The rediscovery of Mendel's laws at the beginning of the present century soon created interest in the possibility of transferring desirable characters from other species and genera to common wheat, *Triticum vulgare* Vill. Carleton (3) suggested as early as 1901 that rust resistance and certain other characters could perhaps be transferred from the tetraploid wheats (emmers and durums) to common wheat. A few years later, McPadden (17) suggested the possibility of obtaining greater winterhardiness from rye, *Secale cereale* L. Still later, in a series of papers which were never widely publicized, McPadden (18, 19, 21) briefly reported on his crossbreeding experiments involving the *Agropyrons* dating back to 1914, and called attention to numerous characters in the genus *Agropyron* that would be of value in the cultivated wheats. Among the *Agropyron* characters specifically mentioned were perennial nature, resistance to heat and drought, extreme winterhardiness, resistance to frost, resistance to alkaline and acid soil conditions, resistance to various diseases, and wide geographic adaptation of the various species. In another paper, McPadden (20) advocated a thorough study of the whole subject of interspecific and intergeneric hybridization with respect to wheat improvement, and more recently discussed (21) the possibilities of obtaining desirable characters from the various species of *Aegilops*.

In the four and a half decades since the first highly speculative suggestions on the use of wide crosses in wheat breeding, many investigations have been conducted in this field and much of value has resulted. Not only have new wheat materials of great practical worth been accumulated, but fundamental knowledge of the wheat group and its relatives has been greatly extended in the fields of taxonomy, cytology, genetics, and phylogeny.

**REVIEW OF LITERATURE**

**FUNDAMENTAL STUDIES**

Sakamura (35) found that the three taxonomic groups of wheats—the einkorns,