liver changes may commence within four or five days of lambs commencing to graze affected pasture; that gross distortion of the liver may take place within a period of three months without photosensitization developing; that gross distortion of the liver may occur in black lambs, thus indicating that photosensitization plays no part in causing liver damage.

Southdown Photosensitization.—It has been demonstrated conclusively that photosensitization in this condition depends on the ingestion of green pasture, and that the photosensitizing agent is almost certainly phylloerythrin.

Sheep Nutrition, Canterbury.—Studies of the various methods of winter feeding of ewes and hoggets and of feeding ewes and lambs for fat-lamb production have been continued. The value of green grazing, such as lucerne or hay aftermath, for finishing suckling fat lambs has been demonstrated. It was shown that vitamin D supplements stimulated growth in hoggets grazing on green-feed oats during the winter, even when clinical rickets did not occur in the controls.

Hogget Unthriftiness. Some preliminary experiments at Wairoa have indicated that hoggets grazing on highly-improved pasture thrive better on feed that is rather more mature than that usually recommended for them.

Sheep-breeding.—Experiments aiming at the development of practical methods of progeny testing sheep have been initiated at Ruakura. A series of experiments to determine the heritability and effectiveness of selection of important production characteristics in sheep has also been commenced. Artificial insemination is being used in these experiments.

Bone Diseases of Sheep.—Field experiments have been conducted to determine the effect of phosphatic lick in preventing a condition known as "bowie" in sheep. Results to date are inconclusive, but show that the disease incidence varies considerably between different paddocks on the same station. The study of rickets of hoggets in the Canterbury District has been continued. The phosphorus in sodium pyrophosphate has been shown to be available to sheep.

Mastitis.—Field investigations in collaboration with the Dairy Board designed to study the effect of environment on the incidence of mastitis have been actively continued. Over 40 herds are under constant observation, and a mass of valuable data is being accumulated. A small experiment was conducted at Ruakura to test the theory that sudden changes in feed induce mastitis. While experimental conditions were not ideal, the results lent no support to the theory, as a sudden change from poor feed to lush grass induced no increase in either leucocyte count or in clinical quarters, and just as much mastitis occurred in the control group of cows maintained on good feed throughout the experimental period. Experiments with intra-mammary injections of therapeutic agents have been continued, but without any very significant results.

Milking-machine Research.—The studies on rubber have been continued. In addition to the measurement of many samples to ensure compliance with the Emergency Standard Regulations, tests have been carried out on new types of rubber. This work has enabled the development of a type of claw rubber with the life greatly exceeding that normally in use. It has also demonstrated that a percentage of reclaimed rubber can be used in milk and air tubes. Studies of the physical properties of rubber used for milking machinery and the effect of butterfat on its ageing have been made. Different types of rubber have been examined for resistance to ageing in the presence of butterfat, and great difficulties were found. Laboratory methods of accelerating ageing have been developed, and these will be of value in testing the new synthetic rubbers when these become available. In order to facilitate the study of milk ejection apparatus has been developed which plots the milk delivered by a cow against the time on a graph. This is in two units, a sample measuring cylinder arrangement in the shed itself communicated by a telephone cable to a recording unit which may be situated well away from the cow-shed. By a system of relays and indicators it is possible to record the milk-flow rates for individual cows without interference in the normal milking procedure. This apparatus should enable definite measurements to be made of the effect of various milking procedures, and such studies have been commenced. Several new commercial devices have been tested, and a simple method of testing vacuum-pumps in the field has been evolved. The relief-valve developed some time ago has completed its second test season satisfactorily.

Stimulation of Milk-production in Aborted Cows.—Research commenced last season with a view to improving the yield of aborted cows gave results sufficient to justify further investigation. Of 10 cows injected with stilboestrol, 8 produced satisfactory yields. During the coming season this work will be extended to include thyroprotein, the effect of which on the production of low-producing cows will also be studied.

Bull Fertility.—The semen-testing service was again available to farmers and 180 bulls were examined. Seven per cent. were classified as sterile and a further 18 per cent. as of low fertility. In view of the importance of bull fertility to the extensive application of artificial insemination, a number of bulls under sire survey were examined with the aid of the Auckland Herd Improvement Association. Based on semen examination no sterile bulls were met with in the 32 examined, while only 9 per cent. were classified as of low fertility, and 25 per cent. as of good fertility. Interim field-mating results for the same bulls also indicated a reasonable level of fertility which appeared to be independent of age. Highly-fertile bulls, however, appear to be something of a rarity. In general, the bull-fertility work has produced some evidence of a genetic basis for certain types of sperm abnormality. The ascorbic acid survey of bulls' semen was continued. Results indicate a general but not close correlation between ascorbic-acid concentration and fertility grading based on microscopic examination.

Artificial Insemination of Dairy Cows. A field trial was organized in collaboration with the New Zealand Dairy Board, 11 herds participating and 973 cows being inseminated. As far as possible,