

low labour cost. A much higher degree of accuracy will thus be possible than from the estimates of production obtained from the usual method of periodic weighing and sampling.

An apparatus for the measurement of intra-mammary pressure has been designed, and preliminary tests have given promising results. This apparatus, if successful, should be of great assistance in fundamental studies of milk secretion.

An improved accurate vacuum pump testing technique has been developed, and field tests indicate that many pumps in milking-sheds are inefficient. Further work with this instrument is planned with a view to setting up standards for vacuum pumps.

Following last year's tests on the relationship of pulsator rate to milking efficiency under various vacuums, a simplified self-contained electric automatic pulsator unit has been designed and is under construction. Testing has not yet been carried out.

The original damped weighted relief-valve, which has now been tested over five seasons with excellent results, has been redesigned with a view to reducing its cost while maintaining its efficiency. On test, the new valve has the same efficiency as the old, but can be produced commercially at half the cost. Cost has been a major factor militating against adoption of the original valve.

An improved "sight glass" has been designed and is being tested. Efficient equipment of this type is essential if milking rate is to be speeded up.

The testing of carbon-black rubber for milking-machines has continued. Air and milk tubes of this rubber have had a life of at least three milking seasons. This is not outstanding, but claw tubes have had the same length of life, which is remarkable. Both types of tube develop an excellent shiny surface, which makes for easy cleaning. The standard specification for milking-machine rubberware has been revised and certain "quality tests" added.

Two new types of teat-cup and a new type of claw developed by private enterprise have been tested. No advantages were found over standard types.

In conjunction with officers of the New Zealand Dairy Board, a field survey of milking-machines on farms in Northland was carried out. Milking speeds showed an average rate of 7.6 cows per hour per set of cups. This is well below the optimum of 10. Vacuum pumps were found to be inefficient, and many redundant gadgets were encountered. General experience with milking-machine problems in the field, and of the work of the co-operative servicing organization at the Kaitia Co-operative Dairy Co., suggests that application of the principle of co-operative servicing is the solution to getting sound principles over to the farmer. The method would reduce costs and improve efficiency.

*Early Prediction of Productive Capacity of Dairy Cows.*—The whole of the dairy-calf population at Ruakura has been examined and graded for mammary-gland development in an attempt to test the claims of American workers that the productive capacity of dairy cows can be predicted at the calf stage with some degree of accuracy. No difficulty has been met in grading calves for gland development; repeatable and comparable results have been obtained by two officers working independently and large differences have been noted. Evaluation of the method will have to await lactation by the animals concerned.

*Artificial Insemination.*—Work during the year has concentrated upon methods of increasing the coverage per bull under New Zealand conditions. The estimate of 200 cows per bull of last year may now be raised to 2,000 cows per bull for the New Zealand breeding season. This has been made possible by reducing the dose rate to 25 million sperms per cow and by more frequent collections from more highly selected bulls.

Experimental work for the year has again been organized on a basis of a winter-mating "pilot" group of about 250 cows and a spring-mating "main" group of 1,200 cows. In addition, a pedigree group was organized along the lines indicated in last year's report. The uterine method of insemination was used throughout.

(a) Winter-mating Group: Two dose rates were employed, half the cows being inseminated with each dose rate. One bull only was used, and the visits to the farms