths, the nodules on the roots are all near the surface, whereas in sandy soils they are distributed lower down on the roots of the plants. Another factor strongly favoring the fixation of nitrogen in sandy soils is the comparatively small proportion of available nitrogen present in them.

It is pointed out that leguminous crops new to a particular region may fail to develop nodules because the proper organisms are not present in the soil.

While large amounts of lime are not required for sandy soils, applications of lime are of value in that they encourage the formation of humus substances which help to fix potash and phosphoric acid. As lime encourages the activities of various kinds of soil bacteria and thus tends to hasten the process of decay and nitrification, sandy soils should be limed less frequently and smaller dressings should be given than in treating heavy soils. Ground unburned lime is likely to give better results than burned and slaked lime. One-half ton per acre of ground oyster-shell lime may show results on sandy soils while remaining entirely without effect on a heavy soil. It was observed that an adequate supply of lime is important in both heavy and light soils in promoting the growth of most leguminous crops, and especially of alfalfa and of various clovers.

LILIUM PHILADELPHICUM

A lily we do not often meet with in gardens is Lilium philadelphicum, a plant with extremely pretty cup-shaped flowers, from two to five on a stem. The base of the segments is yellow, spotted with maroon, and with scarlet at the tips. It is a lily of moderate height only growing about 1½ feet high, and is thus suited to the small garden. It is one of the lilies which like shade and moisture, such as it can receive in many gardens. A peaty soil, moist at the bottom, is good for L. philadelphicum, and it must be noted that it is one of those which emit roots at the base of the stem, and consequently requires top-dressing. The leaves of this Philadelphian lily are arranged in whorls, like many of the North American species. S. A.

OLD MASTERS AND MODERN MUSIC

(Continued from Page Two)

'Elektra' and the 'Symphonie Domestica,' and the controversy between absolute and programme music. Now let us decide. Let us all state our opinions on one side or the other!"

Then followed a general move of these ghostly figures for a moment or two, which resulted in two groups being formed ready to make war upon one another. Only Beethoven remained seated in deep thought, and seemed to take no heed of what was going on around him.

The chief of those on the classical side were Bach, Handel, and Brahms, while the programme musicians were Wagner, Berliox and Dvorak.

The battle waged long and earnestly, phrases such as "limiting the flights of the imagination" clashed against "representing the things of everyday life."

Then Bach stepped forward, and a silence spread over the assembly in homage to the great master of polyphony.

"Great spirits of our art," he said, "I speak on behalf of what is termed absolute music. In the times in which I lived upon the earth people did not resort to music to hear represented things they meet at every turn. No, they fled to it from the petty cares of life, to forget in the charm of harmony all painful memories. And though it is true times change, human nature is the same all the world over, in all times.

"Why limit a composer's genius by keeping him to a set programme, instead of allowing him free scope in his art?

"Why limit the hearer's imagination to one scene and action, instead of giving it freedom to fly at will?

"And, lastly, why should music need an outside interest? And not the modulations and repetitions of melody and the blending of harmony enough in themselves to awaken interest and fix the attention of multitudes?"

Here the classical became uproarious in their applause, but were again silent as Wagner stepped quietly forward and began to give his opinion.

"Our great Master and Ancestor has given his points of argument as clearly as the subjects of his fugues, but may I with due deference point out the feelings of many of the people of a later time?

"Music, we all admit, has become a vastly more popular art than it once was. It is now not only a diversion for the rich, but a pleasure and comfort to rich and poor, and to many a necessity. Therefore, we feel that our art should do more to give life and color to many whose existence is dreary and dull, and how can this be done without appealing to what the multitudes will understand and enjoy?

"Then, poetry is written with an aim beyond that of stringing together beautiful sounds; and why cannot this also be the case with music? What can better be composed than the symphonic poem of our later age, which unites beauty with interest in eternal life so completely?"

At this a perfect tumult arose among the musicians. They gathered in groups to fight out more individually this battle of words.

I gazed at my familiar room, with its appearance of practical twentieth century comfort, and then at the excited faces of the celebrated ghosts, and marvelled afresh.

Then my eye fell upon the solitary figure of the creator of sonata form—Beethoven—still seated in his chair thinking. But as the tumult around him grew louder, he raised his head with a gesture that indicated that his mind was made up. At this very movement the tumult around him subsided, and as they saw he was about to speak, the ghosts waited humbly for his views.

"The modern phrase of music—I think that is the subject you are discussing, gentlemen," he said; "some of you object because it follows a programme, and some are protesting on behalf of programme music. But it seems to me quite simply explained. Is it more difficult to compose beautiful sounds and phrases or to create the beautiful and also make it a representation of life? Is not the latter a step forward? The rules of the art had to be laid down, and a firm foundation made, before music could advance; and absolute music has done this. But does programme music restrict the imagination? Does it not rather lead it farther into certain paths, instead of leaving it to wander aimlessly?

"Again, I have heard music cannot be purely representative because it is not tangible and definite enough. But if music has developed in the past, may it not develop still more and become more definite—more than ever united by its representation to the interests of life? Therefore I proclaim that this division of music is imaginary—that these two kinds form one road to perfection—and so I cry, 'Hail, Strauss!'"

During this speech Bach and Wagner had drawn near Beethoven, and now the three great reformers of German music stood side by side in the centre of the room, and the fire seemed to have an added brightness to its glow, which it cast upon the ghosts.

Berlioz, with his natural impetuosity, immediately took up the cry; as all joined in the room rang with the shout. The ruddy light of the fire, as it rested upon all the faces of the spirits, showed him alight with enthusiasm, as, with raised arms, they cried, "Hail! Strauss!"

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The glad tones died away, I felt a chill wind on my cheek, and I found myself staring at the window which had blown open, letting in the air of the cool dawn. The last spark in the grate expired suddenly, while a faint "Hail! Strauss!" still seemed to ring in my ear.

I shivered, shut the window, and crawled up to bed.—I. B.

EUROPE'S LARGEST STALACITE CAVE

The stalacite cave recently discovered near Schoenbergalm, in the Dachstein mountains, Upper Austria, is claimed to be the largest in Europe. The principal tunnel has been found to extend over a mile, with numerous side passages of varying lengths. In traversing the main tunnel, the exploration party had to cross, by rope ladders, an ice crevasse 75 feet deep and more than 100 feet wide. The cave is divided into two levels. In the upper one was found two immense ice halls containing precipitous subterranean glaciers, about 300 feet long. In the lower level is a series of halls, the largest more than 600 feet long by 100 feet wide.

The enormous total of 261,400,000,000 tons is the estimate of the amount of coal in the Illinois coal fields. This figure is the result of calculations based upon the area of the coal veins as determined by the state statistician.

The German postal authorities are experimenting with an electric subterranean railway system for transportation of mail from the railway stations to the post offices, small locomotives and cars being used.

Fresh peaches are to be exported from the Delaware and Georgia orchards to England as the result of successful experiments made with the product of the Canadian orchards.