part of these extension activities the Northern Wairoa experimental herd will be gradually replaced by Ruakura-bred animals. Twenty-five calves were made available for this purpose this season.

Ruakura Grade Project.—In this project the objective is to build up a herd of grade cows of average size (50 cows) from a relatively low standard to a 400 lb. butterfat average by the use of proven sires and artificial insemination. Twenty-one daughters of proven sires came into milk during the current season, and a further 30 will calve next season.

Ruakura Pedigree Project.—Here the objective is to see if the proven-sire system of breeding is capable of maintaining or even improving a herd average of 400 lb. The almost universal history of all high-producing herds is one of gradual rise to such a standard followed by an equally definite fall to lower levels. In view of the importance of bull-breeding to the industry, and due to the fact that artificial insemination is a more practical proposition with pedigree than with grade cattle, this work is related closely to the whole question of national herd improvement. In particular, since as a method it does not facilitate line or family breeding and therefore tends to cut across established pedigree breeding traditions and methods, its scientific investigation is of paramount importance.

To establish this herd and commence the work, 12 cows and 13 heifers of a 400-lb. standard were purchased last winter and are now in production. Along with 9 Ruakura-bred pedigrees of a similar standard, the herd size is now 34. It will be built up as quickly as possible by breeding to a 50-cow level.

Dairy Cow Nutrition

Study of Fœtal Development in the Cow.—During the past year 24 pregnant cows were slaughtered and the uteri recovered for detailed laboratory examination and dissection. Killings were carried out at twenty-eight-day intervals from conception and a fairly complete range over the whole pregnant period was covered.

The study will yield not only information of fundamental interest on growth and development of cattle, but will have a direct practical application in permitting accurate corrections to be made to cattle live weights so that live-weight changes can be studied independently of pregnancy effects. Rapid increase in weight during the latter stages of pregnancy obscures changes in true body weight.

Calf-rearing.—Experiments have been initiated to provide information on the comparative efficiency of three methods of milk feeding, especially in relation to the prevention of scours during the first three weeks. In all groups colostrum was fed for the first three days, and thereafter whole milk was fed until the calf reached 70 lb. live weight, with a gradual change to skim-milk by the time it reached 100 lb. live weight. In the first group milk was fed in daily quantities based on 12 per cent. body weight, with a maximum of 2 gallons. The second group received the same quantity of milk diluted with 25 per cent. water. The third group was fed undiluted milk on an 18-per-cent. body-weight scale, with a maximum of 2½ gallons. There was no difference in the incidence of scours in groups fed at different milk levels. The addition of water appeared to reduce the incidence of scours; the group fed at the higher level grew very rapidly up to five weeks, but not thereafter.

Lifetime Project.—The object of this project is to examine the effect of two types of pasture-management on the lifetime performance of dairy cows. In one case the pasture is so controlled by rotational grazing, autumn saving of pasture, and maximum conservation of hay and silage as to provide an even high level of nutrition, while in the other the diet of the cattle is controlled almost entirely by seasonal effects. The different treatments are applied in two groups for the whole lives of the cattle, and in the other two changes are made when the heifers calve for the first time. There are