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Abstract Paper

Anderson several times that he wanted to go, but she didn't let him. His mother felt that Mrs. Anderson was at fault because he never messed at home and hadn't since he was two.

I think there is little I will add to this description other than to say that the actions and attitudes expressed in it are fairly typical with the exception that Joan is a particularly capable and perceptive child.

In conclusion, then, it seems to be apparent that the changing economic situation is the cause of the basic alterations in familial structure, that of the emergence of the individual family as the basic economic unit, the father's inability to maintain his former status, and the consequent assumption of the family's direction and support on the part of the mother. On the other hand the relationship between mother and child, a relation of affection and respect has remained more stable.

EXPERIMENTAL VALUE OF THE CLONAL LINE IN FORESTRY

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ABSTRACT

During the past two decades foresters have become increasingly conscious of the need for extended basic forest biological research in the fields of ecology, physiology, and genetics. Important in the development of this research trend has been the acceptance by foresters of the fundamental contribution of genetics, namely, that *all* characteristics of an organism are inherited but that some are controlled rigidly by the genes, whereas others are controlled loosely.

Knowledge of the degree of genetic control exerted over particular characters in trees, or the "reaction range" of such characters in different environments, are matters of primary silvicultural interest since manipulation of the environment provides the only direct tool at the disposal of the silviculturist by which he is able to modify the yield and quality of the trees currently occupying an area.

In the past great reliance has been placed on descriptive methods of research in the field as a means of assessing the degree of genetic control exerted over certain characters. Results of such descriptive methods are invariably confounded by factors of age, site variation, and genetic diversity—a situation which inevitably leads to empirical generalization. Such generalizations are, nevertheless, of great scientific usefulness since they may lead to hypotheses that are amenable to test by experimental methods.

Such problems may be best solved under conditions in which maximum control is exerted over the genotype and environment. In the

past much attention has been directed by forest physiologists, ecologists, and others to the problem of uniform environment development in the laboratory, greenhouse or field. But little concern for the genetic uniformity of the experimental materials has been shown, in spite of the fact that absolute genetic uniformity may be attained directly by the vegetative propagation of an individual (*ortet*) into a clonal line of many genetically identical individuals (*ramets* or *propagules*).

Although clonal lines have been used widely and profitably in many fields of horticultural research, foresters have only in recent years recognized the potential usefulness of such materials. The value of clonal line methods in gum yield studies of the southern pines, one of the first applications of such methods in forestry, has encouraged an ever widening interest in the use of clonal lines in silvical research. Studies of wood density, the vegetative and flowering response to photoperiod, fertilizer effects on growth and flowering and fruiting habits, disease and insect resistance, spacing and thinning, mode of inheritance, adaptation, compatibility, and numerous other special fields of inquiry provide almost limitless opportunity for the utilization of clonal line methods.

One of the currently most active fields of physiological research in forestry is concerned with the problems of vegetative propagation itself, especially the development of practical methods for the rooting and grafting of difficult plants. Recent air-layering and "succulent tissue" grafting studies in the southern pines suggest that development of practical methods of clonal line establishment in other pines, and, indeed, in other "difficult" genera, is not far distant.

With emphasis placed on artificial methods of vegetative propagation there has been a tendency to overlook the fact that naturally occurring clonal lines of trees are common constituents of our forests. The aspens, for example, most frequently occur in clonal clumps of several to several hundred ramets. There is evidence suggestive that certain clones of quaking aspen in the northern part of the state may occupy areas of 10 or more acres and consist of several thousand genetically identical individuals. Such clones provide ideal natural laboratories for the investigation of numerous silvical problems.

A BASIS FOR FOREST TREE SEED COLLECTION ZONES IN THE LAKE STATES

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WHY SEED COLLECTION ZONES ARE IMPORTANT

Forest tree species which grow over a wide range of conditions probably have developed races. There is experimental proof for such

[1] Maintained by the Forest Service, U. S. Department of Agriculture, at St. Paul 1, Minnesota, in cooperation with the University of Minnesota.