SUMMARY

One conclusion that may be drawn from the experimental results and descriptions presented above is that the mechanisms controlling the germination and dormancy of seeds cannot be summarized in a series of simplified generalizations However, there also seems to be some reason to believe that attention to the natural conditions of the areas in which species grow may indicate conditions most likely to give successful seed germination. Sometimes this approach will lead to the paradox that seed of species from the areas noted for high temperatures, like the Mediterranean region, germinate best when sown at low temperatures, whereas seed of species from areas noted for their freezing winters—like Poland—germinate best when sown at high temperatures. This paradox can be logically resolved, and it is hoped that the results presented in this paper will act in some way as a guide to interpretations of climatic factors in relation to seed dormancy and germination.

SEED COLLECTION AND EXTRACTION

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There has over the last few years been a great demand for trees and shrubs in large quantities, and as a result a much larger and improved seed sowing programme has been built up.

HARVESTING

Determining the correct time for harvesting seeds is of vital importance if good germination is to follow. The collector must know the criteria which indicate the optimum conditions for the particular kind of seed he is collecting. These will include size, color and moisture content of the seed.

Before harvesting large quantities of seeds it is advisable to make a cutting test to determine quality and ripeness of the seed sample. It is well known that many seeds will germinate the first year quite freely if the seeds are harvested before completely ripe. With seeds of some species, once the seed coat has hardened germination will not take place until the *second* spring after collection unless special treatments are given.

We have found that seeds which benefit from early harvesting include the following:

> *Acer campestre, Acer miyabei, Acer tegmentosum,* some species of *Viburnum, Cotoneaster* and *Carpinus.*

Ravaging by birds is sometimes encountered with seeds of such species as *Berberis* and some species of *Sorbus* well before they are actually ripe. In such cases the seeds are harvested and placed in shallow trays in a light airy shed; here they remain for approximately two weeks before they are cleaned The majority of our seeds are collected from our own nurseries and arboretum. The task is sometimes undertaken by the foreman of the nursery or by one of the leading hands. The quantity of fruits to be harvested rests with the management, who must take into account the viability of the seeds in question in order that the correct amount is harvested for any given species For seeds which are difficult to pick, a specially designed platform is brought into use; it resembles a platform as used by the electricity company and is mounted on a fore-loader of a tractor.

SEED EXTRACTION

Dry Fruits. Pods and capsules of such plants as *Laburnum, Genista, Indigofera, Carpinus* and *Phlomis,* etc. are spread in shallow trays and allowed to dry for a period of one to two weeks before the seeds are extracted and cleaned. Hand cleaning using various sizes of sieves is practiced, for in many cases the seeds are rare and hard to obtain.

Fleshy Fruits. Fleshy fruits, including berries such as *Cotoneaster, Sorbus, Crataegus,* Plum, Rose, *Berberis, Vaccinium* and *Aralia,* etc.—and, for convenience, *Rubus* species can be included in this group.

Macerating (Pulping prior to cleaning). A considerable advancement was made last year when we obtained a machine from Germany. The machine is, in fact, used on farms for pulverizing fodder such as swedes, mangles, etc. It can best be described as a cylinder with a waterproof motor underneath. A high-speed rotating plate with low flanges is fitted inside, there is also an adjustable plate on the side which can be moved up or down depending on the type and size of seeds to be macerated; the pulp is released at the base of the machine by means of a large shute. The whole thing is rather like a giant food mixer. This machine works at its best when water is added in equal proportions to the fruits. In most cases it has been found necessary to put the pulp back through the machine a second time in order to separate the seeds completely from the flesh.

Flotation. The seeds are separated from the pulp by flotation, the principle being that all empty seeds, together with the pulp and other waste matter, will float off the top while the heavier, sound, seeds sink to the bottom of the receptacle.

Two or three rinses with water from a high pressure hose is generally required before the seeds are placed in a sieve to remove

any excess water; they are then placed in paper-lined seed trays and dried on a greenhouse bench.

The same machine has been used successfully for threshing out seeds of *Laburnum* and *Carpinus;* it was also used with success for dewinging the fruits of *Acer campestre.* In all three cases the chaff was blown away by using a small electric fan; no doubt the chaff could be removed by flotation if one so desired.

PROPAGATION OF LILIES

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PROPAGATION METHODS

Nature has provided many ways by which we can increase stocks of lily bulbs but the rate of increase by bulb division, as in *Lilium hansonii,* by bulblets below ground, as produced by *L. speciosum,* by the rhizomatous bulbs of *L. pardalinum,* or the stoloniferous bulbs of *L. superbum,* is far too slow for most of us. A few species and hybrids form bulbils in the leaf-axils at flowering time and, while these can be collected in quantity and grown on, the two main methods adopted for the propagation of lilies involve the use of bulb scales or of seed

Scales. That universally useful item—the polythene bag—has made propagation by scales so simple an operation that I need spend very little time in describing our method. We take our scales in late summer or autumn when the lifting and transplanting of lilies is normally taking place. We drop the scales into a polythene bag, shake them up with enough PCNB dust (Quintozene) to give them all a protective coating then add a mixture of equal parts of peat and sand, shake until the scales are thoroughly mixed with the compost, then seal the bag. It is essential that the peat / sand mixture is moist but not wet and that the bag is well sealed.

We store our filled bags under the staging in a glasshouse with a minimum night temperature of 50° F. and, in late winter and early spring, the scales having formed young bulbs are ready for spacing out in boxes to grow on.

Seed. The germination of lily seed has never presented many problems although for some species—and hybrids from them—a period of exposure to low temperatures is essential before germination will take place.

Some, and among these are *L. martagon, L. szovitsianum, L. canadense, L. superbum* and *L. japonicum,* exhibit hypogeal germination and have the annoying habit of showing no signs of growth