

on the same plant is necessary (cross-pollination). Some flowers, however, are able to set fruit with their own pollen (self-pollination). In cases where cross-pollination is necessary or advantageous, transport of pollen is secured mainly through two agencies: the wind, and insect visitors, such as bees and butterflies.

A series of pollination experiments was undertaken upon the partridge-berry this season, in an effort to answer the following questions:

1. Is pollination necessary to the production of fruit?
2. If so, is self-pollination possible?
3. If cross-pollination exists, what agency transports the pollen?

POLLINATION EXPERIMENTS.

I wish to reserve detailed report on these experiments till a later date, suffice it to say (1) that pollination is absolutely necessary to fruit production; (2) that self-pollination, if not impossible, is certainly very rare, though pollination between flowers of the same cluster is frequent; (3) that the pollen is transported by the wind, and not by insects. The last conclusion is supported by the fact that pollen is present in the air at flowering-time. This can be shown by hanging a glass slide, thinly coated with vaseline, among the blossoms. After seven hours of exposure, such a slide showed grains of pollen of the shape characteristic of the partridge berry, which had been blown into the vaseline-layer in the same way that they are blown upon the sticky stigma of the plant. It is even possible in bright sunshine to see with the naked eye clouds of pollen discharged from the flowers when a bed of blossoms is brushed with the hand. Clearly, damp, calm weather during flowering would seriously interfere with the yield of berries by making transport of pollen difficult or impossible.

Soon after successful pollination results in fertilization of the ovules, the corolla drops away, and the ovary rapidly enlarges, so that within two weeks from the fall of the blossoms, it is more than half-grown. The changes then take place more slowly,

and consist of further increase in size, development of color, and chemical changes in the pulp. The berries are ready to pick during the second week of September, and at that time are about three-eighths of an inch in diameter, of a deep crimson color, and mealy within. This season, (a very favorable one), about 30% of the blossoms produced fruit.

II. ENVIRONMENT OF THE PLANT

In order to understand the conditions under which the partridge-berry grows on the areas where it is commercially picked, the so-called barrens it is necessary to bear in mind that the vegetation of these tracts is at present in a process of transition. The conditions which are now found there have not always existed, nor will they continue indefinitely to exist.

For every situation, there is an ultimate type of vegetation, the last of a series of types, of which each prepares the way for the next. When this ultimate type is attained, a state of stable equilibrium exists, which can only be disturbed by disturbing the conditions of life in the given situation. In the case of the barrens, this ultimate type is the spruce and fir forest which existed over those areas at no very distant date. No other plants could displace that association so long as natural conditions prevailed, for the reason that the seeds of other plants were not fitted to germinate and grow in the deep forest shade. The destruction of the forest by fire did radically change the natural conditions. Instead of shade, there was open sunlight; instead of shelter, entire exposure to wind, and consequent increase of evaporation from the leaf-surface. The physical constitution, too, of the soil was altered by the burning out of a considerable part of the easily-combustible humus (leaf-mold); while the chemical ingredients remained the same as before, their relative quantities were altered, the incombustible mineral salts being present in a larger proportion.

It is not at all surprising that such a radical change in conditions should