Tilia L. has one or more species known to be self-fertile, while a considerable amount of protandry is known in the Tiliaceae. In *Tilia,* chromosome counts on 12 species show the basic haploid number to be n = 41, with both diploids and tetraploids known in the genus. *Catalpa* Scop., of the Bignoniaceae, is a self-fertile genus (East, 1940). The haploid chromosome number in the genus is 20 based on the examination of three species.

The genus *Picea* A. Dietr. is divided into three sections. The hybrids listed occur as the result of crosses both between and within sections, with more occurring between than within the sections.

Pinus L. is divided into two subgenera, three sections, and ten series. With few exceptions hybrids occur between species belonging to the same series. There are no reported hybrids from crosses of species belonging to different sections or subgenera. The parents of most of the reported hybrids belong to the subgenus *Diploxylon* Koehne, section *Pinaster* Endl. Two hybrids are reported between species belonging to the subgenus *Haploxylon* Koehne, section *Cembra* Spach.

In the genera of the Pinaceae considered here all the species thus far investigated have the reduced chromosome number of n = 12. This number is based on the examination of five, six, five, and twenty-one species respectively for the genera *Abies* Mill., *Larix* Mill., *Picea,* and *Pinus.* They are thought to be self-fertile though normally cross-pollinated (Larsen, 1937).

The hybridization work at the Arnold Arboretum has been limited largely to *Populus, Betula* and *Pinus.* These genera are of value in reforestation projects particularly where the trees are to be used as a source of cellulose. The incidence of both natural and artificial hybrids shows that interspecific hybridization in these genera occurs readily.

The technique employed in the hybridization of forest trees is essentially that employed in the breeding of any flowering plants. Schreiner (1938), among others, has published on methods of tree hybridization. However, each genus requires modifications of the general technique.

Yanchevsky (1904) seems to have been the first to use a method by which flowering branches of *Salix* were brought into the greenhouse, flowered, and seed matured. Wettstein (1933) employed this method in *Populus.* The authors have also used this method in this genus, where it has proved most successful in the case of species belonging to the section *Leuce.* Crosses in other sections of the genus were more successful when made on the trees. Since pollen from all species of *Populus* may be forced in the greenhouse, the advantage of being able to overcome natural differences in blooming time is not lost when crossing must be done in the field.

The forcing of pollen in the greenhouse may be used successfully in the case of *Betula*. Here sausage tubing may be used in place of the usual glassine bags when it is desired to cover a large number of small flowers on one branch. The best results were obtained when the ends of the tube were plugged with cotton wool, thus allowing for some aëration.

Ulmus may be treated in a manner similar to *Populus* in that branches may be brought into the greenhouse and flowered, crosses made, and seed matured. The perfect flowers of *Ulmus* are small and difficult to emasculate. However, since the genus is strongly protogynous, crosses may be made without emasculation. This method was used successfully by the authors in certain crosses made in the greenhouses of the Arnold Arboretum in the spring of 1938. As the knowledge of flowering habits in forest trees grows, increasing use of protandry, protogyny, and self-sterility will simplify hybridization techniques.

Isolated trees of dioecious species or of monoecious species which are strongly protandrous or protogynous may be used as a source of hybrid seed providing that trees of other species in the genus are flowering in the neighborhood. Accurate records on the blooming times of all trees in the vicinity will aid in determining what the male parents probably are.

In the genus *Quercus* there are a large number of natural hybrids but very few reports of artificial hybrids. This must indicate that proper techniques have not yet been developed for this group. A similar lack of technique probably accounts for the failure to obtain artificial hybrids in the genus *Acer*.

There is some evidence that an overabundance of pollen on the stigmas of female flowers in *Juglans* and *Carya* prevents crosses from being successful. Special techniques are needed in order that small amounts of pollen can be used when dealing with these groups.

Very often a cross may yield a good set of seed but the seed may not germinate. In many cases this failure of germination may be due to an upset in the ratio of embryo size to endosperm size. This difficulty may be overcome by making use of the technique of embryo culture. If the embryo is removed from the seed at the critical stage and placed on nutrient media a healthy and mature plant may be obtained where ordinary methods of germination fail.

Crosses between species of *Pinus* and other genera of conifers have been made, but the resulting seedlings are not large enough for critical study. The work on *Pinus* has been confined to the white pine species.

The hybrids in the genus *Populus* are grown in nursery plots and are cut back severely to induce an abundance of lateral sprouts from which