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COVER PICTURE: Mr. B. Parkinson, Divisional Veterinary Officer (Slaughtering), examines beef carcasses at the Brisbane Abattoir.

EDITOR: *E. T. Hockings*

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# More About Grain Fattening Of Beef Cattle

By J. ARBUCKLE, Senior Adviser in Cattle Husbandry

During the 1959 season on the Darling Downs, greater use was made of grain—usually grain sorghum—in fattening beef cattle. Feed-lot fattening extended, and grain was used to supplement light crops in the crop fattening areas. This article summarises the results and comments on the efficiency of grain feeding.

In physical terms the efficiency of grain usage in beef production depends on the ratio of grain consumed to beef produced. Under feed-lot conditions, the liveweight can be reasonably predicted for a particular class of animal on a ration of grain and lucerne hay.

Other factors which determine how profitable such an enterprise will be are variable. Last season they were in favour of the use of grain for fattening. These variable factors are:

- The price of grain.
- The cost of suitable stock and the value of the finished product.
- The size and fattening ability of the stock.
- The extra cost involved in labour and facilities for feeding grain to stock.

Also a supply of suitable stock is necessary and the finished product must fulfil market requirements.

## Grain Prices

The ex-farm return to growers for grain sorghum sold as grain at the end of the 1959 winter was comparatively low. While factors such as distance to rail head, the cost of freight

to ports and storage cost on the property affected prices on different properties, the value of grain sorghum on the property was generally between £7 and £10 a ton.

## Cost of Suitable Stock

Suitable stock are those which are capable of high weight gains with a comparatively low maintenance requirement and producing a carcass which commands a premium price. Normally store cattle can be purchased at a rate per 100 lb. carcass beef which is lower than that obtained for the fat animal. Thus the fattener is able to obtain a return from two sources. One is the value of the meat produced by the animal during fattening and the second is the increased price per 100 lb. carcass obtained for the meat on the store animal at the time of purchase.

Owing to the heavy demand for a leaner type of carcass, the price per 100 lb. carcass of store and forward store stock increased considerably. In some cases the point was reached where there was little or no difference between the meat price per 100 lb. of store and fat cattle. Under these circumstances more attention was paid to weaner and yearling stock. When in a condition for slaughter, these types of animals are somewhat lighter than the most popular type of carcass. However, the demand for beef was so strong that all animals fit for slaughter found a ready and lucrative market. This situation may not recur and in any major expansion fatteners may have to obtain stock which will

produce a carcass at a weight of 400 to 580 lb. Such carcasses attract buyers from many sources and would be less subject of fluctuation in the event of uncertainty in the beef market.

The producer who is able to breed his own supply of store cattle for fattening is in a secure position since he can adjust his activities according to market developments and requirements. Should he be able to produce grain and lucerne hay in addition, he is then in the happy position of being able to adapt his production according to the most favourable avenue available at the time.

### Size and Fattening Ability

The size of an animal is important in determining the productive efficiency of grain. A small animal costs less for maintenance (which can be looked on as an overhead cost) and although its rate of gain may be lower than for a larger animal the ratio of feed used for production to feed used for maintenance favours the smaller animal. (When using the word "small" in this respect it is assumed that the animal is smaller because it is younger and not because of stunting or deformity).

The economy of the younger animal is illustrated in the following table which shows the cost of producing beef on animals of different sizes. The table is based on a feed cost of £10 a ton for grain and hay and weight gains as stated. No allowance has been made for expenses other than feed costs.

TABLE 1  
FEED COST OF FATTENING IN RELATION TO LIVE  
BODY WEIGHT

Liveweight	Expected Gain/ Animal/Day	Maintenance Cost/ Animal/Day	Total Cost/ Lb. Gain	Cost/100 Lb. Estimated Carcass Weight
Lb.	Lb.	d.	d.	£ s. d.
400 ..	2.2	6	5.5	4 11 8
500 ..	2.4	6.7	6.25	5 4 2
600 ..	2.6	7.7	7.0	5 16 8
700 ..	2.8	8.7	7.5	6 5 0
800 ..	3.0	9.6	8.0	6 13 4
900 ..	3.2	10.6	8.5	7 1 8

The maintenance cost of the 400 lb. animal is about two-thirds that of an 800 lb. beast while the cost for each pound weight gain of the 400 lb. animal is about three-quarters that of the 800 lb. animal.

### Additional Costs

Extra costs associated with feed-lot fattening are those for labour, machinery for feed preparation, buildings, water supply, together with running costs, and interest on capital and depreciation.

Since those producers concerned with feed-lot fattening on the Darling Downs last season had adapted existing facilities and used existing machinery and labour, the additional costs are not readily calculated but would be quite low. In fact, the greater use of machinery and buildings has the effect of lowering the overhead charges on these items. More efficient use has been made of labour, in some cases.

Feed-lot fattening to date has been in the nature of a sideline activity and economies could be effected in labour for feed preparation and feeding out should conditions justify its becoming a full-scale activity.

To date, the general procedure has been to process the grain and hay through a hammer-mill, place it in bag butts and take these butts to the troughs located in the centre of the yard. The following figures are quoted as an example of time and labour involved:

At the beginning of a project one operator used 3 men for 6 hours once weekly to mill the weekly ration for 50 head. By some re-organisation an adjustment of hay bale size to suit the mill, the labour requirement was reduced to 2 men who required 3 hours to prepare a similar quantity of feed. If the feed is conveniently prepared in bag butts it is generally accepted that one man can feed 50 head in half an hour. Such feeding is necessary twice daily.

### Feed-Lot Results

By means of a mobile weighbridge it has been possible to measure the weight gain of animals in feed lots. The following information was obtained from a group of Hereford weaners in the Warwick district. The group contained 24 steers and 21 heifers and both sexes gained weight at an equal rate. They were fed for 94 days. Feeding started on July 8 and the stock were turned off on October 16, 1959.

TABLE 2

PERFORMANCE OF 45 HEAD OF STOCK IN A FEED LOT

	8-7-59	16-10-59	Gain
Average liveweight .. .. .	423 lb.	642 lb.	219 lb.
Average estimated dressed weight .. .. .	212 lb.	340 lb.	128 lb.
Average daily liveweight Gain .. .. .	2.3 lb.		
Sale value at £11 per 100 lb. carcass .. .. .	£37 8s. per head		
Value at 8-7-59 at £10 per 100 lb. carcass .. .. .	£21 4s. per head		
Increase in value during feeding period .. .. .	£16 4s.		
Feed cost .. .. .	Lucerne hay £13 ton on property		
	Grain sorghum valued at £10 10s. a ton		
Total feed consumption ..	{ 29,684 lb. lucerne hay { 41,298 lb. Sorghum grain { 7 lb. hay { 9.8 lb. grain		
Average ration for each animal daily .. .. .	19s. 7d.		
Cost of ration for each animal daily .. .. .	£348		
Total cost of feed .. .. .	£7 15s.		
Feed cost per animal for 94 days .. .. .	£8 9s. per head		
Difference between increased value of animal and cost of feed .. .. .	£3 10s. 6d.		
Cost per 100 lb. liveweight gain .. .. .	£6 1s.		
Cost per 100 lb. estimated carcass gain .. .. .	{ 3 lb. lucerne hay { 4.2 lb. grain { 5.1 lb. lucerne hay { 7.2 lb. grain		
Average requirement for 1 lb. liveweight gain .. .. .			
Average requirement for 1 lb. carcass gain .. .. .			

The following table gives average figures from three groups of yearling Herefords at different centres. Figures are averages of 83 head which were fed a ration consisting of two parts of milled grain to one part of milled lucerne hay.

TABLE 3

AVERAGE FEED CONSUMPTION AND RATE OF GAIN

No. of days .. .. .	98
Rate of gain .. .. .	2.47 lb. daily
Weight at commencement .. .. .	609 lb.
Weight at turn-off .. .. .	851 lb.
Feed consumption per head daily .. .. .	{ 13.0 lb. grain { 6.5 lb. lucerne hay
Feed consumption—	
(a) lb. liveweight gain .. .. .	{ 5.2 lb. grain { 2.6 lb. hay
(b) lb. estimated carcass gain .. .. .	{ 8.6 lb. grain { 4.3 lb. hay

From the information obtained on rate of gain of the animals referred to in Table 3 the following guide to feed cost per 100 lb. carcass gain has been derived. It is applicable when the ration consists of two parts grain and one part lucerne hay. (This ratio of grain to hay can be varied in practice, but a variation would probably affect the rate of gain.)

TABLE 4

FEED COST OF PRODUCING 100 LB CARCASS BEEF AT VARYING FEED PRICES  
(Shillings)

Grain Cost Per Ton	Lucerne Hay Cost Per Ton			
	£5	£10	£15	£20
£ 5 .. .. .	58s.	77s.	96s.	115s.
£10 .. .. .	96s.	115s.	135s.	154s.
£15 .. .. .	135s.	154s.	174s.	193s.
£20 .. .. .	174s.	193s.	212s.	231s.

Thus if grain and hay are both £10 a ton, the cost is 115s. per 100 lb. carcass. An increase to £15 a ton in the price of grain increases the cost to 154s. per 100 lb. if lucerne remains at £10.

For intermediate figures for lucerne hay, increase the cost per 100 lb. carcass by about 4s. for every £1 increase in the price of hay. Thus with grain at £10 a ton and hay £12 a ton, the cost is 115s. + (4s. × 2) = 123s.

In the case of intermediate figures for grain, the cost per 100 lb. carcass is increased by nearly 8s. for every £1 increase in grain price.

It is pointed out that Table 4 does not take into account any difference in price per 100 lb. between the store and the fat animal.

### Weaners

The growth rate of a group of weaner calves in a feed-lot has also been measured.

A producer bought 49 head of backward calves in the Dalby saleyards for an average price of £15 a head.

Average price per head on 26-5-59 .. .. .	£15
Average price per head on 15-9-59 .. .. .	£31
Difference (increase in value) .. .. .	£16
Total grain eaten per head .. .. .	908 lb.
Total hay eaten per head .. .. .	454 lb.
Cost of feed per head at £10 ton .. .. .	£ 6
Increase in value less feed costs .. .. .	£10 per head

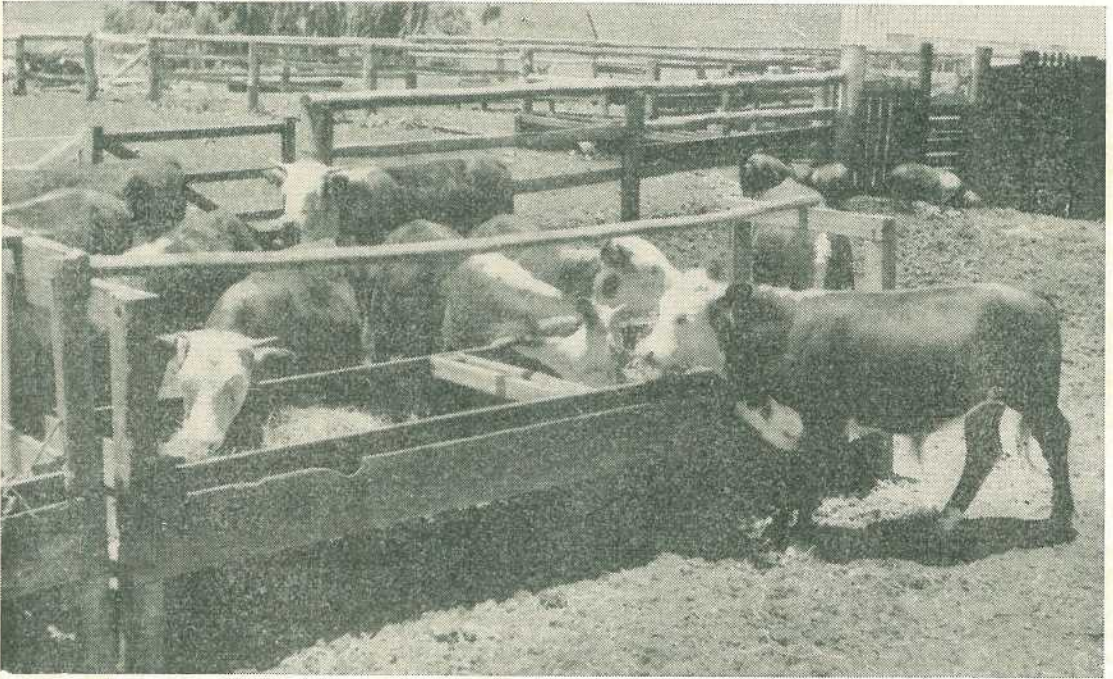


Plate 1

Existing Yards were Turned into a Temporary Feed Lot. Note the use of pigs which lived on grain not digested by the stock.

From this, overhead expenses have to be deducted.

Another way to approach the costing of this venture is to value the beef put on at the market rates ruling at time of sale. This method partly cancels any influence of unpredictable market changes.

Liveweight of calves on 26-5-59	.. ..	332 lb.
Liveweight of calves on 15-9-59	.. ..	556 lb.
Liveweight gain	.. ..	224 lb.

It is estimated 67 per cent. of this gain would be carcass weight, giving a carcass gain of 150 lb.

Average price per 100 lb. dressed weight of calves was £11 5s.

Therefore—

		£	s.	d.
Value of beef gained	.. ..	16	17	6
Less feed cost	.. ..	6	0	0
Gain per head	.. ..	10	17	6

This figure compares with a profit of £10 a head which was the difference between the actual cost of steers and the sale price.

#### Other Uses for Grain

Apart from the feed lot, other uses of grain for beef production were found last season.

Fattening of cattle on winter crop is now a feature of beef production on the Darling Downs. In previous years the practice has been to fatten two and three year old steers. In addition, a good deal of attention was paid last season to vealer production. With both classes of animals the producer is in the position of having to predict crop productivity if he is to approach the best utilisation of it. In 1959, the lack of rain in late winter resulted in a very poor regrowth following the first grazing. Consequently, some fatteners were in the situation of having unfinished stock and not enough crop in the paddock to top them off.

## Crop and Grain

At least two men took the step of putting out ground grain sorghum in troughs in the crop paddock. The stock were given free access to the grain and although there are elements of danger in this practice no trouble occurred because of bloating and there was only one case of founder.

It was found that the stock regulated their consumption to about 10 lb. of grain daily. This reduced the grazing pressure on the oat crop and the combination of grain and crop resulted in the topping-off of the full quota of animals.

The addition of some form of roughage to the grain would make this practice considerably safer. While the efficiency of grain utilisation is comparatively low under these conditions, the feeding of it enabled the producers to adhere to their operational programme and the labour cost was very low. They were able to sell on a high priced market and the cash is available for purposes of re-stocking when required.

## Silage and Grain

Other producers who normally crop-fatten had a supply of sorghum silage on hand. Two of these found themselves with unfinished steers and their crops eaten out. They were able to utilise the silage and grain to finish the cattle. The daily ration fed was about 80 lb. of sorghum silage and 11-13 lb. of grain per animal. Fattening the stock in this manner avoided the alternative of turning the steers out to grass with subsequent loss of condition. They would not have been ready for turn-off until next season.

Should the 1959 relationship continue between the price of grain and the price of beef we can expect to see an expansion of the use of grain for beef production. A supply of grain plus some roughage provides a measure of security to the crop-fattener, enabling him to operate with greater confidence.

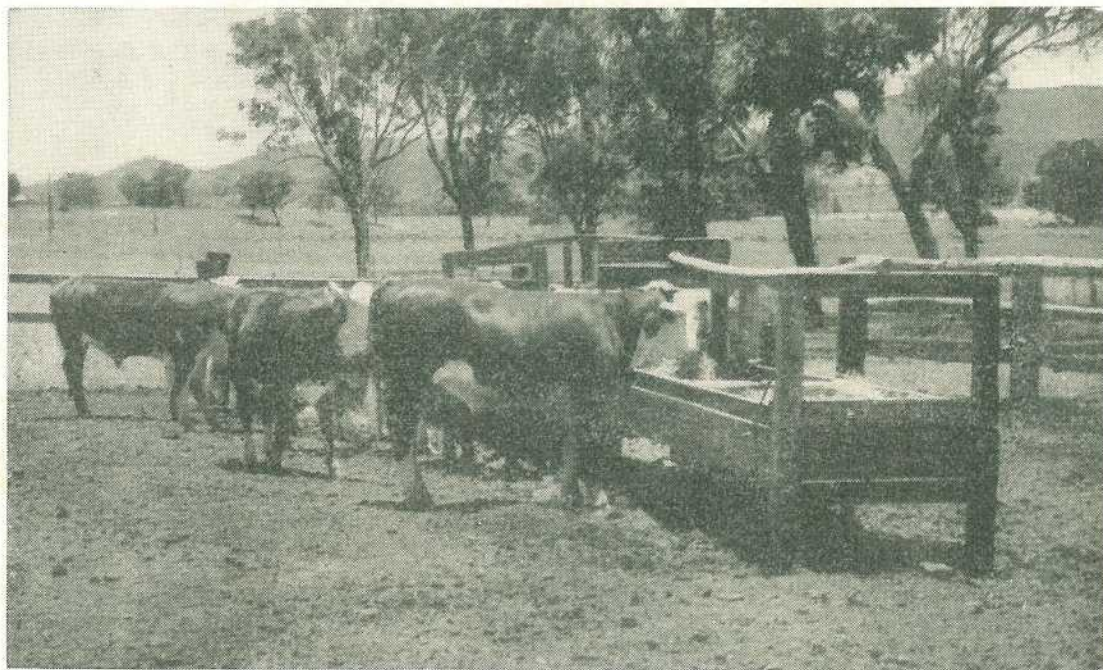


Plate 2

The Troughs Used were Simple, Home-Made Structures. Well-drained yards are needed for the feed-lot.

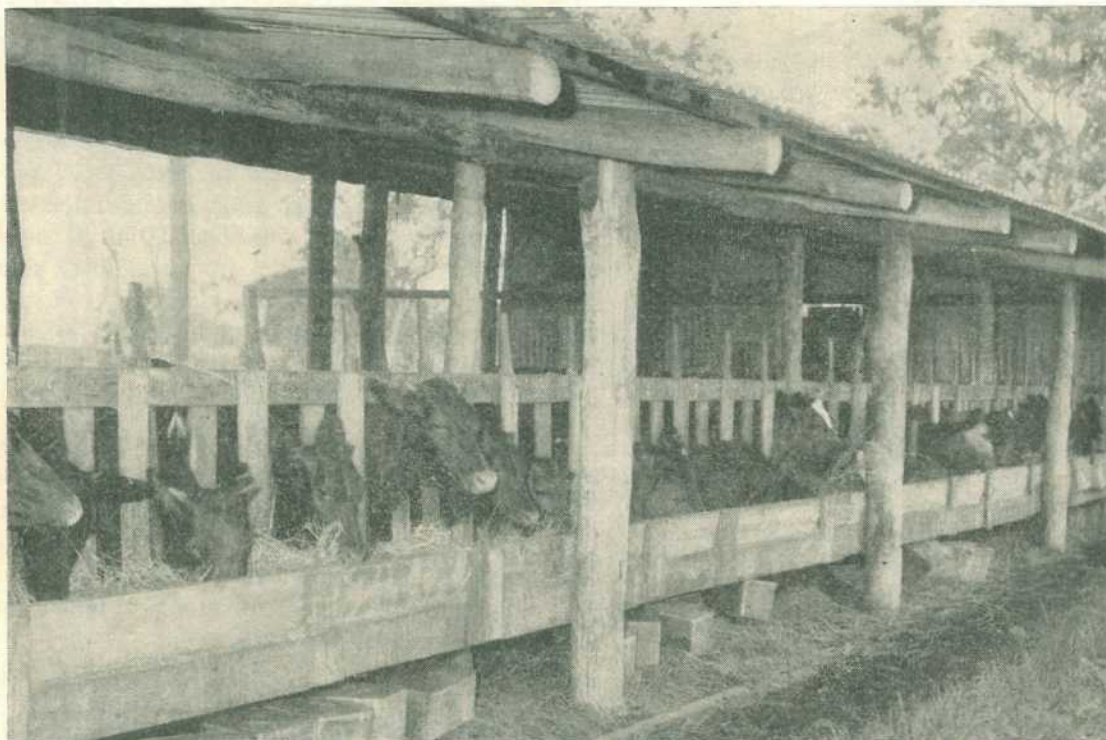


Plate 1: The Best Calf Bails Have a Concrete Floor and a Roof.

# Calf Rearing

By A. HUTCHINGS, Senior Adviser in Cattle Husbandry.

*This article sets out several feeding systems for young calves and deals with the care and management of heifers to the time of mating.*

On an average, 10 calves are required each year to replace wastage in a herd of 50 dairy cows. In general, it is preferable to select and rear them on the property in order to avoid the risk of introducing disease into the herd. Further, a particular line of breeding can be followed, if desired. Finally, the production background of the heifers will be known if they are bred on the farm.

Only healthy calves should be retained for rearing. They should be selected from cows with good production and the desirable dairy characteristics of good temperament and milking habits, thrift and freedom from chronic disease.

## Calf Nutrition

For growth, the young dairy animal requires proteins, carbohydrates, fats, minerals, vitamins and water. Collectively, the calculated total energy value of these constituents in feeds is expressed in terms of Total Digestible Nutrients. The terms "Food Units" and "Starch Equivalent" are used in European countries to express the energy value of a foodstuff.

The Total Digestible Nutrients (T.D.N.) value is taken as a measure of the energy value of a food. Energy is required for maintenance of health, growth and all normal functions. It is used in the processes of digestion, in grazing, walking and galloping around, in maintaining normal body temperature and breathing. Energy



obtained beyond these requirements is stored as fat, and muscle when protein is available, and is reflected in increased weight of the animal.

*Proteins.*—Proteins are substances containing nitrogen and are made up of a number of simpler substances called amino acids. Not all amino acids are present in any one form of protein and for this reason it is desirable that the young growing calf be supplied with protein of both animal and plant origin.

In calves, protein is used in building lean meat and muscle, internal organs, connective tissue and parts such as skin and hair. It is an essential part of the cells which multiply as growth occurs. Thus a sufficient quantity of good quality protein is required for growth of young animals.

*Minerals.*—A recommended diet will normally contain sufficient of the minerals required by young calves. However, the addition of salt is often beneficial in concentrate mixtures and the addition of lime and phosphate is recommended where meals form a high proportion of the total diet of young calves. Either a lack, or a gross imbalance, of lime and phosphate will interfere with normal bone development and may result in rickets.

*Vitamins.*—Of the several vitamins necessary for health only vitamin A needs special consideration. At birth, calves have very little reserve of vitamin A in their bodies. It is provided in the colostrum which they must have. Vitamin A is important in growth and health. It helps to protect the body, particularly the respiratory and digestive tracts, against the entry of disease organisms. Green feeds are rich in vitamin A. Fish oils are the normal source of supplementary vitamin A and can be used in the ration, if necessary.

*Water.*—Water forms a large portion of many organs of the body, and is necessary in the digestion and transporting of food materials, in solution, to and from the various parts of the body. It also influences the control of body temperature.

The amount of water required increases as milk allowance is reduced. As with most animals, calves will drink several times during hot days. Insufficient or impure water supply reduces the appetite, with consequent loss of

condition. So clean cool water should always be available to calves, even when they are getting milk or succulent pasture.

### The Stages of Calf Feeding

The process of calf feeding can be divided conveniently according to age and development of the digestive system. Although development is continuous it is convenient to consider separately three main stages. They are:

From birth to one month.

From one month to three months.

From three months onwards.

*From Birth to One Month.*—There are four compartments in the ruminant stomach. They are the rumen or paunch, the reticulum or honeycomb, the omasum or bible, and the abomasum, true stomach or fourth stomach.

Digestive juices are secreted only in the fourth stomach which digests food in a similar manner to that of single-stomached animals such as pigs and humans. In the first four weeks of life only the fourth stomach functions to any extent. For this reason the very young calf cannot digest roughage feeds. Furthermore, the digestive juices can only properly digest milk or milk products. Other foods are unsuitable and may, indeed often do, cause digestive upsets if fed to calves less than a month old.

The newly-born calf should be fed milk proportionate to its weight. Overfeeding must be avoided. In fact, the daily allowance should be restricted to 10 or 12 per cent. of body weight and when wholemilk is terminated before a month of age the reconstituted milk may be reduced to as low as 9 per cent. of body weight; reconstituted milk may cause digestive upsets if fed too liberally.

Temperature of the milk is important and during the first fortnight, at least, it should be fed regularly at near blood heat. Cooler milk may be fed from then on provided it is fed regularly at the same temperature.

Strict attention to details of feeding and hygiene are necessary at all times. All changes in feed must be made gradually, the complete change taking about two weeks.

The first milk after calving is known as colostrum or beastings. Colostrum is particularly rich in antibodies (substances which assist the

calf to resist certain diseases) and contains up to 70 times the vitamin content and four times the protein content of ordinary milk.

The antibodies can only be fully absorbed by the calf during the first day of life. It is therefore important that the newly-born calf obtain this colostrum, preferably by suckling. Antibodies are normally produced in the cow's body as she builds up resistance to infection.

The buying of very young calves without their dams in saleyards is often a hazard as far as resistance to disease is concerned. *There is no substitute for colostrum.*

Colostrum produced in excess of the calf's requirements can be fed to other calves but it should be diluted with half its volume of warm water.

If a cow is milked out completely a week or more before calving, the colostrum will have been removed. Thus the newly-born calf does not obtain its colostrum unless some has been stored or preserved. The addition of a suitable antibiotic to normal milk may be helpful if a calf is deprived of sufficient colostrum.

Summarising, the calf should have its mother's milk for two to three days. Milk or reconstituted milk should provide most of the diet for the first month of life.

*From One Month to Three Months.*—At about a month of age the milk, skim-milk or reconstituted milk can gradually be replaced by meals. The protein content of the meal should be approximately 20 per cent. and over this two-month period the milk protein can steadily be replaced by vegetable protein such as peanut meal, cottonseed meal or linseed meal. Meat-and-bone meal and blood meal are other good quality protein meals and can be included if the farmer is prepared to take the trouble to get calves to eat them.

While only two or three weeks of age a calf may nibble at good quality crop or pasture and will commence to chew its cud. This indicates that the rumen (first compartment of the stomach) has commenced to function and from this time it enlarges fairly rapidly.

The rumen plays an important part in digestion of roughages, by reason of the presence of countless millions of bacteria which convert complex

starches, fibre and proteins to substances which are readily digestible. The ruminal bacteria can use simple nitrogenous substances such as urea to build protein which becomes available to the animal when the bacteria die. Bacterial activity, therefore, breaks down roughage feeds and vigorous bacterial activity ensures that the calf makes best use of fibrous feeds. Provision of good quality roughage feed at two to three weeks of age and the maintaining of a continuous supply of such feed encourages early and complete ruminal development.

*From Three Months Onwards.*—When fed an increasing proportion of nutritious roughage from a month of age, the rumen will be sufficiently developed to three months for a high proportion of the diet to be roughage, again provided it is of high quality. From this age onwards an adequate daily supply of good quality roughage in the form of pasture or crop, supplemented with hay as needed, is essential for good growth and health.

At three months a calf will eat 2 or 3 lb. of meal daily. Meal should be fed according to the quality of available roughage and response of the calf. Provided adequate pasture or hay is fed it is not necessary to increase the meal allowance. Indeed, it may be reduced with a saving in expense.

In a later portion of this article the use of pasture and hay in rations for calves over three months is discussed further.

## Feeding Systems

There are several systems used in rearing calves. To be successful, they must allow for adjustment of nutritional requirements according to age. The foods that are available and their relative costs, the type and size of dairy farm, its locality and incidence of disease all collectively determine the system used. Stud breeders on cream supply often feed liberal amounts of wholemilk and skim-milk, while suppliers of wholemilk may restrict wholemilk feeding too severely, particularly during the winter quota period.

While greater emphasis is being placed on rearing calves with limited quantities of wholemilk, reconstituted milk (from milk powders) and milk substitutes (calf starter meals), it

should be recognised that greater attention must be paid to husbandry if calves are to be reared successfully on limited quantities of milk.

Restricting the wholemilk allowance too severely may be false economy. The first six weeks of a calf's life are the most critical. Long-lasting, or even permanent effects, may result from faulty feeding during this period. Furthermore, disease takes a bigger toll at this age. Digestive upsets are often caused by over-feeding and it is sound husbandry to avoid this, especially during the first few weeks of life.

The systems of calf rearing can be classified according to the quantity of wholemilk fed—

1. Rearing calves on nurse cows.
2. Rearing calves on wholemilk (hand-fed).
3. Rearing calves on limited amounts of wholemilk plus skim-milk.
4. Rearing calves on small quantities of wholemilk plus reconstituted milk.
5. Feeding whey.

*Rearing Calves on Nurse Cows.*—This system is relatively simple. Calves do well and seldom suffer from digestive troubles and disease. Culls from the milking herd are used as foster mothers.

One cow can nurse two to four calves at a time and she may rear a number of sets of calves during her lactation. The number of calves reared depends on the milk yield and length of time each set of calves is left on the cow. Each calf must obtain its colostrum from its dam before being suckled by the foster mother. It will grow well on  $\frac{3}{4}$ –1 gal. of milk a day. Each set of calves should be trained to eat meal and hay from two to three weeks of age if they are to be weaned at two months.

*Rearing Calves on Wholemilk.*—This is the simplest of the hand-feeding systems. Daily milk allowance should be 10–12 per cent. of body weight for the first fortnight. Thus an average sized A.I.S. calf would receive  $3\frac{1}{2}$  pints at each feed twice daily and a Jersey would receive 3 pints. These allowances should be adjusted to suit large, small or weak individuals.

With good management and attention, healthy calves can be reared on a total allowance of 20 gal. of wholemilk plus meal, but calves will carry more bloom in the first few weeks of life if this allowance is increased to 40 gal. Calf meal containing 20 per cent. crude protein should be fed from the third week onwards and increased steadily so that it will be eating 2 lb. daily in the seventh week when the wholemilk allowance can be tapered off.

Plate 2  
Wooden Feeding Bails May  
be Made to Accommodate  
Calves of All Ages.

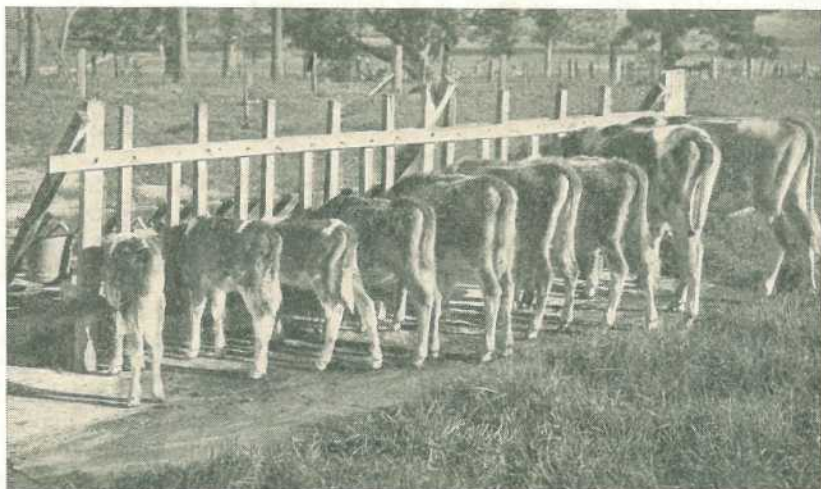


Table 1 outlines the feed allowances. These are set out as quantities for each feed and the calves should be fed twice daily.

TABLE 1

FEEDING SCHEDULE FOR A CALF OF 70 LB. BIRTH WEIGHT

Age	Whole-Milk	Calf Meal	Lucerne Hay	Pasture
Weeks	Pints per feed	Lb. per feed 20 per cent. protein	Free Choice	Rotational Grazing
3-4 days ..	Colostrum	..		
1st-2nd week ..	3½	..		
3rd-4th week ..	4	a little		
5th week ..	3½	½		
6th week ..	2½	¾		
7th week ..	1½	1		

The calf should be encouraged to eat meal, preferably dry meal, commencing in the third week. One satisfactory method is to place a small amount of meal in the bottom of the bucket after the milk has been consumed.

The calf meal should contain 20 per cent. crude protein, of which at least one-eighth should be buttermilk powder or skim-milk powder. There is a number of suitable calf meals, called calf starter meals, on the market. However, if the farmer has some home-grown grains and is prepared to mix his own calf meal he can make an equally nutritious meal at less cost.

A suggested calf starter meal is as follows:—

- 1 part buttermilk powder.
- 1 part peanut meal.
- 2 parts maize meal.
- 1 part barley meal.

Cottonseed meal or linseed meal may replace part or all of the peanut meal; and oatmeal, wheat meal or sorghum meal may replace the barley meal.

A pound each of bone flour (or bone meal) pulverised limestone and salt should be added to each cwt. of the mixture.

Provided pasture is young and nutritious and hay is always accessible, 2 lb. of the meal daily should be sufficient for good growth.

When the calf is three months old the buttermilk powder can be replaced entirely by a cheaper form of available protein such as peanut meal, cottonseed meal, linseed meal or meat-and-bone meal.

*Wholemilk Plus Skim Milk.*—This is a popular and good calf-rearing system on cream supply farms. Feed costs are probably less than in any other system. Wholemilk is fed for a number of weeks as in the previous system. Not less than 20 gal. of wholemilk is recommended to rear healthy calves. The change-over from whole to separated milk should extend over a period of two to three weeks. From the sixth week onwards the skim-milk allowance can be increased to ¾ gal. per feed. If reduced, a calf starter meal must be fed as in the previous system until the calf is three months old. One pound of calf starter meal is about equal to 1 gal. of skim-milk in energy value.

Table 2 outlines the feed (twice daily) allowance for this system:

TABLE 2

Age	Whole-Milk	Skim-Milk	Concentrates	Lucerne Hay	Pasture
Weeks	Pints/ feed	Pints/ feed	Lb./ feed	Free Choice	Rotational Grazing
3-4 days ..	Colostrum	..	..		
1st-2nd week	3½	..	..		
3rd week	3	½	..		
4th week	2½	1½	½		
5th week	1½-1	2½	¾		
6th week	taper off	3½	¾		
7th week		4-5	¾		

Calves fed according to this system will not have the bloom or grow quite so fast as those in the previous system but will catch up in growth by the end of the first year.

When the butterfat is taken from wholemilk by the separator the energy or fattening value of the skim-milk is half that of wholemilk but the protein and mineral content are practically the same. This makes it necessary when changing from whole to separated milk to provide supplementary feed (concentrates) until larger quantities of skim-milk can be fed without risk

of digestive upsets. Wholesome coarsely ground grain mixtures or by-products such as bran or pollard are satisfactory. Protein-rich meals are not necessary. Any grain mixtures can be fed—the amounts will largely be governed by their cost and availability.

Skim-milk has practically no vitamin A, for this is removed with the butterfat. However, in normal conditions and provided there are no disease problems, the calf will obtain, at this age, sufficient vitamin A from pasture or good green leafy hay.

*Wholemilk Plus Reconstituted Milk.*—Substitute foods for wholemilk are sought during the winter-quota period when as much wholemilk as possible is sold and when many calves are reared.

Buttermilk powder and skim-milk powder are suitable substitute foods. They must be fresh, because stale or discoloured powders could cause scours. Furthermore, their nutritional value would have been reduced considerably. These two foods are about equal in food value. Table 3 shows the approximate energy value of buttermilk powder in replacing milk as a calf food.

TABLE 3

1½ lb. buttermilk powder in 6 pints water =	1 gallon wholemilk
3½ oz. buttermilk powder in 1 pint water =	1 pint wholemilk
1 lb. buttermilk powder in 6 pints water =	1 gallon milk

Buttermilk powder is reconstituted by stirring it in water at blood heat (100 deg. F.) for at least a minute. It is then ready for feeding. An old cream stirring rod is suitable for this job.

Table 4 shows a feeding schedule (fed twice daily) using reconstituted buttermilk powder to replace wholemilk at the earliest age. Such early weaning off wholemilk is only possible where disease is controlled and where very good husbandry is practised. Allowances quoted are for an average size healthy calf. For weak, small or large calves the wholemilk allowance must be altered to suit the animal. Allowances are for each feed given twice daily.

From a month, the buttermilk can be replaced steadily by a proprietary calf meal or a home-made calf meal containing 20 per cent. protein.

TABLE 4

SHOWING BUTTERMILK POWDER TO REPLACE WHOLEMILK AT AN EARLY AGE

Age of Calf	Whole-milk	Butter-milk Powder	Calf Meal	Lucerne Hay	Pasture
Days	Pints per feed	Oz. per feed	20 per cent. Protein mixture		
1-3rd ..	Colostrum	..	..		
4-14th ..	3½	1	..		
15th ..	3	1½	..		
16th ..	3	3	..		
17th ..	2½	4½	..		
18th ..	2	6	..		
19th ..	1½	8	..		
20th ..	1	10	..		
21st ..	½	12	..		
22nd ..	taper off	14	..		
23rd-28th..	..	16	a little increase to 2 lb.		
29th-90th..	..	taper off			

Free Choice

Rotational Grazing

A suggested mixture is as follows:

- 1 part peanut meal.
- 1 part maize meal.
- 1 part barley meal.

Cottonseed meal or linseed meal may replace part or all of the peanut meal. Oatmeal, wheat-meal or sorghum meal may replace the barley meal.

Add 1 lb. each of salt, bone meal or bone flour and pulverised limestone to each 100 lb. of the mixture.

At 3 months the buttermilk powder can be replaced entirely by peanut meal, linseed meal, cottonseed meal, coconut or meat-and-bone meal and the meal allowance can be reduced when sufficient young pasture and/or green leafy lucerne hay is fed. A simple mixture of 5 parts of grain to one part of protein-rich meal is suitable at this stage. Molasses can be used to replace part of the grain portion. One pound of molasses is equal in energy value to about ⅔ lb. of grain. Molasses should be introduced gradually and the quantity reduced if scouring occurs.

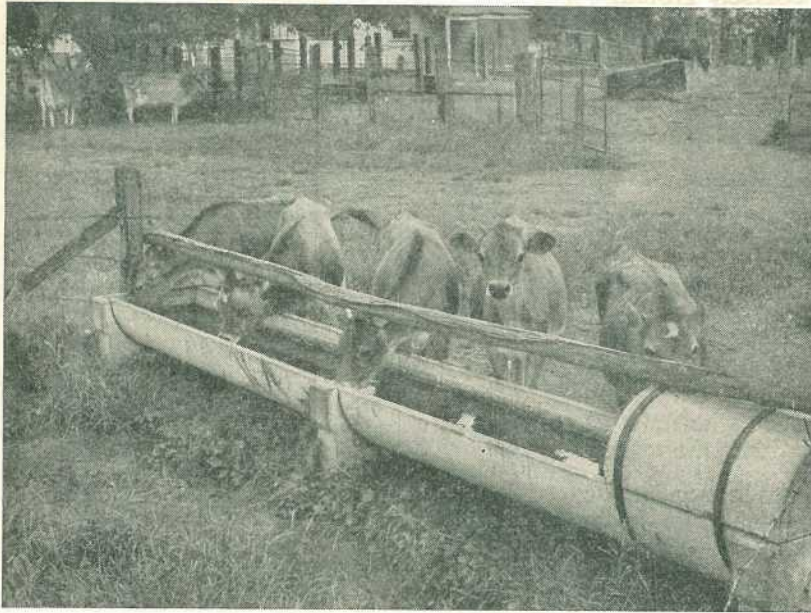


Plate 3  
Clean Water Should be Available to Calves at all Times.

**Feeding Whey.**—Skim-milk is often scarce in cheese making districts but ample whey may be obtainable. The nutritive value of whey lies mainly in its sugar content. Its energy value is about two-thirds that of skim-milk, or one-third that of wholemilk. The fat and two-thirds of the protein have been taken in the cheese. In addition, it is rather laxative in action and needs to be introduced steadily, commencing in the fifth week.

TABLE 5  
FEEDING SYSTEM USING WHEY

Age	Whole-milk	Whey	Calf Meal	Lucerne Hay	Pasture
Weeks	Pints	Pints	Lb.		
1-3 days ..	Colostrum	..	..		
1-2 weeks ..	3½	..	..	Free Choice	Rotational Grazing
3 weeks ..	4	a little	..		
4 weeks ..	3½	½	..		
5 weeks ..	3	1	¼		
6 weeks ..	2	2	⅓		
7 weeks ..	1	3	1		
8 weeks ..	½	4	1½		
9 weeks ..	..	5-6	2		

### Antibiotics

Antibiotics are not a substitute for good husbandry and good hygiene. However, under special circumstances it appears that two antibiotics, oxytetracycline (Terramycin) and chlortetracycline (Aureomycin) are useful in the feeding of young calves when milk is in short supply.

The indiscriminate use of antibiotics in calf feeding cannot be recommended.

### Pasture and Hay

The basis of rearing healthy well-grown calves at lowest cost from three months old onwards is the regular provision of young nutritious pasture. Supplementing with good quality lucerne hay, or clovered pasture hay, is beneficial, especially to counteract the laxative effect of very succulent feed.

When pasture is insufficient or declining in quality, as in autumn and winter, it should be supplemented with suitable hay.

Young clovered pasture or lucerne, and hay made from pasture or lucerne, are rich in all food nutrients and ensure good health and

growth. The leaves are much more nutritious than the stemmy parts of hay and particularly in dry weather they become brittle and fall from the stem. Hay should therefore be fed in boxes or troughs or racks with troughs beneath to catch the leaves. A roof should be provided to protect the hay from the weather.

Observations on calf growth have shown that, when confined to second quality pastures, calves commence to lose weight in the autumn and do not regain that weight until the late spring, yet the skeleton may have grown a little. With such calves, normal development has been retarded by as much as a year and it can be assumed that subsequent production is reduced considerably. Observations in New Zealand have shown that gross under-feeding in early life has reduced production in the first lactation by 36 lb. of butter and in the second lactation by 24 lb. of butter.

### Feeding and Management

**Bucket Feeding.**—Bucket feeding of calves is the most general method used. It is simple and buckets are easy to keep clean. Gulping of the milk may lead to digestive disorders and bucket-fed calves often have a habit of sucking appendages of their mates after feeding.

**Nipple Feeding.**—Feeding through rubber teats was first used half a century ago. A few dairymen still prefer this method. Its main benefits are regulation of speed of intake of milk and a reduction in the incidence of calves sucking one another since their urge to suck has largely been satisfied. A disadvantage is the extra pieces of equipment to be kept clean. More feeding bails are required in a nipple feeding system. Each young calf should receive its milk ration from an individual container.

**Dry Meal versus Gruel.**—Dry meal feeding commenced with the introduction of calf starters. Advantages of the method are a saving in labour of gruel preparation, probably a better digestion of food and less risk of over-feeding and digestive upsets because, by thorough chewing, the food is mixed with saliva and there is no risk of over-feeding.

A recommended method of inducing early eating of dry meal is to place a small amount in the bottom of the bucket as the milk is being cleaned up.

**Grinding Grains.**—Calves chew soft whole oats thoroughly until they are eight months old. But when a meal is added to increase the protein content of the ration it is advisable to crack, or grind, the grains to provide more complete mixing. Coarse grinding only is necessary, as grinding too finely reduces palatability and may reduce the need to chew thoroughly.

### Calf Bails

Bails are necessary for good calf rearing. They ensure that each calf gets its share of feed and the reduction in labour is only fully appreciated when they are used. Calves lose their urge to suck each other when bailed up and fed hay or dry meal after their bucket feed. Calves are mimics and the sight of a neighbour eating its food encourages a hesitant calf to "give it a go".

Calf bails can be built of timber or metal, need only be of simple design and, if in a permanent position, should have a concrete floor and a roof to provide comfort to the feeder and calves during unfavourable weather. Portable bails built on skids are useful if, for some reason, calves cannot be brought to a central feeding site.

### Rotational Grazing

Calves do better when rotationally grazed even when all feed is of good quality. A high level of nutrition and rotational grazing are the fundamentals of worm control in calves.

The size and number of paddocks should be adjusted to allow a change of feed at weekly intervals and a month's spell of each paddock before re-grazing. During that time a large proportion of worm larvae will have died, thereby reducing re-infestation.

### Dehorning

A hornless herd has several advantages over a horned herd. The best method of dehorning the herd is to treat the calves. There are three methods of dehorning described in special Departmental publications.

### Calf Identification

Whether purebred or grade, every calf should be permanently identified so that its complete history can be recorded. Calves can be identified by tattooing, ear-tagging or branding with

numbers. This job should be done as soon as convenient after birth. Members of herd recording units have their calves tattooed free of charge.

### Vaccination Against Blackleg

Blackleg tends to recur in well marked areas but it may not appear for several years. Veterinary advice should be sought concerning the advisability of vaccination in your district. Vaccination gives protection until two years old, after which age cattle are rarely susceptible to blackleg. In infected areas, calves should be vaccinated as a routine at four months of age.

Strain 19 and blackleg vaccinations should not be performed at the same time.

If an outbreak occurs all calves should be vaccinated from two months old and upwards. The younger calves do not acquire a lasting

### Measuring Growth Rate

Periodic weighing of young stock provides a good guide to the standard of husbandry. Comparisons of growth rate can thereby be made with accepted standards. Table 6 summarises data on growth rates of heifer calves of various breeds under most favourable conditions.

Data in Table 6 have been compiled from "Feeds and Feeding," 22nd Edition (F. B. Morrison) and records of the Department of Agriculture and Stock, Queensland.

### Girth Measurements

Where calves cannot be weighed, liveweight can be estimated by measuring the girth immediately behind the forelegs and estimating the weight by using the following table:

TABLE 7  
ESTIMATED WEIGHTS OF WELL-GROWN JERSEY HEIFERS FROM GIRTH MEASUREMENTS

Girth (in.) ..	26	28	30	32	34	35	36.5	38	39	40	41.5	43	44	45-6
Estimated Weight (lb.)	58	78	86	102	125	140	155	170	185	200	220	240	260	280-300

immunity from the vaccination, which should therefore be repeated at five to six months old.

### Strain 19

Heifer calves should be inoculated with Strain 19 at four to eight months of age. This gives protection against brucellosis in later life. Bull calves must not be vaccinated as the germ may persist in the testicles. Revaccination is unnecessary.

TABLE 6  
NORMAL LIVELWEIGHT GAINS (LB.) OF HEIFERS

Age	Ayrshire	Guernsey	Friesian	Jersey	A.I.S.
Months Average Birth Weight*	75	68	96	55	71
1 ..	86	79	115	70	98
2 ..	114	105	155	96	127
3 ..	156	141	207	128	161
4 ..	190	177	260	176	195
5 ..	243	220	317	220	232
6 ..	281	267	379	268	290

\* Individual birth weights vary several pounds from these averages.

The weights of individual calves may vary several pounds from these estimates but this does not matter provided there is a steady gain.

From six months of age good quality pasture, without any supplementary feed, will provide for reasonable growth.

Information on other aspects of calf rearing are contained in the following publications available from the Department of Agriculture and Stock:

"Dehorning of Cattle"—Pamphlet No. 4.

"Try these Easy-to-Work Calf Bails"—Advisory Leaflet No. 183.

"Portable Calf Bails"—Advisory Leaflet No. 42.

"Blackleg"—Advisory Leaflet No. 54.

Advice on Strain 19 Vaccination appears in "Brucellosis (Contagious Abortion) in Cattle"—Pamphlet No. 6.

"Calf Scours"—A leaflet is being prepared for publication.



# pasture and crop

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**Points in Furrow Irrigation.**—Low cost and ease of application make furrow irrigation a favourite for row crops like sugar cane, cotton, tobacco, and potatoes. The method is used to water more than one-third of all the irrigated land in Queensland.

Success of furrow irrigation depends on getting uniform penetration of water to the root zone of the plants. To check the lateral spread and depth of penetration, cut trenches at the top, middle and bottom of the field immediately after watering. These will show the penetration pattern. Irrigation is efficient if the water meets half-way between the furrows and the soil is wet down to the root zone.

Dry patches between the furrows mean that the furrows are spaced too widely or that the flow is too fast for the soil type and slope.

—A. NAGLE, *Irrigationist.*

**Check Your Instruments.**—If a spot check was made of all tractors in operation today, the percentage of tractors in service with inaccurate engine speed indicators would surprise you.

The consequences of an error such as this can be serious when crop spraying, for instance. An inaccurate engine speed indicator can also prove deceptive during grain harvesting operations.

For example, a fairly new tractor equipped with an engine speed indicator on which the standard P.T.O. speed of 536 revs. was clearly defined was employed in operating an all-crop harvester. The grain samples produced were poor and adjustments made on the all-crop har-

vester failed to improve the samples. A check of the engine speed indicator revealed an inaccuracy of 150 revs. That is to say, although the speed indicator was registering 536 revs. the actual speed was found to be 484 revs. per minute. Due to the reduction in speed, the efficiency of the all-crop harvester was lowered particularly with regard to the shaker shoe and fan thus making complete separation virtually impossible. Opening up the throttle on the tractor to obtain correct speed soon had a clean sample flowing into the bag.

So remember—maintain correct speed for maximum efficiency.

—C. G. WRAGGE, *Agricultural Engineer.*

**Impurities in Sudan Grass.**—Growers, beware of Johnson grass and Datura seeds which often occur in Sudan grass seed! Johnson grass and Datura, if introduced with Sudan seed can become serious pests on your property as well as being injurious to your livestock.

Submit your samples of Sudan grass seed before sowing to the Seed Testing Station, Department of Agriculture and Stock, Brisbane. Four ounces of Sudan grass seed is sufficient. No charge is made when the seed is intended for a grower's own use.

The seed testing staff will always advise you on the purity and germination of your seed sample within a few days. The seed testing station operates for the benefit of growers. You are invited to make more use of this service.

—E. PRODONOFF, *Seed Specialist.*

**Fertilizer is Hard on Combines.**—Neglect to clean your fertilizer spreader or combine after use and you'll soon be paying for a new one.

Most fertilizers used today are extremely corrosive and, in addition, have a tendency to set rock-hard when exposed to the air. Corrosion can quickly damage sheet-metal hoppers and cause bearings to seize up. Fertilizer caked on a machine will cause breakages. Neglect will send a machine to the scrapyards far more quickly than fair wear and tear.

It's fatal to leave fertilizer in the hopper. It can be guaranteed to set solid in a short time. Even worse is to operate the drill in this condition, for this inevitably causes breakages.

All parts should be cleaned thoroughly before the machine is stored away. If necessary, the bulk of the caked fertilizer can be chipped off. Then a five-sixteenths heavy duty electric drill with one of the many types of wire scratch brushes can be used to reach awkward corners and to get down to clean metal. A rotary sander, with a wire cup brush attached in place of the disc, is equally effective.

Those parts that come in contact with the fertilizer should be painted every year. However, if you prefer it, you can treat the parts with some anti-rust compound or waste oil. After allowing some time for the paint to harden, operate the mechanism by hand to ensure that it is in order.

Whenever possible, machines that have been used for distributing fertilizer should be cleaned thoroughly immediately after use. If some delay cannot be avoided, at least empty the hopper and hose it out.

Don't overlook the seed boots attached to the coulters. These often cake inside with fertilizer, and should be cleaned thoroughly.

The swing from the coiled spring type of seed tube to new forms of plastic and convoluted rubber is a good one. The metal types are

almost impossible to keep clean and have to be replaced every two years or so.

—C. G. WRAGGE, *Agricultural Engineer.*

### **What is an Honorary Crop Correspondent?**

From time to time you will have read in your newspaper, or heard over the air, an item such as "A survey by the Division of Marketing of the Department of Agriculture and Stock shows that the total area sown to the main summer grain and seed crops for the 1960 harvest is now estimated at about 340,000 acres." Did you ever wonder how this information is obtained?

The best source of this type of information is the farmer himself. He generally knows what is going on in his own district. Every two months the Division of Marketing sends to certain growers, a questionnaire and a reply paid envelope. The farmer fills in the appropriate part of the form and returns it to us. The people who help in this way are called Honorary Crop Correspondents.

When we receive reports they are arranged into production districts. Information on acreage and yield changes is extracted and analysed. Then we consider information from the Weather Bureau, from Departmental field officers and from other organisations who are concerned with the particular crop. When we are satisfied that we are as close as possible to the answer, the Division issues the forecast.

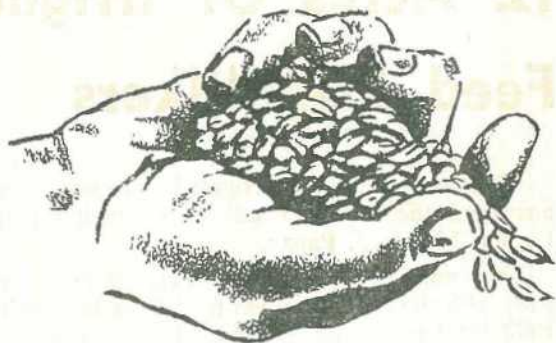
Those of you who are already honorary crop correspondents know much of the foregoing. From time to time it is necessary for us to expand our cover of a crop in some areas because our information is too slight to give us a reliable picture. During the coming year you could be approached to become an honorary crop correspondent. If you decide to accept, your help will be much appreciated.

—R. RILEY, *Statistical Officer.*



# Clean Grain . . .

## Makes Wholesome Flour And Cereal Products



Cleanliness in grain begins on the farm. Insects, birds and rats and other rodents that get into stored grain cause enormous losses. They waste the nation's food and eat away your profits. You can help cut these losses by making sure that all the grain you store and handle is clean.



You can keep rats and mice out with better storage construction. Poison and trap rodents and clean up places where they may hide and live.

It will save money to keep insects out. Fumigate old stored grain. Before storing new grain, get rid of insects by cleaning the bins and areas surrounding them. Spray bins with insecticide.



It might be necessary to use screens to keep out birds and poultry. Use  $\frac{1}{2}$  in. mesh on all windows and other openings.

# 12 Acres Of Irrigated Pasture Feed 26 Milkers

Twelve acres of irrigated pasture have answered the fodder needs of Beenleigh dairy farmer, Mr. A. J. Pagan.

Two milking cows to the acre cannot keep pace with the flush of green feed from late spring right through to late autumn. He has a surplus to mow and store for winter feeding.

But it wasn't always like that on his 30-acre farm on the bank of the Albert River. Eight years ago when Mr. Pagan, a sheepman from St. George, took over, the only pasture was a poor stand of paspalum and native species. The cultivation, now under irrigated pasture, had poor soil structure and low fertility due to intensive cropping.

Mr. Pagan turned to irrigated pasture to restore the farm's productivity and achieved success with a spray irrigated sward. But on this one-man farm he found the labour involved in moving the spraylines was just too much for him.

So in 1956-57, he changed over to the contour ditch system on 12 acres of gently sloping river country. Shortage of fresh water from the Albert River was a handicap in the 1957-58 drought year, but now, with normal seasons and a bigger pumping plant, his production is rising.

In 1957-58, his average yield from 22 milking cows was 336 gallons of milk containing 142 lb. of butterfat a head. Although 16 lb. of butterfat Last year, the average production from 20 cows was 487 gallons of milk containing 198 lb. of butterfat a head. This was 36 lb. of butterfat below his 1956-57 production, it was still 13 lb. above the average for his herd recording group, better than the average for his group.



Plate 1

**Beenleigh Dairyfarmer Mr. A. J. Pagan (left) examines the Production Records of His Herd with Agriculture Department Herd Recording Adviser, Mr. S. Ivers.**



Plate 2

**There Was Pasture to Spare on Mr. Pagan's Beenleigh Farm last Summer.** His herd of 26 milkers could not keep pace with all the forage produced on 12 acres of irrigated pasture. Surplus was cured and the hay stored for winter feeding.

### Protein Worry

Mr. Pagan believes that his rising production is due mainly to good feeding.

"I graze the milkers on the irrigated pasture for 18 hours a day," he said. "From about Christmas on, protein shortage is my chief worry; the clover isn't making vigorous growth and paspalum alone just hasn't got enough. To combat this I'm feeding each cow a protein-rich meal of 4 lb. a day.

Continued high yields, Mr. Pagan says, depend on good pasture management. He believes in close grazing and mowing to keep the pasture short and the protein content high. The 12 acres of irrigated pasture are sub-divided into 3-acre paddocks, and these Mr. Pagan grazes in rotation during the winter. In summer, he permits his cows more extensive grazing.

For most of the year, the pastures have to be irrigated every week or 10 days. Pumping from the Albert River with a 6 in. centrifugal pump

he can give 5 acres a 3 in. irrigation a day. Cost of a day's pumping is about £1.

Every year, after the winter, Mr. Pagan renovates his pastures with tine harrows. He fertilizes the pasture each autumn, applying 2 bags of superphosphate to the acre.

"It looks as though you must have super for production," he said. "In a recent wet season my dry paddock had plenty of feed from a paspalum-white clover pasture that had not been fertilized. To save the irrigated pasture, I put the cows into the rain-grown pasture and in a week production dropped by 10 gallons. As soon as I returned the cows to the fertilized pasture, production returned to normal."

As a milk supplier and grazing irrigated pasture, Mr. Pagan finds that April and May are the best months to bring in his calves. The clover has then started to make vigorous growth and continues to yield heavily until November or December.

"On my pastures, cows calving in April and May continue to milk at their top until November," he said. "Even though they've been in for some time, early-calved cows will pick up in their milk yields from July onwards. Cows calving in the third quarter start to go off at just the same time as the early calved ones, that is, in November as soon as the heat begins to suppress clover growth.

"I've proved this by checking my monthly herd recording summaries over a number of years."

Mr. Pagan is determined to avoid being caught by a drought. He has 3 acres of lucerne, partly irrigated, and from this he has 30 tons of lucerne hay in his barn. Surplus pasture he mows in the summer is also stored. In addition, he has 2½ acres of fodder cane which he uses for winter feeding.

"I find fodder cane is the best protection against bloat," he said. "The cows are never short of cane from July to November and I've

never had any trouble with bloat. In September and October when the clover is a foot high, I give the cows a good feed of cane before putting them into the pasture."

### Herd Records for Culling

Herd recording information is used to help Mr. Pagan in his culling. But he believes a farmer needs records for 3 years before he can make full use of the information.

"When you use herd recording figures to guide your culling, you don't have to worry whether you're culling a medium instead of a poor producer," he said. "You can usually pick the top cows, but even then it's satisfying to have your judgement backed up."

On his 30-acre farm, Mr. Pagan runs 40 cattle including dry cows and heifers. The 12 acres of irrigated pasture provide all the grazing for his 26-cow milking herd.

"I could do with a few more milkers to make full use of the pasture," he added.

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## Step Closer To Hybrid Sorghum

Hybrid grain sorghum bred in Queensland will probably be released to commercial growers next year, said the Minister for Agriculture and Forestry (Hon. O. O. Madsen, M.L.A.).

This follows the success of Agriculture Department trial plantings in central and southern Queensland in the 1959-60 growing season. Yields from these hybrid plantings were consistently 25 per cent. higher than yields from standard varieties.

The average grain sorghum yield in Queensland is in the region of 25 bushels an acre. An increase of 25 per cent. due solely to the development of hybrid strains would be a substantial reward for the cost and effort of breeding them.

If the results achieved in the carefully managed Agriculture Department trials can be matched in commercial plantings, hybrid sorghums are certain to supplant standard varieties. Old favourites like Alpha, Martin, Caprock and so on, which are among the leading standard

varieties, will have to make way for the newcomers.

The hybrids have been developed from seed brought back by Mr. W. J. S. Sloan, Director, Division of Plant Industry, Department of Agriculture and Stock, from his study tour of the United States in 1957. To multiply the stocks of parent seed quickly, it was grown out-of-season in the 1958 winter at Ayr and in a glasshouse in Brisbane. The actual breeding work has been the project of Mr. R. F. Moore, a plant breeder at the Hermitage Regional Experiment Station.

In the United States, hybrids have lifted commercial grain sorghum production by 20 per cent.

The Department is now examining ways to develop a seed certification scheme for hybrid grain sorghum. This would have to be the foundation of any successful hybrid grain sorghum scheme. Like hybrid maize, seed from a commercial crop of hybrid grain sorghum would not be suitable for planting. A certification scheme would be needed to supply the seed for each year's sowing.

# Foot-rot Of Cattle

By O. H. BROOKS, Divisional Veterinary Officer.

Foot-rot is a common disease of cattle, causing considerable economic loss through decreased production. Treatment is quite satisfactory in early cases but prevention through improved conditions and where necessary, vaccination should be the goal aimed at.

An epidemic of foot-rot can seriously upset a milking herd, causing a rapid decline in milk production. The complaint is usually more prevalent following a long period of wet weather, and tends to be of seasonal occurrence. During 1950, it was common to find that 30 per cent. of milkers affected by the disease had become permanently dry before being treated effectively.

The disease may make its appearance in dry weather, if cattle have to walk over stony ground or graze on hillsides and steep embankments. Under such conditions cases are of a sporadic rather than an epidemic nature.

## Only Adults Affected

Foot-rot is confined to adult stock on account of predisposing factors necessary for the infection to gain entry to the soft tissues of the foot (see later).

Bulls are very susceptible, especially when subjected to the predisposing factors common to cows. Their extra weight would be an additional factor.

## Sources of Infection

Foot-rot is caused by a germ (*Fusiformis necrophorus*) which is found under a wide variety of conditions, wherever stock are congregated.

The germ persists in soil for long periods, although it may not infect cattle until conditions are favourable for its penetration of the coronet and cleft of the foot.

After the germ passes through the skin of the coronet or cleft, it multiplies rapidly. This causes an inflammation which, on account of the closely knit structures of the foot, produces severe pain from pressure. The pressure over the affected area arises from the inflammation, exudates, and in the later stages, pus.

## Symptoms

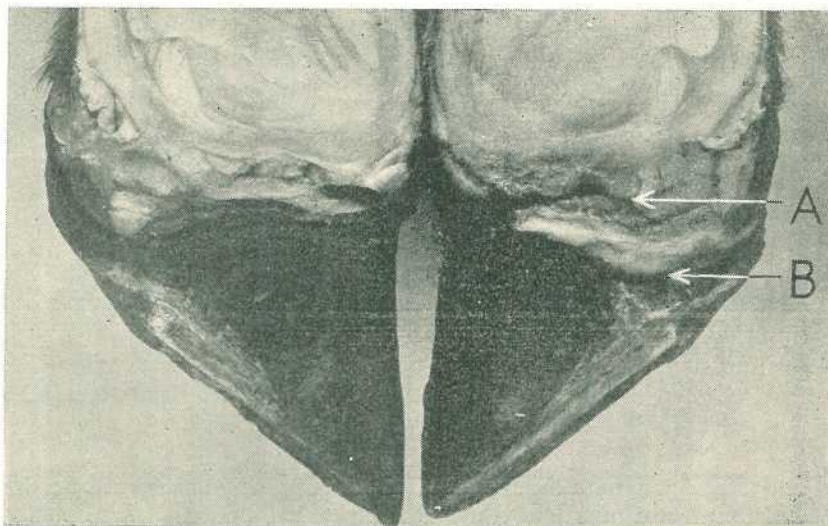
An animal begins to favour the affected leg soon after the infection becomes established. The symptoms become more pronounced within 48 hours until the animal moves reluctantly and often carries the leg. It is usual for only one foot to be affected. At this stage the swelling of the tissue above the coronet, and in the cleft of the foot, is readily seen after it is cleaned. Cases do occur where there is considerable lameness but no swelling.

The cleft of the foot is the more common site of entry of the germ, and the swelling is then located in this region. Pressure with the fingers over the affected area will produce evidence of acute pain. As the condition progresses, the swelling extends farther up the leg and may be observed as far as the knee or hock.

After a few days the skin over the affected area usually ruptures, and allows the escape of a thick, creamy pus, which forms into a scab. When this is removed, the underlying tissue is

Plate 1

**Section of Foot Affected with Foot-rot.** Ulceration of the joint is shown at A and separation of the hoof at B.



in the nature of an ulcer; it has a raw fleshy appearance, and pus can be expressed from it. This tissue referred to as granulation tissue, eventually replaces the damaged and necrotic tissue in the process of recovery. In the more acute cases, several abscesses may form around the coronet, leading to the formation of channels from which discharges escape intermittently.

If untreated, the infection may penetrate to the deeper tissues, such as the tendons and joints of the pastern, when the loss of a claw is not an uncommon sequel.

Neglected cases of foot-rot usually result in the formation of a club foot. The accumulation of fibrous tissue laid down to localise the infection remains as a disfigurement, and the animal is usually left with a permanent limp, as the foot cannot make complete contact with the ground.

Such conditions often lead to overgrowth of the claws, which usually turn upwards to form long horn-like structures. Due to lack of wear, they continue to grow until the animal is unable to move with the herd and is usually culled.

#### Predisposing Causes

Any happening which lowers the resistance of the skin of the foot to infection may allow the entry of the foot-rot germ. The most common predisposing cause is prolonged wet conditions, when yards and watering places become very boggy and the softened skin is easily bruised.

As stones are often used to minimise boggy conditions in yards, they can be a serious factor when they eventually become mixed with mud.



Plate 2

**Foot-rot, Showing Ulceration Above the Coronet Extending into the Cleft.**

The outlet to the bails is often a place where injuries to the foot occur, especially when the soil is eroded away from the concrete floor, leaving a considerable drop into a mudhole. Deep hoofprints, made in wet weather, often cause



foot damage when the ground dries and hardens. Such irregularities are common around gates, dams and water troughs.

Stony ground, especially on hillsides and steep embankments, can be a serious predisposing factor, also deep eroded cattle pads on embankments and leading to the bails.

Cattle stalls with earth floors become contaminated and are a serious source of infection, as the predisposing factors are usually present under these circumstances. The use of a footbath at showgrounds has proved effective in minimising the infection from this source.

#### Treatment

One dose of 100 c.c. of sodium sulphamezathine solution (33½ per cent). given as an injection is sufficient to treat the average dairy

animal to stand in a bath of a 10 per cent. solution of bluestone for 20 min. daily for a few days. This form of treatment may also be used as a preventive when the cattle walk through a bath on their way to the bails.

#### Prevention

Where foot-rot reaches epidemic proportions, the removal of predisposing causes becomes worthwhile. Steps can be taken to ensure that the holding yard and surroundings of water troughs and dams do not become excessively boggy. A concrete pathway leading from the bails has been found to be an advantage. Concrete floors in stalls likewise are of value.



Plate 3

A Yard Such as This is Often Responsible for an Outbreak of Foot-rot.

cow, provided it is applied before extensive damage to the hoof has occurred. A second dose may be necessary in 2-3 days, if the response is not complete.

Penicillin, given as a single massive dose of about 3,000,000 units, is also effective, and may be a little cheaper.

Where a footbath is available, good results are sometimes obtained by allowing the affected

#### Vaccination

A reliable vaccine is now available for the prevention of foot-rot. While improved conditions in the bails and yards must not be neglected, vaccination has given very good results in problem herds. The protection afforded by vaccination lasts only 12 months, but annual vaccination of the whole adult herd prior to the onset of the wet season should be considered on properties where recurrent outbreaks occur.

# *Providing Better Conditions For Useful Wildlife*

By C. ROFF, Fauna Officer

It is practicable to maintain and improve conditions for wildlife on farms and grazing holdings at negligible cost, and without undue interference with normal agricultural or pastoral activities.

On most land in Queensland there is sufficient food for some native birds and other animals for most of the year; insects, wild and cultivated fruits, grass seeds, and green plants are usually

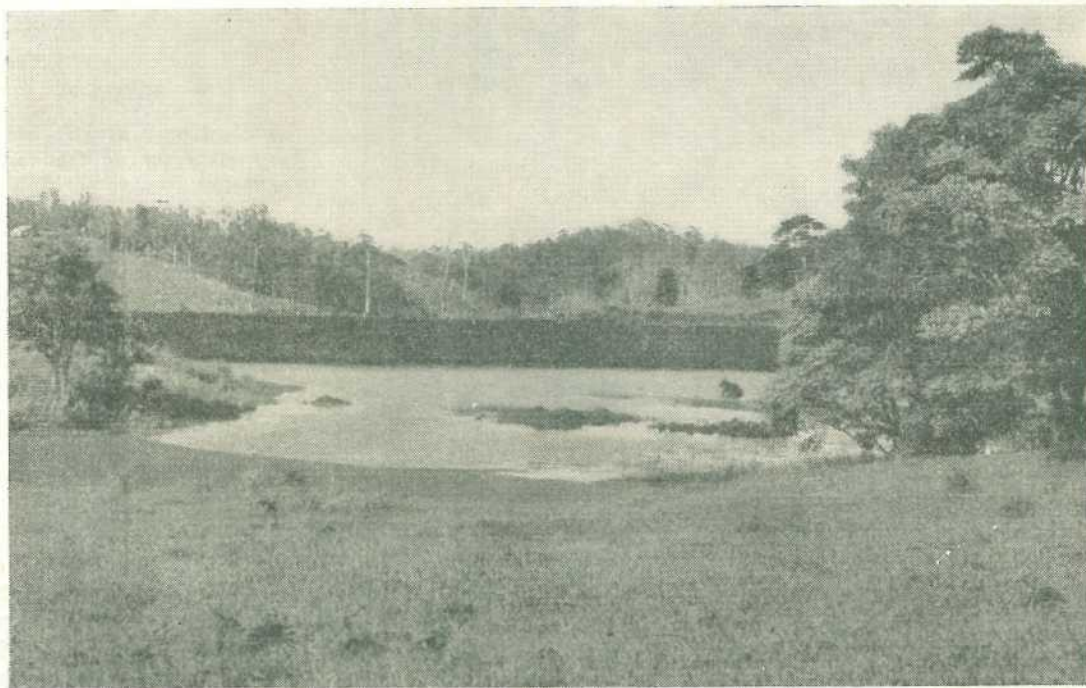


Plate 1

**Farm Dam at Maleny**



Plate 2

**A Mixed Pasture of Poona Pea and White Panicum at Cooroy**

available. During critical periods, which vary with weather conditions, the farmer assists native fauna to some extent when he plants winter crops, or leaves unharvested that part of a crop which is close to their shelter.

Several kinds of shelter or harbourage are required by wildlife. Some conceal nests and young; others provide food, shade from the hot sun, and cover from rains.

Other shelters help with escape from enemies, and afford protection against the cold and wind in winter.

Good shelter consists of grasslands, dense shrubs and clumps of trees. All three kinds should be close together and near available food supplies.

Wildlife obtains its liquid requirements both from free water such as surface water and dew, and from food, which is seldom if ever completely dry. In some areas wildlife exists entirely on succulent foods and dew, but for waterfowl surface water is a necessity.

Fortunately, farms or holdings usually have sufficient water to meet the demands of birds and mammals. The fencing of stock-water dams and the enclosing of an area planted to grasses,

shrubs and trees helps to increase faunal populations by providing water, food and homesites. In addition, wildlife productivity of swamps and other natural water areas is increased by better impoundments, level controls, channelling and regulated grazing.

#### **Improving Waste Areas**

A waste area may be improved by providing basic food and shelter requirements. In this State, eucalypts, pines, athel trees, and privet are suitable for planting to encourage wildlife. It would be as well for farmers to consult the local Forestry Officer for suitable trees for their locality.

On the farm or near the homestead these shelterbelts and windbreaks create homes for insect-eating birds, close to crop land, where they can do the most good. These also provide travel lanes for many kinds of wildlife; and incidentally help control wind erosion and lessen the drying effect of wind on the soil.

If native grasses are sparse and increased quail populations are wanted, any of the following are helpful, particularly as mixed coverages—white and subterranean clovers, annual medics, rye grasses, *Phalaris tuberosa*, Japanese millet,

white panicum, Poona cowpea, and cocksfoot. Again farmers might consult their local Agricultural Adviser for the best mixtures for their district.

If possible do not try for a heavy stand, because nesting birds like to see what is coming their way. Incidentally, some of the native pest fauna, and these of course are not welcome, prefer heavy stands of grass.

If waste areas already contain some of the food and cover producing plants mentioned, there is no need to plant more. Just fill in the kinds of plants that are absent and it is particularly important to construct a fence to keep livestock out.

A question that naturally occurs to the landholder who has only light faunal populations on his property is, "Where will the wildlife come from to stock the sanctuary provided?" Not infrequently, a few pairs of birds or mammals already exist in the neighbourhood, and under more favourable conditions, by natural increase and migration, these few will soon multiply.

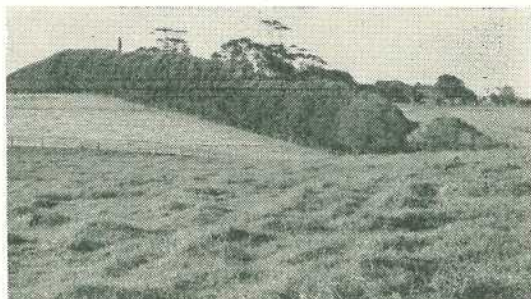


Plate 3

**Privet Windbreak and Improved Pastures on the Maleny Tableland**

If there is any doubt about this latter point, watch the native animals that are attracted to a pond or dam when natural conditions are harsh.

Where food, shelter and water are made available, the amount of wildlife that can be found is surprising.

---

### *Mould Resistant Tobacco In Sight*

Release in Queensland of New South Wales tobacco varieties with a high degree of resistance to blue mould is awaiting the results of manufacturing tests. If the tests are favourable, some seed should be available to Queensland growers in the 1961-62 season. Blue mould is at present the greatest threat to the Australian tobacco industry. It destroys up to 25 per cent. of Queensland's tobacco leaf each year.

Three tobacco varieties highly resistant to blue mould have been bred by Mr. H. Lea, of the New South Wales Department of Agriculture. The Hicks variety is the main parent used in the production of these strains.

Because of the promise shown by the varieties, the Central Tobacco Advisory Committee recommended trials in all tobacco-growing States last season. The aim of the trials was to assess the possibility of early release of seed to commercial growers.

In Queensland, the varieties gave promising results under farm conditions on Agriculture Department experiment stations at Inglewood and Parada.

Leaf produced from the same varieties in New South Wales is now being tested by manufacturers. If these tests show that the leaf is suitable for processing into tobacco and cigarettes, the way will be open to release the most promising varieties immediately.

It is unlikely that manufacturers will complete their tests in time for seed to be available for the coming season. But in the meantime, the Queensland Agriculture Department will conduct further field and laboratory tests. The new strains will be grown at the Inglewood and Parada tobacco experiment stations and in the Lower Burdekin. They will also be grown on one or two commercial farms in each of the main tobacco growing districts in the State.

Farmers are warned against saving seed of any blue mould resistant varieties that they might grow. Fresh seed must be produced each year by specially trained staff who can cross-pollinate the particular parents involved.

—W. J. S. SLOAN,  
Director, Division of Plant Industry.

# Ducklings Drank Themselves To Death

By P. D. RANBY, Veterinary Officer.

Don't let ducklings go thirsty. Take care to have plenty of clean drinking water in front of them all the time. If ducklings become very thirsty, they are likely to die from overdrinking when they are next watered.

An example of this trouble occurred recently on a farm near Brisbane. The owner had a flock of mixed three and four week old Muscovy ducklings which appeared to be thriving. One morning he found their water trough empty and filled it. The ducklings went crazy for the water and drank it greedily.

After four or five minutes of continuous drinking, one duckling rolled on its back, paddling its legs. The same thing quickly happened to the remainder, and soon all ducklings were lying collapsed around the water trough. In about 10 minutes they began to recover, but were very groggy for a while. On examining the water trough, the owner found it was leaking. The ducklings had evidently been without water during the night.

One morning 10 days later, the water trough was again found empty. The owner had noticed the trough nearly empty late the previous afternoon and had forgotten to fill it. As a result, the ducklings were without water for some time. When the trough was filled at 9.0 a.m., the



Plate 1: These Three Ducklings are Survivors of the Case in Question, Photographed a Few Days Later. They are from a flock of ducklings which, on two occasions, had overdrunk as a result of excessive thirst. Overdrinking resulted in immediate collapse and some deaths.

ducklings again drank greedily and collapsed as before. But this time recovery took twice as long (20 minutes), while some of the ducklings failed to recover at all. The owner suspected poisoning.

However, it was pointed out to him that this was simply a case of overdrinking. Rapid, excessive drinking distends the small intestine. The stretching of the bowel wall causes severe pain and reflex nerve effects. Under these conditions, the nerve reflex would cause the heart to flutter, which, if severe enough, will lead to heart failure and death.

Ducklings drink much more water than chickens and must always have a water supply at hand. If allowed to become very thirsty, there is always the risk that they will overdrink when water is supplied to them. The danger of death from overdrinking is very real.

When sudden deaths occur among previously healthy ducklings, keep in mind the possibility or overdrinking after excessive thirst.

# How To Avoid Milk Taints

By W. C. T. MAJOR, Dairy Technologist.

*The causes of undesirable flavours to be found in milk and milk products are discussed, and recommendations are made for the elimination of these unwanted and economically damaging taints.*

Although the flavour of dairy products may not affect their nutritive value, people eat less of these "protective foods" when undesirable weed, feed or other flavours are present. Such a lowering of consumption reacts unfavourably on the economy of the dairy industry. Not only is the volume of sales depressed, but the price per pound of the product is also reduced. It is, therefore, in the interests of consumers, processors, and producers to ensure that undesirable taints are kept out of dairy products, particularly milk, cream, butter and cheese.

## What is Desirable?

It is desirable that the dairy product be always palatable. It must be attractive in itself, and be attractively merchandised. It should have a rich colour, a good body, a pleasant aroma and a clean, uniform, characteristic flavour, free from any unnatural or objectionable taint. The flavour and appearance must be both uniform and attractive.

Secondly, the chemical composition of the product must be well balanced. The fats, proteins, carbohydrates and minerals must be present in the correct form, and bear the correct ratio to each other.

Thirdly, the bacterial content must be satisfactory. There must not be any harmful germs, whether of human or animal origin. Some dairy products, notably butter and cheese, depend on the by-products of microbiological activity for

their characteristic desirable flavour and aroma. These organisms must be present, and have the correct conditions for development. However, the presence of organisms capable of producing undesirable fermentations (such as bitterness, gas, ropiness, fruitiness, fishiness and maltiness) is most undesirable. It is equally important to maintain conditions which will not permit undesirable organisms to produce products which will taint dairy products.

Fourthly, milk and its products must be free from abnormal flavours due to either the feeds or the weeds which the cows have eaten. Under Queensland conditions, 45 to 55 per cent. of the butter packed as choice, and degraded for various reasons, is degraded for weed taint. To this must be added the vast amount of butter packed at grades lower than choice because of the weed taint recognised in the milk or cream on arrival at the factory.

Weed taints, therefore, play an important part in reducing the palatability and price of large amounts of milk, butter, cream, and cheese.

On the other hand, unaffected dairy products have a desirable attractive flavour which excites the palate and stimulates increased consumption.

## Feed Flavours

The fodder, crops and pastures eaten by the cow impart characteristic flavour and aroma to the milk she produces.

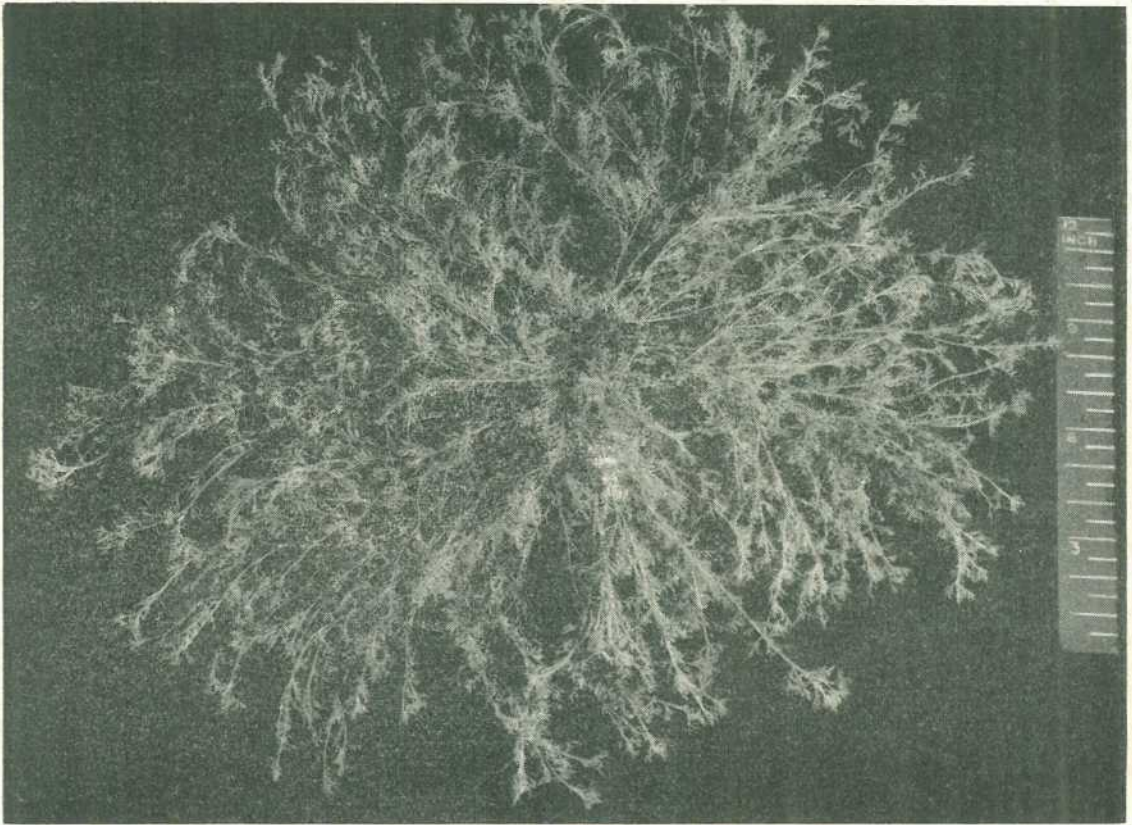


Plate 1  
Bitter Cress or Swine Cress (*Coronopus didymus*).

For example, when cows are milked immediately after grazing lucerne, the milk has a strong, objectionable lucerne taint. However, when the cows are removed from the lucerne some time before milking commences, the lucerne taint is less pronounced.

The longer the interval between grazing and milking, the less pronounced will be the taint.

No matter what feed the cow eats, it will influence the flavour of her milk. Native grasses, oats, Sudan grass, peas, sorghum, maize, improved pastures and clover all impart their own characteristic flavour and aroma to the milk produced. Some feeds produce acceptable flavours, whereas others are objectionable to varying degrees.

In general, if the herd is removed from taint-imparting feed from 3 to 4 hours prior to milking, then the milk produced will not be

markedly affected by undesirable feed taints. This cannot be taken as a hard and fast rule, because the time varies from one locality to another. It is also influenced by the amount, the nature, and the variety of the feed consumed.

Where supplementary feeding is practised, another factor is also important, namely the absorption by the milk of the aroma of the feed. Therefore, if an untainted milk is required it is necessary for such fodders as silage, brewer's grains, pineapple waste, chopped green crops, ground grains, meatmeal and bloodmeal, to be fed in such a manner, and at such a distance, that their aroma cannot be detected in the milk room. It is also desirable to feed the cows after they have been milked, not immediately before milking.

#### **Weed Taints**

Weed taints are, usually, more serious than feed taints. Many weed taints are most objection-

able. Some weed taints are reduced during factory processing, whereas the flavour of others is intensified during pasteurisation. Some are almost undetectable in cold, unheated milk or cream, but are most objectionable in heated milk or cream. This is particularly so with some varieties of cress, for example, lesser swine cress (*Coronopus didymus*) (Plate 1). Other important taint-producing weeds are pepperwort (*Lepidium bonariense*) pepper cress (*Lepidium hyssopifolium*) shepherd's purse (*Capsella bursa-pastoris*) and slender celery (*Apium leptophyllum*) shown in Plates 2, 3 and 4.

Many of the taints imparted by weeds are not eliminated during an interval of 3 to 4 hours between ingestion and milking. Some taints appear immediately after ingestion, whereas others take hours to appear.

Moreover, minute amounts can cause serious damage.

One cow nibbling some weeds will produce enough tainted milk to spoil the bulked milk from the whole herd. Similarly, weed-tainted milk or cream from one supplier is capable of spoiling an entire vat of milk or cream at a factory.

### Control of Weed Taint

Where milk is being used for pasteurisation and bottling, or cream is being used for the table cream trade, it is necessary for it to be taint-

free. If milk is being used for cheesemaking, or cream is being used for buttermaking, some (but by no means all) taints can be reduced during processing. In this way, some milk which is unsuitable for the bottled milk or table cream trades may be used to produce choice quality butter or cheese.

However, other weed and feed taints survive processing and so spoil butter or cheese.

An examination of grading figures reveals that 90 to 95 per cent. of the degrading for weed takes place between July and December, the vast majority being in July, August, September and October, which is the period of:

- minimum growth of dense ground-covering, summer-growing pastures;
- maximum feeding of cultivation crops;
- scarcest amount of farm grown feed.

The control of weed taints is, at present, being investigated along two distinct lines:

The first is treatment of tainted milk, or milk products, to remove, or markedly reduce taints. Results, to date, indicate that some weed taints cannot be easily removed from milk or cream. However, these investigations have shown that butter-oil free from weed taint can be produced from strongly weed-tainted dairy produce. This weed-taint-free oil can be used to produce high quality ice cream mix and various reconstituted

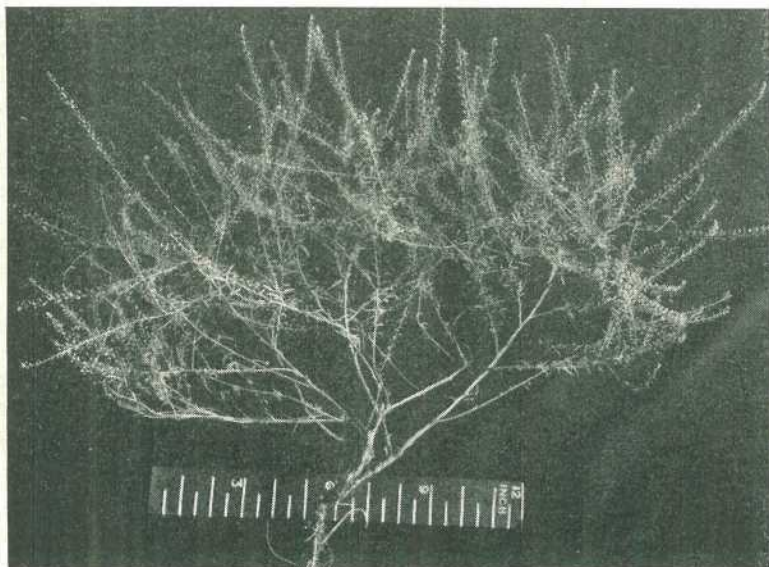


Plate 2  
Pepper Wort (*Lepidium bonariense*).



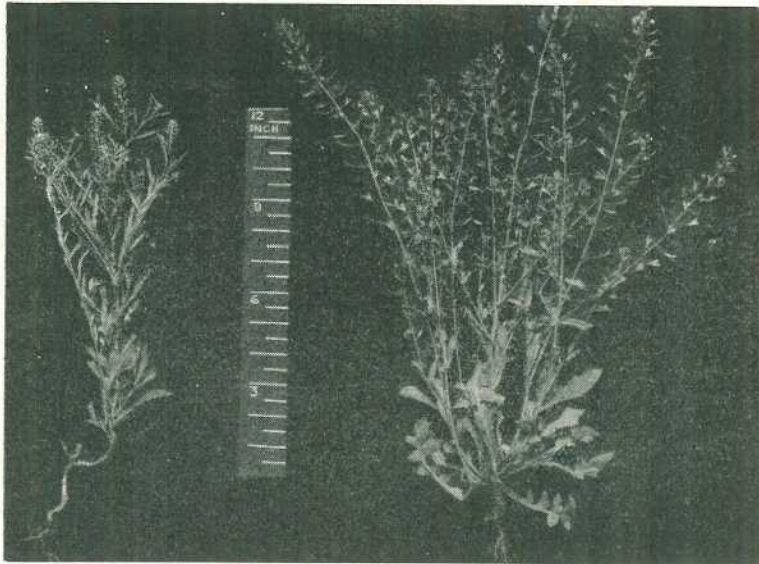


Plate 3

At Left: Pepper Cress  
(*Lepidium hyssopifolium*).

At Right: Shepherd's Purse  
(*Capsella bursa-pastoris*).

dairy products, whereas the original weedy butter was quite unpalatable. However, the cleaned product is no longer butter.

The second treatment is the development of a system of farming which will avoid the production of weed-tainted milk or cream. The farmer desirous of supplying milk or cream free from weed and feed taints has three alternatives. His immediate routine may combine all three alternatives, while he so organises his farm and resources to ultimately employ only one. The alternatives are—

- (1) Feed the milking herd exclusively on fodder crops, pasture or concentrates which do not produce undesirable taints in the milk or cream supply. (This may well be the ultimate aim.)
- (2) Feed taint-producing fodder crops, pasture, silage, or concentrates early enough to enable the taint to disappear before milking (with adequate aeration and cooling this may extend the variety of fodder crops, pasture and concentrates sufficiently to enable the supply of a suitable cream for buttermaking or milk for cheesemaking, or give some relief while changing over to the first alternative).
- (3) Taint-producing plants, particularly weeds, can be removed from the crops and pastures grazed by the milking herd. It is

also necessary to eliminate these plants from the yards, laneways, watering places and rest areas frequented by the milking herd. This could well be one of the first steps taken by the farmer in his drive to produce milk and cream free from weed taint.

The production on the farm of milk or cream free from weed taint involves first class farm husbandry, with emphasis on the elimination of taint-producing weeds from those areas of the farm which are grazed, or frequented, by the milking herd. This involves the judicious use of farm implements to give adequate moisture retention and satisfactory tilth at seeding to ensure good germination of crops and their subsequent rapid and vigorous growth—probably assisted by adequate fertilizing and the sowing of high germination, weed-free seed.

Adequate fencing is essential to ensure controlled, intermittent grazing to maintain good ground cover and rapid plant recovery which will discourage weed invasion and establishment.

The judicious use of selective weedicide and the chipping hoe may also be necessary.

It may be necessary on many farms to increase considerably the amount of fodder available to each cow from July to December, inclusive. This is because weeds are often the main source of green feed for the dairy herd for part at least of these months particularly in paddocks previously used for summer-growing crops.

It is essential to keep the ground well covered to prevent the germination of weed seeds, and this cannot be done unless there is an abundance of fodder available to the dairy herd. Close grazing permits weed invasion and establishment.

It is suggested that:

- (a) The most productive areas of the farm be thoroughly prepared and sown down to appropriate crops or pasture.

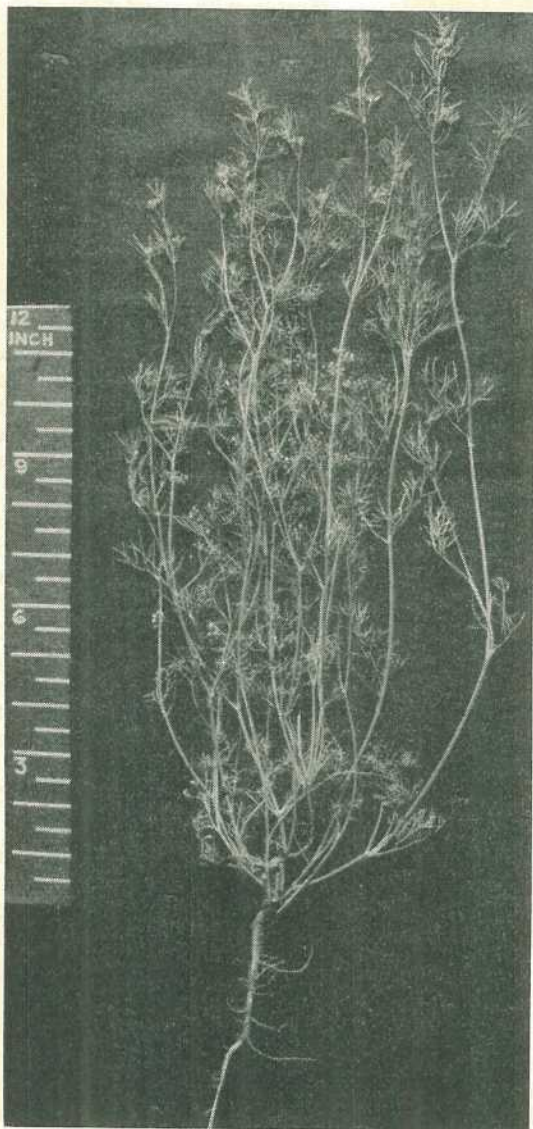


Plate 4

Slender Celery (*Apium leptophyllum*).

- (b) Weeds be eliminated from these areas.
- (c) These weed-free areas be judiciously grazed by the milking herd (giving weed-free milk or cream on some days during the troublesome period). If you are short of feed never flog these specially prepared areas.
- (d) Each year the "weed-free" area be extended until at least the milking herd have access to only weed-free pastures, crops, fodder, and concentrates.
- (e) It may be uneconomic to maintain the whole farm "weed-free" but the infected areas can be used for "dry" cattle, other farm animals, or non-dairy cash crops. Naturally, it will be necessary to exclude the milking herd from this area when taint-producing plants are present on it.

### Chemical

The palatability of milk and its products can be spoiled by chemically induced changes, such as "cappy", "cardboard", or "oily" flavours. The development of these flavours is frequently accelerated by traces of copper and iron from worn brass fittings on milking machines, coolers, or cans from which the protective tin coating has been partly removed. These changes are further accelerated by exposure of dairy products to sunlight—as, for example, when milk in clear glass bottles is exposed to sunlight.

Other "chemical" changes which spoil the attractiveness of dairy products are those such as rancidity. These are frequently due to the activity of enzymes, either liberated by microbial contaminants, or from the udder (due to either disease, malnutrition, or unduly prolonged lactation).

Subnormal chemical composition of dairy products frequently correspondingly reduces the attractiveness of both the flavour and the appearance of dairy products.

### Microbiological

Milk, cream and many dairy products provide enough food and moisture to permit contaminating bacteria, yeasts and moulds to grow actively in milk and milk products. These microorganisms can only grow by altering milk solids into other chemicals, many of which impart an

undesirable flavour and aroma to the product. It is therefore necessary, if we are to produce palatable human food to:

- (1) Keep contamination to the economic minimum.
- (2) Take steps to reduce the growth of the contaminant to a minimum.

The steps usually taken are—

- (a) Rapid cooling followed by cold storage of milk and its products.
- (b) Partial or complete dehydration of the product during processing.
- (c) Control of the acidity of the product.

### Accidental

Milk and its products are capable of absorbing odours from their containers or their surroundings. The odour of such things as kerosene, dieselene, disinfectants and tickicides is sometimes quite readily detectable in milk and cream when received at dairy products factories.

A very objectionable aroma develops inside cans when the lids are placed on them at the factory before the inside of the can is dry. This objectionable odour is accentuated when the cans, with lids on, stand in the sun on the roadside on return to the farm. Unless such cans and lids are very thoroughly washed, drained and racked at the farm, this taint will be apparent in the milk or cream forwarded to the factory.

It is also important that the drainage and sanitation of the milking shed, yards and surroundings be satisfactory, otherwise unpleasant odours can be taken up by the product. It is just as important not to store malodorous substances in or near the dairy buildings.

Unless the rubberware of the milking machine is always thoroughly cleaned and replaced before it becomes soft, spongy, or cracked, it will impart an objectionable odour to milk and cream. Objectionable odours can also be imparted from other unclean equipment, in addition to the undesirable "fermentation" changes brought about by the microbial contamination from unclean equipment.

Although the presence of extraneous matter, such as insect parts, dust, hair and chaff, may

or may not affect flavour (depending on the nature and activity of the microbial contaminants associated with it), the presence of extraneous matter does very adversely affect the appearance of the product. It reacts adversely on both the volume of sales and the price per pound of product. It is necessary therefore to take adequate steps to prevent extraneous matter getting into milk or milk products.

### To Sum it Up

The production of palatable, attractive dairy products is nutritionally and economically desirable. To achieve this object, it is necessary to:

- (1) Milk only healthy, well-fed cows.
- (2) Eliminate taint-producing plants from pastures, crops, conserved fodder and concentrates, and do not feed pastures, crops, conserved fodder or concentrates which will produce undesirable taints in milk or cream.  
Eliminate taint-producing plants from yards, laneways, watering and resting places frequented by the milking herd.
- (3) Use only clean equipment in sound mechanical condition.
- (4) Keep the temperature, moisture content, and acidity of milk, cream and milk-products within limits known to result in the production of desirable flavour, body and aroma.
- (5) Maintain the chemical composition of the products above certain well-known minimum standards.
- (6) Protect the product from the damaging effects of sunlight, age, metallic contamination, and enzymes.
- (7) Keep the equipment, particularly the milking machine rubberware, in sound mechanical condition, clean, and free of any objectionable aroma.
- (8) Produce, process and store milk and its products under such conditions that it cannot absorb taints from its containers or surroundings.
- (9) Keep out extraneous matter.

Good dairy products have an attractive appearance, a pleasant flavour and aroma, and are free from taints.

# Paspalum Ergot Poisoning Of Dairy Cows

By O. H. Brooks, Divisional Veterinary Officer.

Dairymen in the areas of paspalum pasture such as the Mary Valley, Eungella Range, and Atherton Tablelands are often bewildered at the peculiar behaviour of their cattle as they are driven to the bails.

While there are a number of plant toxins which may cause nervous disorders to muscles of the leg, the spasms produced by the paspalum ergot are characteristic.

Wherever paspalum grows in Queensland, the seed-head becomes infected with ergot fungus, which replaces the seed with a ball-like structure. The fungus produces ergot which gives the seed-head a heavy dark appearance.

During most years the paspalum seed-head is affected by the ergot fungus. The dark sticky syrup-like exudate from the seed-head is a constant hazard to clothes. The faces of cows and horses are the first to show its presence.

The fact that many dairymen have not experienced a case of ergot poisoning speaks for itself, as it is the exception for cattle to become poisoned.

Ergot poisoning is to be seen only under special circumstances. Normally the seed-heads affected by ergot are not eaten.

However, sometimes when the ergot is at a certain stage of development cattle may become poisoned within 24 hours.

It is usual to find more cases of ergot poisoning during the periods of high humidity and heavy rain of the monsoonal season.

It is not usual to find more than a few in a herd affected at any one time. Occasionally, about one-third of the herd may show varying symptoms of poisoning.

Milk production may drop rapidly when the ergot is thick on the grass.

## What Are the Symptoms?

Ergot is a nerve toxin. It causes symptoms similar to those produced by strychnine. The muscles tremble and twitch in the early stages. Later the muscles become cramped or severely contracted. This causes the cow to hold her head high, and walk with a stilted gait. The legs paddle as though out of control, and are usually flung outwards to maintain balance.

Animals will walk for a distance in this incoordinated manner, and then fall down from exhaustion.

Affected animals when approached are usually nervous (especially with strangers), as they cannot move away freely. They fling themselves around, especially if on concrete, and often fall over and remain on the ground for some minutes, paddling aimlessly.

In keeping with the excitement, the eyes are usually more pronounced, and in some cases blindness may occur. Champing of the jaws and frothing of the mouth is also a feature. The bowel movements are over-stimulated and scouring is usual.

A less violent symptom of ergot poisoning is a sudden dropping off in production of the herd when the ergot is washed on to the flag during rain.

In the more chronic cases, ergot may cause soreness of the feet, and a discolouration of the teats. This symptom is due to the adverse effect ergot has on the blood supply to these regions; there is an insufficient supply flowing through the tissue thus causing local necrosis. Unlike the ergot produced by rye, the paspalum ergot does not appear to be responsible for abortions, except in very odd cases. Misadventure during the toxic spasms is more likely to be the actual cause of abortion.

### What Can Be Done?

Affected cattle are best left alone. If treatment is desirable, then dosing with epsom salts at the rate of 12 oz. for Jersey, and 16 oz. for A.I.S., can be adopted.

Paspalum can be prevented from heading freely by pasture rotation and mowing.

When a paddock is heavily affected with ergot, it should be spelled.

Where the ergot has become a real problem, some farmers have sown down other grasses such as kikuyu.

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Crawley, R. A., Rockthorpe, Linthorpe  
Edwards, C. E., "Spring Valley" Stud, Kingaroy  
Farm Home For Boys, Westbrook  
Fletcher, A. C., "Myola" Stud, Jimbour  
French, A., "Wilson Park", Pittsworth  
H. M. State Farm, Numinbah  
H. M. State Farm, "Palen" Stud, Palen Creek  
Handley, J. L., "Meadow Vale", Lockyer  
Handley, G. R., "Lochlyn" Stud, Lockyer  
James, I. M. (Mrs.), "Kenmore" Stud, Cambooya  
Kath, E. E., "Topcamp", via Toowoomba  
Kimber, E. R., Block 11, Mundubbera  
Law, D. T., "Rossvill" Stud, Aspley  
Lees, J. C., "Bridge View" Stud, Yandina  
Ludwig & Sons, A. R., "Beau View" Stud, Beaudesert

O'Brien & Hickey, J., "Kildurham" Stud, Jandowae East  
Orange, L. P., "Eula", Flagstone Creek  
Pfrunder, P. L., Pozieres  
Potter, A. J., Ascot, via Greenmount  
"Tayfield" Stud, Taylor  
Q.A.H.S. & College, Lawes  
Regional Experimental Station, Hermitage  
Rosenberger, N., "Nevrose", Wyreema  
Rosenblatt, G., Roseville, Biloela  
Schellback, B. A., "Redvilla" Stud, Kingaroy  
Smyth, E. F., "Grandmere" Stud, Manyung, Murgon  
Stark, H. L., "Florida" Stud, Kalbar  
Thomas & Sons, F., "Rosevale" Stud, Laravale  
Traves, G., "Wynwood" Stud, Oakey  
Weier, V. F., "La Crescent", Clifton  
Wolski, A., "Carramana", Warra  
Young (Jnr.), W., Kybong, via Gympie

## Large White

Assenbruck, C., Mundubbera  
Barron Bros., "Chiltern Hill", Cooyar  
Bell & Son, E. J., "Dorne", Chinchilla  
Bishop, C. E., Beerwah  
Butcher, Dr. B. J. & Parnwell, A. J., Plunkett, via Tamborine  
Clark, L. D., Greens Creek, Gympie  
Duncan, C. P., "Colley", Flagstone Creek  
Fowler, S., "Kenstan", Pittsworth  
Franke, H. J., "Delvue" Stud, Cawdor  
Garawin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield  
Gibbons, A. E. H., Mt. Glorious  
Gibson, H., "Thistleton" Stud, Maleny  
H. M. State Farm, Numinbah  
Hall, M., "Milena" Stud, D'Aguiar  
Heading, J. A., "Highfields", Murgon  
Hickson, K. L., "Warra", Calliope  
Horton, C. J., "Manuemu Brae" Stud, Manuemu, Kingaroy  
Hutton, G., "Grajea" Stud, Cabarlah  
Jensen, S., Rosevale, via Rosewood  
Jones, K. B., "Cefn" Stud, Clifton  
Kahler, J. & S., "Karajoy", East Nanango  
Kanowski, A., "Exton", Pechey  
Kennard, R. B., "Collar" Stud, Warwick  
Larsen, H. L., "Oakway" Stud, Kingaroy  
Law, D. T., "Rossvill" Stud, Aspley

Lees, J. C., "Bridge View", Yandina  
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood  
Mack, A. J., Mundubbera  
Neilsen, L. R., "Sunny Hill", Ascot, via Greenmount  
Neilsen, A. R., Ascot, via Greenmount  
Palmer, V. P. & Son, "Reimlap", Greenmount  
Pampling, G., Watch Box Rd., Goomeri  
Port Curtis Co-operative Dairy Association Ltd., Stud Piggery,  
Biloela  
Postle, R., "Yaralla" Stud, Pittsworth  
Powell, R. S., "Kybong", Gympie  
Q.A.H.S. & College, Lawes  
Radel, V. V., Coalstoun Lakes  
Radel, R. M., Coalstoun Lakes  
Regional Experimental Station, Biloela  
Robinson, O. R. & O. J., "Linvale", Argoon, Biloela  
Rosenblatt, G., Roseville, Biloela  
Skyring, G. I., "Bellwood" Stud, via Goomeri  
Stanton, H. R., "Tansey" Stud, via Goomeri  
Stehn, L. W., "Hodgson Vale", via Toowoomba  
Stewart, L., Mulgowie, via Laidley  
Stumer, K. F., French's Creek, Boonah  
Wharton, C. A., "Central Burnett" Stud, Gayndah  
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah  
Zahnaw, W., Rosevale, via Rosewood

## Tamworth

Armstrong, H. J., "Alhambra", Crownthorpe, Murgon  
Booth, J. D., Swan Creek, Warwick  
Campbell, P. V., "Lawnhill" Stud, Lamington  
Coller, R. H., Tallegalla, via Rosewood  
Fletcher, A. C., "Myola" Stud, Jimbour  
Herbst, L., "Hillbanside", Bahr Scrub, Beenleigh  
Kanowski, S. E., "Miecho", Pineblands  
Potter, N. R., "Actonvale" Stud, Wellcamp

Regional Experimental Station, Kairi  
Salvation Army Training Home For Boys, "Canaan" Stud,  
Riverview  
Skerman, D. F. L., "Waverley", Kaimkillenbun  
Stephen, T., "Withcott" Stud, Helidon  
Thomas & Sons, F., "Rosevale" Stud, Laravale  
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah

## Wessex Saddleback

Ashwell, J., "Green Hill", Felton South  
Cooper, G. J., Neumgaa  
Douglas, W., "Greylight" Stud, Goombungee  
Dunlop, J. B., "Kunawyn", Acacia Rd., Kuraby  
Kingsford, D., "San Antone", Toowoomba  
Kruger & Sons, "Greyhurst" Stud, Goombungee

Law, D. E., "Homevale", Goombungie  
Law, D. T., "Rossvill" Stud, Aspley  
Mack, A. J., Mundubbera  
Scott, A., Wanstead Stud, Grantham  
Smith, C. R., "Belton Park", Nara  
"Wattledale" Stud, 432 Beenleigh Rd., Sunnybank

## Landrace

Crothers, B. M., "Booligar", Clifton  
Duncan, C. P., "Colley", Flagstone Creek  
Grayson, D. G., Killarney  
Kath, E. E., "Topcamp", via Toowoomba

Kingsford, D., "San Antone", Toowoomba  
Neilsen, A. R., Ascot, via Greenmount  
Orange, L. P., "Eula", Flagstone Creek  
Stehn, L. W., "Hodgson Vale", via Toowoomba

## Large Black

Pointon, E., Goomburra

# bucket and bail

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**Care of Glass Milk Pipes.**—Glass pipe lines are becoming popular on modern milking machines. This use of these pipes has many advantages, but care must be exercised to prevent costly and inconvenient breakages. The following precautions should be observed:

Ensure that the pipe is firmly held in the joint. If this is not done any slight vibration, or bump, will knock the pipe onto the cement floor with consequent breakage.

Do not leave the in-line teat-cup holder hanging on the milk line during cleaning. (If one is available it should be in use on the teat cluster.) The sudden rise in temperature of the glass when boiling water is passed through the pipes for scalding purposes has been known to cause the glass to break at the point where the cold metal holder is hanging on the pipe. The risk of this happening is much greater in winter.

See that the pipe is given sufficient protection on the fascia board to prevent it from being bumped with the cow's head or horns.

Take care with back chains when a cow is being let out of the milking shed. It only takes a flick with the chain to break the glass pipe.

Watch the handle of that yard broom. Carelessness in using the broom when scrubbing the milking shed floor has caused the breakage of glass milk pipes.

*F. J. SLATTER, Dairy Adviser.*

**Herd Records and Farmers.**—Each year, more and more dairy farmers are proving that the man who keeps herd records is in the best position to increase his profits. Records point unerringly

to weaknesses in dairy herd breeding, feeding and management.

So much modern equipment is needed on a dairy farm that the investment per cow is high. This means that there's no place for low producers.

The Department's herd recording section offers farmers a service that will enable them to cull their lowest producers accurately. From the reports you will know the best cows to use for breeding herd replacements. The records will also prove the herd improving quality of your bull. Dairy farmers are urged to join a herd recording group without delay.

*S. E. PEGG, Chief Herd Recording Adviser.*

**Get the Best from Your Dairy Heater.**—Long life and trouble-free service from the dairy water heater are yours if only you take the common-sense precautions of caring for it and using it properly.

Soft water should always be used in a dairy heater. Bore waters usually corrode the metal and reduce the life of the heater. A steam sterilizer, fuelled with solid or liquid fuel must not be set up in the dairy as smoke and fumes may contaminate milk and cream.

When using steam to boil water, be sure the water is actually boiling before removing the steam hose. When the steam is turned on, the pressure will agitate the water and soon give a false impression that it's boiling. Don't be too hasty in removing the steam hose from the container.

*—K. L. NORMAN, Dairy Adviser.*

# What The Fruit Grower Should Know About Quality And Maturity—II

By T. HOPE, Chemist, Horticulture Branch.

With the object of helping the grower to harvest his fruit in accordance with the regulations, maturity standards of fruit are defined and all the visible external indications of maturity are given.

Variations in both physical and chemical qualities occur in fruit from the same tree from season to season, and in fruit from different trees in the various growing areas. Consequently fruit tested for maturity must be harvested from selected trees in representative districts over a period of years. Work of this nature is naturally detailed and prolonged if a standard of maturity is to be established which will apply equally well to all districts. Chemical standards of maturity have been established for pineapples, citrus fruits, grapes, mangoes, and the Fuerte variety of avocado, and are incorporated in regulations prescribed for these fruits.

## Maturity Standard for Pineapples

Under the regulations, pineapples harvested during the months October to March should contain at least a total soluble solids content of 12 per cent. and have a tinge of yellow colour at the base of the fruit.

During the months April to September, pineapples should contain at least a total soluble solids content of 10 per cent. and be not less than a quarter yellow colour at the base of the fruit.

It must be emphasised that these are minimum standards for the fresh fruit market. In some instances growers will find it desirable to delay harvesting until a little more colour than that prescribed has developed at the base of the

fruit in order to ensure a fruit of high edible quality. Peculiarities in soil type, climate and cultural practices known only to the grower will largely influence him in his decision to harvest fruit with a content of yellow colour at the base greater than that prescribed.

## Citrus

Physical and chemical determinations of maturity have been made on Navel, Joppa, Late Valencia, other oranges and mandarins.

Under the regulations, "mature" in relation to mandarins and oranges means that the fruit has the natural colour and palatability of tree-ripened fruit and is in such a condition that the quantity of deci-normal soda solution required to neutralise the acidity content of 10 millilitres of juice drawn from the mixed juices of a sample of not less than 10 fruits taken at random from any package or packages bearing a similar mark, shall be not more than 20 millilitres in the case of mandarins, 24 millilitres in the case of navel oranges, and 30 millilitres in the case of oranges other than navels.

"Mature" in relation to grapefruit means that the fruit has the natural colour and flavour of tree-ripened fruit.

"Juicy" in relation to oranges and mandarins means that the fruit has not less than 35 per cent. of juice by weight of the total weight of



the fruit; "juicy" in relation to grapefruit and lemons means that the fruit has not less than 30 per cent. of juice by weight of the total weight of the fruit. The weight of the juice is obtained by rotating the halves of the freshly cut fruit on a conical glass lemon or orange squeezer under hand pressure only and straining the resultant juice through a strainer of not less than 30 meshes to the lineal inch. The sample from which the juice is extracted shall consist of not less than 10 fruits selected at random from a package or packages bearing a similar mark.

Citrus fruits do not ripen after picking; consequently fruit picked with an acidity in excess of that prescribed by the regulations will retain its high acidity and fail to pass laboratory tests. The same fruit, had it remained on the tree, would have lost a fairly constant amount of acidity each week and gained considerably in flavour, quality and aroma. It is therefore preferable to delay harvesting until the fruit has become sweet and palatable.

Some growers prefer to carry out their own chemical tests in order to ensure that the acidity of the juice is below the maximum value prescribed by the regulations. This is performed by combining the juice extracted from 10 or more fruits, measuring 10 millilitres into a conical flask, adding 100 millilitres of water and 2 drops of a 1 per cent. solution of phenolphthalein indicator. The deci-normal solution of caustic soda is then added gradually until a pink colour appears.

Provided the sample of fruit tested is truly representative of the fruit to be harvested, and the acidity is not above the prescribed maximum, fruit at the same stage of maturity as the sample tested may be harvested. As there are often wide variations in the acidities of fruits on the same trees and on different trees it is desirable that the acidity value should be slightly below the maximum prescribed in order to allow some margin for error.

### Grapes

"Mature" in relation to grapes means sweet and palatable. In addition, the total soluble solids of the filtered juice of the grapes shall not be less than 16 degrees as measured by a Brix spindle at 20 deg. C. Grapes to be harvested should possess the uniformly good colour of the

variety and be of good size. Small grapes are often immature and should be trimmed from the bunch. A grower recognises the mature colours of his varieties and when flavour is good it may be assumed that crops are suitable for harvesting. The grape can be tested by the grower by extracting the juice and determining the sugar content with a Brix spindle.

### Avocados

The avocado does not soften readily until it is picked. Because visible indications of maturity are lacking while the fruit is on the tree, there is always a danger of premature harvesting. An avocado insufficiently mature when picked will shrivel and may rot whilst ripening. The flesh will also lack the nutty flavour of the mature fruit. After the green varieties have reached a certain stage of maturity there occurs a slight change of colour from green to a paler green, the stem changes to a yellowish colour and skin gloss is less pronounced. The green variety of avocado when picked at this stage of maturity will ripen without shrivelling and the flesh should have a good buttery flavour.

With coloured varieties, harvesting should commence when the stem turns yellow and the amount of purple or black colour is from one-quarter to one-third the total area of the skin. This will ensure the formation of the 50 per cent. black or purple colour prescribed by the regulations when the fruit arrives at the market.

For the green coloured Fuerte variety regulations prescribe an oil content of not less than 15 per cent.

### Mangoes

During the early stages of growth the colour of the skin is usually dark green, but as the fruit approaches full size the skin on the cheek exposed to the light assumes a blush peculiar to the variety.

There are many varieties or races of mango, each assuming at maturity its own peculiar blush and ground colour which varies with environment. The grower of a particular variety must therefore be familiar with the characteristic ground colour and blush peculiar to the environment in order to harvest fruit which will withstand normal transport conditions and yet ripen satisfactorily to a fully mature flavour.

Prescribed maturity standards are as follows: Kensington Pride, a total soluble solids content of not less than 15 per cent.; for other varieties, a total soluble solids content of not less than 11 per cent.

During the fortnight before full maturity is attained the fruit increases in size rapidly. At the end of this stage the fruit may be removed readily from the stem and will ripen to a good mature flavour. Immature mangoes are difficult to pick and often the full length of stem remains attached to the fruit. Only when the fruit is almost mature do the abscission cells in the stem permit easy picking.

### **Maturity of Other Fruits**

Fruits other than pineapples, citrus, grapes, mangoes and avocados have been the subject of detailed maturity studies but no suitable chemical index of maturity has yet been found. However, some observations made during the course of these investigations may assist the grower in the harvesting of his crop for the fresh fruit market.

### **Apples**

As all apples on a tree do not mature at the same time, several pickings may be necessary. Probably the simplest way for the grower to assess maturity is by the change in ground colour. Dessert apples should not be picked for the fresh fruit market until the ground colour has changed from green to green yellow. At this stage the fruit is generally crisp, sweet and palatable.

### **Apricots**

The earliest stage at which apricots may be picked is when the green colour of the skin assumes a pale yellow or straw colour.

### **Bananas**

Bunches of bananas for harvesting should consist of mature, well-filled fruit devoid of any yellow colour. The fruit should be evenly rounded, the ribs scarcely visible and the skin light-green in colour. The remains of the flowers can be rubbed off readily by the fingers. Bananas maturing during winter to spring will split if allowed to become too full on the plants. Splitting is undesirable because the flesh ripens and becomes too soft for transport. A slight ribbed appearance is permissible during this period, but the fruit must not be thin and the green colour of the skin must not be too deep.

### **Cape Gooseberries**

Cape gooseberries are usually harvested over a period of from three to six months after planting, depending upon conditions. The berries are mature when the colour of the husk has changed from green to pale brown. At this stage the fruit falls to the ground. It is better to pick the fruit from the ground than from the bush, as this ensures uniformity of colour and maturity. Ground picking should occur at regular intervals and each bush should be shaken during each picking in order to dislodge mature fruit.

### **Cherries**

Cherries for the fresh fruit market should be firm, fully mature and well coloured. The skin of the dark-fleshed varieties should be fully coloured to a deep red. The skin of light-fleshed varieties should possess a creamy ground colour with a well developed red flush.

### **Custard Apples**

The flesh of the custard apple which is allowed to mature on the tree is too soft for normal transport. Hence the fruit is harvested while still firm in texture but sufficiently advanced in maturity to ripen satisfactorily. The fruit is ready for harvesting when the fissures between the segments close, become curved and develop a lighter colour. Fruit picked too early fails to develop full flavour, becomes hard and develops an objectionable black colour.

### **Lemons**

Lemons should be harvested at the stage known as "silvering," which occurs during the change in colour of the rind from dark green to pale yellow. Fruit allowed to remain on the tree until fully coloured becomes large and coarse and the flesh deteriorates in quality.

### **Pears**

Pears should be harvested when the ground colour of the skin is changing from green to green-yellow. Pears harvested prematurely tend to shrivel and to ripen abnormally.

### **Papaws**

There are two main harvesting periods in southern Queensland—April-June and September-November—although ripe fruit is

generally available throughout most of the year. In tropical districts the main harvesting periods are somewhat extended.

Fruit for the local market should be picked at the half-yellow stage during the period April-September, and at a stage when the colour of the skin is changing from green to yellow during the period October-March.

Fruit for export to southern States should be harvested at an earlier stage of maturity than that for local markets. During the months October-March it is essential to have some tinge of yellow colour at the base of the fruit to ensure successful ripening and full maturity of flavour. During the months April-September the base of the fruit should be one-quarter to one-third coloured yellow for successful ripening and fully mature flavour.

### **Passion Fruit**

Passion fruit should be harvested when at least three-quarters of the skin has acquired a purple tinge.

### **Peaches**

During the few days prior to full maturity the peach increases rapidly in size and improves both in flavour and in colour. In the case of yellow-fleshed peaches the fruit is mature when the green commences to fade and is replaced by a yellow tinge. With white-fleshed varieties the green colour is replaced by a creamy tinge.

For local markets peaches may be picked after the green colour has faded but for distant markets a slight green colour is essential in order to avoid over-ripeness and injury during transit. The degree of firmness in the suture is a very good index of maturity.

### **Plums**

In light-coloured varieties there is a marked change from the dull-green ground colour to yellowish green, then to yellow and finally to either brighter yellow or red, depending upon variety. Dark-coloured varieties change from green through greenish blue or reddish purple to dark blue or purple, depending upon variety. Development of full colour is accompanied by a softening of the flesh at the base of the fruit. At this stage picking should commence for local markets. For distant markets plums should be picked at the firm stage but slightly less than full colour.

### **Rockmelons**

Rockmelons must be fully mature when harvested as the sugar content does not increase subsequently. In netted varieties full maturity is indicated when the fruit may be slipped from the stem by slight pressure of the thumb; this is known as the "full-slip" stage. In yellow varieties maturity is also indicated by some tinge of yellow colour in the green colour of the skin and development of strong aroma. A small crack also appears at the stem end of some fruits, whilst in others the crack may occur at the blossom end. For transit over short distances and local markets, rockmelons should be picked at this stage of maturity. For distant markets it is advisable to harvest at the slightly less mature or "half-slip" stage, when only part of the stem is dislodged cleanly from the fruit by slight thumb pressure.

### **Strawberries**

Strawberries for the fresh-fruit market should be picked when at least three-quarters of the fruit is showing a pink or red colour. Daily pickings are usually necessary.

### **Tomatoes**

Tomatoes never develop full colour if picked immature, and should be allowed to remain on the plant till green mature.

For distant markets only green mature fruits should be picked. Such fruits must be fully grown, glossy in the skin, pale-green in colour and the flesh around the seed of deep amber colour. More mature fruits may be picked for local markets.

### **Watermelons**

Neither size nor colour is an indication of maturity in the watermelon, as the skin colour does not change with increasing maturity and some small fruits may mature before larger fruits. Experienced growers tap the fruit with the knuckles and listen for the hollow sound which indicates maturity. As the sound produced by tapping varies with variety at maturity, it is advisable to taste a few fruits after tapping in order to enable correlation of the hollow sound with mature flavour. Harvesting should then be based on this correlation. When harvesting, about two inches of the stem should be left on the fruit in order to minimise injury by stem-end rot.

# Tuberculosis-Free Cattle Herds

(As at 1st June, 1960)

## Aberdeen Angus

Crothers, G. H. & H. J., "Moorenbah", Dirranbandi  
Elliott, A. G., "Ooraine", Dirranbandi

Mayne, W. H. C., "Gibraltar", Texas

## A.I.S.

Cox, T. L. & L. M. J., Seafield Farm, Wallumbilla  
Crooke, J., Arolla A.I.S. Stud, Fairview, Allora  
Davis, W. D., "Wamba", Chinchilla  
Dennis, L. R., Diamondvale A.I.S. Stud, Mundubbera  
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy  
Evans, E. G., Lauraven A.I.S. Stud, Maleny  
Green, D. B., Deloraine A.I.S. Stud, Fairdale  
Heading, C. A., "Wilga Plains", Maleny  
Henry, Mrs. K., Greenmount  
Henschell, W., "Yarranvale", Yarranlea  
H. M. State Farm, Numinbah  
Littleton, H. V., "Wongalea", Hillview, Crow's Nest  
Marquardt, A. C. & C. R., "Cedar Valley", Wondai  
McShane, A. H., Handford Road, Zillmere  
Mears, G. S. & E., "Morden", M. S. 755 Toogoolawah  
Moore, S. R., "Sunnyside", West Wooroolin  
Neale, D. G., "Groveley", Greenmount  
O'Sullivan, Con., "Navillus", Greenmount

Power, M. F., "Barfield", Kapaldo  
Messrs. Mitchell and Mulcahy, Rosenthal  
Queensland Agricultural High School & College, Lawes  
Radel, R. R. & Sons, "Happy Valley", Coalstoun Lakes  
Roche, C. K., Freestone, Warwick  
Sanderson, W. H., "Sunlit Farm", Mulgildie  
Schloss, C. J., "Shady Glen", Rocky Ck., Yarraman  
Scott, M. E. & E., "Wattlebrae", A.I.S. Stud, Kingaroy  
Scott, W. & A. G., "Walena" A.I.S. Stud, Blackbutt  
Shelton, R. A. & N. K., "Vuegon" A.I.S. Stud, Hivesville, Murgon  
Estate Sokoll, A. H., "Sunny Crest", Wondai  
Sperling, G., "Kooravale", Kooralgin, Cooyar  
Sullivan Bros., "Valera", Pittsworth  
Sullivan, D., "Bantry", Pittsworth  
Sullivan, F. B., "Fermanagh", Pittsworth  
Thompson, W. H., "Alfavale", Nanango  
Webster, A. H., "Millievale", Sabine, via Oakey  
Wieland, A. W., "Milhaven", A.I.S. Stud, Milford, via Boonah

## Ayrshire

Dudgeon, C. E. R., Marionville Ayrshire Stud, Landsborough  
Dunn, T. F., "Alanbank", Gleneagle  
Goddard, B., Inverell, Mt. Tyson, via Oakey  
Holmes, L., "Benbecula", Yarranlea

Mathie, E. & Son, "Ainslie", Maleny  
Scott, J. N., "Auchen Eden", Camp Mountain  
Zerner, G. F. H., "Pineville", Pie Creek, Box 5, Post Office, Gympie

## Friesian

Behrendorff, E. C., Inavale Friesian Stud, M.S. 786, Boonah  
Macdonald, S. E. G., "Freshfields", Marburg  
Naumann, C. H., "Yarrabine", Yarraman

Pender, D. J., Lytton Road, Lindum  
Stumer, A. O., Brigalow, Boonah

## Guernsey

Doss, W. H., Degilbo, via Biggenden  
Fletcher, A. B., "Cossart Vale", Boonah  
Holmes, C. D. (owner Holmes L. L.), "Springview", Yarraman  
Johnson, G. L., "Old Cannindah", Monto  
Miller, G., "Armagh Guernsey Stud", Armagh, M.S. 428, Grantham

Ruge, A. & Sons, "Woowoonga", via Biggenden  
Scott, C., "Coralgrae", Din Din Rd., Nanango  
Swendson, A. C., Coolabunia, Box 26, Kingaroy  
Wisemann, R. J., "Robnea", Headington Hill, Clifton

## Jersey

Beckingham, C., Trout's Rd., Everton Park  
Birt, W. C. M., Pine Hill Jersey Stud, Gundiah  
Borchert, Mrs. I. L. M., "Willowbank" Jersey Stud, Kingaroy  
Burrows, R. N., Box 23, Wondai  
Bygrave, P. J. L., The Craigan Farm, Aspley  
Carpenter, J. W., Flagstone Ck., Helidon  
Conochie, W. S. & Sons, "Brookland", Sherwood Rd., Sherwood  
Crawford, R. J., Inverlaw, Kingaroy  
Farm Home For Boys, Westbrook  
Fowler, P. & Sons, "Northlea", Coalstoun Lakes  
Harley, G., "Hopewell", M.S. 189, Kingaroy  
H.M. State Farm, Palen Creek  
Hutton, D. R., "Bellgrath", Cunningham, via Warwick  
Johnson, H. G., Windsor Jersey Stud, Beaudesert  
Lau, J. F., "Rosallen", Goombungee, Toowoomba

Mathews, E. A., "Yarradale", Yarraman  
McCarthy, J. S., "Glen Erin", Greenmount, Toowoomba  
Meier, L. E., "Ardath Stud", Boonah  
Noone, A. M. & L. J., "Winbirra", Mt. Esk Pocket  
Porter, F., Conondale  
Q.A.H.S. & College, Lawes  
Ralph, G. H., "Ryecombe", Ravensbourne  
Scott, Est. J. A., "Kiaora", Manumbar Rd., Nanango  
Sengreen, A. L., "Tecoma", Coolabunia  
Seymour, B. T., "Upwell" Jersey Stud, Mulgildie  
Smith, J. A. & E. E., "Heatherlea" Jersey Stud, Chinchilla  
Tatnell, W. T., Cedar Pocket, via Gympie  
Toowoomba Mental Hospital, Willowburn  
Verrall, F. W., "Coleburn", Walloon  
Weldon Brothers, "Gleneden" Jersey Stud, Upper Yarraman

## Poll Hereford

Anderson, J. H. & Sons, "Inverary", Yandilla  
Hutton, D. R. & M. E., "Bellgrath", Cunningham, via Warwick  
Maller, W., "Bore View", Pikanjinnie

Mallér, W., "Bore View", Gowrie Junction  
McCamley, E. W. G., "Eulogie Park", Dululu  
Wilson & McDouall, Calliope Station, Calliope

## Poll Shorthorn

Leonard, W. & Sons, Welltown, Goondiwindi

Yamburgan Pastoral Company, Noondoo

# Caring For Young Citrus Trees

By V. C. BEAN, Adviser in Horticulture.

The future of citrus trees depends largely on the care and attention given to them during the first two years after they are established. Far too many good trees are lost in this critical period through mishaps of one kind or another and many of these losses are quite unnecessary.

Tree failure in newly established orchards can be due to several causes. Chief among these are an unsuitable soil, lack of water or plant foods and climatic hazards.

## Soil Types

Citrus is a sub-tropical tree. Nevertheless, the crop is grown in all States of the Commonwealth and on a variety of soil types. This simply means that, with efficient management, minor disabilities in climate or soil are not necessarily obstacles to citrus production.

Nevertheless, it is not altogether an accident that commercial citrus orchards in Queensland are mainly centred in three districts—Gayndah, Maroochy and Howard. All have mild climates with annual rainfalls ranging from 30 in. at Gayndah to 70 in. at Nambour. The rainfall is not well distributed, however, and irrigation facilities are a necessity for consistent production from year to year.

Growers with irrigation facilities invariably show a preference for sandy loams or sands of considerable depth. In these soils, root development is good and tree growth is correspondingly vigorous in well-managed orchards.

The preference for such soils is a practical recognition of the fact that citrus trees cannot tolerate waterlogged conditions for any length of time. Such conditions are usually followed by root failure and tree decline.

Where irrigation facilities are absent or the amount of water for irrigation is limited, lack of soil moisture in spring or early summer can place citrus on the lighter types of soil under considerable stress. The after-effect of such stress is a heavy fruit drop. To offset this, growers who are unable to supply water to their trees prefer land with a more heavily-textured surface soil and a reasonably open subsoil.

Regardless of the texture of the surface soil, a compact clay at shallow depths would rule out any soil for citrus.

## Establishing the Trees

Before planting begins, the soil will have been well cultivated, tree positions marked out according to the planting system selected by the grower and holes dug to receive the trees. When the trees reach the orchard, the packages should be opened under shade.

Trees are usually consigned bare-rooted from the nursery and it is standard practice for nurserymen to dip the roots in a clay "puddle" before packing as a precaution against drying out in transit. The clay film adhering to the roots of the trees when they arrive at the orchard must therefore be removed by sluicing the root



Plate 1

**Young Citrus Tree Dug in Nursery.** Note the straight stem and fibrous root system.

systems with water in a barrel or some similar container. After trimming any damaged roots, the trees will be ready for planting.

However, until they are actually planted, they must be covered with wet bags or kept moist in some other convenient way.

The planting operation is relatively simple. A mound of topsoil is placed in the bottom of the planting hole. The tree is set upright in the hole so that the stem is in the middle and the bud union about 6 in. above ground level.

A notched planting board helps in this operation.

Spread the lateral roots of the young tree over the mound of soil with the roots well spaced in their natural position. Soil is then carefully worked into the hole to cover the roots and hold the tree in position. When sufficient soil has been added to half-fill the hole, pour in about 1 gal. of water. Lift the tree slightly to offset any sinking which may have occurred when filling in, and allow the free water to drain away. Finally, top off the hole with additional soil and form a 3 ft. basin around each tree for post-planting irrigation.

Don't rush this planting job. Unless the soil is thoroughly worked among the roots of the young tree and watering is thorough, air pockets formed around the roots tend to delay re-establishment of the tree and an early setback of this kind can be serious.

Unless rain falls shortly after planting, the tree should be watered every few days during the first month. Young trees have only a limited root system and only a limited area of soil can be effectively exploited for moisture.

From then on, each tree should receive 8-10 gal. of water at intervals of approximately 3 weeks. Precise watering schedules, however, will vary with both the season and the soil type. Trees established in a sandy loam will need more water than those in a clay loam, and the water requirements of the tree will be greater in hot, dry weather than in cool, moist weather. It is sound practice, therefore, to use a probe at weekly intervals to check the moisture status of the soil around the trees. You will be surprised at the amount of information it gives.



Plate 2

**Consignment of Citrus Trees Ready for Dispatch to the Orchard.** The roots are trimmed and "puddled" before being packed in straw and hessian.

A straw or grass mulch around the tree helps to conserve moisture in the soil and reduces the irrigation commitment of the grower. Use such a mulch by all means, but do not place it in position before spring; mulches tend to increase the risk of frost injury in the winter months in some areas. Further, do not pile up the mulch around the stem; the bud union is the weakest point of the tree and should be kept open to both sun and air.

Most of the soils used for citrus are not inherently fertile and, even with adequate water, plant foods must be supplied. Fertilizer should not be used in the planting hole itself; the risk of damage to the roots is considerable, particularly if the grower has a liberal hand.

Spring applications of fertilizers are, however, worthwhile; they stimulate that early flush which is essential for most favourable growth during the season. A 8/10/8 or similar mixture can be used at the rate of 8 oz. per tree in the first year and 1 lb. in the second year.

Supplementary nitrogen can be supplied at other times of the year should the leaves show the yellow-leaf symptoms typically associated with a deficiency of this element.

### **Sunburn and Frost**

Trees which receive insufficient water and plant foods tend to be unthrifty. Unthriftiness, however, does not necessarily involve the loss of trees. More important in this connection are sunburn and frost damage.

Sunburn occurs when trees with a limited amount of leaf growth encounter a spell of very hot weather. The damage shows up as bark lesions on the trunk and branches, followed by development of water shoots below the points of injury. Even if the tree is not killed outright, it is difficult to train subsequent growth into a balanced shape. In commercial practice, special precautions are seldom necessary. Growers should, however, use their secateurs sparingly on young trees. Well-foliaged young trees provide their own protection against sunburn injury.

On a well-sited orchard, frost damage in the major citrus districts is only likely to occur on relatively flat land where topographical features tend to bank up cold air around the trees. Injury to the tips of the young tree is of no great moment. Injury to the stem and branches can, however, be serious.

In sub-coastal districts particularly, it is wise to erect a frame with a screen of hessian or other material arranged tent-fashion around each tree and tied at the top. These are fitted before the onset of winter.

Thick paper or straw wraps round the trunks of the trees are a useful deterrent against pests such as hares which sometimes prove troublesome in a dry spring when green feed outside the orchard is in limited supply. Pests of this kind sometimes cause spectacular damage in newly established orchards.

Caring for young citrus trees is not a complicated business and many failures are the aftermath of neglect. Success in the orchard business, however, goes to the man who buys good trees and manages them efficiently after planting.

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## Bulk Handling Saves Cotton Grades

Bulk handling is helping central Queensland cotton growers to get higher ginnery grades for machine-picked crops, the Minister for Agriculture and Stock (Hon. O. O. Madsen, M.L.A.) said.

Bulk handling is something new in the Queensland cotton industry, though it is adopted widely in the United States. In this method, big trucks or semi-trailers pull right into the paddocks and load up to 16,000 lb. of loose cotton. It goes by road to the ginnery. Formerly all cotton was put into bales and railed to the ginnery. The bulk method is especially suitable for handling cotton harvested with mechanical pickers.

Main advantage of bulk handling is that the grade of machine-picked cotton does not deteriorate so much as it does in bales. Machine-picked cotton often contains excessive moisture and green leaf. The moisture causes the cotton to sweat when it is compressed in bales for long periods, and results in stained lint. Stained cotton goes into one of the spotted grades and brings a lower price. The interval between baling and emptying the bales at the ginnery is often as long as three weeks.

On the other hand, cotton handled in bulk is rarely compressed in the truck for longer than 24 hours before it is put through the cleaners at the ginnery. In this short time the grade is not affected. Even damp cotton is not compressed long enough to sweat excessively and little staining results.

Mr. Madsen said that even at this early stage of its development, bulk handling is somewhat cheaper than handling in bales. It is also reported that bulk handling reduces costs at the ginnery. Growers who handle their crops in bulk are given a rebate of about  $\frac{1}{3}$ d. a lb. by the Cotton Marketing Board. This is compensation to cover the cost of rail freight which is normally paid by the board.

Chief difficulties in bulk handling at present are the slowness in loading the cotton in the paddock and unloading it at the ginnery. Altogether these delays may tie up a truck for 10 hours or more, adding to the cost of transport. A drop in transport costs can be expected to follow the development of methods to streamline loading and unloading.



# *Mycotic Dermatitis On Cattle*

By O. H. BROOKS, Divisional Veterinary Officer.

When a germ (*Dermatophilus dermatonomus*) invades the hair follicles of cattle, it causes an exudate which forms a scab on the skin, matting the hair. When the scab is lifted, it leaves a raw bleeding surface.

These lesions are known as mycotic dermatitis and are found from time to time affecting beef and dairy cattle. In the case of the former, bulls appear to be more susceptible, whereas in the latter, heifers are more commonly affected.

The disease has been observed occasionally over the past 20 years, but seldom becomes serious. Although infectious, it is usual to find infection confined to individual animals. It would appear that where the disease is introduced by purchased stock, the germ does not spread rapidly.

Mycotic dermatitis requires a high humidity to remain active, hence the sporadic nature of outbreaks. Early lesions may be mistaken for those of the ringworm fungus which also invades the hair follicles of the skin.

The infection can become serious amongst a group of stud stock in preparation for showing, as they are confined to a relatively small area and remain in close contact for longer periods than range cattle.

## Recognition

The first indication of the disease is a matting of the hair close to the skin. As the lesion develops, the scab gradually thickens until only the tips of the hair are showing through. Scabs may be up to  $\frac{3}{4}$  in. thick, covering several square inches.

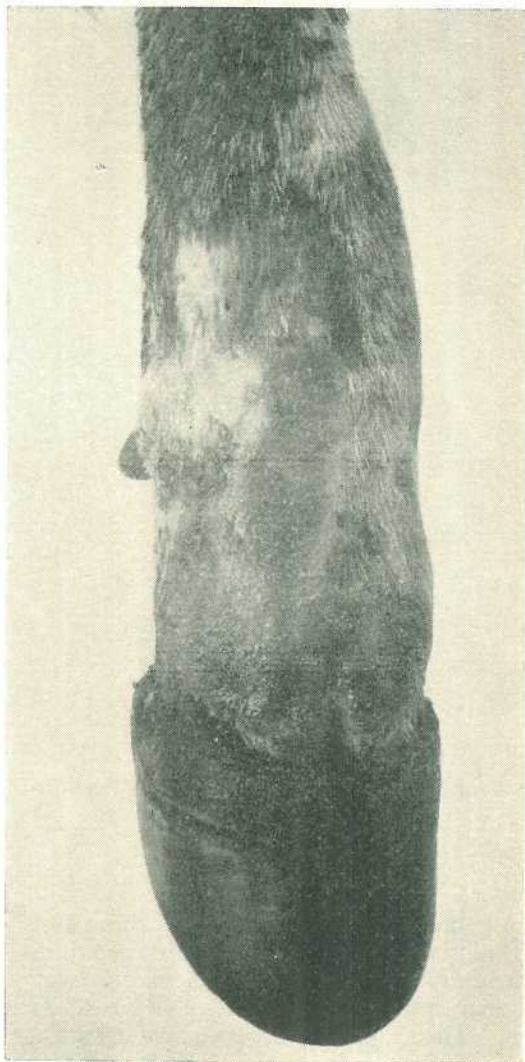


Plate 1

Foot Lesion Showing Thickening of the Skin and Granulations After Removal of Scab.

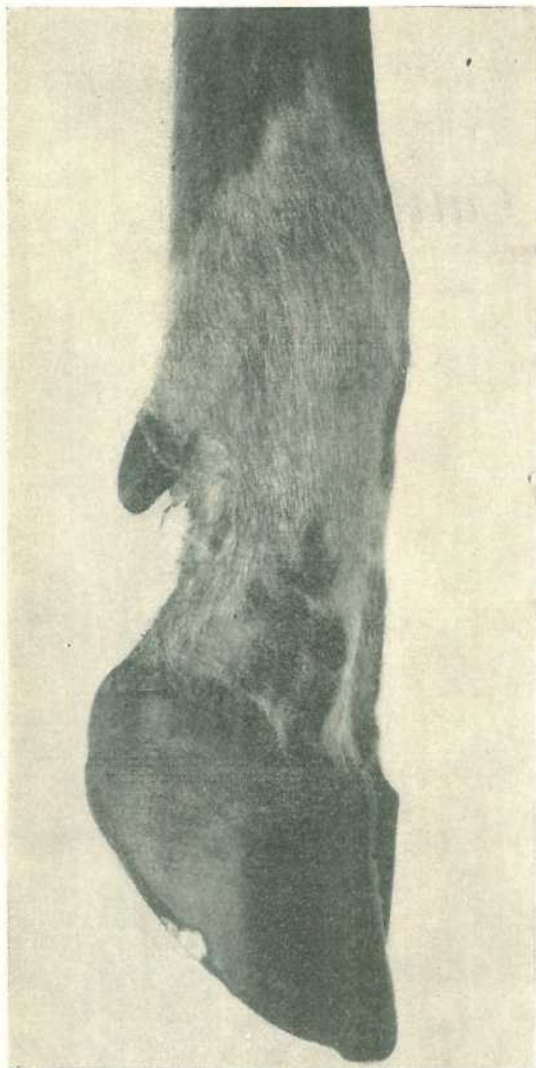


Plate 2

Foot Lesions Showing the Fissured, Encrusted Type of Scab.

As the lesion extends, the skin loses its flexibility and becomes stiffened. When the lesion extends over a considerable area, the scab can be seen through the hair as a "pie crust" formation. This is usually fissured and irregular.

Once the disease is established in the skin, it appears to spread rapidly. This may be due to spreading of the germ by rubbing.

Mycotic dermatitis is often mistaken for an unusual form of flattened warts which may spread over the body in a similar fashion. It can also be mistaken for ringworm which produces a scab and spreads by contact. A scab can be examined and should be forwarded to the Department for identification.

### Affect on the Animal

Extensive lesions produce a hide-bound condition with scabs showing through the hair. The lesions irritate the animal, causing it to rub. This leads to breakaway of the scabs, leaving a raw bleeding surface. Secondary infection may lead to purulent discharges with a general thickening of the skin and fluid under the skin.

Death may follow a prolonged course of 6 to 12 months, during which animals become emaciated and hide-bound with an encrustation of scabs showing through long roughened hair.

It is common to find early lesions along the neck, back and near the pin bones. They spread along both sides, causing an encrustation which may form over the entire body. The affected animal becomes progressively weakened and may eventually die from starvation. Lesions on the legs may spread rapidly, causing a complete loss of hair. The skin becomes raw and thickened, and irritation may prevent the affected animal from grazing normally.

### Treatment

The use of equal parts of tincture iodine and paraffin oil applied to the lesions daily has been effective. When the lesions are extensive, the use of potassium iodide by mouth, or sodium iodide by intravenous (jugular) injection, is more effective than local treatment.

For adult cattle, potassium iodide is given at the rate of 2 teaspoonfuls twice daily for 10 days or until symptoms of iodism appear. Iodine poisoning causes a loss of appetite, watering of the eyes, and drooling. It is not a serious condition because the symptoms soon disappear when the dosing is discontinued.

Sodium iodide solution is made by adding 2 oz. of sodium iodide to 1 pint of sterile (boiled) water. For adult stock, all this solution is

injected into the jugular vein. As this method may require some experience, it would be desirable to seek the assistance of a veterinary surgeon.

Copper solutions are also effective as a spray, and there are several copper compounds available. Copper sulphate (bluestone) is used as a 2 per cent. solution (1 oz. to 1 pint). If the lesions are extensive the treatment should be staggered to prevent copper poisoning from absorption.

### Control

Isolation of animals affected by mycotic dermatitis is desirable, although seldom possible. Fortunately the germ is not highly infectious, as most animals have a natural resistance and lesions do not become extensive.

In the event of the disease becoming serious, spraying of posts and rails (where cattle rub) with lime sulphur (1:30) or copper sulphate (1:500) is recommended.

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## Farmers Ask About White Clover

Many inquiries concerning the use of White Clover have been received lately.

*Answer:* White clover is probably the most commonly used legume in permanent pastures growing in the temperate regions. In Queensland it has become naturalised in coastal paspalum pastures and its range extends well into the subtropics. Under Queensland conditions it does best in irrigated pastures and grows mainly in the winter and early spring.

White clover is a perennial plant with a rather prostrate habit. There are several commercial strains having a more upright growth. Leaf stalks may reach a height of 3 to 18 in. depending on strain, soil type and climatic conditions. The flower heads are rather globular in shape, white in colour and are held upright.

The plant will thrive on a wide range of soil types provided its moisture requirements are met. It does better on loamy soils than on sandy or heavy clayey soils and tolerates some degree of acidity and though more tolerant than lucerne in this regard it does not succeed on acid soils. An application of superphosphate to acid soils will assist growth.

The seed should be sown in the autumn at the rate of  $\frac{1}{2}$  to 2 lb. to the acre, depending on whether it is sown in association with other legumes or is the only legume in the mixture. If care is not exercised in the management of this legume it may cause bloating of stock, especially

if the animals are allowed unrestricted grazing of the pasture in the lush season. The types of white clover usually grown in Queensland are New Zealand White, Irrigation White, Ladino White and Louisiana White.

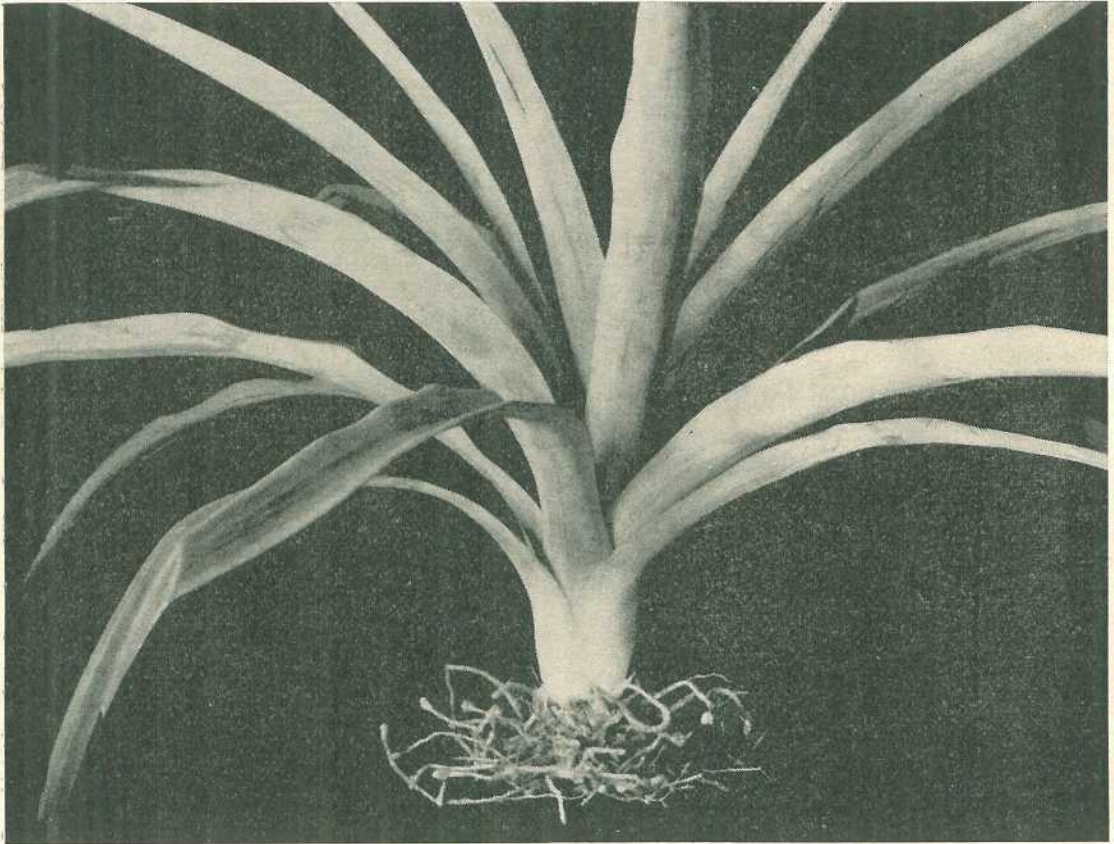
### Irrigated Pastures For The Southern Downs

In the article "Irrigated Pastures For The Southern Downs" which appeared in the April issue of the *Queensland Agricultural Journal*, the planting rates on page 249 were given in a manner that could possibly be misunderstood.

To remove any doubt about the rates, the recommendation is set out as follows:

2. Pasture mixtures recommended for the southern Darling Downs district where adequate water supplies are available:

	Per acre
(a) Irrigation White Clover, Ladino White Clover ..	1 lb. each
Phalaris tuberosa, Phalaris arundinacea .. ..	1½ lb. each
H.1. Ryegrass .. ..	2-3 lb.
Perennial Prairie Grass ..	2 lb.
(b) Irrigation White Clover, Ladino White Clover ..	1 lb. each
Phalaris tuberosa, Cocks- foot .. ..	3 lb. each
H.1. or Perennial Ryegrass	2-3 lb.



**Plate 1: Eight-Month-Old Pineapple Plant Showing Heavy Root-Knot Nematode Infestation.**

## Nematode Control In Pineapples

By R. C. COLBRAN, Entomologist.

A problem facing pineapple growers in Queensland is that of declining yields, and fewer ratoons on re-plant land. Recent investigations have shown that these conditions are frequently attributable to the nematode complex associated with the roots.

The important members of this complex are a root-knot nematode which produces root swellings, a root-lesion nematode which feeds within the root cortex, causing premature breakdown of the fibrous roots, and a spiral nematode which feeds externally, producing superficial lesions.

The result of nematode infestation is a root system reduced in size and efficiency, a smaller plant and smaller fruit.

### CONTROL:

Control of nematodes in pineapples can be achieved by injection of a suitable fumigant into the soil either before or after planting. The treatments are as follows:

#### (a) Pre-plant Treatment

Use either EDB (27 per cent. W/V or 12½ per cent. V/V)\* or DD at the rate of 25 gal. to the acre for overall treatment or 17 gal. to the acre for bed treatment.

In the overall treatment the fumigant is applied over the entire area in rows 1 ft. apart. In the bed treatment, injections are made in four rows

1 ft. apart along each bed, leaving the interbed spaces untreated. In each instance the fumigant is applied at a depth of 6 to 9 in.

For effective fumigation:

- (1) The soil should be well prepared, free of clods and undecomposed plant residues.
- (2) The soil should be moist, not dry, particularly in the lighter soil types.
- (3) The weather should not be extreme.
- (4) A roller should be used immediately after treatment.

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\* Use other formulations of EDB at equivalent rates.

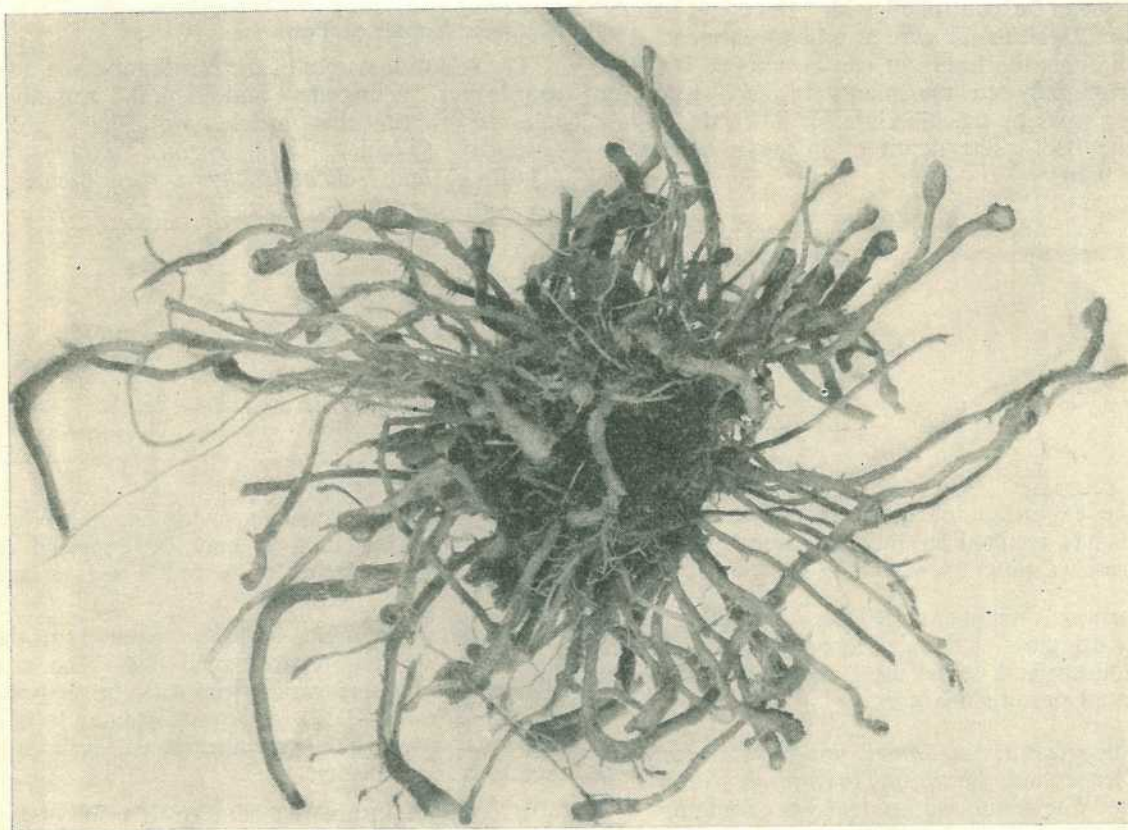


Plate 2

Pineapple Root System Infested with Root-Knot and Root-Lesion Nematodes.

The following points are pertinent when considering whether overall or bed treatment should be used:

- (1) For overall treatment, land preparation and fumigation can be carried out many months prior to planting, provided no weeds are allowed to grow for more than three weeks in the intervening period. Fumigation can be carried out when conditions are suitable for maximum effectiveness.
  - (2) Bed treatment is less expensive. As growers bed up shortly before planting, a limited time is available for fumigation, and soil conditions may be unsuitable.
- (b) *Treatment of Established Plants Less than Eight Months Old.*

Nematodes on or near the roots of pineapple plants can be controlled with "Nemagon" at the rate of 2 gal. to the acre as a bed treatment. For small areas the fumigant can be applied by hand injector between the plants in each row; for larger areas by machine injector down the middle of the bed. The depth of injection should be 6 to 9 in.

Pre-plant fumigation is more effective than fumigation after the plants have become established and infested with nematodes. Because considerable expense is involved and the nematode population in the soil could be insufficient to affect growth seriously, some growers may not be prepared to adopt pre-plant fumigation as a standard practice.

As an alternative, it is recommended that every fifth bed be treated with EDB or DD prior to planting. If a marked response occurs within six months, the remaining rows should be treated with "Nemagon."

#### WARNING

DD, EDB and "Nemagon" are poisonous to humans and animals, but are not dangerous when handled properly. Any unnecessary breathing of the fumes and contact with the skin should be avoided.

#### Scientific Names of Pests

The scientific names of the root-knot nematode, root-lesion nematode and spiral nematode referred to in this article are *Meloidogyne javanica* (Treub), *Pratylenchus brachyurus* (Godfrey) and *Helicotylenchus nannus* Steiner.



## Wimmera Ryegrass

The expansion of irrigated pasture establishment has resulted in inquiries about Wimmera ryegrass (*Lolium subulatum*).

*Answer:* Wimmera ryegrass is widely used in fairly dry parts of the southern areas of Australia. In Queensland it is used to some degree in irrigated pasture mixtures.

This grass is an annual which produces very soft leaves and stems and may reach a height of 18 in. The stems are produced in spring and the plant dies following setting of seed. As it is a winter grower it does best under winter rainfall conditions, and on fertile soils, especially if the

rainfall is small during its growing period. When grown under irrigation it may be expected to produce a good sward on a fair range of soil types.

Wimmera ryegrass should be planted in the autumn in a well-prepared seed bed. The rate of planting per acre varies from 4 lb. in mixtures with legumes to 10 lb. as a pure stand. It is a palatable grass but its nutritional level falls rapidly after maturity.

In order to insure regeneration it is necessary to close the paddock during the seed-setting period, after which the area may be grazed safely again.

# stock and station

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**Breeding Better Beef Cattle.**—Performance recording offers Queensland graziers a ready means of improving beef cattle quality.

Performance recording involves keeping records on the growth rate before weaning, the growth rate after weaning and conformation. In the main, the ability of a bull or a cow to transmit its good qualities to its progeny can be gauged by its own performance. When performance records are kept, it's no longer necessary to wait for an animal to have offspring before it can be judged. This can speed up the rate of improvement in a herd.

Performance recording is easy to apply in a herd and produces results sooner than progeny testing. It's effective in British breeds, Brahman cross cattle and Santa Gertrudis, and is being adopted by breeders of all these types.

—G. I. ALEXANDER, Senior Cattle Husbandry Officer.

**Deaths of Water Birds.**—Reports were received of deaths of native birds at Winderamere Station lagoon in early February of this year. About 40 black ducks, 12 pelicans, a few eels and large numbers of fish (perch) were noticed dead around the edge of the lagoon.

It seems that excessive heat in late January killed the fish which were then eaten by the wild ducks and pelicans. Deaths ceased after heavy rains flooded the shallow lagoon, washing away the dead fish.

Botulism organisms in decomposing vegetable and animal matter have been responsible for mass killings of waterbirds elsewhere in

Australia; this outbreak may have been due to this cause.

—C. ROFF, Fauna Officer.

**Death Hid in Old Tins.**—An old tin of poison dumped in a paddock recently cost a grazier 174 sheep before the cause of death was tracked down.

The grazier had cleared a number of old tins out of his woolshed and stacked them in a nearby horse paddock. The deaths occurred in two mobs of sheep that were held in the paddock some time later. Deaths were found to be due to arsenical poisoning, and the source of the arsenic was traced to one of the old tins. This had rusted through and the contents had leaked over the ground.

A loss like this is far too high a price to pay for the time it takes to dispose of poison containers safely. The containers should have been either buried or stacked in a fenced enclosure out of reach of sheep.

—J. T. LITTLETON, District Stock Inspector.

**Three More Poultry Flocks Approved.**—Three more Queensland poultry farmers have been granted approval on probation under the State's poultry improvement plan. Approval on probation is granted to breeders whose birds have reached qualifying standards for egg production and other factors of economic importance.

The farmers are Mr. George Lax, of Thornlands; Mrs. I. Rumball, of Mt. Gravatt; and Mr. George Loveday, of Peachester. Their flocks qualified in the 1959 random sample production trial.

The breeders recently approved will join Messrs. Walter Shale, of Hemmant; and Mr. Sidney Lingard, of Buderim, who qualified in the 1958 trial. The trials are carried out at the poultry section of the Agriculture Department's Rocklea Animal Husbandry Research Farm.

In the 1959 trial, average egg production showed a decided improvement on the results of the first trial in 1958. The production, 171 eggs a bird in the 48 weeks' laying period, was 11 eggs better than in the previous test. The top pen recorded an average of 186 eggs a bird and lowest 151.

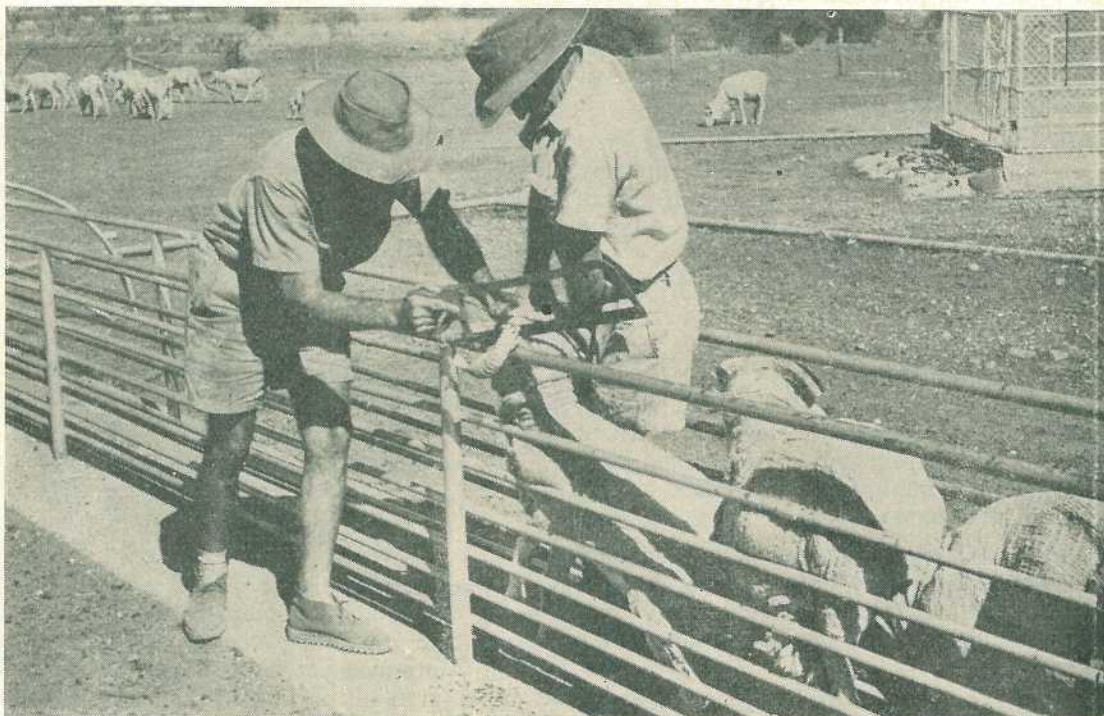
The most profitable group in the trial returned £2 3s. 6½d. a bird over the cost of feed. How-

ever, this should not be accepted as the general level of profitability in the poultry industry. It does not take into account the cost of labour, depreciation of buildings, and other fixed costs. But it does indicate that a very reasonable profit can be made from a properly managed flock.

Deaths during the laying period were 8.75 per cent., showing a sharp drop from the 12.31 per cent. recorded in the previous trial. Between day-old and 18 weeks, when the pullets were moved into their permanent laying quarters, deaths were below 3 per cent. Although deaths during the laying period were low, leucosis in its various forms accounted for more than half of them.

Early maturity of the birds was another feature of the trial. The average age of the birds when the first egg was laid was 20 weeks. Most groups had reached 50 per cent. production by the 24th week.

—A. L. CLAY, Director, Division of Animal Industry.



Cutting a Ram's Horns in an All-Steel Race at "Verastan", Muttaborra.



# Preventing Accidents On Farms

By J. R. WHITAKER,  
a British Agricultural Engineer.

As you are all well aware, agriculture in Britain underwent a mechanical revolution between 1939-1949, and the spate of mechanisation is only now starting to tail off in this country. The result has been that virtually all machines have been designed without any thought at all for "safety" and in many cases quite simple modifications or guards would make a world of difference.

Had the Safety Act been law before mechanisation took place most of the machines at present on farms would be adequately guarded. This would have meant that right from the start new machines would have been introduced to workers and employers who were already beginning to be safety-conscious. An "awareness" that danger exists is the first and most important step in accident prevention.



"Mercury" (Hobart) photo.

*This is an extract from an article which first appeared in the "Journal and Proceedings of the Institution of British Agricultural Engineers" relating to accidents on farms, and methods of prevention.*

If people could be persuaded to pause and think, many of the accidents against which we cannot legislate or guard could be prevented. The two points, greater care and better guarding, are the first lines of attack in the war on accidents.

## Safety Regulations

The inherent danger of moving machinery and the potential danger of workplaces is being dealt with. Seven safety regulations have been published, although not all are in force yet, as time

is being allowed to bring existing machinery into line and to alter production plans in respect of new equipment.

The following regulations are now in force:

(a) First-Aid Equipment, the amount varying according to the number of workers, must be provided by employers. The type and number of bandages, and so on, is specified in the regulations.

(b) Ladders must be soundly constructed, in good condition and properly used. Missing rungs or damaged rungs or stiles are an offence, and certain details of construction are required with wooden ladders.

(c) Children under 13 years of age are prohibited from driving or riding on tractors and almost all agricultural vehicles, implements and machines.

(d) Power Take Off. This regulation is not always fully understood. The tractor power-take-off—just the short splined shaft—must either be covered up or guarded from the top and both sides at all times when the engine is in motion. The shaft to the machine must, apart from certain special exceptions, be totally enclosed right up to the first fixed bearing on the machine. The main exception is for machines in use on February 1, 1959, but then only for shafts which throughout their whole length are entirely less than 2 ft. from the ground. In such circumstances these shafts must be guarded from the top and both sides by a guard which extends 2 in. below the lowest point of the shaft. There are very few of these inverted U-type guards which are deep enough.

The following regulations come into force on the date shown:

(e) Circular Saws. Top and bottom guards and rising knives of specific design and position will be required. Limits are placed on the age at which a worker can first use a saw, and training and supervision are required.

In operation from September 12, 1959—March, 1960.

(f) Safe Workplaces. In general, these require safe floors, hand-rails for staircases and guard-rails for openings in floors, edges of floors and pits in the ground. Covers or doors can replace the guard-rail in certain circumstances.

In force April, 1961.

(g) Stationary Machinery. Again, apart from special exceptions, guards will be required for the belts, pulleys, chains, cogs, gears and cranks of all machines designed for stationary operation.

In force July, 1961.

### Causes and Prevention

The most important problem which we must tackle first is to obtain a reduction in the number of fatal accidents. It is probable that any measures, publicity campaigns or regulations which reduce fatal accidents will also reduce non-fatal ones. Very similar accidents can be anything from humorous to the onlooker to fatal to the participant. P.T.O. shafts have been known to tear a man's trousers off without injuring him, whilst a similar accident has killed another man.

Tractors are responsible for the biggest individual number of accidents. This could be partly a reflection of the fact that there are more tractors than any other machines, and that tractors are used for longer periods throughout the year. This can lead to misleading assumptions.

A report on accidents in the Eastern Counties showed that roughly there were:—

	Accidents Rate
15 Tractor accidents from 26,000 machines ..	1 per 1,800
and 5 Baler accidents from 1,350 machines .. ..	1 per 300

The baler, therefore, is a greater hazard—six times as great—and because it has a short season of use it is even more dangerous, or so the report appeared to evaluate the figures.

But we are not concerned with hazards related to accident rates. Farms are equipped with a given range of machinery in numbers that will not change very greatly, and if tractors are involved in 15 accidents and balers in 5, then tractors are three times as dangerous as balers, and tractors must be our first consideration.

Then having blamed the baler as a machine, the report later states that in each case that had been considered the accident was due to the failure of the operator to stop the machine before

making adjustments—so surely there is some contributory negligence. It goes on to state that the fitting of additional guards would serve no useful purpose, as these would have to be removed before adjustment could be made.

I do not agree with this. On many balers there are several points which could be better guarded—belt drive, main crank, P.T.O. flywheel and needles; and if the guard has to be removed for adjustment it must only be when the machine is stationary. In any case, the presence of and need to remove a guard will be a reminder of the danger.

### Is It Negligence?

Negligence is, perhaps, too condemnatory a word. It implies knowledge of the precaution which should or could be taken, and in many cases lack of instruction or training is the root of the trouble.

Speed, plus sharp turns, uneven brakes with a heavy trailer load, or bumpy ground are the causes of overturning. Any one of these on its own may not cause an accident, but two of them taken together add up to an overturned tractor and an injured or killed driver.

It is not often the man who is taking a risk and looking for danger points who has the accident; it is more often than not the routine job—apparently safe—done with a little less care or under slightly changed conditions which results in the accident.

The manufacturers do what they can, though I don't think it is enough. Instruction books warn against high speeds, sharp turns, and so on, and I am sure, too, that dealers and salesmen when supplying tractors warn users of the dangers, but it does seem unfortunately true that memories are short and that a continuous campaign is necessary to make any appreciable impression.

It is better to have an idea knocked into a man's skull than his skull knocked in by an overturned tractor.

The first of the new series of farm safety leaflets deals with tractors overturning; we hope that the rather unpleasant picture on the front will have a deeper and more lasting effect than written exhortation.

Falls from tractors account for nearly as many deaths as all implement and field machinery accidents, and a large proportion of those who fall are passengers, including children who should not be there. If the Children's Regulation is complied with, it should reduce the deaths of children, due to accidents in agriculture, by at least a third.

So far as other passengers are concerned, opinion is divided. There is some suggestion that if a proper seat were provided it would be the best solution, and whilst I sympathise with the people who would like this, I cannot support it—mainly, I admit, because one tractor which provided a seat which could accommodate two people had its controls so positioned that with two people on the seat neither could properly control the tractor.

Many people carry loose on tractors a miscellany of tools, oil-can, coats and gadgets which can and often do interfere with the controls, and so contribute to an accident. I would plead for a large toolbox, with a separate compartment for drawbar pin, D, links, and so on, and perhaps even a separate box for lunch kit and flask.

### Greater Care Needed

The circumstances which cause many accidents are generally simple—identical with what many of us here have done in the past and may do again in the future, although we hope without serious result.

In one case of a tractor overturning when turning from a steep farm lane into a field, to which there were no witnesses, clear tyre tracks showed the course that had been attempted, and my own opinion was that the tractor should have got round quite safely. I would willingly have tried to drive a tractor round—but the accident happened. Possibly, just at the wrong moment the driver wasn't concentrating.

A non-fatal accident, involving a ram-type pick-up baler, occurred when the operator fed several bales which had only been tied with one band back on to the pick-up. One of the tied strings caught round his ankle and his leg was severely injured by the pick-up which had picked up the tied string.

Simple in their occurrence, impossible to legislate against, yet they would have been prevented by taking greater care, and the latter certainly

reduced in severity if the baler had had a guard rail in front of the pick-up which the operator could have grasped.

There are many similar examples which could be quoted. In the main, these accidents can be prevented by greater care and thought by the people concerned, but they will only take heed if everyone concerned, in season and out, keeps reminding them.

### **Adequate Guards**

The other type of accident where the machine is the main cause will be prevented by adequate guarding. We can look forward to the fitting of more guards in the very near future.

In so far as these guards will act as a reminder of danger, they may help general accident prevention by keeping people aware of the need to take a little more care at all times.

Many of the accidents happen because operators carry out servicing and maintenance whilst the machinery is in motion. It may not be possible or necessary to prevent this, but in every case revolving shafts and belts should be so protected that the worker is not endangered.

Normal servicing and maintenance should be done with machinery stationary, particularly if guards have been removed. Instructions to that effect could be given by every employer. If servicing has to be done to moving machinery with a guard removed, then a responsible person should be detailed to do it after having been given full instruction. This, however, should be exceptional.

Ideally, guards should be arranged so that the machine must be stopped and cannot be re-started until the guard is replaced (as is the case with many machines in factories). This would mean complicated guards and involved inter-locking arrangements for much equipment, and it is obviously too onerous a requirement for every situation.

On the other hand, if machinery can be run without its proper guards, greater emphasis must be placed on requiring guards to be fitted and kept in place by both employer and worker.

It should be accepted that an employer is responsible for giving or having given training and instructions to every employee, not just on

the requirements of the Act or Regulation, but on the reason why a guard is there and the danger of its removal.

It is possible that those accidents associated with the maintenance of machinery, particularly when it is in motion, will be reduced by the introduction of self-lubricating bearings. A small reduction, perhaps, but important in that it allows greater emphasis to be laid on the remaining causes.

Similarly, other trends of modernisation can lead to safer working conditions. The overhead shaft driving a multiplicity of machines with flat, unguarded belts is being replaced by individual electric motors with short drives which can easily be guarded. The big danger here is faulty electrical installation.

Electricity can be the most dangerous power unit on the farm; I say can be—it need not. Provided it is installed according to the regulations it will be safe, but deterioration can and will occur. Regular inspections and tests by a suitably qualified electrician will show up faults before they can result in danger.

It is on the probable need for guards on existing machinery that the trade generally will have an opportunity to introduce the question of accident prevention and, it is to be hoped that they will use the opportunity not merely to sell the required guard, but to sell the idea of being accident conscious.

As you can see from the figures, it is not sufficient to guard machinery—or even to guard against bulls; people must be protected from themselves by the only method we have—propaganda.

I am certain that most farmers and farm workers know of most of the dangers which are met with around the farm, but like us all, they are not often consciously aware of the danger. If they are, they probably think—"Well, it won't happen to me". This in spite of the fact one worker in twenty has an accident every year—some not very serious, but others leading to incapacity and perhaps death.

### **Comparison With Industry**

A comparison with the situation in industry may be both useful and interesting.

Factories have a lead of many years on agriculture in the field of safety and accident prevention activity, and we should not hesitate to use any of their ideas which could speed the reduction of agricultural accidents.

I would like to quote figures, opinions and suggestions from a report of the Industrial Safety Sub-Committee on Industrial Accident Prevention. Their conclusion applies to farming equally as much as to industry.

In industry, accidents have been reduced from 30 per 1,000 workers in 1937 to 22 per 1,000 in 1954. One very disturbing factor when these figures are broken down into age and sex groups is that the accidents rate for men and boys is similar, 28.9 per 1,000 and 29.6 per 1,000, although it is reasonable to suppose that boys under 18 are generally employed on less hazardous work, and that women and girls also have similar rates, 10.0 per 1,000 and 11.5 per 1,000, which are very much less.

A breakdown of the figures into causes shows that only one in six accidents can be attributed to power-driven machinery, in spite of the popular belief that machinery is dangerous. (By comparison, 50 per cent. of the fatal accidents in agriculture are due to machinery.)

Industry itself realises that this popular misconception must be uprooted if any appreciable reduction is to be made in accident rates. Unless everyone can be made to accept, and fully realise, the fact that it is some failure of the human element—the momentary abstraction which causes most accidents—there will be no progress. The drive and enthusiasm must come from the top, and must be continually renewed from that course. The employer or manager must feel it is his job to keep the works free from accidents.

The report suggests six principles of accident prevention:—

1. Accident prevention is an essential part of good management and good workmanship.
2. Management and workers must co-operate wholeheartedly in securing freedom from accidents.
3. Top management must take the lead in organising safety in the works.
4. There must be a definite and known safety policy in each workplace.
5. The organisation and resources necessary to carry out the policy must exist.
6. The best available knowledge and methods must be applied.

I am certain that these can also apply in principle to farms.

### To Sum Up

The problem is a high accident rate, approximately double that for industry; the need is to reduce it.

Those concerned are employers and employees, manufacturers and dealers, and the safety inspectorate.

Each has a specific job, but all must co-operate on some jobs. The manufacturer can design new machines with greater safeguards; the dealer can supply and fit guards to existing hazards, which have, we hope, been pointed out by both employer and employee; but unless there exists constant reminder by all concerned to "think safety" all the time, we will only progress slowly.

The Safety Inspector, in co-operation with all the other people concerned, has to ensure that the proper guards are fitted, and to endeavour to see that everyone knows the need and reason for both guards and greater care.

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## Botany For Farmers

Although compiled in the first place for beekeepers, "The Honey Flora of South-Eastern Queensland" has a use for farmers and others interested in botany. It contains illustrations and descriptions of the important ironbarks, gums, bloodwoods, boxes, stringybarks, wattles, tea-trees, and cultivated plants such as lucerne, pumpkins, oranges and clover.

"The Honey Flora of South-Eastern Queensland" contains 199 pages and 178 illustrations. Prices are: In Queensland 15s. a copy, with a 3s. discount to registered apiarists, University botany students and booksellers; elsewhere £1 a copy.

### When Buying a Suit

Irrespective of style, finish, fabric and cost, an ill-fitting garment is a poor buy.

This is particularly true of suits.

Here are some points to check on before buying a suit.

Try the suit on over the type of clothing you'll be wearing underneath it.

Look at yourself from the front, back and sides in a full-length mirror. See how the garment looks and feels in action—as you walk, sit, bend and reach for something.

A suit jacket should fit comfortably throughout, with the collar holding up close to the neck at back and sides and the shoulder line straight from the neck to the highest point of the sleeve.

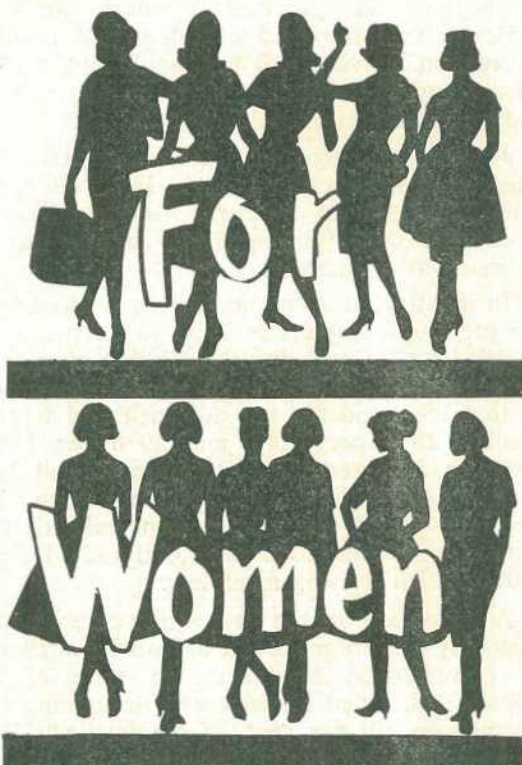
The grain of the cloth ought to hang straight at the centre front and run crosswise around body and sleeves at bust level. Darts in the jacket should be directed to the bust.

Sleeves must be roomy enough for clothing to be worn underneath, with elbow-ease provided in the cut. Bend elbows to make sure this ease is where it will function properly.

A long sleeve should reach the wrist-bone as you touch the lobe of your ear on the same side.

The curve of lengthwise seams in jackets or fitted coats is best if carried slightly below the natural waistline. The jacket should fasten without strain.

Be certain that the bottom of the jacket does not come exactly half-way between the shoulder line and the lower edge of the skirt. The lower edge of the jacket of a classic style suit should run straight around the figure at an even distance from the floor.



Ease of walking in a skirt avoids strain at seams, and discomfort.

There should be enough sitting room to prevent both strain and crosswise wrinkles, to keep the skirt from pulling up too short when you sit, and to prevent cupping under.

In a well-fitting skirt the waistband fits snugly to the figure and holds the skirt in place.

The skirt should be smooth at the hips and allow extra ease at the fullest part of the hips—the side fastening should lie flat and be smooth.

The lengthwise grain of the skirt hangs straight at the centre front and centre back, while the crosswise grain runs straight around the figure at hip level in all straight-cut skirts.

Check to see that the back hangs straight with no cupping under the seat. The lower edge of the skirt must be straight and an even distance from the floor.

## Select Fabric to Reduce Sewing Time

Irrespective of whether you like to make your own clothes, or not, the time in which to do so is not always available.

One way of cutting down on time is to select the material with the facts in mind:

- Firm and closely woven fabrics are easy to cut out, and can often take a finger crease which reduces trips to the ironing board. Many firm, closely-woven fabrics do not pay and seams need less finishing.
- Plain colours, all-over prints or *small* woven checks or stripes are quicker to cut out and put together than larger plaids or stripes that need so much time when cutting and putting together to ensure matching of stripe or check.
- Plain or all-over designs are better than one way designs as less time is required to lay out pattern pieces.

## Avoid—

- Slippery fabrics which take longer to cut out because they twist and slip, and need more careful basting to ensure accurate final stitching.
- Loosely woven fabrics on which more time has to be spent in seam finishing to prevent fraying.
- Materials which are hard to sew, to handle and to press such as the *very* closely woven ones which are harsh and stiff; some with finishes through which it is difficult to push the needle; some of the newer synthetics which require special care of one kind or another; and also pile fabrics which need careful tacking to prevent the fabric slipping as it is being stitched.
- Material that requires straightening before cutting.
- Material that requires pre-shrinking.

## Filling for Cushions

Bright cushions are a popular method of introducing colour to our surroundings but it is desirable that they be as good to use as to look at.

Much of this will depend on the filling used, and today there is a variety of filling material from which to choose.

It is well to remember that the comfort of a cushion rests on the quality, as much as on the type of filling used.

A cushion which is packed too tightly has only a limited use, and one which is too loose is unattractive because it cannot hold its shape.

Decide whether the cushion is to be for use and ornament, or ornament only, remembering that both needs can be met in the one cushion.

Foam rubber or plastic is available in a variety of types, some softer than others; it may be in one piece, chopped, or crumbled. The crumbled type tends to disintegrate with use, and in addition, needs to be covered with a smooth foam-type material to prevent the granular feel and appearance caused by the pieces.

Down or duck feathers make a cosy cushion which will last well.

Kapok will compress in time but is cheaper than down or duck feathers.

## Soda for Safety

So often it is the simplest thing that can prevent a serious, or perhaps disastrous, happening.

The serious happening may be a small indoor fire—and the simple remedy in this case is ordinary bi-carbonate or baking soda.

Ordinary baking soda will make a simple fire extinguisher for small grease or paper fires that may occur, particularly in the kitchen.

An added advantage of this simple remedy is that the soda can be handled easily and safely by children.

A wise precaution would be to keep a packet in a handy place and be sure everyone knows where it is.

Show it to the children and show them how to use it, so that valuable time will not be wasted if a small fire starts when they are alone.

## Keeping Copper Bright

The beauty and warmth of copper has made it a popular metal for household articles and furnishing accessories, but owners sometimes wonder whether the labour involved in maintaining its lovely sheen and glow does not dim the joy of ownership.

The reason for this is that copper is quickly affected by moisture and so loses its glow. Tarnishing is also a problem.

The following treatment should result in a longer period between polishings:

Clean, dry and polish well, then apply a thin coat of shellac, which is obtainable from the paint store.

This will keep the moisture and air from the metal and so it will not tarnish as quickly.

In time, however, it will crack and peel.

When this happens wash it in warm, soapy water, dry thoroughly, repolish and relacquar.

Should the lacquer become dull, polish with a very little furniture cream.

The shellac treatment would be of no use for kettles, saucepans and utensils used in the preparation of meals.

Heating would crack and chip the lacquer the first time the article was used.

The only suggestion to prevent tarnishing of these items is that they be kept thoroughly clean and dry, polished weekly, and stored in a dry place.

**Gifts For The Sick.**—Deciding on a gift for a sick friend is not always easy, particularly if one wishes the gift to be attractive and useful.

Miss Nancy Foskett, Senior Extension Officer, Women's Service, N.S.W. Department of Agriculture, has jotted down some ideas which she hopes will help both giver and receiver.

*Flowers*—although popular are not always the wisest ... they often wilt quickly, staff are too busy to give them the correct attention, or there may not be anywhere to put yet another vase.

Nevertheless there *are* times when flowers are the right, and wanted, gift and when this is so the donor who brings them already arranged in a heavy-based container adds much to the

gift. Where space is limited, or breezes treacherous, the small posy set in damp moss (which can be kept moist) will often give pleasure without anxiety.

If there is a suitable spot, a tiny pot plant or a bowl planted with bulbs about to flower is preferable to flowers.

*Books and magazines* are generally very acceptable if chosen to suit the invalid's taste or, alternatively, to introduce them to a new interest.

Paper backed books are light to hold—but be sure the print is easy to read—large and clear.

A bookmark will also be appreciated.

*Handkerchiefs*—remembering how hard it is to find that "nice white" handkerchief amongst the bedclothes, give coloured ones—or coloured tissues—they show up and are easily found.

*Notepaper* and a ballpoint pen or a soft, dark pencil, will be welcome to the convalescent—and if you include a book of stamps your gift will be more than doubly appreciated. Vary the notepaper from small cards, to notelets, and the usual writing paper. A few letter cards could be handy.

*Toilet* accessories and preparations are usually accepted with pleasure—especially if they're likely to boost the morale. A convalescent woman friend has time to pamper herself, and so would appreciate cleansing and skin creams and tonics, and hand care products.

A box of paper hand towels (although not easy to find) would have many uses.

*Miscellaneous*—fruit knife, a torch, a fan, pack of cards, a book of crossword puzzles for the convalescent enthusiast, some extra face washers, a vacuum tumbler that keeps cold drinks cold, a pair of mittens for winter patients who are well enough to hold a book or the paper.

Whatever the gift, try to be as original as possible (without losing sight of use and need), and bear in mind that gifts which help the patient to be independent of others, and relieve the tedium of long hours in bed are the welcome gifts.

—From the New South Wales Department of Agriculture's "Press Copy."



## Make It Yourself . . . . .

With winter here, now is the time to take a second look at those attractive woollen remnants you just couldn't resist at the sales. Some will be sufficient to transform into smart skirts and blouses.

Shown here is an outfit easy enough for any beginner to make. The skirt (Simplicity Pattern 3114) takes one yard of 54-in. fabric and would look fine in a soft flannel, a hard wearing worsted or one of the attractive woollen boucles. The pattern is cut in waist sizes 23½ in. to 28 in.

The blouse (pattern 3117) is also in the simple-to-make range. A fine plain crease-resisting wool or one of the many attractive prints is ideal for this. It is cut in sizes 10-18. For sizes 14 (34-in. bust) one-and-a-half yards of 54-in. wool is needed.

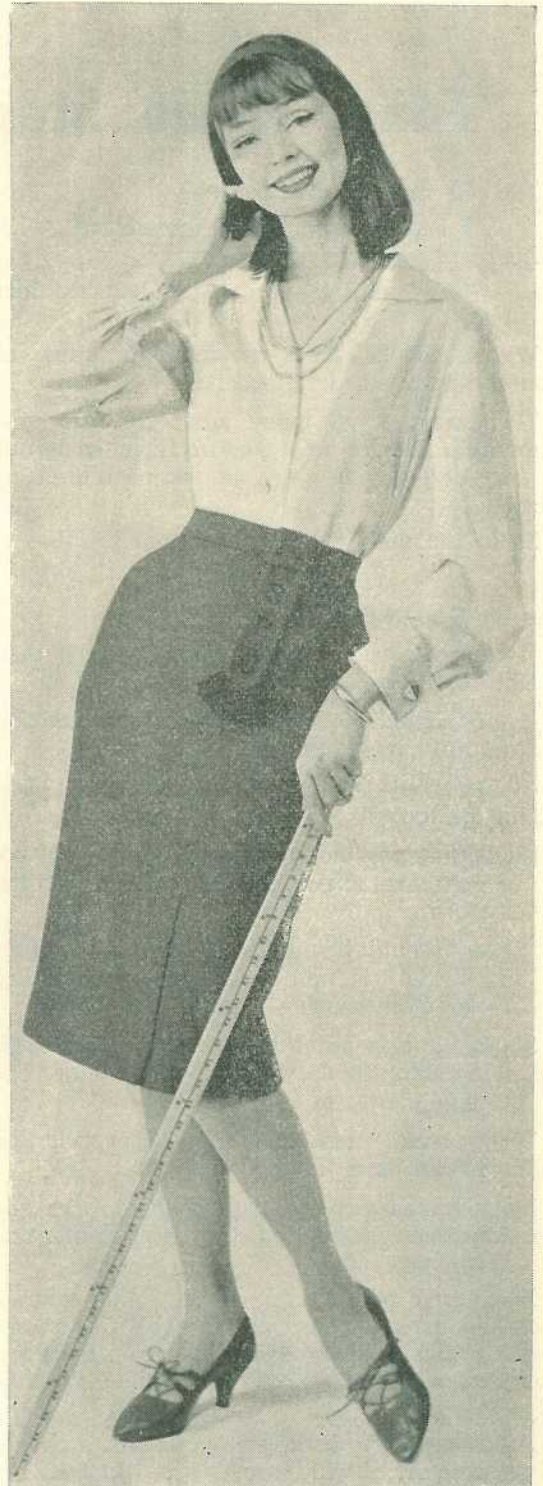
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### In Wool Competition



Miss Patricia Lockett, an Entrant in the Wool Princess Competition, was Sponsored by the Toowoomba Apex Club. She is on the staff of the Agriculture Department, working in the Division of Dairying. Miss Lockett's hobbies are squash, tennis, amateur theatricals, surfing and water skiing. She is treasurer of the Women's Squash Rackets Association of Toowoomba.



# Take These Steps To Foot Health

The old proverb which starts—

“I had no shoes and I complained . . . ”  
could be fittingly ended thus—

“ . . . until I found that I had healthier feet.”

Without doubt, shoes are the main cause of painful, and often, deformed feet.

The fact that so many adult feet are misshapen parodies of what Nature intended is due to the adult having worn in the past ill-fitting footwear.

So to the main steps toward foot health—

## Choose the Right Shoes

- Everyone's shoes should be **LONGER** than the feet (more so in the case of children).
- Shoes should be **WIDE** enough to ensure that toes are never squeezed.
- Shoes should be **HIGH** enough never to press on the toenails.
- Shoes bearing the wearer's weight should not be stretched anywhere. If so, they are too small.
- Shoes should be almost **STRAIGHT** down the inside. If not, the big toe is squeezed across, often causing bunions.

Shoes should never “be broken in.” This means breaking in the foot to fit the shoe, one of the main causes of foot troubles.

Tight socks and stockings, especially on children, can do a lot to damage feet.

Insist on an easy fit, and change socks and stockings often, laundering them in a manner that will keep them soft.

Feet thrive on exercise. Spend a few minutes each day strengthening the toes. Walk on the toes; try picking up small objects from the floor; stand on a book and curl your toes over the edge.

After the day's work, give your feet a change to the comfort of wide, roomy soft slippers. But

keep slippers for after hours. They are not designed to support feet through the working day.

Follow frequent bathing with a brisk rub with a rough towel. For a real foot tonic, use the contrast of warm and cold water. Always wash and dry thoroughly between the toes.

## Common Foot Troubles

Now let us look at some of the common foot troubles and what can be done about them.

There are two arches in the foot. One is along the foot, and most marked at the instep. The other is across the front of the foot—the pad. If this one is fallen, callouses develop, and you should seek advice from your doctor.

The long arch is the one which most commonly falls, and this is called flat foot. The most common cause is the ankle “going over,” and this pushes the arch down.

Exercises will strengthen the muscles, but if the ankle is over, the heel, and perhaps the sole of the shoe should be raised on the inner side, after advice from your doctor. Of course, this cannot be done on a high-heeled shoe because it would be too unsteady. Arch supports are of very little use unless the heel is so raised, but may help them.

Corns are caused by tight shoes that pinch or create friction. The pain of corns can be relieved by medication and cutting. But never try home surgery. Let your doctor be your guide. The cutting cannot cure the corn. Only correct shoes will do this.

The first thing to do about a bunion is to wear roomier shoes. If there is still pain, or if the bunion is so big that no normally-shaped shoe can be worn, surgery can be very satisfactory.

Ingrown toenails are caused by the nail being forced into the flesh by narrow or short shoes or socks. To diminish the effects of this, cut the toenails straight across and not too short, and wear roomier shoes and socks.

Your choice of shoes for your children in their growing years can make or mar their feet.

—Queensland Health Education Council.