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The Agricultural Experiment Station

FORT COLLINS, COLORADO

INSTRUCTION FOR CO-OPERATIVE TREE PLANTERS

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In Press Bulletin No. 22, A Co-operative Experiment in Tree Planting, brief directions were given for the planting and care of a tree-plantation for timber purposes. This leaflet has been prepared with the purpose of giving more detailed instructions to those with whom the station is about to undertake the co-operative tree planting experiments, outlined in the above press bulletin, and, in addition, it is intended to be of service to any persons who contemplate the growing of trees for utility purposes on their own account in this state.

The wide range in conditions of soil and climate which our state possesses makes it impossible to formulate any set of rules that will be suitable for all places or for any and all species of trees that might be planted for utility purposes. We have, moreover, but little exact data from actual experience of tree planters in this state to aid in this matter and must, therefore, depend largely on generally established principles in tree culture as well as the results of such practices in neighboring states. It should be further borne in mind that the following directions apply more particularly to the growing of the hardy or western catalpa and the common, yellow or black locust, which have been selected for our co-operative experiments in tree planting.

Location and Soil—The location of the tree plantation will be left largely in the hands of the owner of the land and may be made a matter of convenience providing suitable soil and irrigating facilities are available. On the plains, where the natural water supply is the only available one, the lay of the land may in some cases make it possible to set the trees where they will benefit by the surface flow from higher ground.

The soil should be such as is adapted to the growing of agricultural crops. While it might in some instances be possible to secure a growth of trees on poor soils and with a meagre supply of water, the purpose is to secure as rapid and productive results as possible and this cannot be accomplished on unproductive soils. Neither should a soil strongly impregnated with alkali be selected for this purpose nor such as are subjected to much seepage nor frequent overflow.

The soil should be well prepared by deep ploughing in the fall,

if possible, followed by thorough harrowing in the spring. If done in spring the ploughing should not usually be as deep as that in the fall, especially if the soil is a stiff clay or adobe as it does not work down easily but is apt to contain large air spaces unfavorable to the growth of roots of plants. Sandy soils are better prepared by deep ploughing at all times. Soil which has been in cultivation for one or more seasons is usually in better condition for tree planting than new soils and requires less work to prepare. In any case the preparation of the soil should be such as would adapt it to the growing of sugar beets, corn or wheat. It is not desirable to manure the land intended for trees unless it is done one year before the trees are set, thus allowing time for thorough decomposing.

PLANTING THE TREES

Spacing—The trees grown for utility purposes are to be planted in rows so that thorough cultivation can be given. The spaces between the rows and between the trees in the row must vary somewhat according to the conditions. Thus on land that is supplied with plenty of moisture throughout the growing season the trees may be set more thickly than on the plains where no irrigation can be given. The spacing decided on for the co-operative experiments in tree planting, as published in press bulletin No. 22, was in rows six feet apart and four feet apart in the row for irrigated land. This is probably the closest planting that should be recommended and in many cases may be better made 8x4 or 8x5 feet. With these spaces it may be desirable to remove alternate trees in each row after a number of years. To prevent as much as possible the drying effects of sun and wind the plantation should be in as compact form as possible. Thus the area set to trees should not be more than twice as long as wide.

The following table indicates the number of trees per acre when set at the given distance apart, also a suitable length of row for setting a plantation of only six hundred trees.

Spaces	No. of Trees Per Acre	Length of Row	No. of Rows	Width of Plantation
4x6	1850	10 Rods	15	5.5 Rods
4x8	1352	10 Rods	15	7.3 Rods
5x8	1089	12 Rods	15	7.5 Rods
6x12	604	240 Feet	15	11.5 Rods

The following plan which has been successfully followed by Mr. J. C. Cope on the plains in eastern Colorado, will be largely adopted by the station for experimental plantations under similar conditions. The land is ploughed in strips so as to leave dead furrows twelve feet apart with a back furrow, forming a ridge between. The surface of the land is thus caused to slope each way toward the dead furrows in which the trees are set at intervals of six feet apart. These dead furrows are maintained during the first few years of cultivation so that any rainfull, sufficient to cause a surface flow, is directed toward the rows of trees. These depressions also tend to hold the snow in winter which might otherwise blow away.

Heeling In—As soon as the trees are received from the

nursery they should be taken care of without delay. They should be unpacked and either planted out at once or if the land is not ready they should he heeled in carefully. For this purpose a shady place is preferable if they are to be left for some time. Dig a trench with one sloping side and deep enough so that the roots of the trees will not entirely fill it. The roots of the trees are then placed in the trench while the trunks lie at right angles to it on the sloping surface. Enough moist soil is then thrown on the trees to bury the roots so there will be no danger of drying out, and it is also well to cover the trunks nearly to the tip. The trees should be planted before growth begins.

Fig, 1.

Fig. 1. The trees as they come from the nursery. a, black locust. b, hardy catalpa.

Flg. 2. The same trees after being properly trimmed.

Fig. 2

Trimming—As they come from the nursery the trees will usually need some trimming just before they are set in the ground. All broken roots should be trimmed off and the long sprawling ones shortened somewhat. The tops will also need cutting back to make them correspond to the reduced root system. The accompanying figures will help to explain the extent to which this should be done.

Planting—In establishing a tree plantation or an orchard, careful planting goes a long way toward insuring success. Two persons can generally work to better advantage than one alone,

and if the soil has been well prepared and is moist, the planting of one and two year old seedling trees can be rapidly done. Such trees, which usually run from one to two and one half feet high are to be preferred to larger trees. One person thrusts the blade of a spade to its full depth into the ground and opens the soil by pushing the handle forward. The second person sticks the seedling in behind the spade, which is then withdrawn and the soil is then firmly packed about the tree with the feet. The seedlings should be set a little deeper than when in the nursery to avoid exposure of the roots when the soil settles. For larger trees holes must be dug large and deep enough to accomodate the roots and to leave a slight depression around the tree after the soil is put back. The roots of the trees should be brought in good contact with the soil. If the soil is adobe in character, care should be exercised not to pack it too firmly in filling the holes as it may thus be so hardened as to exclude necessary air and water and greatly retard root growth. It is better in such cases to leave the soil somewhat loose and to settle it after all are planted by a thorough irrigation. If the soil is quite dry at the time of setting, water should be turned into the holes and a layer of dry, loose soil thrown on top after the hole is filled, or if water is available, a thorough irrigation may be given after the trees are set. Great care should at all times be taken to keep the roots of the trees protected from sun and dry air for more than a few minutes at a time. Thus a moist burlap may be wrapped about the roots while the trees are being transported and planted.

Irrigating—Unless the soil is well supplied with moisture at planting time a thorough irrigation should be given after the trees are set to settle the soil and encourage root growth. Further irrigation will depend largely upon the character of the soil, the amount of rainfall and the cultivation given. Water need not be applied oftener than is necessary to keep the soil moderately moist. Trees are usually accustomed to plenty of water during the earlier weeks of the growing season but the supply should be diminished or entirely withheld toward the end of summer to induce early maturing of the wood. Probably little or no irrigation should be given after the first or middle of August in ordinary seasons. Trees sometimes suffer more from drought in winter than summer and where water is available late in the season a final irrigation is desirable after there is no further danger of growth being started.

Cultivation—Cultivation can in a measure supply the lack of irrigation facilities. It is in fact absolutely essential to success on the plains or where the only supply of water is the usual rainfall. Under such conditions surface cultivation not only greatly retards evaporation of moisture from the soil but it tends to allow the rain to penetrate instead of running off. Shallow surface cultivatino therefore should begin as early in spring as the conditions will allow and be continued throughout the growing season at intervals of ten days to two weeks. No crust should be allowed to form but the soil must be stirred after each shower. On irrigated land surface cultivation should follow each application of water as soon as the soil will allow. Cultivation, like irrigation should be discontinued toward the end of the growing season in order to let the new growth mature and thus avoid winter killing.