The possibility of capitalizing hybrid-vigour depends upon its extent and the cost of producing hybrid seed. It is likely to be most attractive commercially when a little labour results in the production of a large amount of seed. The tomato is an example in which one cross will furnish a large amount of seed, and it is found that the measure of improvement resulting from certain crosses more than compensates for the cost involved in producing the hydrid seed. Generally speaking, the hybrid is earlier, produces a heavier yield, and the fruit is intermediate in appearance between the two parents.

Plants like wheat and peas that are self-fertilized become "fixed," and the progenies of a single plant resemble the parent. The tomato is dominantly self-fertilized and therefore, generally speaking, its characteristics are "fixed." In this event the first-generation hybrids are all alike, although differing in some respects from either parent. This uniformity is not permanent, for in the second and subsequent generations segregation occurs and many variations arise. It is from this segregating material that the plant breeder makes his selections and later attempts to "fix" them. Naturally the same position arises in the case of the hybrid-vigour. Its expression is at its maximum in the first generation following the cross, and is not permanent because in subsequent generations segregation occurs and hybrid-vigour becomes less progressively with each generation.

The problem then resolves itself into finding varieties which when crossed result in some definite improvement above either parent along the lines of increased yield, earlier maturity, or improved quality.

Several workers have investigated the possibilities of commercializing hybrid-vigour in tomato-production. In general, hybrid-vigour has been demonstrated, and in certain cases this has been reflected in an increased yield of fruit and in precocity. Alabouvette and Titard (France) found the greatest increase in two varieties with the least morphological resemblance.

New Zealand Trials.

The trials to be discussed were conducted at the Plant Research Station, Palmerston North. Four varieties, selected at random, were used—namely, Large Red, Early Cluster, Kondine, and Sunrise. Kondine and Sunrise proved to be very similar in nearly all respects, and Early Cluster was not markedly different from these. Large Red, however, proved quite distinct in maturity, growth, yield, and shape of fruit. It was unfortunate for the purposes of this trial that three of the varieties were so similar to one another.

The varieties were crossed one with another, both ways, in 1933–34, and the resulting hybrid seed was sown in 1934–35. The seedlings were planted out, staked, and pruned to a single stem, in a manner similar to that adopted generally by commercial growers. Each plot consisted of five plants, the hybrid plot being grown alongside the parent plots for purposes of comparison, and the whole trial replicated three times. The fruit was picked and weighed when it showed colour, and usually two pickings each week were found necessary. This allowed determination of not only the total yield but also the earliness of maturity (precocity).

General Observations on Results.

It was observed throughout that the hybrid plants grew more vigorously than the parents, but no measure of this was attempted. The