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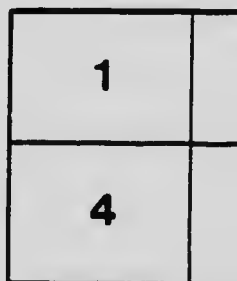
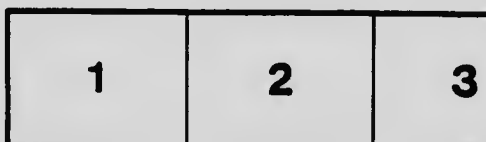
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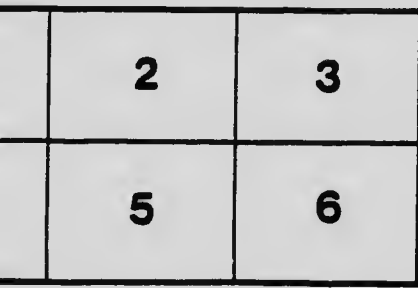
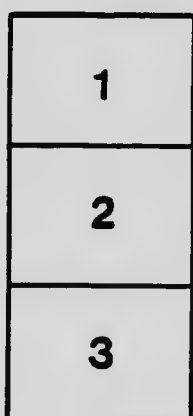
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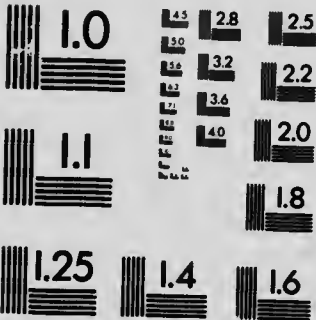
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PROVINCE OF BRITISH COLUMBIA.

DEPARTMENT OF AGRICULTURE (HORTICULTURAL BRANCH).

SELECTION OF ORCHARD SITES AND SOILS.

By BEN HOY, ASSISTANT HORTICULTURIST.

AS TO LOCATION.

THIS will depend to a very large degree on the likes and dislikes of the intending orchardist, for there are many localities in British Columbia that are equally well adapted to the growing of certain kinds of fruit. There is much discussion about the quality of the fruit grown in irrigated and non-irrigated districts, but comparisons made are often unfair to both districts. What will do well in one section often does not do well in another, and varieties of fruit that are grown to perfection in an irrigated district are often of poor quality in a non-irrigated one, and vice versa.

The new-comer, looking to commercial returns from his orchard, will be well repaid by looking over several of the districts that are producing the kinds of fruit he wishes to grow. He can then assure himself, within reasonable limits, that in general characteristics the district is suitable for his purpose. The length of growing season; distance from shipping point; character of roads; in non-irrigated districts, the amount of rainfall; in irrigated districts, the irrigation facilities; the cost of clearing and preparation of land for planting; the size of the district in its relation to car-load shipments, and the possibilities for extension of transportation facilities with the increase in product are all points that should be considered before purchasing. The best test of the fruit-growing possibilities of any district is the success that has already been attained there. It is often on this account that land in proven fruit districts sells at a much higher price than in districts not so long established.

AS TO ASPECT.

There is no one exposure equally well adapted to all fruits and all localities. In localities where there are strong prevailing winds some protection must be looked for, either in the form of a hill, direction of slope, or natural timber-growth. Where there is natural timber-growth a certain amount should always be reserved on the windy side of the orchard; a wind-break is valuable in reducing evaporation, reducing the number of windfalls and bruised fruit, preventing the blowing of the soil, and is a great aid in growing symmetrical trees.

NORTHERN EXPOSURE.

Where late spring frosts are of common occurrence, this is undoubtedly the best exposure for fruit-trees, because the blossoming period is retarded, thus reducing the liability of damage from frost. Less evaporation takes place on a northern exposure and the danger from drying out in late summer is not so great. Sun-scald, which often kills the bark on the south-west side of the tree, is not so common on a northern exposure, because of the more even temperature between day and night.

SOUTHERN EXPOSURE.

Where there is not any danger from frost a southern exposure is a good one for the production of early and highly coloured fruit. On this exposure the trees start growth earlier in the spring and the growing season is longer and hotter, thus enabling one to grow earlier and highly coloured fruit.

AS TO AIR-DRAINAGE.

This important point is one which many intending fruit-growers fail to fully understand. Cold air has a greater weight per cubic foot than warm air, in exactly the same way as cold water is heavier than warm water. On a still night the cooler air flows down to the lower levels, and this drainage of cold air is called air-drainage. The lower levels, as well as pockets enclosed by timber, are, therefore, much more liable to frosts. To avoid frosts in blossoming-time is one of the greatest essentials to continuous and heavy bearing. For this reason fruit-trees should be planted where the air-drainage is naturally good. This applies particularly to peaches and apricots, which bloom very early.

AS TO SOIL.

Fruit-trees grow and do reasonably well on a great variety of soils and in a great range of locations. This does not warrant, however, the conclusion that they will grow anywhere, or that all types of soil are equally suited. It is a matter of common observation that many orchards are "going back," and even dying, as a result of defective soil conditions, even before the strain of heavy bearing has commenced. In common with other plants, a fruit-tree requires a soil containing all the necessary elements of plant-food, one that will retain sufficient moisture and that will allow of easy tillage. As a rule, where potatoes and other garden crops grow well, the soil is suitable for fruit-trees, providing that there is also good water and air drainage, the latter to ensure freedom from spring and fall frosts. Depth of soil is also a very important factor. A first-class orchard soil should be deep, mellow, well drained, and free from alkali, to allow of a maximum root-development at the minimum expenditure for improvements in these lines by artificial means. Orchard trees will thrive for a period more or less short on some of the shallow soils, but, as a rule, they will begin to "go back" as they begin to bear heavy crops of fruit. Practical experience has shown that these soils must be avoided, if economical production of fruit is to be attained. The limitation of bearing-capacity is the certain result of planting on soils deficient in depth. These shallow soils not only hinder root-development and fruit-production, but require larger quantities of water to produce growth, which also involves the leaching and loss of soluble plant-food.

DISTINCTION BETWEEN SOIL AND SUBSOIL.

The colour is the most important point considered in distinguishing the surface soil from the subsoil. The upper layers of soil, which are more exposed to the weather, and which contain the greatest amount of organic matter, are almost always of a darker colour, and there is invariably a sharp line of distinction between the surface soil and the subsoil, especially in the humid regions. It is in the top soil that the greatest amount of available plant-food is found. The action of the air in oxidizing certain minerals and in feeding the necessary bacteria that help to break up the more complex and unavailible compounds that are essential for plant-growth, along with the decayed organic matter, tend to make the surface soil of a darker colour.

On some of the bench lands in parts of the Dry Belt, soils that appear very light and sandy are often found. These are generally of considerable depth, and there is not any distinguishing feature between surface soil and subsoil. Such soil is generally very productive, especially when green manures are used as humus-formers.

OBJECTIONABLE SUBSOILS.

Though the predominating soils of the fruit-growing districts of British Columbia are of the depth, lightness, and richness to produce large crops of fine fruit, defective soils are to be found. It is owing to the fact of not detecting these defective soils that poor results, disappointment, and sometimes failure have resulted. There is much land in the vicinity of well-paying orchards that is not good land from a horticultural point of view, and too much reliance must not be placed on the surface appearance. A shovel or soil-anger is a necessity in selecting orchard soils, for the character of the subsoil must be determined.

HARD-PANS.

Occasionally we find some good soils overlaid with a hard, stiff clay, which the root system of the tree cannot penetrate. This land makes it necessary for the plant to send out shallow roots and feed from the surface layer of soil. As the result of heavy rains or excessive irrigation, the soil becomes water-soaked, and the hollows and holes serve as a basis to hold the water. If a tree is to be over one of these holes, it means that the tree is growing under very adverse conditions, and generally the result is death. While trees on soils overlaid with a hard impenetrable subsoil are easily water-soaked, they are dried out just as easily, and no water being brought up through the hard layer below, they suffer from lack of water in the dry seasons. It is on such soils as these that a great deal of winter injury has resulted.

Such a soil is not desirable for fruit-trees. Small fruits and vegetables are oftentimes grown very successfully on them, but under the above conditions it is almost impossible for our larger fruits to thrive.

In some horticultural countries such soils have been greatly remedied by the use of dynamite and subsoiling, but, to my knowledge, this remedy has not as yet been tried in this country to any large degree. From $\frac{1}{4}$ to $\frac{1}{2}$ lb. of dynamite is put down in a hole about 3 feet deep. The explosion shatters the subsoil and fills it full of cracks and crevices. The roots take hold in these cracks, and once they get down they tend to disintegrate the hardened

and impenetrable substrata with their gases. Once opened up in this way and the water and air allowed to get in, it is done for ever. Underdrainage is also a good investment in such soils.

LEACHY SUBSOILS.

Good soils are sometimes overlaid with a gravelly or very open sandy subsoil. These soils are often so open that they will not allow of the rise of capillary water, and irrigation-water is leached away just as fast as it is put on. The trees on such a soil are shallow-rooted and feed entirely from the surface, which means the surface soil is soon going to be depleted. Frequent irrigation is also necessary, which means the washing-out of a large amount of plant-food. These soils are more difficult to remedy than the soil with a hard layer underneath. Growing clover and alfalfa on a soil with a leachy substrata does a great amount of good, because of their deep rooting. Frequent irrigation can be applied and the roots penetrate down, and when ploughed under they rot and tend to make the subsoil more retentive, also enriching it with nitrogen.

WATER STANDING CLOSE TO THE SURFACE.

Good fruit lands are often in such a position that water is always standing close to the surface. This is sometimes due to natural seepage from the hills to the lower levels and to faulty irrigation-ditches. It is one of the worst conditions that can exist in orchard soil, and trees seldom reach maturity where such conditions prevail. It is the natural tendency of the roots to go to the water-level, and with the fall of the water they follow down. When this water rises the tips of the roots become immersed. This unnatural condition causes disease in the roots and interferes with the normal physiological functions of the plant, and soon results in killing the tree. Generally the top of a tree that has wet feet shows a poor growth and pale-green or yellow leaves.

This condition can sometimes be remedied by underdrainage, or if it be caused by a poorly constructed irrigation-ditch, by repairing the ditch. As a rule, however, land so low as to be troubled in this manner is not suitable for fruit-growing purposes.

ALKALI SOILS.

These soils generally occur in the low-lying places at the foot of hills, in swales, etc. They very seldom are found on the higher land. There are many remedies used on alkali soils, but the most permanent and universally used remedy is the use of gypsum and underdrainage. These soils are generally very rich in plant-food, and if the alkali is removed are often the very best of soils. By using gypsum and underdrainage, the alkali is carried away by leaching, and the gypsum will tend to hold the plant-food in an insoluble form, so that it will not leach away.

PREPARATION OF LAND BEFORE PLANTING.

Thorough preparation is essential to the success of an orchard. The roots of fruit-trees require a much more favourable condition of the soil than do the roots of the forest trees, especially the coniferous forests which cover large parts of this Province. It is not advisable to plant on land

Immediately after clearing or breaking. After clearing, plough to a depth of 5 to 7 inches in the fall, and let stand in the rough during the winter. This exposes more soil surface to the weather, which tends to ameliorate the condition of the heavier soils. There is also less run-off of the winter precipitation, the land being in a better condition to absorb it. In the spring, work the land into a good seed-bed with a disk or spring-tooth, followed by some sort of smoothing-harrow. Then sow clover or vetch, or plant to some hoed crop which will permit intercultivation during the season. If vetch or clover is sown, do not remove the hay, but plough down the entire growth produced in the fall. In the spring following, get on the land as soon as it is fit, and work the soil deeply into a fine tilth, so that it will be ready for the trees. Care in preparing the land will well repay the grower in the faster and heavier growth made by the trees.

In the Dry Belt it is not usually possible to get a catch of clover on newly broken land, in which case rye or wheat should be sown and ploughed down green. Where land is to be irrigated, any inequalities should be smoothed down, to facilitate irrigation, immediately after clearing, before any crops are planted. When an immediate return from new land is desired, the potato is one of the most suitable crops.

On some of the lighter soils, particularly where the clearing has been light, reasonably good results are often obtained simply by fall ploughing previous to spring planting. As a general rule, however, and always on heavier soils, the ground should be worked at least one year before planting.

Victoria, B.C., December, 1912.

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