Work of John Innes Institution

Gardeners are indebted to a London research station for one of the most interesting investigations ever made into practical gardening methods. The story behind those investigations is fascinating.

The John Innes Horticultural Institution, Merton Park, London, began in much the same way as the Cawthron Institute at Nelson. It was founded by private bequest in 1910 for the promotion of horticultural knowledge by research and teaching, but has grown enormously in the last 20 years and is now about to move to a much larger place in the country, where there will be more scope for future development.

The outstanding scientific work of the John Innes Institution has been in connection with genetics and the study of plant breeding, to which the staff of the institution has made a very notable contribution. The discoveries which are of immediate importance to every nurseryman and home gardener have been made as an interesting sideline to this more scientific work.

In pursuing their genetical studies the scientists required to raise large batches of plants, and it was often important that every single seed from a particular cross should be raised and grown on. This work was the responsibility of the head of the Garden Department and his staff, who were equipped with the usual facilities for propagating work.

Although the many batches of seeds were sown and grown on by competent plantsmen using traditional gardening methods, there were occasional failures which were annoying from a horticultural point of view, but were disastrous to the geneticists, to whom loss of a batch of seedlings might mean the frustration of long and patient breeding work.

Every nurseryman and gardener has had similar exasperating failures which could not really be accounted for, although they are often attributed quite wrongly to "bad seed," "bad soil," or "bad weather;" in fact, to anything but "bad growing," which is often the true reason.

The staff of the John Innes Garden Department therefore began a series of investigations into propagating methods to see whether more certain and uniform results could be obtained. Over a number of years they have investigated each aspect of the work in turn, from the original choice of soils and other ingredients for propagating composts to details of the treatment of the growing plants.

Mr. W. J. C. Lawrence, head of the Garden Department, once said, "Never let respect stifle your critical faculties." Working on this principle, the institution has investigated practices which have been hallowed by long horticultural tradition, and has found that these practices do not, in fact, always produce the best results. The long and painstaking experiments have borne such ample fruits, however, that plants can now be raised with much greater certainty than ever before by following exactly the advice given by the institution.

Among the most important recommendations are those concerned with making up the so-called John Innes composts in which plants are proving to grow so well.

The composts consist mainly of steam-sterilised loam, to which are added some form of organic matter to increase its water-holding capacity, coarse sand to ensure that surplus water can drain away, and fertilisers to provide the plant foods needed at the particular stage of growth at which the compost is to be used.

Choosing the Loam

When composting according to the John Innes methods the exact nature of the loam used is perhaps less important than usual, as the organic matter and sand will improve its texture and the fertilisers will provide the necessary plant food. It is still, however, important that the loam should be as nearly ideal as possible if the very best results are wanted.

The ideal soil is a good, fertile, medium loam which is neither too clayey nor too sandy and one in which plants or grass have been growing well. (Technically, a "loam" is a soil containing a mixture of fine and coarse particles and organic matter. A "clay loam" contains a high proportion of fine clay particles, and a "sandy loam" contains fewer fine particles and more large, coarse ones.)

Silty or clay loams should not be used, as they tend to cake in the pot. Soils which are light and sandy are also unsuitable, as they dry out too quickly after watering, and chalky soils give very poor results after being sterilised because of a chemical reaction caused by the heat.

Where possible the home gardener should obtain his loam from a fertile grass paddock by digging out turves 4 or 5in. thick and stacking them in a heap for a few months. The turves are best dug in early summer while the soil is still moist and there is a strong growth of grass. Dry turves will not rot down in the stack and should be watered if necessary. The stack should not be packed tightly or made larger than about 6ft. high or 8ft. wide if the turves are to come to best condition for propagating work.

If the loam is very poor, it can be made fit to use by incorporating up to one-sixth of its bulk of animal manure as the stack is built; but this introduces a variable factor, and it is far better to choose a suitable loam which does not require fortifying in this way.

The gardener should not be impatient to use loam before the grass and roots have rotted and disappeared, which usually takes about six months, but a loam which is left much longer than that will probably have lost some of its valuable humus by the time it is used.

Careful growers make a test of the loam before finally deciding whether it is suitable by filling a few pots with loam passed through a ¼in. riddle, and then sowing tomato and lettuce seed in it. At the same time seeds are also sown in pots filled with a loam which is known to have given satisfactory results. The pots are put in a warm greenhouse and the growth of the seedlings observed. If they grow as quickly and look as healthy in the loam under test as in the other, it is probably satisfactory; but if the new loam produces seedlings which are stunted, yellow in the leaf (probably caused by serious nitrogen deficiency), or purple in the case of tomatoes (deficiency of phosphorus), the soil is not really suitable.

Sterilising the Loam

Home gardeners have sometimes reported that plants, especially seedlings, did not seem to grow any better, or even grew worse, in sterilised than in unsterilised soil. This has usually been the result of a misunderstanding on their part of the principles of soil sterilisation.

When soils are heated to a temperature approaching the boiling point of water the first and most obvious result is that all injurious insects, other forms of animal life, fungi, and weed seeds are killed. All these effects are beneficial and should result in better growth of plants.

At the same time, however, the heat causes a complex chemical change, which is still not fully understood, in the humus whereby nitrogen is released in a form immediately available to plant roots.

The amount of nitrogen liberated depends on various factors, but far more than is good for most plants, especially at their seedling stage, is released if the soil is heated too long or at too high a temperature, if the soil is very rich in humus, if leaf mould, etc., is mixed with the soil before sterilisation, or, especially, if the soil is chalky or if lime has been added to it before it is sterilised. This explains why a compost should never be sterilised after the ingredients have been mixed.

The "free" nitrogen seems gradually to be locked up again in the soil, and