Resistance to plant pathogens deserves serious consideration in a crop-improvement program. The existence of physiologic forms in pathogens which cause some of the most destructive plant diseases has added considerably to the complexity of the problem. The inheritance of disease resistance may be complicated not only because of the presence of many and varied forms of the pathogene, but also because disease resistance is the result of the interaction of two elements, i.e., the host plant and the parasite. The mode of inheritance of reaction to the various physiologic forms of stem rust aids materially in deciding how extensively any particular cross must be studied. Furthermore, from the practical standpoint, one must have a variety which is resistant to all the forms present in the region where the variety is to be grown.

Variatel testing and breeding of spring wheat for resistance to stem rust were started at the University of Minnesota about 1907 by E. M. Freeman and E. C. Johnson as a cooperative project between the Minnesota Agricultural Experiment Station and the United States Department of Agriculture. The earlier work consisted primarily of varietal testing, and, in a much more comprehensive form, is still being carried on cooperatively by the United States Department of Agriculture and various state agricultural experiment stations. At the University of Minnesota the problem is being attacked cooperatively by the sections of Plant Breeding and Plant Pathology and the Office of Cereal Crops and Diseases of the United States Department of Agriculture.

In crop improvement, the line of development usually is placed in three categories: First, the testing of domestic and foreign varieties; second, selection; and third, hybridization. The testing of established varieties naturally is the first step in the search for strains.

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2Associate Pathologist, Office of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture, in cooperation with the Agricultural Experiment Station, University of Minnesota. The writer is indebted to Doctors H. K. Hayes and E. C. Stakman for suggestions in the preparation of this paper and for the use of unpublished data on phases of the problem which are a part of the general cooperative project.