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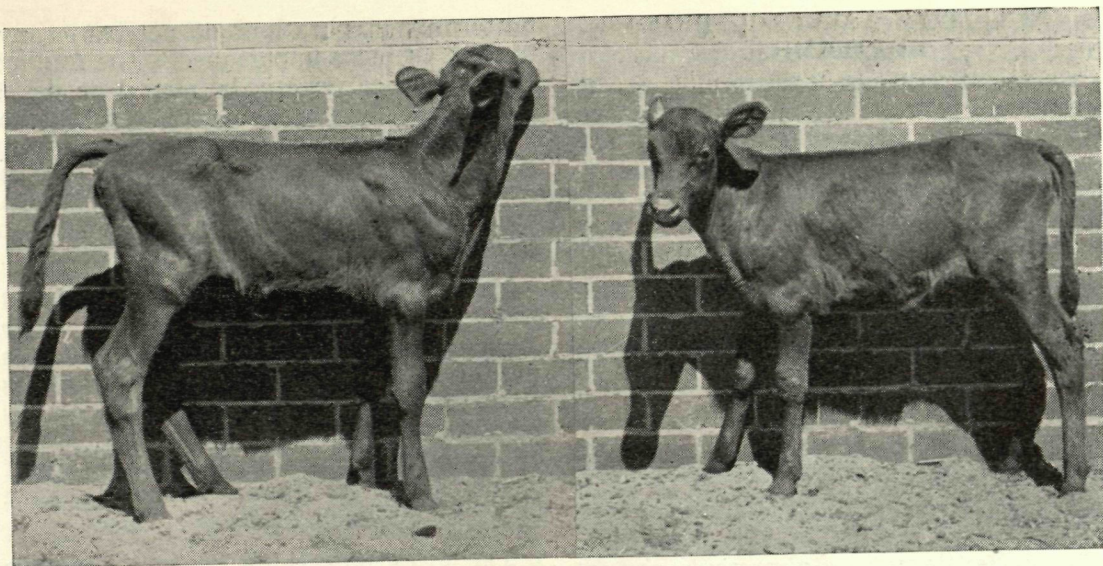


Fig. 1.—Twin Guernsey—A.I.S. cross heifers at the age of 11 days when they had received whole milk only. Their liveweights were 84 lb. and 90 lb., respectively

# THE USE OF DRIED BUTTERMILK TO REAR CALVES

By L. C. SNOOK, D.Sc., Animal Nutrition Officer

**O**NLY a limited number of calves are reared on dairy farms which sell whole milk. At current prices, it is only a very good calf which is worth more than the milk it would consume, and as a result, the heifer calves from thousands of productive cows are each year slaughtered at birth. In the past the whole milk supplier was able to obtain his herd replacements from farmers in the more distant dairying districts who of necessity sold butterfat and could rear calves on separated milk.

Now, however, these butterfat producers are selling more and more whole milk for processing and they in turn are coming up against the problem of rearing calves on a minimum of milk. Some are already taking the line of least resistance and are rearing few, if any, calves. Obviously, it is a matter of some urgency that dairy farmers should be encouraged to rear the maximum number of heifer calves. The best way to do this is to show that there are cheap and easily used whole milk substitutes.

It is surprising that dried buttermilk has been neglected for so many years as a calf-food. In many ways it is an ideal

milk substitute on which to rear calves. It is relatively cheap, it keeps well when stored, and is easily used. Following the successful trials which were carried out at the Animal Health and Nutrition Laboratory and at the Bramley Research Station, a local company is now manufacturing dried buttermilk as a special line for rearing calves. The product is carefully prepared and dried to prevent any undesirable changes taking place during storage. It is sold in cellophane bags which prevent the absorption of moisture. Now that a dependable product is available dried buttermilk can be used with confidence to replace milk in calf rations.



## NUTRITIVE VALUE OF DRIED BUTTERMILK

As a calf food, dried buttermilk can be considered to be equivalent to dried whole milk. In actual fact it is dried sour milk in which the lactic acid has been neutralised. Part of the sugar in the fresh milk is changed to acid when the cream goes sour. In turn this acid is neutralised with soda when the dried buttermilk is prepared. It is not possible to extract all the butterfat from buttermilk and the dried product is registered to contain at least 5.7 per cent. fat. The dried buttermilk is rich in the vitamin riboflavin (hence its value as a chicken food) and also contains all the valuable minerals present in fresh milk.

### COSTS

Dried buttermilk is at present sold at 87s. 6d. per 100 lb. bag (10½d. per lb.). Whole milk contains about 13 per cent. of solid matter. This means that about one and a quarter pounds of the powder should be mixed with one gallon of water to give the equivalent of milk. This milk substitute can be prepared at a cost of 1s. 1d. per gallon.

### METHODS OF FEEDING

In our first trials (Snook, 1953) it was assumed that calves would require whole milk for the first fortnight, after which a gradual change to reconstituted buttermilk would be necessary. This procedure gave excellent results but experience has shown that abrupt changes to dried

buttermilk preparations do not cause any upsets. Of more importance is the finding that young calves can be placed on dried buttermilk diets as soon as the colostrum is finished. This means that as soon as the cow's milk is fit for sale the calf can be transferred to the milk substitute. In other words, calves can be reared without any reduction in the volume of milk sold.

The buttermilk solutions are prepared by mixing the dried buttermilk in water at the rate of 1½ lb. in one gallon. This mixture is fed in the same way as is ordinary milk. In general, the quantity of fluid fed each day should approximate 10 per cent. of the body weight, i.e. a calf weighing 100 lb. should receive a gallon of milk or its equivalent each day.

The dried buttermilk does not dissolve in water; suspended particles quickly settle to the bottom. For this reason it is best to put each calf's ration in a separate bucket and add the water. By doing this one can be certain that each calf gets its quota of solid material. If possible the calves should be fed in bails or separate pens. Small calves cannot thrive if stronger animals can obtain most of the food.

Calf rearing can be made a simple, straightforward job but unfortunately it is all too easy to slip into methods which are careless, haphazard or downright dirty. Good results can be assured but only where strict attention is paid to detail.

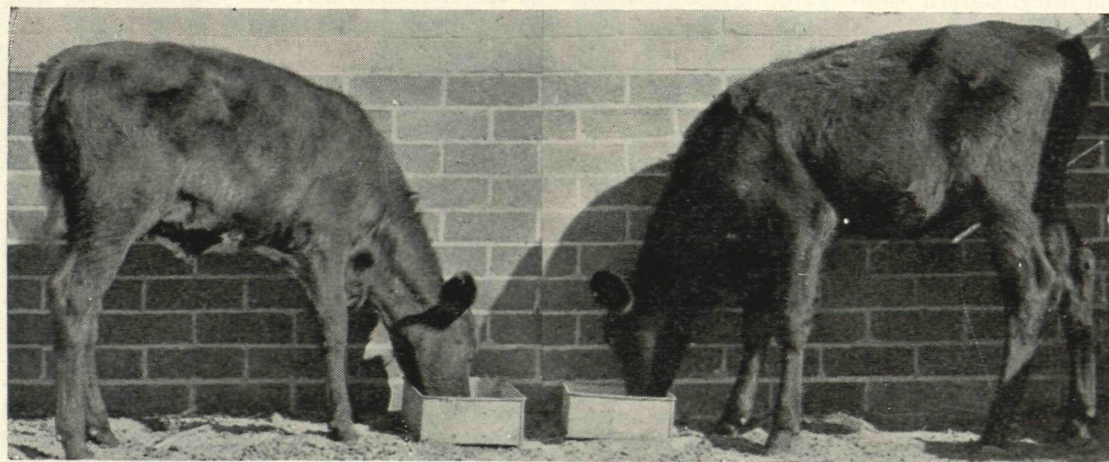


Fig. 2.—The same heifers shown in Fig. 1, at the age of 13 weeks after being fed dried buttermilk mixed with bran and pollard and fed as a dry meal. At this age they weighed 182 lb. and 222 lb., respectively



## TRANSFER TO DRY FEEDING

Calves should be encouraged to eat dry meals, hay and pasture from the third week onwards. Dry meal can be added in increasing quantities to the bucket after the milk has been consumed. This serves the dual purpose of supplying extra food and discouraging the calves from sucking one another. Buttermilk powder can be used alone or mixed with linseed meal, crushed cereal grain or pollard. Linseed meal gives an excellent "bloom" to calves and a dry meal made up of equal parts of buttermilk powder and linseed meal is recommended. When this is being consumed in sufficient amounts and the animals have learnt to drink water, the liquid ration can be cut out entirely. Many dairymen prefer to continue liquid feeding for some months but calves can be taught to eat an adequate ration of dry food while quite young. So long as care is taken to ensure that all the calves receive their share of a nutritious dry ration, weaning in the sixth week can do no harm.

Clean palatable water is essential in the rearing of healthy calves. Well-cured meadow hay should also be made available. If the calves can be rotated on green pasture so much the better. If good hay or pasture is unavailable cereal grains should be mixed with the dry buttermilk and linseed meal.

## COBALT ESSENTIAL

Much of the unthriftiness seen in calves is due to cobalt deficiency. Young animals are particularly susceptible to cobalt deficiency. This explains why unthrifty calves often are seen in areas where the cows appear healthy.

Commercial cobalt chloride or cobalt sulphate is cheap (about 10s. per lb.) and it is folly to risk any deficiency in young stock. If one ounce of the commercial salt is dissolved in one gallon of water, one teaspoonful of the solution will contain enough cobalt for 10 calves each day. It is recommended that a solution of this type should be prepared so that the cobalt supplement can be added to the milk or milk substitute **every day**.

When the calves are transferred to solid food supplies of cobalt are still essential. Cobalt salt can be mixed with the dry meal (1 oz. per 100 lb.) or Denmark Lick can be used (4 oz. per 100 lb.). Calves do not necessarily eat enough of a salt lick and it is better to place the cobalt in a palatable food mixture. Drinking water can be treated (1 oz. of cobalt sulphate in 5,000 gallons) or the pastures can be treated with a boom spray (4 oz. of cobalt sulphate per acre). (See Leaflet No. 2172.)

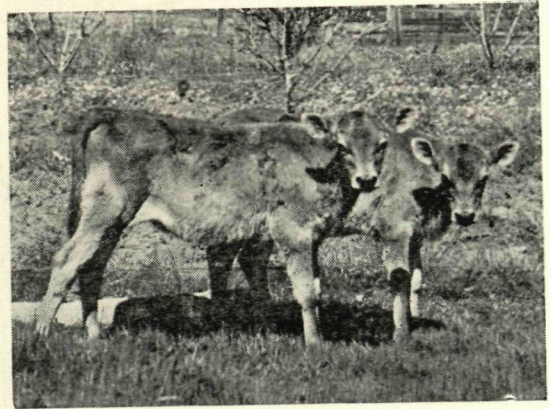


Fig. 3.—These twin heifer calves at the Bramley Research Station were fed on reconstituted dried buttermilk

It would save the farmer a lot of bother if cobalt could be added to the liquid buttermilk at the factory before this was dried. The cost would be very small and farmers using dried buttermilk would no longer have any worries concerning cobalt deficiency. After weaning, of course, the calves would still require a cobalt supplement.

## POSSIBLE DANGERS

In the initial trials at the Animal Health and Nutrition Laboratory dried buttermilk gave such good results that one wondered why it was not universally used as a calf food. Not only were calves reared successfully from two days of age but calves which had developed scours on whole milk diets were cured when transferred to reconstituted buttermilk (see



illustration). At the Bramley Research Station equally good results were achieved under practical farming conditions.

However, when dairy farmers began to use dried buttermilk, reports were received of excessive scouring and some farmers declared that the product was too dangerous for general use.

These complaints were investigated and it was found that the quality of the buttermilk powder on the market varied considerably. Some samples had not been neutralised properly and contained either excessive acid or excessive alkali. Other samples had not been dried properly and the damp powder had begun to decompose. Samples which had been held in store for long periods had absorbed moisture and deteriorated. These stale powders also caused severe scouring.

It follows that dairy farmers must restrict their custom to high quality buttermilk powder. This is now being produced locally and sold in special bags. The dried buttermilk should be of fine texture, free running and of a pale yellow colour. Preferably the bags should have a date ticket so that the use of stale powders can be avoided.

If farmers use a wholesome product there should be no risk of scouring. By the same token, if dried buttermilk is used carelessly, or allowed to become con-

taminated, it can become as dangerous as rotten meat. Likewise only freshly-prepared solutions should be fed to calves. Fluid which is not quickly consumed must be discarded.

### DRIED SKIM MILK

Now that farmers have learnt the value of dried buttermilk, the demand tends to exceed supply. As a result it may be necessary to use dried skim milk powders. This is somewhat more expensive (1s. per lb.), and contains very little butterfat. Dairy farmers, however, have found that the dried skim milk can be used in the same way as the dried buttermilk. The cost can be reduced by mixing in a proportion of linseed meal. Likewise, limited supplies of buttermilk powder can be augmented with linseed meal.

### WHEY

The use of dried whey is **NOT** recommended as a calf food. This product contains 70 per cent. milk sugar and can cause serious digestive upsets. Care should be taken to avoid the purchase of dried whey in mistake for dried buttermilk.

### SUMMARY

In Western Australia it has become a common practice to rear calves on dried buttermilk.

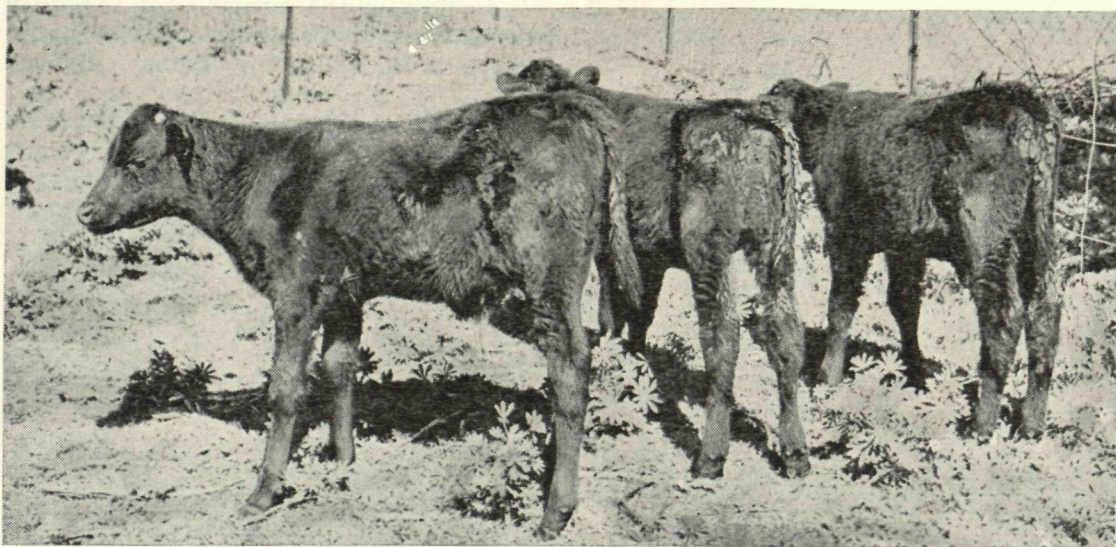


Fig. 4.—These calves were scouring badly when received at the Animal Health and Nutrition Laboratories. After a few days on reconstituted dried buttermilk, the scouring ceased and the calves began to gain weight



This is reconstituted by mixing the powder with water in the proportion of  $1\frac{1}{4}$  lb. to a gallon.

As soon as colostrum is no longer available, young calves can be transferred directly to the buttermilk solutions.

From the third week onwards increasing amounts of dried buttermilk can be fed as a "meal."

When adequate amounts of dry buttermilk are being consumed, liquid feeding can cease.

Clean water and good hay should be made available from an early age. Green pasture is desirable but not essential.

Scouring and wasting will result if badly-prepared or poorly-preserved buttermilk powder is fed to calves.

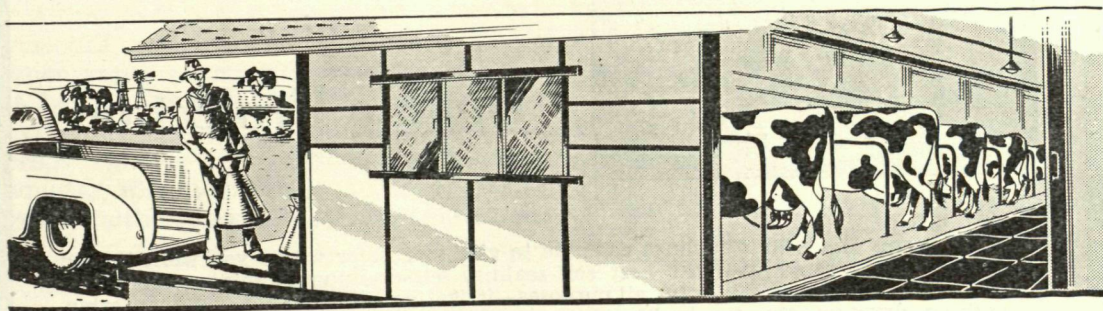
Manufacturers now market dried buttermilk which has been processed and packed specifically for use as a calf food.

If dried buttermilk is unavailable dried skim milk can be used.

As the calf develops, increasing quantities of linseed meal can be used to replace dried buttermilk, if this is in short supply.

#### REFERENCE

Snook, L. C. (1953).—W.A. J. of Agric., 2: 373.



#### MORE WHEAT RESEARCH

Additional comprehensive investigations of the bread-making qualities of wheats grown in Western Australia were soon to be put into operation, said the Minister for Agriculture recently.

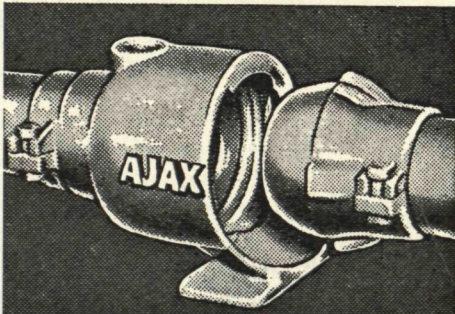
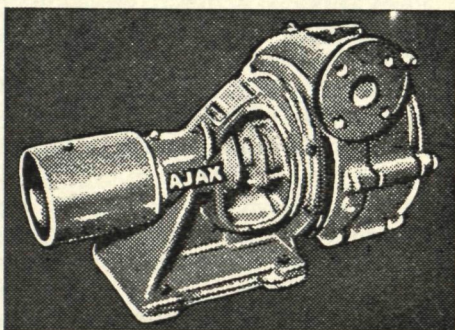
The present cereal research laboratory of the Department of Agriculture was begun in 1937 with the assistance of a generous donation from the W.A. Flour Millers' Association and much good work has been done. Provision in the new laboratories at South Perth would allow for expansion in cereal research commensurate with the importance of cereal growing in Western Australia.

It was generally admitted, said the Minister, that the real test of the quality of wheat is the type of loaf which can be produced from it and for that reason facilities for experimental bread baking will be included in the new laboratory. Other tests used to measure wheat and flour

quality will also be conducted as an aid to wheat authorities and flour millers as well as to assist with the experimental programme already planned by the Department of Agriculture.

An officer of the research laboratory had just returned after spending some months working in the cereal laboratories in the Eastern States. He had worked at the Bread Research Institute in Sydney, the Victorian Cereal Laboratory at Melbourne and the Agricultural Research Institute at Wagga, where he had acquired the most up-to-date information on cereal research. At the same time, he had determined the most suitable milling, flour-testing and baking equipment necessary for the expansion of cereal research activities in Western Australia. The research to be undertaken would be closely related to extensive field activities as well as to the department's programme for breeding better varieties of wheat and barley.





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