

one must study local conditions. In general, for orchard drainage on medium soils, the tiles should be from 3 to 3½ feet deep. There are conditions where they may be deeper. For general farm conditions it is desirable not to drain too deeply. On heavy clay soil, the problem is not so much to get rid of the subsoil water as to get rid of the surface water.

Drainage Obviates Irrigation

There has been considerable agitation in western New York and other sections concerning irrigation. It seems to me that any system of drainage which will increase the available supply of water in the soil will do as well. Much of the land in need of irrigation in August has an excess of water in April. By installing a system of thorough under drainage one equalizes the soil moisture conditions and obtains better results.

Irrigation has a place in New York agriculture but until we have made the best possible use of the storage capacity of our soil by tillage, drainage and other processes we have no right to look to irrigation. On a greater part of our lands it is preferable to improve the crop growth by better tillage and drainage rather than by the introduction of such an expensive practice as irrigation. Irrigation is to be resorted to only after everything else has been done. We should not look to irrigation to supplant tillage.

Culture Killed Quack Grass

R. E. Dimick, Wisconsin

The present system has proved that the system of deep plowing that I have advocated for the extermination of quackgrass is just as effective during wet weather as during a dry season. Four years ago I had a 12-acre field badly infested with quack. Part of it was a solid sod, while in other parts the grass was still in patches. I sowed this field to winter wheat, and early in the spring sowed clover and let the frosts and rains cover it. I had a good crop of wheat and got a good catch of clover. The next year I cut this clover for hay, and then applied manure with a spreader at the rate of about 15 tons per acre. I had enough manure to cover a little over a half of the piece. Just before the ground froze up I plowed the sod under about 9 inches deep.

In the spring, as soon as I could get on the ground, I began using a disk, and later a smoothing harrow. I then used a soil packer and smooth harrowed again and then planted the ground to sugar beets. The beets had the usual five or six cultivations, three hoeings and hand weeding. This operation put a pretty effective check on the quack. The subsoil plow used for lifting up beets just before freezing weather arrived loosened up the ground and brought most of the stray quack roots to the surface, where they were exposed to the winter weather. Last winter as soon as I could get on the ground, I started the disk again and kept it going until it was time to seed peas, when I planted the usual four bushels per acre and had a fine crop of garden peas. I find now that there is not a trace of the quack to be found on the whole field.

This system has proved so effective I shall hereafter apply it to all fields where quack gets a start. I am of the opinion that where there is a market for the beets and the peas they are the best combination to be had for putting quack out of business. Where there is no market, or where the conditions are not right for these crops, I would follow as nearly as possible the same lines with some other crops. That is to say, I would get a good clover sod all over the field and cut one crop for hay, then manure as heavy as possible, plow deeply and plant a cultivated crop. I would keep up the cultivation until very late in the fall and the next spring sow some early rank-growing crop. If the work is done thoroughly and care is taken to turn the deep furrows down flat, I believe this treatment will finish the worst piece of quack-grass in the country, and at the same time greatly improve the land.

Plants For Home Grounds

George S. Woodruff, Iowa

I am particularly interested in flowering plants designed for the ornamentation of the home grounds, rather than those planted for cutting flowers. Perhaps the simplest way to go at it is to start with the spring and take the flowers somewhat in the order of their blooming. I begin with the Dutch bulbs, the crocuses, scillas, tulips, hyacinths, snowdrops, and daffodils, indispensable on account of their beautiful colors, early blooming and hardiness. I plant these, of course, in the early fall. One of the very earliest of spring flowers, and which is a great favorite of mine, is the mercensia or bluebell, which, though a wild plant, is well adapted to garden culture. It is easily grown, spreads rapidly, and gets entirely out of the way early in the season. By the way, I have, under a tree, a collection of wildlings which I am helping to save from extinction. The list includes trilliums, bellwort, several kinds of violets, hepaticas, plenty of bloodroot, waterleaf, solomon's seal, smilacina, polemonium and a lot of other things.

I assume that the usual well-known flowering shrubs are planted, as they should be, at the outside or back of the grounds. Of course, spireas, lilacs, syringas and the Japanese hydrangea are al-

ways attractive, but there are several flowering shrubs not as well known as they should be. One of these is the deutzia lemoinei, another is the snowball hydrangea, which I think is the most important addition to our list of hardy shrubs in the last few years.

Some Desirable Perennials

Taking up the herbaceous perennials, the most important by far in the ornamentation of grounds is the hardy phlox. This is now to be had in the purest white and in bright colors and of various heights, from a few inches up to 5 feet.

The borders for perennials should be prepared like the finest vegetable garden and made very rich. Attention should be given to cutting the flowers promptly and freely as this insures continual bloom until hard frosts. One of the neglected plants which should be grown by everybody is the perennial larkspur or delphinium. For some reason or other we get into ruts and plant the same shrubs and flowers year after year, and for this reason many fine plants are neglected. This is partly due to the fact that so many things are offered that are not adapted to our climate and general conditions, but the larkspur is worthy of all praise. It is perfectly hardy and the new hybrids are most beautiful, making flower spikes, often 2 feet long in a great variety of shades of blue and pink.

Following the tulips and preceding the phloxes come the peonies. By selecting the earliest and latest varieties their blooming season may be made to overlap the tulips a little and reach to the earliest of the phloxes. The dielytra, or old-fashioned buttercup and the columbines should not be left out, and for yellow flowers the coreopsis lanceolata is desirable, and if cut freely will bloom all summer. Everybody knows the Rudbeck golden glow, still one of the best things if kept in place and well fed.

Attractive Annuals

I have said nothing of annuals because the perennials are so much less trouble and so permanent. The seeds of the annuals often fail to germinate at all under out-door conditions, and are late in getting ready to bloom. Still there are a few that are indispensable, such as the petunias and the asters. Where there is room the improved snap dragons are splendid to grow for cutting and even for display. The salpiglossis, too, with its rich and varied flowers, is not so well known as it should be, and the scabiosa makes a pretty mass of color and is good for cutting. For large grounds the plumed celosias make a gorgeous show. I believe that where there is a greenhouse near it is better for most people to engage the florist to start the annuals in pots or flats and so have them in bloom early.



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