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WORK OF THE CLOQUET FOREST EXPERIMENT STATION

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Agricultural crops mature in one growing season. Forestry crops require from thirty to one hundred years to reach maturity. Herein lies the difference between the problems of the two lines of endeavor. The time element makes the solution of forestry problems more difficult than if the crop matured annually. It is almost impossible for one person to carry on an experiment with a given crop from its origin until it is harvested. The forester must deal with only certain phases and certain conditions of the stand and by going out in nature and selecting stands of different ages he readily manages to piece together the entire life history of the crop. This is, of course, not as satisfactory as following a specific crop thru from planting to harvest. It is necessary for the forester to wait five to ten years before the effects of even the simplest of his experiments can be determined.

The Forest Experiment Station was established in 1909 to answer any questions that might arise connected with the growing of forest products. At that time there was very little real forestry being practiced and it was necessary to anticipate in a measure which questions would be the first to come up. The first logical question of course would be the establishment of a crop. Even at that time people were beginning to realize that much of the timber crop of the north had been harvested and a great deal of

the area devastated. In order to produce a second crop it was felt that planting should be resorted to that the character of the crop might be controlled and not left to chance.

There are three questions which arise when a person begins to think of planting forest crops. The first is the species of tree to plant, the second, the age of the planting stock, and the third the method which will be most successful and most economical. To answer these questions the Experiment Station has established about 300 experimental planting plots located on the 2700 acres of the Experiment Station area and scattered thruout cut-over lands of the north. An effort was made to cover all conditions of planting which one would meet in the ordinary course of forestry practice. These plots have shown us that in the open and severely burned areas the cheaper seedling class of stock can be used because there is no brush to compete with the trees. Where there is considerable brush it is necessary to resort to the use of the more expensive and sturdy transplant stock. It has been found that it is best to use native trees. The indications are however that some of the native trees can very profitably be moved from the type of soil on which they occur naturally to another. Thus on the Experiment Station area we have very good plantations of white pine growing on what is known as Jack pine sand. Only one species of exotic conifers has been found useable in this section and that is the Scotch pine. It seems to thrive in the early stages almost as well as some of the native trees. It was, of course, necessary before these planting experiments could be worked out to determine the best methods of collecting, extracting and storing seed, and the proper

method of sowing the seed in the nursery and caring for it after it germinated. This has all been worked out and at present the nursery operated by the Forest Experiment Station has a capacity of one million 4-year-old transplants annually.

Within the boundaries of Minnesota we have all gradations of conditions from open prairie to the heavy coniferous forests of the north. At first very little attention was paid to planting in the prairie region, but in 1919 it was felt that it was the duty of the Experiment Station to help further the planting of forest trees on the prairie. With this idea in view a co-operative windbreak project was begun. There are at present over 200 windbreaks in various stages of completion under this project. These demonstration plantings are proving to the farmers of the various communities that it is possible to grow trees for protection of the farm homestead in all sections of the state.

The condition of the cut-over lands of the north has always been a matter of conjecture. Nobody knew how much was barren; nobody knew how much reproduction was coming in, nobody knew its character or value. In order to have some definite information on this matter the Experiment Station made an extensive survey of the cut-over lands of St. Louis and Lake Counties. This survey, which covered about 150 sections, showed that there was considerable more reproduction coming in than was generally supposed. The figures gathered on these sections showed that only 4% of the area was entirely barren. This does not mean that 96% of the area was satisfactorily reforested, but it does mean that on the rest of the area wher

tree growth could be expected, that is, land not in stream bottoms or in open meadows, some sort of timber crop was coming in. True, very often the number of trees per acre was unsatisfactory and the character of the species making up the stand was not the best, but the tree crop did exist. Forestry practice would be helped greatly by working out the utilization of these stands rather than attempting to replace these vast areas of so-called inferior species with the original stand. It is necessary to develop a change in the attitude of the general public mind from considering these stands as brush to regarding them as young trees having a potential value.

One of the most important functions of the Experiment Station is to lead the way by actually practising forestry methods on the Experiment Station area. It will probably be some time before corporations and private individuals will practice forestry and it is only this way that we can encounter the problems of forestry. Thru the practice of foresters the problems will be solved and the practicability of forestry methods will be demonstrated.

The Experiment Station area covers about 2700 acres. There are present on this area all age classes of timber, from the very youngest reproduction to the mature timber 100 to 120 years old. There is very little barren area on the Station, probably not more than 100 acres which require any planting work and this area needs planting only to fill in places where nature has failed to establish seedlings. There is a disproportion in age classes. We have too many young age classes and not enough old ones. This, of course, makes it necessary to reduce any cutting which may be done in order to hold back the older age classes until such a time as the rest of

the stand has had an opportunity to approach a normal condition. When the entire area has been put under intensive management and has become 100% productive it should be possible to cut about 2500 cords of material from the forest each year or expressing it in board feet, 1,250,000. This would mean that the soil must produce 500 board feet or one cord per acre per year. Our preliminary studies of yield in wild and unthinned stands shows that this is entirely possible.

In handling some of these young stands question arises as to just what density should be maintained. Many of our wild stands are heavily overstocked. This fact causes a reduction in the rate of growth. In order to determine just at what density should be maintained there has been established a series of thinning plots in stands of different ages. In these thinning plots a portion of the stand has been removed and an attempt has been made to leave the proper number of trees per acre for that age class. This is the foresters way of cultivating his crop and it is necessary for him to wait five to twenty years before he can determine whether he was right or wrong in his judgment.

We have found in working out management plans for the Station areas it was necessary to have volume tables showing the contents of trees of various sizes. This has been worked out for Norway pine, white pine, jack pine and white spruce. Volume tables for the remaining species are badly needed. It is also necessary to work out the probable yields for trees of different ages. Some work has been done of this on jack pine. The remaining species have not as yet been touched.

It is the aim of the Forest Experiment Station to answer the questions which arise in the production of forest crops by growing those crops themselves in the same way that the agricultural experiment stations answer the problems pertaining to agriculture.