

If his offsprings are from different females, but still resemble him uniformly, his prepotency is insured. The sire should be mature, and the proper age should be about 4 years.

Sometimes it is necessary to buy bulls that are about a year old. If the young stock in the herd in question are fairly uniform, the calves uniform, and the bull more or less prepotent, any sire selected from such a herd is going to make good in building up particularly graded stock. Price should not be considered in such a case.

Now with reference to the cows. By weighing and testing the milk it is possible to weed out the unproductive ones, that is those that cannot produce at least 5,000 pounds of milk in a year. A greater proportion of cows must be more productive than is now the case, and they are susceptible to improvement. To become really successful the breeder must himself raise a number of heifers which should be selected from the best cows. It does not follow from this that the largest milk-producing cow is necessarily the best cow to select the calves from. The reason is that we are not attempting to perpetuate the characters of a grade cow, but of the sire that is pure-bred. The calves that have at birth the typical characters of the sire's breed are the ones to be selected, and the best character used as an indicator at that time is the color markings. The calves resembling the sire most in this respect are chosen.

In a mixed unproductive herd there is a great variability that the individuals will show on changing the environment. Scantly-fed cows put upon liberal rations will show a varying response according to their nature. The dams that show improvement in production under better feeding con-

ditions are plastic and should be selected for breeding, because a pure-bred bull will exercise greater prepotency over such females.

The pure-bred sire is successful if the cows improve 50 per cent. in butter-fat production. If the dams give 150 pounds of butter fat per year, the offspring when two years old should give 225 pounds or more. If the bull cannot bring about this improvement, he should be discarded. By raising calves the herd can be maintained. The offspring mature while the sire is still useful, and should be bred to him, if they are all alike, vigorous and resemble him.

Half-blood females of uniform type are found in the first generation, even in a mixed breed. The three-quarter bloods do not show improvement equal to that of the half-pure blood and reversion takes place to the type of the original mixed dams. This cannot be controlled, but can be overcome by selection. In-breeding is perhaps the best method to minimize reversion.

In three-quarter bloods the qualities of dams and sires should be considered in selecting individuals for mating. The three-quarter reverted pure-breds should not be used to breed from. Only the continually improving dams should be used for this purpose. Progress in third and fourth generation should be measured by maintaining the production of about 225 pounds of butter-fat. More than this can be produced, and the individuals responsible for it should be retained as the more valuable ones.

When the original sire becomes aged or deteriorated, it is necessary to select his successor. It is necessary then to see that there is a strong resemblance between the old and the new sire, and that they should be "line-bred," that is they should come from the same