

a piece of stem and one leaf with its axillary bud. It is clear that whereas some varieties do quite well, others lack vigor. Experimental work on the vegetative propagation of rhubarb has shown that it may be readily propagated from cuttings obtained by cutting out — discarding — the largest buds to destroy apical dominance and so stimulate a number of small shoots. Various physical manipulative treatments have been given to the English red raspberry, *Rubus idaeus*, during “summer” conditions in growth rooms and — this summer — to plants in the field, with the objective of obtaining regeneration from root cuttings in the so-called “off” season, a period roughly corresponding to summer in England.

At present, sterile culture work is confined to asparagus and is concentrated on anatomical work to follow the sequence of events which take place when pieces of stem are grown *in vitro* to produce plants.

Supplementary light and high temperatures given during the propagation stage of winter lettuce and an extension of the normal daylength in the growing house have resulted in an advance of five weeks to maturity, lettuces forming heads in February instead of the end of March.

In a quick walk round the Department, the Conference participants saw some of this work in progress and, in addition, several interesting projects of the final year horticultural students. Reprints of published papers were available for those who wished to delve more deeply into certain aspects.

The Society was honored to have as its Guest of Honor at the Inaugural Dinner, Professor J. D. Ivins, Deputy Vice Chancellor of the University of Nottingham, who warmly welcomed members of the Conference.

THE PRESIDENT AND HIS KNIFE

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It is old-fashioned to speak about knifemanship today because the whole trend is to do away with it, to make it obsolete. And another thing, it is a bold man who will stand up among his fellow propagators and talk about it. So I want to make a few friends, to take you into my confidence and to discuss our problems together. In that way we may each learn something or at least catch a bit of stimulation to encourage some down-to-earth enquiries and vital reassessment of our practices.

A while ago I was listening to one of those morning talks, “Farming Today”, and a large-scale rose grower was saying that today they try to eliminate every hand operation, and they are succeeding.

Herbicides have replaced the hoe, machines plant, cut over and lift, and pallets convey the material into and through the sheds and storage. Wrapping, labelling and packing is done by machine and the final distribution is palletised in collaboration with forwarding agents. Orders are sorted, advices and invoices mailed and reminders allotted by computer. Output has doubled and the staff is half what it was.

In all this there is one thing not covered — the bud-grafting operation. Beyond providing some improved materials for tying or otherwise anchoring the new bud, we are still using the unaided intimate human skill of the trained knifesman. These skills are in short supply and we must make them go as far as possible. I suggest we should now concentrate on easing the work of the skilled operators. To do this effectively we must change our attitude to work evaluation. We must use the extra capacity of the skilled man's hands, eyes and brain to the maximum, and prevent him from getting tired. Examples from other trades are seen in packing sheds where flow patterns prevail, in milking parlors where the operator is placed on a special floor level to adjust the machine, and in fruit picking, where one's hand moves but an inch or so and all preliminary and further work is mechanical. Some modern plant nurseries are using ground level mobile platforms, for hydraulic cutters and pulverisers to cause trimmings to disappear. These things and others are already on the way. Our attitude must now be to regard the skilled hands as of the highest value and to place these in their best position for maximum efficiency.

Essentials for grafting success. To be really skilled and efficient we must know the material (the plant) we are handling. We can learn much from teachers but we must ourselves be good observers. We know that the parts to be grafted must not only be alive, they must stay alive till grown together. The chief cause of death is drying, and detached leafy material dries very quickly and needs special care. Leafless woody material also needs good protection to prolong its life. A modern jacketed cold-store is excellent for holding scions but many old-fashion horticultural tricks are also quite satisfactory. Polyethylene bags are a tremendous aid provided they are partially ventilated and shaded from the sun.

Compatibility is essential for a permanent graft and this may be destroyed between stock and scion by a virus carried in one component not tolerated by the other. Remember, too, that grafting is due to the healing together of wounds and that well-matched wounds hasten union formation. Firm anchorage is vital, and correct alignment helps. Over all, there is the need for good horticultural practice, choice of variety, timing and culture. Grafting is but an incident in the life of the plant and the number of unions formed over a period or at one time is not limiting. Growth and form of the composite plant is

more related to the disturbance of the root shoot ratio by pruning, than by the actual grafting. Massive well-established rootstocks certainly give quick results but may not be acceptable.

Knives I have known. There are knives of many shapes and sizes, some highly manufactured, others simple if not crude, yet each quite adequate for its purpose. The essentials are strength, a good comfortable grip for control and a lasting edge. Grafters generally have favorite knives to which they have grown accustomed, thus you will find pet knives which with use and sharpening have become quite unrecognizable. Speaking of sharpening I like having a straight blade that can be sharpened on a flat stone. I hold the blade at about a 25 degree angle to the stone and push it forward against the stone as in sharpening a chisel; I personally prefer blades sharpened on both sides. This 25 degree angle provides adequate strength and such blades sharpened so last well and do not roll up their edges. For shield-budding I favor the curved-back blade for flicking open the stock as I finish the cut. However, knives are almost infinite in pattern and the dozen or so I have here are merely a few examples. Some grafting knives are used more like chisels or gouges, or even needles, but mostly we like to use them to make slicing cuts. This means that the cutting edge travels across the path of forward progression and makes cuts with great smoothness and efficiency and with least damage to both blade and plant tissue.

Mechanization and grafting. The mechanization in bench-grafting is well-established and is used on a vast scale, especially for vines where the material is so readily graded to fit. Simple, self-holding, grafts are efficient and good graft anchorage is achieved by callusing them in temporary warm storage. While complete mechanization generally may be the aim, much can be done to speed grafting even today. For example, scions may be prepared in advance of field work. The scions are cut into short lengths, tied in bundles and dipped in anti-dessicants, or other seals, and when dried are cut to wedge or tongue, as necessary, and stored moist and cold in containers ready for use during the next few weeks. Grafting is then possible at high speed during selected weather. Incidentally, no further scion-sealing is required. Furthermore, scions pre-sealed succeed later in the season than non-sealed.

The art and science of knifemanship. It is an art based on observation of scientific facts. The exploitation of the facts is the art itself. Each operator will develop his technique in his own way but he will only become really efficient if he observes the essential needs of his materials and has the knowledge, acquired by study, to make full use of the basic physical facts.