**Graft-Blight of Lilac.** The result of the discovery of the use of Privet in the propagation of Lilacs has been that to-day practically half of the Lilacs grown in America are privet-grafted. The remaining half of the Lilacs in this country are grown by various own-root methods.

As might well be expected, when one considers the various methods of propagation employed, there has been a certain amount of controversy among the nurserymen as to the most satisfactory method of Lilac propagation. In fact while nurserymen in general almost universally condemn the grafting of Lilac upon common Lilac, there are two distinct schools of opinion among them supporting respectively the own-root methods and the methods involving the use of Privet. Each of these schools of opinion has backed its contentions with numerous assertions as to the relative superiority of Lilacs propagated by one of the methods considered, but neither group has subjected its beliefs to scientific analysis.

The extensive lilac collection in the Arnold Arboretum is constantly being added to by new plants received from a variety of nurseries as well as by plants propagated by cuttings in the Arnold Arboretum greenhouses. During comparatively recent years it has become increasingly evident that many of these newer plants were manifesting symptoms of disease, and the diseased plants eventually became so numerous and unsightly as to require a thorough investigation for the purpose of determining and eliminating the cause of the diseased condition.

The diseased Lilacs in question showed symptoms of chronic nutritional deficiency. The plants were very small and their growth exceedingly limited. When fifty diseased plants were measured during their sixth and seventh years of growth it was found that their average growth during the seventh year was an inch per plant. Practically none had blossomed even after nearly a decade of culture in some cases. When the leaves appeared in the spring they were usually very small and dark in comparison with leaves of normal Lilacs, and were gathered in little tufts at the tips of the thin, frail twigs. As the summer wore on the leaves became curled and very yellow, this yellowing beginning at the
tip and between the larger veins and proceeding eventually to involve the whole leaf. The leaves during this yellow stage were notably thicker than normal and markedly brittle. Leaf-cast began early during the summer and the plants usually were devoid of leaves by midsummer, although in some cases the dead leaves actually persisted on the twigs long after normal leaf-fall. The new growth in a given season was very limited. The buds were weak, the twigs frail, and the plants in an obviously hazardous condition to meet the exigencies of an unfavorable season.

The accompanying illustration is a photograph of a Lilac showing the disease in typical form. The curled, pale leaves are seen in their characteristic diseased condition, and the severity of the disease is very evident.

Early in the investigation of these diseased Lilacs it became evident that all of the plants in question had been propagated by grafting upon Privet. In fact the distribution of the disease in the Arnold Arboretum almost exactly coincided with the distribution of the privet-grafted lilac plants which had been received in recent years. It was soon observed and demonstrated that the disease was not contagious, that it was not due to unfavorable soil or moisture conditions, and that it was not restricted to certain lilac varieties, but that it was evident on old, long-proven varieties as well as on the newer French hybrid Lilacs. Since the disease under consideration was always associated with the grafting of Lilac upon Privet, and since it has been found that the disease is caused by such grafting, it has received the name "Graft-blight of Lilac".

On investigation it was found that graft-blight was not limited in its distribution to the Arnold Arboretum. It was seen in typical form in numerous nurseries and private collections of Lilacs in New England, New York State, New Jersey, Pennsylvania, and Ontario, Canada, while what was unmistakably the same disease was reported by correspondents in Oregon, Ohio, Colorado, and Germany. That large numbers of Lilacs were involved was evident both from the observations and from the reports.

In order to investigate the effect of grafting Lilacs upon Privet, a set of experiments in lilac grafting were planned and executed in the Arnold Arboretum greenhouses and nursery beds. Lilac scions of one of the most vigorous varieties in culture (Andenken an Ludwig Späth) were grafted upon a number of species of Privet, Ash, Forsythia, Chionanthus, and Lilac. These were compared in their development with the normal health of sister lilac scions grafted upon common Lilac, rooted in the soil directly, and growing on the parent plants. The grafts of Lilac upon Ash, Forsythia, and Chionanthus proved unsuccessful, those upon common Lilac were entirely successful, while those grafted upon the various species of Privet showed in characteristic form the same condition as the graft-blighted Lilacs in the Arnold Arboretum ornamental collection described above.

The lilac scions grafted upon the California Privet (Ligustrum ovalifolium) and the Amur Privet (Ligustrum amurensse) were especially
Graft-blight of Lilac. The horizontal line approximately divides the privet section of the root-system from the adventitious lilac roots. The healthy appearance of the sucker is explained in the text.
significant. In the former case the grafted plants showed precisely the same diseased condition as Lilacs in the field suffering from graft-blight, while on the other hand, the Amur Privet grafts showed in a single season the whole course of symptoms, stunting, yellowing, leaf-curl, leaf-cast, and death, evidenced by California Privet grafts during the course of several years. Meanwhile the Lilac-on common-Lilac grafts and the own-rooted scions remained strong and healthy. A confirmation of these experiments resulted from examinations of many own-rooted and grafted Lilacs in nurseries. Here the symptoms of graft-blight were always associated with privet grafting. Finally further evidence resulted from the observation that even in privet-grafted Lilacs, occasionally a lilac sucker found to be on its own roots, is seen in perfect health although attached to a severely blighted plant.

Hence it was plainly evident from these experiments and observations that the cause of the disease observed in the Arnold Arboretum lilac collection lay in the practice of grafting the Lilac upon Privet, particularly upon the California Privet. To obtain further information a questionnaire was submitted to the majority of the larger lilac producers in America and to some in Europe.

This investigation yielded a number of interesting and significant facts regarding the commercial practices of lilac propagation. Since it was discovered by this means that half the Lilacs in culture in America were propagated by own-root methods, the practicability of own-root lilac propagation was at once evident. But it was found that privet-grafted Lilacs are much quicker in attaining marketable size than Lilacs grown from cuttings. This fact implies that the privet-grafted Lilac may be sold at a somewhat lower price than the own-root Lilac and still afford a reasonable profit on the nurseryman's investments. Hence the problem is plainly an economic one, and the solution lies in the hands of the purchaser of Lilacs.

The nurseryman who uses the privet-grafting method of propagating Lilacs does so, in most cases at least, with the conscious belief that such Lilacs will soon become own-rooted and throw off the privet stock. Many observations, however, show that this does not invariably happen. In fact, in the majority of cases privet-grafted lilacs are still dependent on their privet roots years after the most careful propagation on Privet. Graft-blight results, but since the symptoms are seen in the collection of the purchaser and not in the nursery of the propagator there is a tendency for the nurseryman to be unaware of the diseased condition or to attribute it to unfavorable soil or culture.

The purchaser of Lilacs is anxious to obtain permanent, long-lived, healthy plants. The additional cost of own-rooted Lilacs is but a small fraction of the original cost of the plants and a still smaller fraction of their value as ornamentals. Moreover there are nurserymen in every section of the United States who can provide the finer named varieties of Lilacs propagated by own-root methods. The nurseryman will produce what the purchaser demands. Hence the connoisseur of Lilacs will tolerate within his ornamental planting only own-rooted Lilacs, thereby escaping at once the winter-killing of privet-grafted Lilacs, the danger of predominance of privet suckers, and the penalty of graft-blight.

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