EFFICIENT use of recurrent selection procedures requires the evaluation of lines or plants at the earliest practicable stage. The usual procedure, when selecting for combining ability in corn, is to cross either selected S₀ plants or S₁ lines from a heterogeneous population with a tester. Since the phenotypic appearance of an S₀ plant is not a reliable indication of its genotype, Lonnquist (4) has recommended top crossing S₀ lines rather than S₀ plants. This permits selection for desirable agronomic traits among the S₁ progenies before expensive yield trials are undertaken. Even when the original population is satisfactory agronomically, it seems advisable to practice visual selection among S₁ lines before growing the test hybrids in each cycle of selection in a practical breeding program.

An alternative procedure to making test crosses with S₁ lines is to test a single plant chosen from each desirable S₁ progeny row. When either S₀ plants or S₁ lines are crossed with a tester, it is the test cross progeny of an S₀ plant, which normally is highly heterozygous, that is evaluated for combining ability. If, instead, a single plant in each desirable S₁ line is selfed and outcrossed to the tester, the plants being evaluated contain only about 50% as many heterozygous loci as the original S₀ plants. This procedure requires no more time or effort than the usual procedure of testing S₁ lines. It appears to be a better plan than the latter for the following reasons:

(A) Genetic variability within lines, and hence within test crosses, is reduced in proportion to the reduction in heterozygous loci that occurs on selfing an additional generation. Sprague (6) showed experimentally that genetic variability within lines decreases by \( \frac{1}{2} \) with each generation of selfing. For this reason selection should be effective at more loci when S₁ plants rather than S₀ plants or S₁ lines are involved.