

## Horticultural Observations in the Pacific Northwest

Prof. C. V. Piper, in U. S. Bulletin 153.

### Conditions Affecting Orchards in the Inland Valleys.

The Cascade mountains separate two regions widely different in soil and climate. On the one side these have fostered the development of great forests; on the other almost antithetical conditions have resulted in the plains and hills being practically treeless. While the coast region has an abundant rainfall and no great extremes in temperature, the inland region, in many parts at least, has an insufficient rainfall and the extremes of heat and cold are more marked.

In the fruit growing districts of the inland region there are well-marked differences between the valleys, where for the most part irrigation is practiced, and the uplands, where rainfall must be depended on.

The valleys here considered are those which lie at an altitude of 300 to 1,000 feet above sea level, including practically all of the regions in which the peach thrives, and which in the main are cultivated under irrigation. In these valleys commercial fruit growing is, perhaps, more extensively engaged in at present than anywhere else in the Pacific Northwest.

The extremely favorable conditions, so far as pests are concerned, in these inland valleys lies in the absence of any serious fungus disease. Apple and pear scab do not occur; brown rot is reported from but one locality; blackspot canker is unknown. How far these conditions are due to climate, and how far to comparative isolation, is difficult to determine. The experience of most of the older fruit-growing communities is a warning to the fruit grower that there is little ground for hope of immunity from any particular pest on account of climatic influences. The absence of such serious enemies as peach yellows, brown rot and plum curculio, not to mention others, is an important factor in successful orcharding in these valleys.

#### Insect Enemies.

The following are the insect pests of most importance:

**San Jose Scale**—The first appearance of this insect in the Northwest seems to have been in the Snake River valley at Almota. At the present time the insect is abundant in most of the valleys and occasional on uplands. The universal practice is to spray in winter with the sulphur-salt-lime wash, which is completely effective when properly applied. Excepting that such winter applications entail a perennial expense, the advent of the insect has caused little damage. An incidental feature gained in peach orchards by these winter sprayings is the control of the peach-leaf curl, which occasionally caused considerable damage.

**Codling Moth**—Taken all in all this is the worst insect pest in the Northwest, and it is more destructive in these inland valleys than elsewhere. Owing to the long warm season, the insect may be found at almost any time, and in all stages, from May to September. It is commonly believed that in these valleys the insect has three or more annual broods, but this is by no means demonstrated. The experience of fruit growers has led them to spray from five to seven times each season

to control this insect. The majority of orchardists use Paris green, but others secure as good results apparently with the cheaper arsenite of soda mixture. The sprayings as carried out by most growers are as follows: The first, just as soon as the petals fall; the second, two weeks later; the third, about July 10, and the remaining sprayings at intervals of two to three weeks, the last one being in September. A few growers supplement their spraying with the "banding system," and believe that the results secured justify the practice.

**Aphides, or Plant Lice**—In some sections these are occasionally very abundant, especially those of the apple and plum. Kerosene emulsion is generally used to keep them down.

**Peach Moth, or Peach Twig-Borer**—The insect was abundant in 1897 and again in 1900 and 1901. Winter sprayings with kerosene emulsion as determined by experiments on Snake River are very effective. The sulphur-salt-lime wash seems to have no effect on the insect.

#### Bacterial and Fungous Diseases.

**Peach Mildew (Sphaerotheca pannosa)**—This disease is of general occurrence in peach orchards, but does comparatively little damage. Some years the disease is excessively abundant and other years scarce. I have never been able to detect any other reproductive organs than the conidia or summer spores. The fungus lives over winter on young twigs.

Up to the present time the disease has received no specific treatment, and, in view of the relatively small damage done, it is probably not profitable to spray against it.

**Pear Blight**—This disease has been extremely destructive in almost every part of the inland region for three years past. It is estimated that 70 per cent. of the pear trees in the region are either killed or so badly injured as to be of little value. Some varieties have withstood the disease much better than others, but strangely enough the same variety seems to differ in its degree of resistance in different localities.

### Conditions Affecting Orchards in the Inland Uplands.

By the uplands are meant the valleys and rolling hills having an elevation of from 1,000 to 1,300 feet. In general, such lands comprise the wheat growing area of the inland region. Dependence is placed entirely upon the rainfall, which in some localities is barely sufficient to insure a crop. In wheat raising, indeed, the most common practice is to summer fallow the land each alternate year, and in the drier localities this is necessitated by the scanty rainfall. During recent years a great acreage of fruit trees has been planted in such lands, and the hardier fruits have proven very satisfactory investments.

#### Insect Enemies.

Thus far there has been but very slight damage from insect pests. How much this is due to the relative newness and isolation of the orchards and how much to the climatic conditions, it is difficult to determine. The following notes on such insects and diseases as have already appeared give the only indications we have as regards their probable future behavior:

**Codling Moth**—In the past four or five years the average damage caused by this insect has been less than 10 per cent. It is generally thought that this low percentage of damage is due to the cool nights of the region, to some extent aided by the prevailing fresh winds. Inasmuch as the damage occasioned by this insect in Snake River Valley is always large, while on the uplands 2,000 feet higher and only 1 to 3 miles distant the loss is nearly always small, considerable weight is given to this opinion. Nevertheless in occasional orchards in the uplands the loss has in certain years, notably 1898, reached as high as 25 and even 40 per cent. This is commonly ascribed to the peculiarities of the particular season, which may be the true explanation; but in view of the newness of the orchards it cannot be considered as demonstrated.

**San Jose Scale**—Up to four years ago this insect was not known to occur in the interior uplands, and it was generally believed that it could not thrive there. Its occurrence in at least

acter of this disease, the future of pear culture in the Northwest is very uncertain.

**Apple Scab**—Of the lands here called the inland uplands, the greater portion is treeless prairie. To the northward and eastward, however, the prairies merge into the forest-clad foothills of mountain ranges, where the rainfall is somewhat greater. In these forested regions, especially in northern Idaho, the apple scab has been more or less prevalent for several years past, the amount of the damage varying in different seasons. On the adjoining prairie regions the disease seems to be spreading slowly, but until now not 2 per cent. of the apples have been affected. Outside of the forest belt, at least, the present experience would indicate that the disease is not apt to become an important factor.

#### Legislation.

While differing considerably in character, the horticultural laws of Oregon, Washington and Idaho aim to prevent the introduction and to con-



JOHN B. POWLES.

four orchards located at an altitude of about 2,000 feet has dispelled this notion. In each case, however, the spread of the insect in the orchard has been very slow, so that but little damage has been caused though no attempt has been made to destroy it. These facts would seem to point strongly to the conclusion that outside of the peach growing districts the San Jose scale is not likely to prove a serious menace. In every case, however, no pains should be spared to exterminate the insect, and this (by hard pruning and thorough spraying, can be accomplished. It is far more economical to exterminate the insect, if possible, than to be compelled to spray for it every year or two.

#### Bacterial and Fungous Diseases.

**Pear Blight**—This terrible disease has been very destructive in the past three years, from 60 to 80 per cent. of the pear trees in the region having been practically destroyed. Quince trees, too, have suffered severely, but apple trees have scarcely been affected. In view of the highly destructive char-

diseases by all practicable means, namely: Nursery stock inspection, quarantine of suspected fruit, and compulsory treatment of infested orchards.

#### Nursery Stock Inspection.

Perhaps more attention has been given to this phase of the horticultural laws than to any other. Unquestionably the effect has been to make nurserymen much more careful regarding the quality of the nursery stock they ship. Without doubt, too, this inspection has to some degree limited the spread of well-known insects and diseases. It is very probable, indeed, that the cost of the service is more than repaid by the benefits derived. But as a means of preventing the introduction of new pests, nursery stock inspection has not succeeded.

With the exception of a very few dangerous insects and diseases, among them peach yellows and plum curculio, practically every serious orchard pest is now known to occur in the Northwest. It may be, and probably is, the fault of an imperfect service rather than of the method, but the fact re-