

PROGRESS REPORT, THE INSTITUTE OF PAPER CHEMISTRY

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At the first Lake States Forest Tree Improvement Conference a report was made upon the initial phases and the methods of a study to determine the possible utility of polyploid aspen as a source of pulpwood. The investigation was under the joint sponsorship of the Marathon Corporation and the Rhinelander Paper Company. Research facilities were provided at Beloit College.

In January 1954 the study was transferred to the Institute of Paper Chemistry. There, other paper firms who are members of the Institute joined in the support, and progress on the project was accelerated.

At the same time a new department of genetics was established at the Institute to engage in fundamental research in the genetics and improvement of forest species which furnish pulp to the paper mills of the United States. For several years previously, the Institute had been laying plans for the creation of such a department.

Since the nature and purposes of the Institute may not be generally familiar, a brief description may be in order. The Institute comprises a graduate school, a research organization, and a library in behalf of the paper industry of the United States, Approximately 55 students are enrolled in a 4-year program leading to the Ph, D. degree. The curriculum gives much attention to the fundamental sciences which underlie the pulp and paper industry, and is especially designed to encourage the

development of resourcefulness and judgment Both fundamental and applied research is carried on, with about 120 projects currently in progress. Extensive abstracting and bibliographical services are provided, and the library is the most complete of its type. Approximately 40 persons carry primary responsibility in teaching and research, and the total staff numbers about 260. Support comes from membership participation on the part of approximately 125 companies, these accounting for about three-fourths of the tonnage produced by the pulp, paper, and paperboard industry of the United States.

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The genetics department is housed in a new building with greenhouse attached, which was completed early in 1955, A nursery was established this spring on a temporary site 30 miles north of Appleton, and a permanent site closer to the Institute is to be purchased as soon as a suitable location can be found, The principal field location--including nursery, forest, propagation area, and test sites--has been provided by the Rhinelander Paper Company on its Forestry Farm near Eagle River, Wisconsin. Here some 20 acres of highly uniform soil have been set aside for future experimental plantings.

In addition to the geneticist, the staff of the department now includes Dr. Dean W. Einspahr, specialist in forest soils and silviculture, Dr. Peter A. Hyypio, cytologist, and several assistants. The department has also entered into a consultant relationship with a forest pathologist and a forest entomologist who are specially qualified to guide current studies in relation to tree diseases and insect pests. There is close cooperation with other research groups of the Institute in both teaching and research. An optional course in genetics will be taught for the first time this fall.

In the polyploid aspen project considerable advance has been made. Polyploid trees from several sources are now in hand; efforts are continuing to secure others; and some tree material will soon be ready for early testing. Polyploid trees grown for testing will be evaluated in the juvenile stage and at maturity.

Since the membership of the Institute is national rather than regional, the program in genetics will include studies of species in various sections of the country. The primary interest of the Institute is in the gene behaviors as they affect the expression of those tree, fiber, and chemical characteristics in which the industry has particular interest. In the characteristics which influence the suitability of wood as a raw material for making paper, there is a considerable array of variables which exert an important effect at some stage of manufacture or in the finished product, It will be important to learn to what extent these variables may be subjected to genetic control, and to improvement by the breeder. It seems quite apparent that the usefulness of tree improvement programs will depend heavily upon the availability of this kind of information, since at present we are very poorly informed in this area.

Parallel with and supplementary to this kind of activity will be a major emphasis upon intelligence in the nuclear cytology of forest trees, As is true generally in breeding programs, much advantage--both direct and indirect--often comes from familiarity with the behavior of the chromosomes of the breeding materials.

In the prosecution of the genetics program full advantage is taken of the fortunate opportunity which is available at the institute of working in partnership with specialists in most of the areas in which genetic improvement is desirable, These areas include the specialized aspects of the basic sciences of chemistry, physics, biology, and also the various technologies, In its largest context and in its most effective relation, it seems quite evident that genetic improvement ought to be regarded as a co-enterprise with technological modification and with silvicultural modification, and the more intimate the relations between the researchers in these three areas and their allies, the more productive the enterprise.

While the first genetics project at the Institute has majored upon polyploidy as a method to be tested with reference to improvement in amenable tree material toward several specific objectives, there is no thought of imposing a bias in favor of this particular method of improvement except as similar studies may be justified by the tree material used in projects initiated in the future.

In addition to the aspen polyploidy study, several other studies of aspen have been undertaken. These include:

1. In cooperation with Dr, Scott S. Pauley, a study of the inheritance of certain characteristics of aspen, with four related generations as experimental material.
2. An investigation of natural variability in Lake States aspen wood,
3. Research to improve methods of raising aspen from seed.
4. A study of methods for killing insect larvae which feed upon aspen seeds and pollen.
5. Preparation of an extensive annotated bibliography of the genetics and improvement of pulpwood species, which is now at the half-way stage.