should raise their level of entry requirements and standards of attainment required for the overall benefit of the industry and for the art of propagation, which many graduates enter.

To summarise, the propagator is a responsible person in the management and practice of the nursery industry, possessing several skills, but essentially a committed person with a life-long task which cannot but satisfy.

## THE PROPAGATION OF ALPINES

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There are many snags in propagating alpine plants. Some of the high mountain species of *Androsace*, which produce tight rosettes of minute leaves, can only be raised from seed which is rarely produced in quantity and the seedlings grow very slowly.

Raising plants from seed is of considerable importance to the propagator of alpine plants who must be prepared to meet a range of spcialised requirements. *Primula whitei, P. edgeworthii* and *P. gracilipes* and their relatives of the Petiolaris section produce seeds which rapidly lose their viability. They must be sown as soon as they are ripe, with the seeds taken directly from capsule to seed-pan. Some people, however, have been led to the mistaken conclusion that all species of *Primula* should be so treated. In fact, the greater number of species respond far better to a spring-sowing programme; in this way they grow and develop and are ready to enter the normal resting period when winter arrives.

The seeds of *Gentiana verna* and *Lewisia cotyledon* hybrids benefit from a period of low temperatures under moist conditions without such treatment germination is likely to be sporadic and generally unsatisfactory. Seeds sown in containers in early March usually germinate freely when taken indoors into a heated glasshouse.

There are, however, many species of alpine plants which can be sown in a warm glasshouse in spring; e.g. *Aquilegia pyrenaica, Ramonda myconii* and the dwarf members of the Ericaceae.

*Jankaea heldreichii* can be propagated by separating offsets from the parent rosette; *Phlox nana* (*P. triovulata*) can be propagated by root-cuttings, but the rate at which these plants produce vegetative propagules, (to use an American term), is alarmingly low. Indeed, this is one of the major problems in raising a range of alpine plants for which the demand is greater than the supply. Most intelligent nurserymen use the plants of this category as bait for the considerable connoisseur custom which exists in this field.

It is perhaps in the next group of plants where real commercial possibilities exist. These are plants which offer some

difficulties, but which may, however, be overcome if a few rules are observed. For example, plants of *Anchusa caespitosa*,[1] (as distinct from *A. angustissima*, which often masquerades under the name of *A. caespitosa*), have retailed over the last few seasons for prices ranging from 10s.6d. to 21s.Od. Yet it can be rooted with the ease and speed of plants which are retailed in the 3s.Od. to 4s.6d. bracket. A small area of stock bed consisting of well-drained media raised to an elevation of 15 inches above ground level is desirable. A garden frame can be used for the stock bed if convenient materials for a retaining wall for the bed are not available. The stock plants should be set at 18 inch intervals; a well-established stock plant can be expected to produce upwards of 50 cuttings in a season. The stock plants can be covered with frame lights in extremely cold or excessively wet weather in winter. Shoot cuttings are collected with a very short portion of stem below the rosettes of leaves and the cuttings can be expected to root at any time in the growing season. Much the best results are obtained from cuttings inserted in late April or early May as these will grow away without the check that later struck cuttings often experience. The use of IBA in talc seems to lead to a marginal improvement in rooting performance.

The timing of the preparation of quite a range of alpines is of very great importance. *Gentiana sino-ornata* and its hybrids are often propagated commercially by division of the roots in early spring. Further increases in stocks can be achieved by propagation from cuttings, which again will root over a long period in the growing season. Only those cuttings rooted earlier in the season, however, are likely to develop resting buds which are essential for the young plants to over-winter. Much the same is true of *Cyananthus lobatus* and *C. integar*. The question of timing is further illustrated because later-struck cuttings display a considerable impetus towards flower-bud production instead of making vegetative growth.

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[1]Ed. Note: *Anchusa caespitosa* Lam = *Pentaglottis caespitosz* (Lam) Tausch.
*A. angustissima* Koch = *A. ochreleuca*
*A. angustissima* Bourg. ex Nym. = *A. undulata*

## PROPAGATION OF MINIATURE ROSES BY GRAFTING

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*Preparation*

Preparation for the grafting of miniature rose trees starts at the beginning of November. The second-grade miniature rose trees are pruned fairly hard, potted up into four-inch 'long toms' and placed into a cold frame or glasshouse where they are given a cold period for about four weeks.

The grafting pit is prepared in early December with about 9 inches of peat. We like to get the peat at a temperature of