phosphorus and nitrogen. Supplementary feeding of potassium phosphate decreased the calcium balances to a negative value. Supplements of dried blood enabled the animals to retain nitrogen, and at the same time improved the retention of calcium and phosphorus. The calcium and phosphorus balances were not improved by feeding Nauru rock phosphate as an addition to the hay and dried blood diet. The work, though only preliminary in nature, suggests that sheep feeding on a pasture similar in nature to the hay used—*e.g.*, high country or droughty conditions—will not benefit by supplementary feeding of mineral mixtures to the same extent as they would by improvement of the nitrogen intake.

Analysis of Sheep Milks.—A number of samples of sheep milks from the Wallaceville and Rotorua districts were analysed to provide further data for the study of the calcium and phosphorus metabolism of the sheep.

High Protein Feeding and Reproduction.—Work commenced on rats in 1931 has been continued. The fertility of females fed diets containing 80 per cent. protein was not affected, but the male rats fed such a diet for long periods have become sterile. The investigation is being continued in collaboration with the Officer in Charge.

Grass Staggers in Dairy Cows.—Factors causing the upset of magnesium metabolism in this disease are being investigated by preliminary work on rats, which will later be extended to ruminants. The effect of the level of dietary magnesium on the calcium and magnesium contents of bodies, bones, and blood has been determined. The most interesting finding is that the blood magnesium level reflects the magnesium content of the diet, and by feeding extra magnesium as carbonate, sulphate, chloride, or phosphate the magnesium content of the blood has been raised considerably above the normal. This relationship is being tested out on sheep, which are being drenched daily with magnesium salts, and will later be tested on cows supplied with magnesium containing licks or with magnesium salts in their drinking-water. The importance of the work resides in the fact that, since the most marked finding in the blood of cows with grass staggers is a greatly reduced magnesium content, then a practicable method of raising the blood magnesium during the period of susceptibility to the disease might help to mitigate its incidence. Such methods as supplying stock licks containing large proportions of magnesium if these can be made palatable, or the introduction of soluble magnesium salts into drinking-water, might achieve this end. Different strains of rye-grass, which forms a large proportion of the pasture in districts where grass staggers occurs, are being investigated at various stages of growth.

Irregularity in Growth of Wool of Angora Rabbits.—Investigations in collaboration with the Assistant Officer in Charge at Wallaceville indicate that this trouble may be due to a dietetic fault, similar to that produced experimentally in rats (see *N.Z. Journal of Agriculture*, Vol. 44, No. 5, May, 1932, p. 335). This may have a bearing on the growth of wool in the case of sheep.

Hogget Mortality.—Pasture analyses are being undertaken in connection with the investigation at Wallaceville of this trouble.

Contamination Factor in Pasture Analysis.

Despite great care in the collection of relatively clean pasture samples, experience has shown that soil contamination can seldom be disregarded in the interpretation of the ash analysis, particularly in regard to elements occurring in minor proportions such as iron, manganese, and iodine.

In practice the content of alumina has proved the most useful guide to determine the degree of soil contamination, on account of the facts that the higher plants absorb in general only traces of alumina, while in soils aluminium is the most abundant metallic element.

A study has been made of the relationship of the alumina content of grasses and clovers to soil contamination, with conclusions which have been published in an article in *Transactions of N.Z. Institute.*

Iodine Investigation.

This work has been very actively prosecuted during the year. Several thousand thyroid glands comprised in 760 samples have been forwarded by Veterinarians and Meat Inspectors, and analysed for iodine content.

It was thought that " bobby " calves might provide material for a preliminary survey of Taranaki, and with this aim the Veterinarian at New Plymouth examined 1,750 bobby calf thyroids during August and September. He found 4 per cent. enlarged above 15 grammes. Of the 119 glands analysed all were found to have an iodine content above 0·03 per cent., the critical value. The distribution of weight was as follows: Under 4 grammes, 1 gland; over 4 grammes and under 9 grammes, 87 glands; over 9 grammes and under 15 grammes, 16 glands; over 15 grammes, 15 glands. With three exceptions, the enlarged glands came from two definite but unidentified districts. Lack of iodine is evidently not the cause of enlarged glands among bobby calves in Taranaki. Possibly, except in cases of acute deficiency, lack of iodine is not reflected in the new-born young, which is supplied from the body store of the mother, even though the latter may be depleted.

In the Wairarapa district samples of thyroids from sheep varying from three months to six years old showed that the age considerably affected the iodine content, the percentage of iodine increasing with age. On the other hand, forty-three pairs of samples of lambs' thyroids showed no difference between male and female glands, either in size or iodine content. Certain generalizations were drawn from the analyses of the glands, correlating iodine content with the type of country from which they were derived.