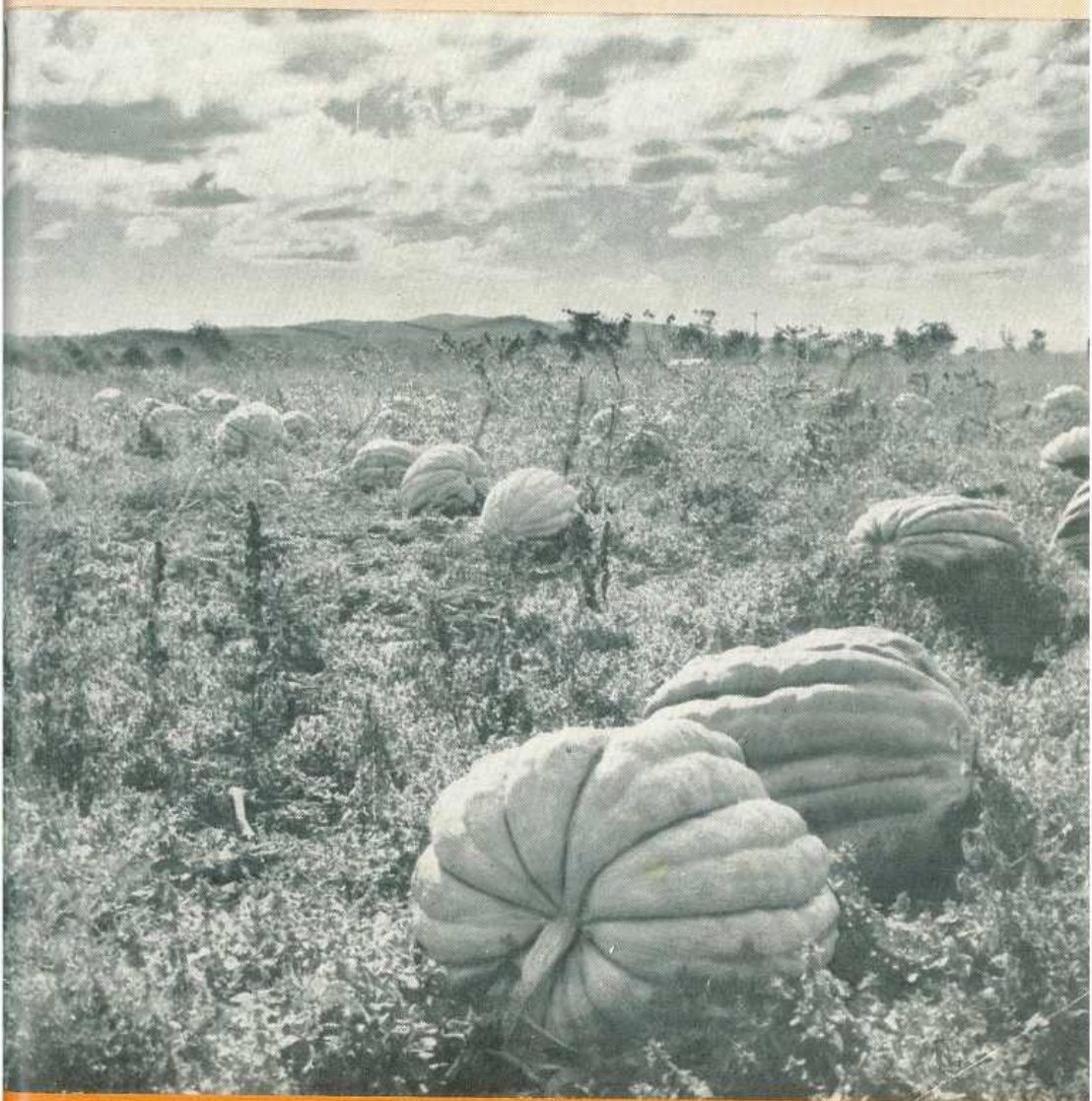
# Queensland AGRICULTURAL JOURNAL



CATTLE PUMPKINS IN THE BEAUDESERT DISTRICT (See p. 395).

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# Contents




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Plate 1: Fordson Diesel Mounted with Front-End Loader.

# Mulga At Less Than 2d. A Week

By R. J. ANSON,
Adviser in Sheep and Wool.

**Costs working out at 1.7d. per sheep per week highlight mulga pushing as a most economical method of feeding sheep during drought.**

PUSHING mulga with front-end loaders, four men fed and kept alive 24,500 sheep and 350 cattle through a year-long drought—and the weekly cost was only 1.7d. per sheep.

Messrs. N. and R. Watts, with two helpers, were forced to mulga-feed on their 289 sq. m. property, "Tinderry," which lies 100 m. south-west of Quilpie, in Queensland.

They began to push mulga in February, 1958, and were still pushing in January, 1959. Rainfall at "Tinderry" in 1958 was 585 points, in 16 falls. However, where mulga was pushed, less than 2 in. fell during 1958.

On the red brown soils and low, stony rises of the Grey Range west of Quilpie, mulga (*Acacia aneura*) is the principal standby for drought feeding. From the axe to the bulldozer various methods have been used to put mulga in front of stock.

At "Tinderry" they pushed it down with tractors equipped with front-end loaders.

These machines have dealt effectively with umbrella mulga and tall mulga and they worked well in dense scrubs.

Plate 2.
**Front-End Loader at Point of Impact, Showing Guard Plate for Radiator.**

In umbrella mulga they were used to knock out the branches in such a way that the trees continued to grow, that is, they knocked out the leaders without damaging the laterals.* The branches were scattered so that sheep had ready access to the foliage and did not become entangled in the fallen branches.

Trees carrying mistletoe were pushed right down and crushed to kill the parasite. Any sharp sticks or old stumps which appeared likely to damage the tractor tyres were swept away with the front-end loader before it was lifted to push the trees.

## Machinery Used

Several good, second-hand tractors, all of the rubber wheel type, were purchased at the commencement of feeding.

Types and costs were:—

| Tractor. | Fuel Type. | Power. | Cost. |
|---|---|---|---|
| | | B. H. P. | £ |
| Ferguson .. .. .. .. | Kerosene .. .. | 28·4 | 425 |
| David Brown .. .. .. .. | Kerosene .. .. | 27·5 | 300 |
| Fordson .. .. .. .. .. | Diesel Distillate .. | 41·0 | 350 |
| Fordson .. .. .. .. .. | Kerosene .. .. | 32·5 | 275 |
| 4 Front end-loaders, new .. .. | .. | .. | 1,175 |
| | | | £2,525 |

* See article "Feeding Sheep on Mulga," Q.A.J. June, 1958.

Taking into account only the 24,500 sheep, this cost works out at approximately 1.2d. per sheep per week.

Calphos ration at 10 bags per 24,500 sheep is equivalent to $\frac{3}{4}$ oz. per head per week.

With long-term mulga feeding, it is advisable to give a Calphos ration of 2 oz. per head per week to fulfil phosphorus requirements as was done later at "Tinderry."

This would raise requirements to 31 bags of bone flour per week, and add £42 to the costs shown.

The result would mean raising the cost per head per week to 1.6d., which is very economical.

However, this does not take into account interest on capital expended, and depreciation of plant. These items could be estimated at 20 per cent. on £2,525, plus interest on capital expenditure at 6 per cent. making a total of approximately £650. This is equal to £12 10s. per week, or equivalent to adding .125d. per week to the cost of 1.6d. per head per week.

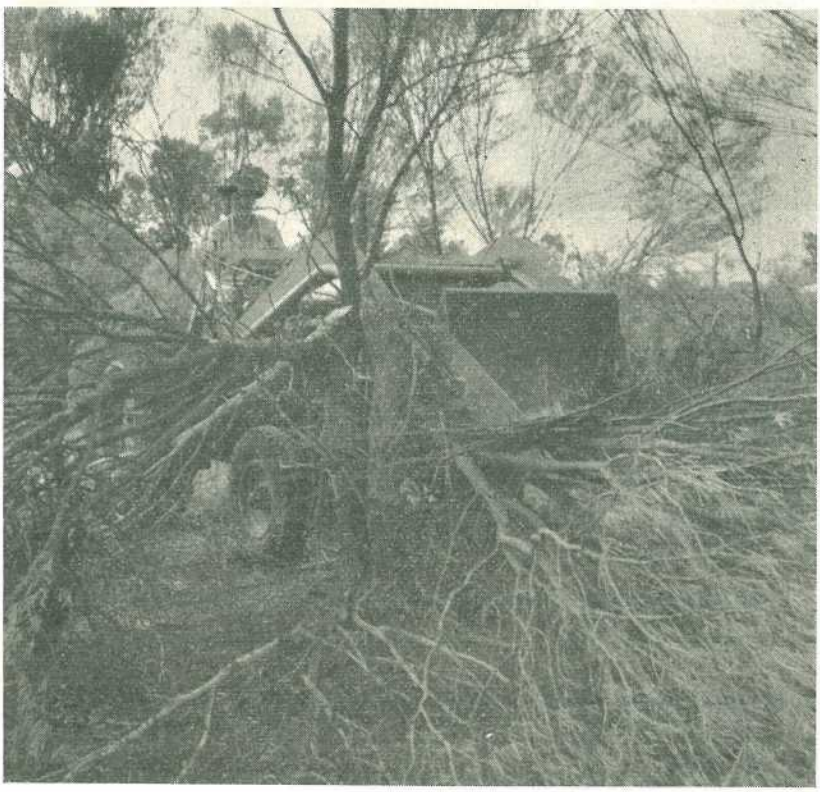

Plate 3.

**Mulga Tree in Process of Being Broken; and Leaders Being Pushed Out, Leaving Lower Laterals Intact.**

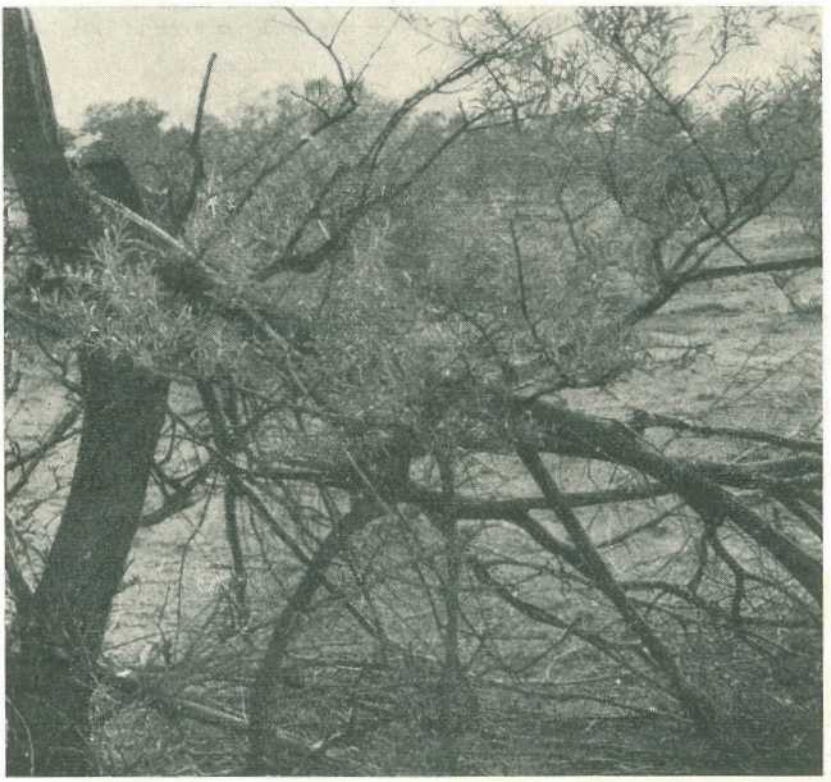

Plate 4.

**Regrowth from Laterals After Pushing.**

Breakages were negligible, and the only replacements required were two front and two rear tractor tyres.

## Stock Losses

Of the 24,500 sheep and 350 cattle fed, losses throughout were negligible.

## Weekly Costs

| | £ s. d. | £ s. d. |
|---|---|---|
| Labour— | | |
| Wages, 4 men .. .. .. .. .. .. | 56 0 0 | |
| Keep, 4 men .. .. .. .. .. .. | 20 0 0 | |
| | | 76 0 0 |
| Supplementary Lick— | | |
| 10 bags Bone Flour (Calphos) .. .. .. .. | 20 0 0 | |
| 5 bags Coarse Salt .. .. .. .. .. | 4 10 9 | |
| | | 24 10 9 |
| Fuels, oils, for tractors— | | |
| 66 gal. power kerosene at 4s. 3d. gal. .. .. .. | 14 0 6 | |
| 16 gal. petrol at 4s. 8d. gal. .. .. .. | 3 14 8 | |
| 27 gal. distillate at 3s. 11½d. gal. .. .. .. | 5 6 11 | |
| 4 gal. oil .. .. .. .. .. .. .. | 2 14 0 | |
| | | 25 16 1 |
| Total Weekly Cost .. .. .. .. .. .. | | £126 6 10 |

# Weed Risk Seen in Sorghum Almum

Sale of sorghum almum seed in Queensland is still prohibited, and for several good reasons, the Minister for Agriculture and Stock (Hon. O. O. Madsen, M.L.A.) said recently.

He said Agriculture Department officers feared that sowings of this plant could create a troublesome and costly weed situation. They urged caution until it had been tested thoroughly under Queensland conditions.

Sorghum almum seed cannot be readily distinguished from Johnson grass seed—and Johnson grass is a very serious weed pest in cultivated land. One of the parents of sorghum almum is known to be Johnson grass.

It would appear that sorghum almum is no more dangerous to graze than Sudan grass and the well-known grain sorghums and sweet sorghums. But the risk is there, and it is a very real one where uncontrolled grazing methods are employed.

Sorghum almum comprises a mixture of strains, and some of these strains can cross with Johnson grass. Because of this, there is a chance that, if fields of sorghum almum are sown in the vicinity of Johnson grass, many types of plants closely resembling Johnson grass in habit could develop in the stands of sorghum almum.

## Further Investigation

Sorghum almum is not a perennial in the sense that it will be a permanent pasture for many years as would be the case, for example, with Rhodes or buffel grasses. Whether sorghum almum can be grown in combination with a legume to provide the basis of a permanent pasture needs further investigation. Evidence suggests that there has been some success in this direction.

As far as is known at present, sorghum almum appears to do best on the more fertile soils. But even on these soils, periodic ploughing and rotation of the land with other crops would be necessary to maintain the level of fertility required for the good growth of sorghum almum.

Hon. O. O. MADSEN, M.L.A.

There is the risk that the normal rotation programme could be prejudiced by having to combat Johnson grass or plants of very similar habit introduced as a result of the previous sowing of sorghum almum.

It is understood that some thousands of acres of sorghum almum have been sown with seed obtained in various ways. Before further sowings are made, however, the risks should be carefully weighed, said Mr. Madsen.

Annual crops of Sudan grass for summer grazing and oats for winter grazing offer a safe approach for graziers who are adopting the very desirable practice of using grazing crops on cultivated land for better livestock feeding.

Research on sorghum almum is being continued by the C.S.I.R.O. and other organisations. Departmental officers will keep in touch with developments to determine whether any change is warranted in the Department's attitude on this species.

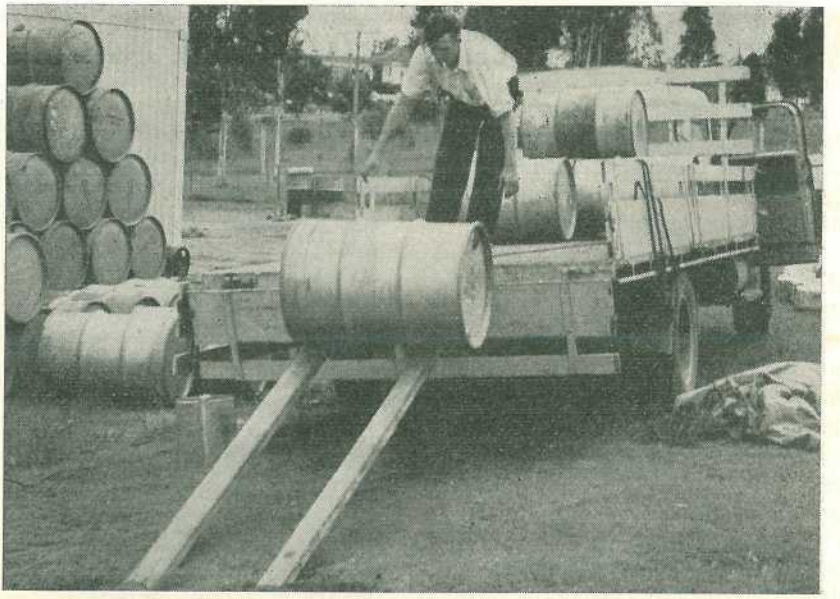

Plate 1: Honey in 44-Gallon Drums Being Unloaded at a Brisbane Honey Packing Factory.

# Honey in 44-gallon Drums

By C. ROFF
Adviser in Apiculture.

QUEENSLAND beekeepers are taking an interest in marketing bulk honey in 16-gauge, 44-gallon, galvanised steel drums, and already several have stopped using 4-gallon cans.

Use of the larger containers has the following advantages:—

1. Time is saved both in the field and the packing house, and consequently handling costs are reduced.

2. The 44-gallon drums are returnable to the beekeeper and may be used indefinitely, while 4-gallon cans have only limited re-use value. The initial cost of £5 17s. for the large container against 5s. 3d. for a 4-gallon can is quickly recovered.

3. The drums, either empty or full, may be stacked unprotected in the open. Four-gallon cans, which rust easily, must be stored in a shed or under tarpaulins.

In the beginning, beekeepers may encounter difficulties in handling drums, but as in other industries, these have been overcome by experience. Drums may be filled on the truck, and will need to be marketed immediately to release the vehicle for other purposes. Particular care should be taken when loading from the ground with hardwood skids, as a full drum of honey weighs about 725 lb., and a slip could result in serious injury. A suitable ramp or loading platform is desirable where these heavy containers are handled constantly.

Drums should be marked clearly at all times with the owner's name and address, and the tare. Empty drums vary from 76 to 82 lb.

# *Stock and Station*

DRENCHING alone will not give good worm control in calves and weaners. It should be coupled with rotational grazing so that newly drenched stock can be put into spelled paddocks.

Drenches confer no immunity on the animals. They only kill the adult worms inside the beast. When drenched stock are put back in the same paddock, they immediately start to pick up a fresh burden of young worms from the contaminated pasture. In a week or so they will be carrying just as many worms as they were before treatment.

For worm control measures to be effective, subdivision is essential. At least one paddock should always be unstocked to starve out the worm larvae. Then spelled pasture is always ready for drenched stock. In this way, you'll get full value for the cost and labour of drenching.

*—K. M. GRANT,*
*Assistant Director of Veterinary Services.*

IT'S dangerous to dip cattle in arsenic when they're hot or excited, or in rainy weather. Furthermore, don't excite them or drive them immediately after dipping.

Cattle may still sometimes scald, even when these precautions have been taken and when a dipside test has given a normal reading of eight. This is because some types of bacteria act on the arsenic compound in the dip, changing it into another form. In this form, it isn't detected by the dipside test and it isn't very effective in killing ticks.

For this reason, each year you should send a thoroughly stirred sample of your dip to the Animal Research Institute, Yeerongpilly, for testing. If tests show your dip isn't efficient, you'll be told how to correct it.

*—S. G. KNOTT,*
*Divisional Veterinary Officer.*

PIGLETS are normally weaned at eight weeks, but attention is now being given to earlier weaning. In many places it's becoming common to wean litters at 10 days or 4 weeks. Trials in Queensland have shown that weaning at 10 days would not be successful on the average farm. But good farmers could wean their litters at 4 weeks.

To obtain satisfactory growth in litters weaned at 4 weeks, the piglets must be housed in a shed with a warm, dry floor and free from draughts. The food must be palatable and readily available, and rich in energy and protein. If you want to try early weaning, start with 6-week-old pigs, and as you gain experience gradually reduce the age of weaning. In this way, you're less likely to have serious failures.

*—F. BOSTOCK,*
*Senior Pig Husbandry Officer.*

BLACKHEAD is caused by a minute parasite which attacks the blind-gut or caeca of turkeys. Fowls commonly carry the parasite but are rarely affected. In turkeys, the parasite usually enters the liver from the blind-gut, causing pale yellowish areas up to the size of 3d. These are characteristic. Death rates of more than 50 per cent. are common in turkey poults.

For the blackhead parasite to complete its life-cycle, it requires the presence of the caecal worm. It enters the caecal worm eggs where it is protected.

Prevention is the rule for blackhead. Reduce ground contamination by removing caecal worms from older birds (both turkeys and fowls) before the youngsters arrive. This may be done cheaply by supplying phenothiazine in the mash for two days.

For the young poults, supply Enheptin-T in their mash or drinking water for the first 8 to 12 weeks of life. This drug can also be used for treating affected poults but is much more effective as a preventive.

Range the turkeys as much as possible. Do not rear young turkeys near older birds. If many turkeys are raised, it is better not to keep fowls at all.

*—P. D. RANBY,*
*Veterinary Officer.*

TODAY the modern trend is towards intensive methods of poultry farming and the use of "high energy" rations which are based largely on crushed grains. It has been noted that under intensive methods of management, and with the use of high energy mashes, feather picking and cannibalism may become prevalent.

This can be prevented by debeaking, which is the removal of part of the upper beak. Debeaking also reduces food wastage and the birds can't effectively "pick over" the feed.

Debeaking can be performed with an electric debeaker. We have found from our experiments that best results will be obtained when debeaking is carried out on three-day to week-old chicks. Only half of the top beak should be removed, and the end of the seared beak should be properly cauterized to stop bleeding.

Debeaking, although generally practised at chicken stage, should be a valuable means of combating cannibalism if the condition happened to appear in older fowls. Debeaking is easy, successful and money saving. Ask your district poultry officer for full information.

*—K. D. PUGH,*
*Assistant Adviser, Poultry Branch.*

## Timely Tips for July

WITH the cows starting to calve this month or in the near future, what about herd recording? Things are getting tighter all round so anything that helps you farm more profitably is good. Herd recording has something for you. See your local dairy officer about it.

Worms can do young pigs a lot of harm without a farmer really knowing about it. Make up your mind to find out how your pigs stand for worms. Mention it to your veterinary officer and he will drop in next time he is out your way. If worms are active he'll give you details of modern treatments which are safe and simple.

A lot of infectious diseases flare up in pigs shortly after weaning. Probably the pigs are more prone to infection then because of the change in diet. Watch them closely at this time. If you see any symptoms, check a few pigs' temperatures and, if there is any rise, discuss it with your vet.

Every farmer should have a thermometer and be able to read it. It tells a lot about ailments of all animals.

After calving, cases of milk fever and grass tetany may be seen in your cows. Watch for any peculiarities of gait, excitement, and paralysis at this time. Both of these conditions can be treated with injections (different in each case).

If you inject any drug into your animals make sure you know how to do it properly. An injection that is not cleanly done can be as serious as the disease it was meant to treat.

# How many fowls should a dairy farmer keep?

By B. W. MOFFATT, Adviser,
and R. V. BYRNES, Assistant Adviser,
Poultry Section.

**Keeping about 25 hens for egg production on the dairy farm is quite practical and economic if the right methods are followed.**

One of the advantages of living on a farm is that the household bills can be reduced by producing a variety of food—for example, vegetables from a good vegetable patch and eggs from a small flock of fowls. On most dairy farms can be found a flock of fowls of one sort or another quartered in, under, and around barns and sheds. The efficiency of production of these flocks is questionable. Often they have bred indiscriminately for generations as is shown by their multi-coloured plumage derived from two or more breeds.

It is quite often the case that although up to 50 or more fowls are on the farm, eggs are in short supply. The fowls often have to find their own feed and consequently their egg production may be below 100 eggs a year. A few well-cared-for fowls should have little trouble in supplying eggs for the farm household throughout the year. The outlay involved in a small poultry shed should be more than offset by the ready supply of fresh eggs at most times, and a reduction in the household food bill.

How big should the dairy farm flock be? If 25 layers were fed properly and housed in a good shed they could be expected to produce an average of seven dozen eggs a week. This would be more than sufficient for the average farm household.

If only a small number of good hens are to be kept, then it is essential that these be replaced every year or at least every second year. It is now a well-known fact that many birds will lay 200 eggs in their first year, but they may only lay 120-140 in their second year. In addition to this, after their first year's lay, most birds will moult for a period up to three months.

If these birds are not replaced at the end of their first year, eggs are likely to be in short supply in the winter months while the birds are moulting. For these reasons then, it is suggested that the layers be culled heavily from September onwards and replacement chicks purchased in August or early September. As these birds will start laying in January or

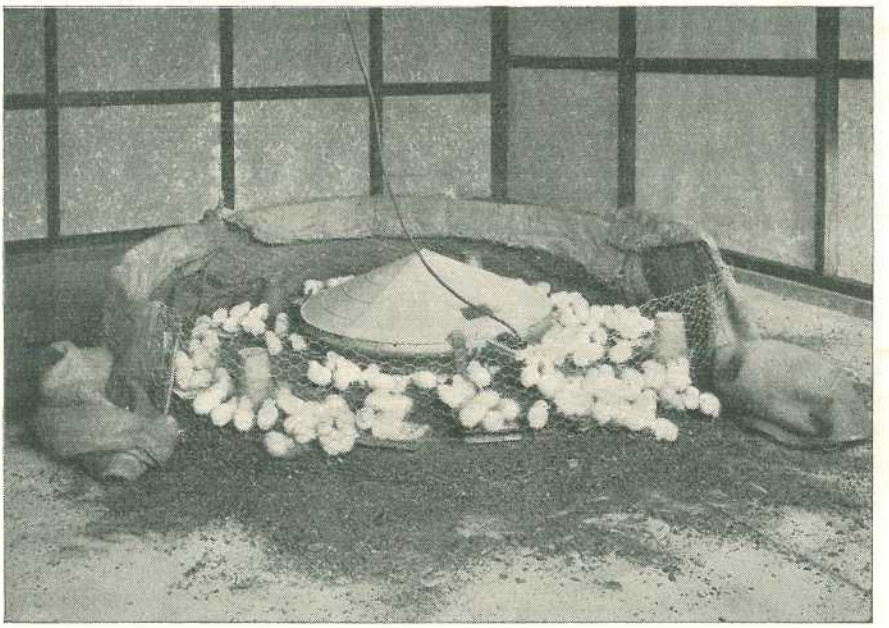

Plate 1.

**An Electric Hover Type Brooder with Thermostatic Control.** When chickens are first placed under the brooder, they should be confined to within 1 ft. of the outside edge and their range increased from day to day.

February, all the old hens should be killed off before the beginning of March.

Replacements are best obtained as day-old chicks. Started stock, at least a month old, are often purchased for replacements, but with this class of stock, there is a much bigger risk of bringing disease onto the farm. The day-old chicks can be purchased as pullets or as unsexed chickens depending on whether cockerels are required for table purposes. If unsexed chicks are obtained, the cockerels should be separated from the pullets as soon as possible to avoid bullying.

For egg production "crossbred" pullets may be preferable, as experiments have shown that these usually lay more eggs than "purebreds." Chickens should be obtained from a Government-registered hatchery. If 25 laying birds are eventually required it would be wise to purchase 30-40 day-old pullets or 60-80 unsexed chickens to allow for rearing losses and culling. It must be remembered that if 50 or more head of poultry are kept on a farm within an egg board area, then this flock must be registered with that board.

## Look After Young Chicks

Chickens need special attention during the first three weeks of their life. They must be kept warm by means of a brooder and protected from rats, hawks and other killers. Brooders are available which are suited to rearing small numbers of chicks. Electric brooders are the easiest to operate, but where electricity is unavailable, kerosene brooders prove very satisfactory. The initial brooding temperature is 95 deg. and is reduced gradually as the chickens become older. By three weeks of age, the chickens should

need no further heat, provided they are kept in a reasonable shed free from direct draughts. The behaviour of the chickens will indicate whether the temperature in the brooder is too high or too low. If the chicks are too widely spread under the brooder at night, the temperature is too high. If they are huddled under the brooder, then it is obvious that the temperature is not high enough. With a little experience, it is not difficult to tell when the chickens are comfortable and the temperature is right. Small electric brooders do not usually have a thermostatic control so the temperature has to be controlled by raising or lowering the brooder, which either lowers or raises the temperature in the vicinity of the chickens.

When the chicks are about four weeks old they can be allowed to run out provided weather conditions are not too severe. It is, however, essential to protect them from predators such as hawks, crows, kookaburras and rats.

As pullets will commence to lay at about five months, it would be wise to have them settled in the laying quarters at four months.

## Home Comforts

The intensive method of housing has a number of advantages over the semi-intensive or house and yard system. Weather conditions have very little effect on the birds; predators such as foxes cannot take toll of the flock; manure can be easily collected

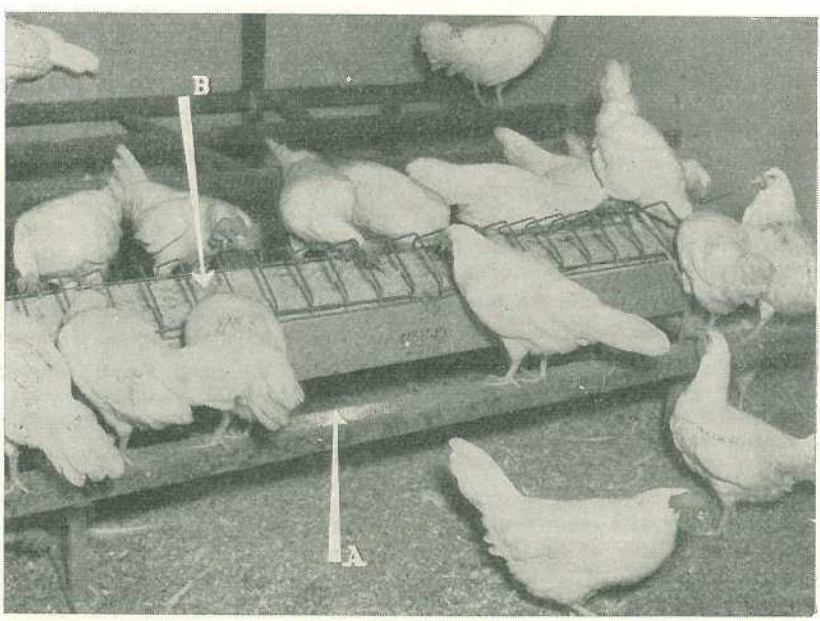


Plate 2.

**Pullets Feeding From a Recommended Type Feed Hopper which Has Been Overfilled to Show the Feed Wastage which Results.** This photograph was taken 10 min. after the trough had been filled to the brim and the mash levelled off. Spilled mash is already visible on the alighting perch of the hopper (A). Mash is being raked out at (B).

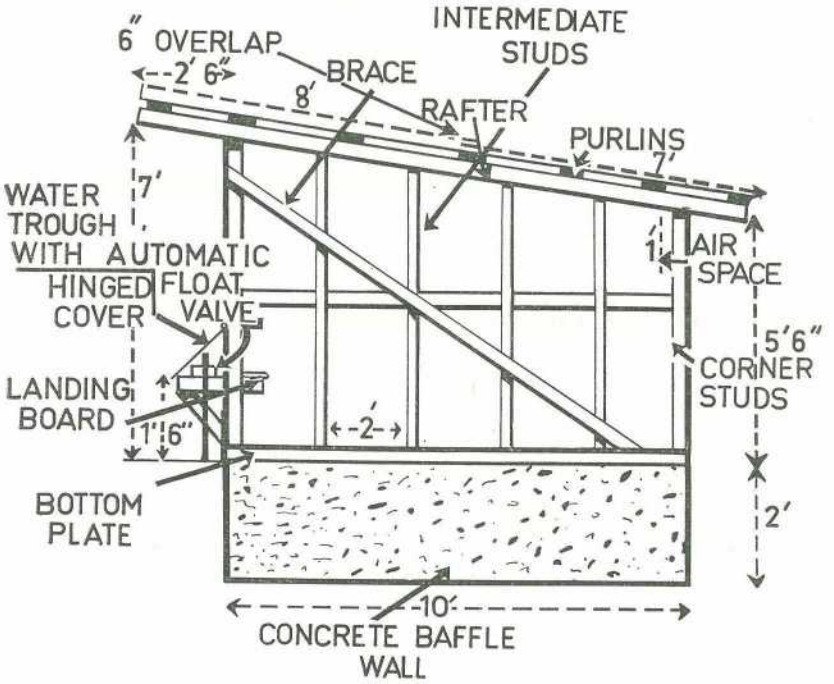


Plate 3.

**Side Elevation of an Intensive House to Accommodate 25 Birds.**

and used for a vegetable garden; parasites can be effectively controlled; and during wet weather the eggs produced are much cleaner. With this type of housing, a minimum of 4 sq. ft. of floor space should be allowed for each bird. If 25 birds are to be kept then a shed 10 ft. x 10 ft. would be sufficient to house them. This shed should preferably have a cement floor. Ventilation and coolness must be considered and for these reasons the front of the shed should be covered by wire netting and some ventilation allowed in the back of the shed. If the shed is constructed of iron it can be painted silver on the outside to reduce the inside temperature in the summer months.

The floor of the shed should always be covered with at least 4 in. of litter such as sawdust or shavings. It need not be cleaned out unless the litter becomes wet or too deep, but it is wise to clean the shed before new pullets are housed.

Nests should be provided in the pen at the rate of one nest to every five birds. These nests should preferably be cool and dark and no more than 2 ft. from the floor. A good depth of nesting material should always be kept in the nest boxes to prevent breakages. Pine sawdust or shavings are very good for this purpose.

Perches 18 in. to 2 ft. from the ground made of sawn timber such as 3 in. x 1½ in. should be provided for the birds. Allow at least 6 in. of perching space for each bird.

A feed hopper for mash allowing 8 linear feet of feeding space would be required for 25 birds. Where a reliable water supply is available, an automatic watering trough, such as the

float valve type, is ideal. This is best situated on the outside of the wall of the pen, and the birds allowed access to it through a wire grill. If ordinary water troughs have to be used, they should also be placed on the outside wall of the pen, so that the litter does not become wet around the water trough. As cool water is always desirable, the trough should be shaded from the sun.

## Correct Feeding Important

As most dairy farmers would not be likely to mix their own mash for a small number of birds, the purchase of prepared mashes is suggested.

Chickens are fed on a chicken starter mash from day-old to eight weeks of age. From eight weeks to laying stage, a growing mash is fed.

When the birds commence to lay, they are fed either an "all mash" laying mash or a laying mash with grain, in the afternoons. When purchasing these feeds, it is a wise precaution to stipulate that they contain vitamins A and D3. When feeding mashes with vitamins added, it is not essential to feed green feed. However, if fresh green feed is available, it can be fed to advantage at the rate of 1 lb. a day to every 20 birds.

Shell grit should be provided at all times to supply calcium. Fine shell grit will be needed for the chickens. Where birds are housed intensively or where the soil contains very little insoluble grit (small stones), a small amount of this grit should be placed in the pen from time to time. Creek gravel is suitable for this purpose.

There is no truth in the statement that fowls can be overfed. Restricted feeding results in reduced egg production. Mashes are a main cost item, so to prevent wastage feed hoppers should not be filled more than half full.

## Don't Keep Loafers

Any birds that are obviously not paying their way should be used for the table immediately, as they still eat their share of the mash.

If production in the pen is not sufficiently high, all the birds can be handled so that the poorer producers are removed. The poor producers are detected by a small dry vent, with less than two fingers' distance between the pubic bones and less than a hand's breadth between the pubic bones and the breast bone. These poorer producers often have the best looking plumage, either because they moult frequently or do not get their feathers worn from visiting the nest.

Any bird showing signs of disease should obviously be removed as a cull.

## Disease Prevention

Where birds are kept in small numbers, disease is seldom a problem. However, the odd disease case does occur from time to time.

In chickens the most likely disease to be encountered is coccidiosis. Chickens suffering from this disease have a drowsy appearance with ruffled feathers. Free blood is seen in the droppings. Sulpha drugs such as sulphaquinoxaline, sulphamerazine and sulphadimidine give good control.

Worms can be a problem in growing chickens. Treatment in mash or water with a piperazine product is effective against the large roundworm, which is the most common one.

In layers, a disease known as leucosis is likely to be the main cause of death. This disease often strikes pullets commencing to lay, and causes paralysis of the leg or wing. Another form of leucosis causes cancer-like growths on many of the internal organs. Although the disease cannot

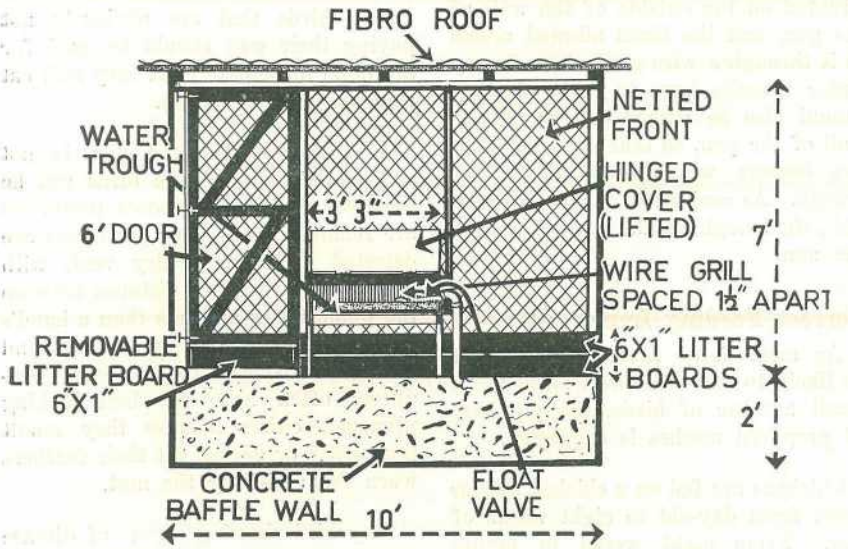


Plate 4.

**Front Elevation of the House for 25 Birds.**

be cured, losses can be reduced by rearing chickens in isolation from hens, for the chickens are most susceptible to the virus during the first few weeks. Even though they may contract the disease while very young, the infection remains dormant until later in life.

Parasites such as ticks, mites and lice can be a problem in the fowl house. If mites or lice are noticed on the birds, treatment should be carried out by painting the perches with BHC perch paint. When the birds perch, the fumes from this paint will kill lice or mites in their feathers. If mites or ticks are noticed on the walls of the shed, the whole shed should be sprayed with a BHC or a dieldrin preparation, at regular intervals of not more than a month, until no further mites or ticks can be found.

In general, the losses due to disease can be reduced if well-balanced, vitamin-fortified mashes are fed and attention is paid to general hygiene. Water troughs should be cleaned regularly. Feed troughs should be so constructed that contamination by droppings, a major source of disease spread, is avoided. For advice on disease problems, consult your local veterinarian or an officer of the Animal Industry Division of the Department of Agriculture and Stock.

## Conclusion

Poultry farming is becoming a specialised industry and the large intensive egg-producing farms of 2,000 birds and more are nowadays regarded as essential to profitable production. Sideline production on dairy farms is unlikely to be worthwhile as a commercial proposition. However, production for the domestic requirements of the farm is quite practicable and economic, if undertaken properly.

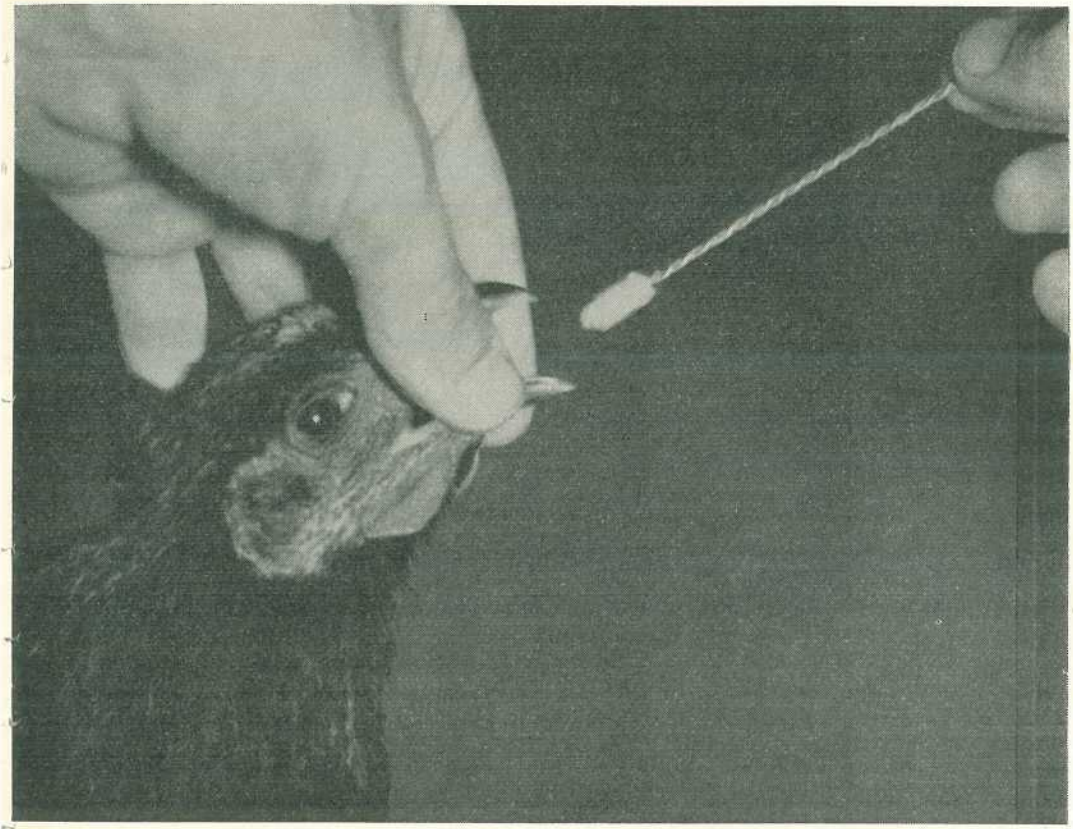

**Plate 1: Removing a Cheesy Cast or Plug from the Upper Wind-Pipe of an Australorp Hen Affected by I.L.T.** This bird was showing signs of asphyxia.

# Fowls with "Laryngo" Can be Saved

**By P. D. RANBY,**
**Veterinary Officer.**

INFECTIOUS laryngo-tracheitis (I.L.T.) is a severe respiratory disease of fowls caused by a virus. It is characterised by severe coughing, gasping, and a small proportion of swollen eyes. (See Plate 2.) Coughing of blood occurs in the more acute forms while in other cases, a plug, or cheesy cast, forms in the larynx and upper portion of the trachea or wind-pipe. (Plate 3). These cheesy plugs are a common feature of I.L.T. outbreaks in Queensland.

Death is due to asphyxia brought about by the blocking of the air-passage in the trachea by blood-stained mucus or by a cheesy plug.

Vaccination of the new season's chickens is fully effective in preventing outbreaks of I.L.T. However, once the disease appears in a flock, vaccination of the affected flock is of no value. This is because I.L.T. is so

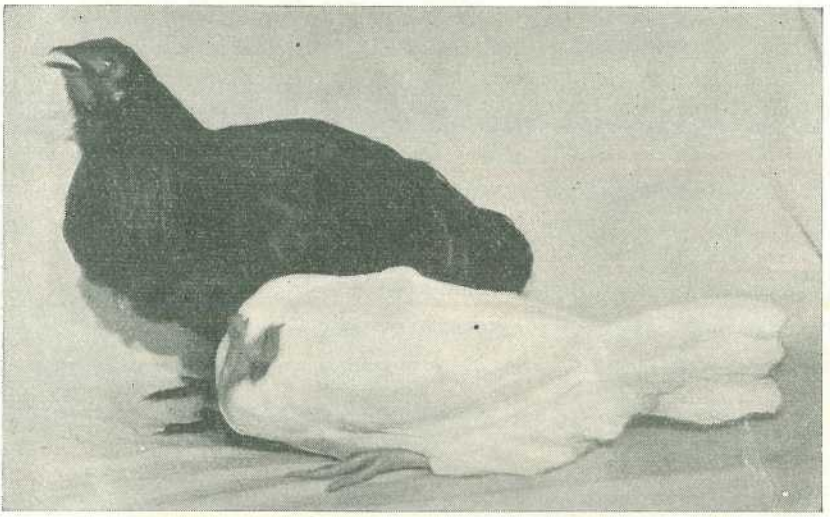

Plate 2.

**These Two Fowls are affected by I.L.T.** Note the characteristic gaping of the Australorp's mouth as it gasps for air.

infectious that even birds still not showing symptoms are incubating the disease.

## Removing The Plug

It is generally accepted that there is no treatment for infectious laryngotracheitis once outbreaks occur. Thus rather helplessly, an I.L.T. outbreak was observed in 3,500 laying fowls on a poultry farm north of Brisbane. The affected birds were coughing and gasping, and nearly all were found to have a cheesy plug in the larynx. Some fowls showed signs of choking or asphyxia, as indicated by general distress and a dark-bluish colouration of the comb and wattles.

Over 100 fowls had died in one week and deaths were continuing as the disease swept from flock to flock, the fowls having free contact with one another on range.

In desperation it was decided to try removing plugs with a wire loop from cases showing signs of choking. The wire loop, as shown in Plate 4, was just wide enough to be passed through the air-passage in the larynx. It was made from gauge 18 wire.

In cases where the air-passage was nearly closed by cheesy material, the loop was pushed through the soft cheesy mess into the upper portion of the trachea. Then pressing gently sideways, the cheesy plug was removed.

## Results of Treatment

Fowls showing signs of suffocation brightened up as soon as the plug was removed. The normal pink colour returned to the comb and wattles, indicating that the blood was carrying oxygen again.

Treated fowls were placed in a separate pen. Treatment of further cases was left to the owner who was in a position to give the fowls frequent attention.

In all, 110 fowls were thus treated over a 10-day period. Only three of these died. Ordinarily, it would have

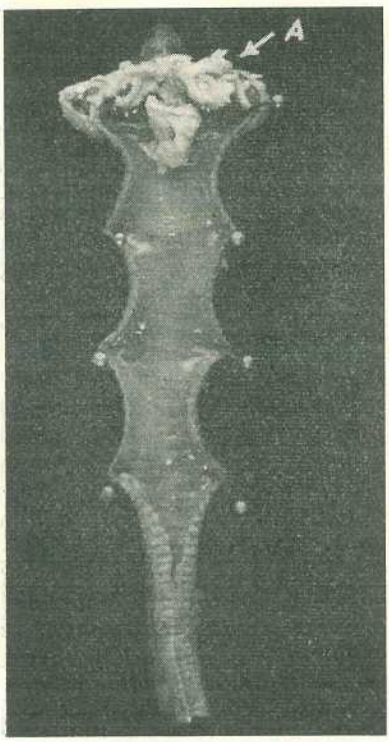


Plate 3.

**Trachea (Wind-Pipe) from a Fowl Which Died from I.L.T.** Note the plug (arrow A) which caused a blockage of the air passage.

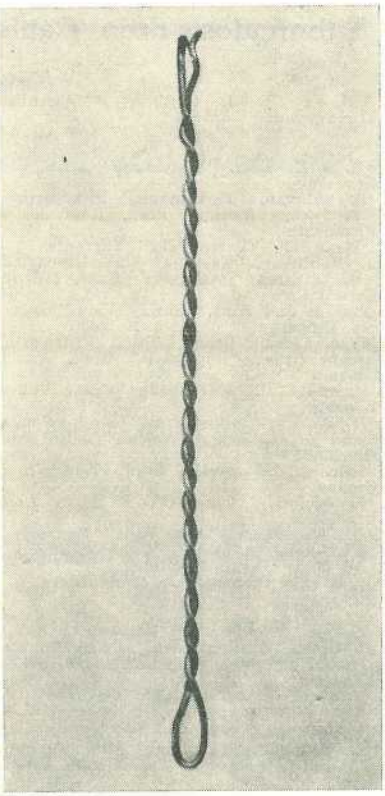

Plate 4.

**Wire-Loop. Actual Size. Gauge 18 Wire. Used to Remove the Cheesy Plug.**

been expected that most of these would have died if the plugs had not been removed.

Some 30 deaths occurred in untreated fowls during the trial. Most of these were found dead in the morning and had probably developed asphyxia during the night, while unobserved.

Thus treatment appeared to cut down the deaths considerably.

## Fowls Must be Watched

For satisfactory results, the method requires frequent observation of the fowls in order to detect cases showing signs of asphyxia.

**The method is suitable for I.L.T. outbreaks where plugs in the windpipe are a common feature. It is not intended as a treatment of I.L.T. infection, but to relieve extreme respiratory distress.**

## *Know Your Ducks*

Identification of 17 species of wild duck found in Queensland is made easy in a special booklet issued by the Agriculture Department. The booklet is issued free on application to Fauna Officer, Department of Agriculture and Stock, William Street, Brisbane.

# Tuberculosis-Free Cattle Herds.

(As at 1st June, 1959.)

## Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

## A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongelea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy
Sullivan Bros., "Valera" Stud, Pittsworth
Reuschle Bros., "Reubydale" Stud, Ravensbourne
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H. M. State Farm, Numinbah
L. R. Dennis, Diamondvale, Mundubbera
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

## Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
B. Goddard, Mt. Tyson, *via* Oakey
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

## Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

## Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Wowoonga, via Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham
N. H. Sanderson, "Glen Valley," Monto

## Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnston, "Windsor" Jersey Stud, Beaudesert
S. A. Cramb, Bridge street, Wilsonton, *via* Toowoomba
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgildie
R. N. Burrows, Box 23, Wondai
W. T. Tatnell, Cedar Pocket, *via* Gympie

## Poll Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

## Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi

# Economic Feeding Of Our Dairy Herds—Part I.

By W. F. MAWSON,
Senior Adviser in Cattle Husbandry.

**This article deals with the subject of feeding the commercial dairy cow. An attempt is made to indicate an economically sound system for providing a feed supply on a herd basis.**

Farmers wishing to obtain maximum production from individual cows will require more detailed information. At present levels of returns in the dairy industry, feeding a commercial herd for maximum production is not the most profitable system. However, there is also a stage where under-feeding is equally unprofitable. Between these two extremes of full feeding on one hand and gross under-feeding on the other lies the level of most profitable feeding.

That level must be the aim of the commercial dairyfarmer.

The level of production which is most profitable will vary between farms—it may vary from year to year on the same farm. Many factors influence it. The relative costs of different types of feed, area and fertility of land, availablity of farm machinery, labour cost, weather conditions, return from sidelines, age of the herd, the price received for the product and the farmer's managerial skill are all variable. While recognising the effect of all these variable factors, evidence is available which allows some forecast of levels of production which are practicable under various conditions in the State.

The level of production is governed by the three broad factors of breeding, feeding and management. All play their part. In practice, improvement or advancement in one aspect soon results in improvement of the other two.

Improvement in production through breeding is a long-term project. Once the aim of breeding is clear and the necessary steps taken to achieve the aim, there is little that can be done but await results.

Management and husbandry reflect the skill and ability of the farmer. They are absorbing tasks requiring planning as well as daily attention.

However, in Queensland dairy herds, the greatest avenue for increasing net returns to dairy-farmers is through better feeding. In addition, the results become evident within a short space of time. If the farms with the highest and lowest producing herds within one district are compared, the differences in production can be attributed largely to the quantity and quality of feed which is available to the herds.

Variation in the composition of milk is a problem which usually reaches its height in spring. It

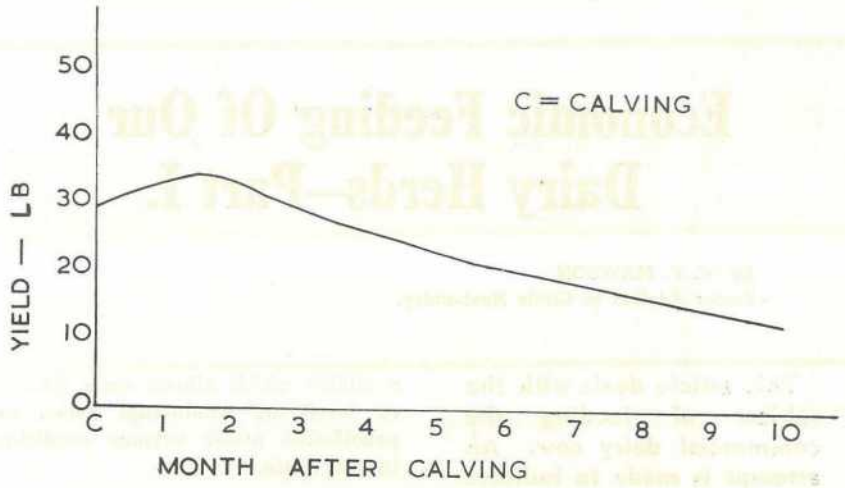


Plate 1.
**A Normal Lactation Curve.**

appears to be more severe on farms with a poor feed supply. Having the herd in good condition and on a reasonable plane of nutrition should result in less trouble from this source.

Dairy cows are remarkable animals. Within limits they can adapt themselves to a wide range of climatic conditions; they can digest coarse feeds unsuitable for other animals, and store reserves of fat, muscle and minerals for use when needed. Cows can eat material of little or no use as human food and convert it to highly digestible and nutritious human food.

But they are not magicians. They cannot make something out of nothing.

To produce milk, the raw products must be obtained as feed, principally at the time of production but also to a limited yet important extent, when dry.

## Normal Pattern of Prodution

Production of cows fed at a reasonable level before and during lactation follows a fairly regular pattern. This is known as "the lactation curve." Examination of lactation curves provides us with evidence on the effect of nutrition on production. The typical lactation curve shows that peak production should be reached between the fourth and sixth week after calving. It then declines at the rate of about 10 per cent. each month. Plate 1 shows a normal lactation curve for a cow producing about 700 gal. in 10 months.

Compare this with the curves in Plate 2. The top line in Plate 2 is the curve for cows calving in August in a number of recorded herds in south-east Queensland which average between 180 and 200 lb. butterfat (220–250 lb. commercial butter) a cow yearly.

The broken line in Plate 2 is the "curve" for cows calving in August in the same district in herds whose average production is less than 100 lb. butterfat (120 lb. butter) a cow yearly. While the curve for the higher producing cows does not show a distinct peak (possibly because the production from the start of lactation

to the first month of recording is not known), production is maintained at a fairly high level.

The response to improved pastoral conditions is seen in January and a reasonable level of production is maintained to the end of lactation. By contrast, note the constant decline in production right from calving and the short lactation of cows in the low producing herd. There is a short rise in January due to the flush of grass, but the cows were dry at the end of March.

A study of lactation curves is a very practical proposition as it leads to an understanding of the pattern of production. From this understanding, develops a knowledge of the best means of using feedstuffs. Commercially, we have to accept the situation that stock may not always be adequately fed, either from the viewpoint of quality or quantity. Underfeeding always takes its toll but its ill-effects are less serious at some stages of lactation.

Although at a considerably higher level, dairy production in New Zealand has a similar basis to Queensland. Their dairy economy is based on pastures and conserved pastures and they face periods when feed supply is short. Workers there have studied the effect on milk production of underfeeding for fixed periods, either during lactation or in the preceding dry period.

One point stands out as being of great importance to Queensland dairy farmers. It is this:

**Production during lactation and also length of lactation are largely dependent on the establishment of peak production (the highest point of the lactation curve) in from four to six weeks after calving.**

What does this entail? Firstly, it means that the dry cow must receive the necessary attention. She needs enough feed to build up body weight ("condition") and reserves of the minerals, calcium and phosphorus. At calving she should be relatively fat. These reserves of weight and minerals are used up for milk production. Secondly, if feed has to be bought, give it to the cows which are freshly calved.

The well-fed dry cow in good body condition should be a "must" on every dairy farm. An examination of production patterns for the State indicates neglect in this respect.

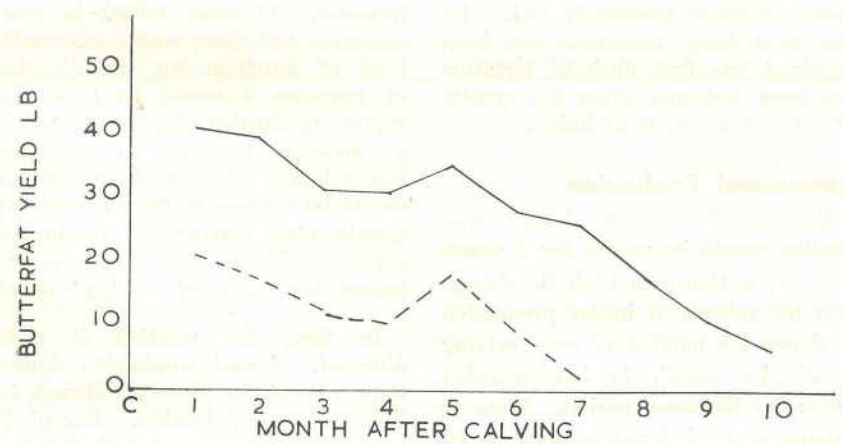


Plate 2.

**Lactation Curves of Cows in Selected Herds in South-East Queensland.**

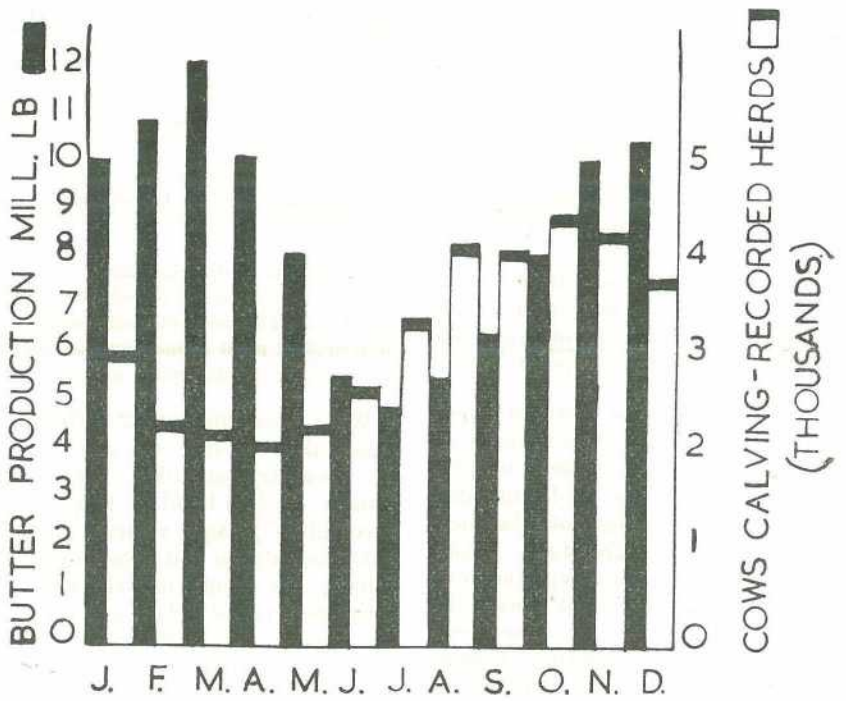


Plate 3.

**Queensland Butter Production by Months in Relation to Month of Calving in a Cross-Section of Herds.**

Cows in poor body condition at calving time produce at a low level since a relatively high proportion of the food eaten is used to build up the body condition previously lost. By the time body condition has been regained, the first flush of lactation has been lost and often the quality of pasture is again declining.

## Queensland Production

Queensland's average butter production month by month for 3 years, 1953–55, is shown in Plate 3. Alongside the column of butter production is shown the number of cows calving month by month in herd-recorded herds for the same period. Time of calving in these herds is taken to be representative of the distribution of calvings in all herds in the State.

The figures show that more cows calve in October than in any other month. The four months of greatest calvings are August to November, inclusive. If cows calved in good condition and there was a reasonable level of nutrition for the duration of lactation it would be logical to expect production figures to follow a similar pattern to calvings. Remembering that peak production should be reached in from one to two months after calving, the production curve would be one month or so behind the "time of calving" curve.

In fact, the position is quite different. Actual production figures show a peak in March, followed by February and December. Except in years of abnormal rainfall distribution, there is sufficient high quality grass in dairying districts by the

end of January to ensure top production. Why then, is top production delayed until March? The main reason lies in the fact that many dairy cows are in poor body condition in January and are forced to use the high quality young grass available to increase body weight. This takes from 6 to 8 weeks. The lag in reaching peak production can be overcome if cows are maintained in good body condition. Animals in good condition on low quality feed will respond quickly to high quality feed provided production has not fallen to a very low level and the cows are still in the first half of lactation.

## Three First Principles

The first principles which require application are:

1. Maintenance of the herd in good body condition through the year. Except in special cases, such as the availability of waste products (wet brewer's grains or pineapple pulp) or the purchase and storage of fodder during a glut when prices are low, *the fodder for this purpose should be produced on the farm.* It is difficult to see how dairying can be a profitable main enterprise on farms incapable of providing adequate feed for this purpose at a reasonable cost.

This problem is primarily one of *quantity* of suitable feed. The quality of feed can be quickly improved by purchased concentrates if necessary. The dairyman whose herd is in good condition is able to choose whether to buy feed. He will only do so if the extra returns are greater than the cost of buying and feeding out. The unfortunate position of some farmers is that they are often forced to buy comparatively high-priced feed in an effort to keep their amimals alive.

2. An adequate ration for dry cows, building up to a peak at calving.

3. Sufficient feed of both quantity and quality throughout the lactation period, particularly during the first six weeks.

In order to achieve 1, a continuous supply of feed of reasonable quality is needed. Is this practicable and if so, how is it to be achieved?

## Feeding Based on Pasture

Pastures grown under natural rainfall conditions are the basis of feeding for the State's dairy herds. For this reason some consideration will now be given to the productive value of the pastures which are available.

The value of pasture as a feed for dairy cows depends on the quantity and quality of the material and the period when it is available. Under dryland conditions this in turn depends basically on:—

(*a*) The fertility and structure of the soil.

(*b*) The species of grass or grasses.

(*c*) Climatic conditions—

(i.) Incidence, distribution and reliability of rainfall.

(ii.) Other climatic factors—particularly the effect of extremes of temperature.

(*d*) Whether legumes can be successfully grown.

(By "quantity" is meant the bulk weight of the material produced. "Quality" is a somewhat general term which in this usage refers to protein and fibre levels in addition to palatability and digestibility. For practical purposes we can think of it in terms of amount of protein since most feeds containing a comparatively high percentage of protein have a low fibre content and are highly digestible, although all are not palatable).

The following should be considered in connection with the foregoing points:

(*a*) *Soil fertility and structure*: Grasses growing on fertile soil will outyield the same species of grass on poor soil. The water-holding capacity of the soil is most important. On soils which hold moisture, grass will remain in a productive state for weeks longer compared with the same grass on a soil which dries out quickly.

(*b*) *Species of Grass*: All species of grass are different, but some attempt will be made at grouping the main ones from the point of view of dairy production. It is sufficient to state here that all grasses have a productive season limited by such factors as light, temperature and moisture conditions and no one grass will grow satisfactorily all the year round.

Under dryland conditions, practically all Queensland's pastures are summer-growing species. This is because of the lack of suitable rainfall in the winter and spring.

(*c*) *Reliability of Rainfall*: Total rainfall figures can be misleading. The "spread" or distribution of rain is much more important than the total quantity which falls. Prevailing temperatures, the nature of the wind and the presence or absence of cloud are other factors. For example, an isolated inch of rain in early December would be little use if followed by two or three days of clear skies, strong winds and high temperatures. A similar amount of rain in May followed by a few calm, cloudy cool days may be very beneficial.

On the subject of rainfall, Mr. J. C. Foley has published a book entitled "Droughts in Australia." He surveys the period from 1871 to 1955 and lists a table of droughts. For this purpose a "drought" is defined as "a dry period of over three months' duration." In the 84 years to 1955, south-east Queensland has had 12 such droughts and the Central Coast—between Gladstone and Bowen—has had 22 droughts. Thus the average for south-east Queensland is one drought every 7 years while it is one in less than every four years for the Central Coast.

It should be recognised further that a dry spell of considerably less than 3 months' duration will bring pasture growth to a standstill except in low lying or swampy areas.

(*d*) *Legumes*: Legumes are plants such as clovers, peas and lucerne which are rich in protein and minerals and provide nutrients which contribute to the vigorous growth of associated grasses. Furthermore, the feeding value of legumes does not decline so quickly with age and maturity as compared with grasses. The presence of legumes is regarded by many authorities as a necessity if permanent pastures of high productivity are to be maintained.

## Pasture Potential

Table 1 is designed as a guide to the production which can be expected from a herd under different pastoral conditions and without any other feed. If no attempt is made to supplement such pastures the production given will approximate total production. The table gives an indication of the relative productive values of the main pastures on which dairying is carried out in the State.

For higher production and returns, some additional measures of improving the feed supply are needed.

What should be done? Since pasture is usually the cheapest form of feed, the first step is to utilize it to

TABLE 1.

| Grass SPP. | Production. | | | | Value. | |
|---|---|---|---|---|---|---|
| | Per Cow/Year. | | 40 Cows. | | Milk at 3/- gal. | Butter at 3/6 lb. |
| | Milk. (gal.) | Butter. (lb.) | Milk. (gal.) | Butter. (lb.) | | |
| | | | | | £ | £ |
| Native Grasses Matt grass .. Couch grass | 200 | 100 | 8,000 | 4,000 | 1,200 | 700 |
| Rhodes .. Molasses .. Green Panic Guinea Grass Buffel .. Paspalum .. | 300–350 | 140–160 | 13,000 | 6,000 | 1,950 | 1,050 |
| Kikuyu and Mixtures of above .. | 350–380 | 160–185 | 14,600 | 7,000 | 2,190 | 1,225 |

the full. The fundamentals of improved use of pasture are: (*a*) making more pasture available by the clearing of logs, other obstructions and weeds; (*b*) increasing productivity by renovation, fertilization, having a variety of grasses. inclusion of legumes and so on; (*c*) improving utilization by strip grazing, deferred grazing, planned stocking and grass conservation when practicable.

## Pasture as Source of Feed

Irrespective of how productive and well managed a dryland pasture is, it is subject to limitations which will vary considerably from year to year. Any one or combination of the circumstances listed can leave the pasture farmer without a reasonable feed supply:

1. Prolonged dry weather.

2. Heavy frosts either at the beginning or end of winter especially if followed by a dry spell.

3. Attacks by insects such as caterpillars or grass hoppers.

4. Floods.

5. Fire.

From May to August, the spring and summer growing grasses are in a dormant state and a reserve of grass has to be accumulated in the paddock for this period if it is the only source of feed supply.

Considered from the viewpoint of quality, young growing grass ranks high. The protein content then falls gradually until flowering. The fall is then accelerated until seeding, after which it drops quickly to a very low level. Frosts, rain and heavy dews also bring about deterioration of mature grass. The value of legumes is evident here in that they have a high protein content which does not drop to the same extent as that of grass and is still quite fair in the mature plant.

## Supplementing the Pasture

When a herd is maintained throughout the year on rain grown pastures, whether improved or unimproved, there will be periods in all years when feed is inadequate in quantity and/or quality for the needs of the herd. In looking for the best means of filling in the gaps when improved pasture is inadequate, we will discuss briefly the pros and cons of the various main methods. Of course, combinations of supplements can be used and it is for each man to decide on the system

which best suits his particular circumstances.

Firstly, let us consider the possibilities. These are listed in what is considered to be a normal order of cost on a food unit basis beginning with the cheapest, and taking harvesting costs into account where necessary. The assumption is made that soils are capable of producing reasonable yields.

1. Irrigated pasture.

2. Summer and winter grazing crops and lucerne.

3. (*a*) Standing crops such as cow cane or elephant grass. (*b*) Farm-produced hay, silage or grain.

4. Purchased grains or hay.

For purposes of discussion and illustration we will assume that rain-grown pasture quality is low from May to August and that quantity and possibly quality are lacking from September to the end of December.

## Water Must Be Ample

1. *Irrigated pasture*: This is satisfactory provided there is ample suitable water available when it is most needed—that is in the driest time. To obtain maximum benefits from irrigated pastures they should be used in conjunction with rain-grown pastures. Rain-grown pastures can supply cheaply a large portion of the animals' needs for carbohydrates with irrigated pasture providing a supplement of highly digestible, protein-rich feed.

2. (*a*) *Summer grazing crops such as sudan grass, white panicum, etc., with cow pea or other suitable legume*: The summer grazing crops are most useful either at the beginning of summer or the beginning of autumn. On most farms there is plenty of pasture during mid and late summer. The early crop may provide grazing in November if conditions have been good or irrigation has been possible. On the other hand if a late planting—say February—is possible, useful grazing may be obtained in April and May extending into June in some districts if conditions are favourable.

Care must be exercised in grazing plants of the sorghum family (sudan grass is the most common one) because of the possibility of prussic acid poisoning. The precautions consist of a trial grazing using the least valuable animal, observation of the herd while grazing and a knowledge of the symptoms and treatment should poisoning occur. One pound or so of photographic hypo should always be on hand for treatment.

2. (*b*) *Winter grazing crops such as oats and wheat with field peas, vetches or tares*: These crops are very useful because they supply high quality grazing when the summer pastures have lost or are rapidly losing their content of digestible protein. Grazing should be available during May if an early planting is made.

Planting additional areas at intervals of about 3 weeks should give a continuity of grazing during the winter months. In most years, little reliance should be placed on the winter grazing crops for feed after the end of September.

In order to get several grazings from one crop some winter rainfall or irrigation is needed.

Digestive upsets and mineral imbalances sometimes occur in animals grazing on winter crops.

The heavier the grazing crop the more profitable it is. Payable crops can be grown only on suitable soils and by using sound cultural methods.

2. (*c*) *Lucerne*: While the crops already mentioned are best treated as annuals, lucerne can be expected to last for a number of years without replanting. Lucerne develops long roots and can withstand dry weather better than any other similar plant. It will produce some feed over most of the year. When planted alone,

lucerne is often used for hay production plus some grazing. Lucerne provides high quality grazing but care has to be taken to prevent stock losses from bloat. Spraying the material before grazing with a tallow-detergent mixture promises to give control when lucerne (or pastures for that matter) are causing bloat. Mowing and wilting the lush lucerne before giving the herd access to it is another method of reducing the incidence of bloat.

3. (*a*) *Standing crops such as cow cane or elephant grass*: These are heavy-yielding crops which provide a bulk of reserve feed in the paddock. They are a useful standby, particularly in an unfavourable spring and early summer. The overhead cost of this form of feed is low because of the comparatively small area of land involved and no storage facilities are necessary. However, they make a continuous drain on labour for feeding out, as the material has to be cut at least every second day and transported. Chaffing of the material avoids wastage in feeding and enables the herd to eat it in a shorter time.

This type of fodder is best suited to those farms with good pastures and only a small area of land suitable for cultivation. When climatic conditions are favourable, the pastures may carry the herd through the year and the standing cane becomes a reserve. However, for purposes of regrowth the cane should be cut at intervals of not more than 18 months regardless of whether it is needed for fodder. Further information should be obtained on the management of elephant grass.

3. (*b*) *Farm-produced hay, silage or grain*: Lucerne hay is possibly the most valuable form of conserved fodder because of its high food value and convenience in feeding out. Oaten and wheaten hay are subject to damage by rats and mice and are not greatly favoured. Hay made from the summer crops is often fibrous and of low food value. Surplus pasture is sometimes available in March or April but weather conditions at that time are uncertain for hay making. Time of cutting has a big influence on hay quality.

## Plan Ahead

Green crops can be ensiled successfully provided the correct methods are used and the silo is suitable. Surplus grass would appear to be a cheap source of material for ensiling but there are two important points which should not be overlooked. Firstly, it is necessary to plan ahead and prepare the paddock intended for grass silage. Secondly, a minimum of 20 tons of green material should be available at one time. This is a disadvantage compared with hay of which as little as a few hundredweight can be successfully made at one time if desired.

The summer-growing crops such as maize and sorghum, with or without a suitable legume, are very well suited for silage purposes. They grow readily in most parts of the State and are probably the simplest of all crops from which to make good silage.

Silage is one of the surest forms of conservation since it is fire and flood proof (if properly sited) and can be made under weather conditions which would prevent hay-making. Silage is also a very suitable fodder for feeding to stock under dry conditions as it is succulent and slightly laxative. It is rather bulky to handle but modern machinery removes the hard physical labour from silage-making.

Grains warrant consideration in districts where they can be readily grown. They are economical to store and easy to feed out. Grains should be rolled, crushed or coarsely ground before being fed.

4. *Purchased grains or hay*: The buying of hay or grain may be

sound business if it is part of a predetermined policy to buy and store when prices are low. The essentials of good buying are to know the type of feed required and then buy it in its cheapest form. The tables in Part 2 show the values of common feeds. There are also examples of how to estimate the cost per feed unit.

In addition to the main types of feeds described there are others which are useful where available. These include the stubble of maize, sorghum, oats or wheat; peanut straw; sweet potatoes, both vines and tubers; swede turnips and mangels.

Waste products which are available on a limited scale are wet brewer's grains, pineapple pulp and molasses. The latter two are not available for the whole year but molasses can be stored in drums.

## Which Type of Feed?

The decision on the type of feed to use in order to supplement pastures will vary from farm to farm and depends on many factors. The more important ones are:

(*a*) The quantity and type of feed required. If plenty of low quality roughage is always available then grazing crops or grain plus a protein concentrate may be a good choice. On the other hand if quantity is needed, silage or lucerne hay may be the answer.

(*b*) The months over which it will be required. For example a winter grazing crop does not supply feed in December.

(*c*) The type of farm. If arable land is very limited a high yielding crop will be needed.

(*d*) The machinery which is owned or can be purchased or hired.

(*e*) The facilities for feeding the cows.

(*f*) The main calving season for the herd.

(*g*) Periods over which milk quotas are determined.

(*h*) Whether product has to be supplied all the year round.

(*i*) The amount of time which is available for producing and handling feed.

(*j*) If the only requirement is for a protein-rich supplement for a short period, the purchase of a protein-rich concentrate may be the best proposition.

## Concentrate Feeding

Concentrate feeding presents a knotty problem and will be considered in the two sets of circumstances which are common.

Concentrates are feeds of high food value without being bulky. The main ones concerning the dairying industry are the various grains, bran and pollard, and the meals such as meat and bone, cottonseed, peanut, linseed and coconut and proprietary mixtures made up by various firms.

Let us consider the first circumstance of a farmer who produces grain on his own farm:

Suppose a farmer has a crop of sorghum which he wishes to use as fodder for his herd. He can either make silage or head the crop and feed the grain as well as allowing the herd to eat the standing stubble. If he has grain-harvesting machinery and facilities for storing and feeding out the grain without the equivalent for silage, then the utilization of the crop as grain and stubble is probably justified. In this case it is convenient and possible to use a concentrate rather than a roughage.

Similarly, when fodder has to be bought, the best value for money should be obtained. If concentrates are the most economical buy, there would appear to be no good reason why concentrates should not be the choice.

However, the more common approach to concentrate feeding concerns the feeding of concentrates in order to obtain extra production. Will concentrate feeding do this economically? This is a question which is of importance to many farmers. The answer depends mainly on the following considerations:

1. The stage of lactation of the animals and present level of production.

2. The productive capacity of the animals.

3. The type of feed otherwise available.

4. The length of time over which concentrates may have to be fed.

5. Feeding the correct type of concentrate according to the nature of the basic ration.

6. The cost of the concentrate.

7. The price received for milk, cheese or butter.

## The Basic Ration

It will be necessary to consider the basic ration before discussing further the pros and cons of concentrate feeding.

The main portion of this article is directed towards the need to maintain a continuous supply of good quality, cheaply produced feed. This basic ration is often termed the "roughage" ration and when the term "good quality roughage" is used it refers to such items as growing pasture or crops, lucerne hay or good silage. Examples of low protein roughage would be mature pasture, poor silage, cow cane, stubble, and so on.

For purposes of estimating feed requirements for dairy cows it is convenient to consider that there are two components to the daily ration. The first part is known as the maintenance ration. This is defined as the amount of feed required to maintain an animal for 24 hours without its gaining or losing weight and without any milk production. The production ration is the part used for milk production and can be estimated as a certain amount of feed per gallon of milk.

These distinctions are convenient but not clear cut. For example, when a cow in milk is fed a maintenance ration only, she does not cease to milk entirely but draws on her body fat and muscle for some milk production as long as these reserves are available. Of course, this is done only at the expense of future production.

There is another feature which distinguishes a maintenance ration from a production ration. The protein content of the ration must be higher for purposes of production. From $\frac{1}{2}$ to $\frac{3}{4}$ of a pound of digestible protein is needed for maintenance of a mature dairy cow and about half a pound of digestible protein is needed for each gallon of milk. Thus a cow producing three gallons of milk a day needs nearly four times as much protein as a dry cow, unless the dry cow is getting close to calving. It follows that a cow producing at this or lower levels requires a ration of higher quality in terms of protein content than does a dry cow.

## Below 50 Per Cent.

In the United States of America it has been estimated that good cows provided with all the high quality roughage they will eat but no concentrates will attain about 85 per cent. of their basic producing capacity. When medium quality roughage is fed this falls to 75 per cent. and further to 64 per cent. when poor quality roughage is fed. In Queensland we

have a further situation where not only is the roughage of very poor quality for most of the year but it is also lacking in quantity. There the production attained is probably well below 50 per cent. of the basic producing capacity.

Under the conditions outlined, the farmer with good quality roughage is in a position to feed concentrates if it pays him. He will want an increase in milk production which more than pays for the cost of buying and feeding the concentrates. A small scale trial will soon give him the answer. At the other extreme where the roughage is lacking in both quality and quantity, any extra feed received will go primarily towards maintenance of the animals. The position thus is that high-priced concentrates are being used to do a job which should be done by the cheaper farm-produced roughage.

It is suggested that the basis of sound dairy practice is to be in the position to feed concentrates if it pays. Besides the immediate return in sales of produce there are other factors worth considering and for which there may not be an immediate return. These are:

1. Under certain conditions concentrate feeding has the effect of reducing the quantity of feed eaten in the paddock.

2. Increased production may mean more skim milk for pigs, thus saving overall farm feed costs.

3. Concentrates may be the best means of balancing a diet which is deficient in just one respect. Protein is the factor usually involved in this case.

4. The use of concentrates may be justified to prevent a drop in production due to a short-term gap in the feed supply. This would most commonly occur in the period before the wet season when calving in spring is practised.

In summing up, it is probably true to say that the farmer who is likely to make money from concentrate feeding is the one with the best basic ration. The uneconomic position arises when a farmer is forced to buy concentrates to use as a maintenance ration for his herd.

No mention has been made of the feeding system described by Professor Boutflour of England. His method is to supply the cow with large amounts of good quality concentrates and only enough roughage to maintain her bodily functions in good working order. Stalling of animals and frequent feeding and milking are necessary. There are difficulties in the large scale application of this method in Queensland under present conditions.

## Continuous Feed

A continuous feed supply does not just happen. Planning is necessary—not only for normal conditions but also for a reserve to deal with the inevitable dry spell or crop failure. The farmer who relies on favourable seasonal conditions for the supply of feed is sure to be disappointed frequently in most of Queensland's dairying areas.

The steps in planning are to decide what form the feed supply will take, how much will be needed and when it will be needed.

By way of example, take the case of a farmer with a herd of 40 Jersey cows who has Rhodes grass and green panic plus a little lucerne in pasture mixtures. He can grow winter grazing crops and the summer crops such as maize and sorghum.

We will consider the feed supply by the calendar:

*January to April*: With the possible exception of January the pastures will be quite good and no other feed is necessary.

*May to September*: The pasture will vary, depending on the season,

but can be expected to provide fair quality roughage. Some good quality feed is needed for production. This could take the form of a winter grazing crop such as oats and there may be some lucerne grazing. If oats is used, about ½ of an acre for every cow will be needed—that is, from 13 to 15 acres altogether.

*October to December-January*: This is usually the most difficult period. There may be a good spring growth of pasture if storms are plentiful and frequent but more often the pasture is very short and providing only a fraction of the animals' needs. Lucerne grazing will supply a little high quality feed but there will still be a lack of quantity.

The possibilities could be:—

(*a*) Lucerne hay; or

(*b*) Cow cane or elephant grass; or

(*c*) Silage—either crop or grass.

## Based on Four Months

The quantities shown are based on a period of four months, assuming that pasture is a doubtful quantity in January. The allowance made per cow daily is an average, bearing in mind that some pasture is also available. There would also be an overlap in feeding. For example, silage feeding should start a week or 10 days before crop grazing finishes and the amount fed would be steadily increased from 10 lb. daily up to the limit.

(*a*) *Lucerne Hay*—10 lb. daily for 120 days = roughly half a ton per cow or 20 tons for 40 cows. This quantity could be produced from about 8 acres without irrigation in a reasonable lucerne growing district. Higher yields would be obtained under irrigation.

(*b*) *Cow Cane or Elephant Grass*: 40 lb. daily for 120 days = roughly 2 tons per cow or 80 tons for 40 cows. This could be grown on 2-4 acres of suitable land. Cow cane normally yields the greater weight of material per acre.

(*c*) (*i.*) *Grass Silage*—40 lb. daily = 80 tons for 40 cows. Probably between 14 and 20 acres of grass would be needed.

(*ii.*) *Maize or Sorghum Silage*—40 lb. daily = 80 tons for 40 cows. From 8 to 12 acres of this crop would produce this quantity.

With such a feeding system, yields of from 460 to 600 gal. of milk or 225-275 lb. of commercial butter per cow yearly are quite practicable.

This is an example of normal yearly needs and allows nothing for reserves. Such reserves are needed to meet the situation when the winter feed supply fails and/or the spring and early summer feeding is prolonged or at a heavier rate. The conservation of 1 ton of hay or 3 tons of silage per cow in addition to normal requirements could be regarded as a reasonable fodder reserve.

# Book for Pig Raisers

A book written for the pig raiser and the student is L. A. Downey's revised edition of "Pig Raising." Mr. Downey's first-hand knowledge of his subject springs from his experience as a pig husbandry specialist in Queensland, New South Wales, and Victoria. This book is reliable and authoritative. The revised edition is well-illustrated with photographs and drawings to meet present-day requirements.

**Pig Raising by L. A. Downey, H.D.A., Second Edition. Revised 1958. Angus and Robertson, Sydney. Price 45s.**

# Bucket and Bail

DANGEROUS enemies of the keeping quality of milk are hidden in the dust in and around milking sheds. These are the bacteria that cause milk to go sour and curdle. The dust menace around milking yards can be greatly reduced by the proper layout of the dairy shed. Provision of a grassed, stock-free area around the milk room will be a great help.

When planning a new shed, give some thought to the prevailing winds. Even with a grassed, stock-free area, dust can still be a problem on windy days when the milk room lies in the path of winds blowing over dusty yards. If you're building new dairy premises or altering your layout, you've an opportunity to keep the dust nuisance to a minimum. Consult your local Dairy Officer for details of dairy shed layout.

*—J. ARMITT,*
*Dairy Officer.*

CULLING, or weeding out the low producers, is a necessary part of dairy farming. It allows the farmer to get rid of the passengers in his herd and to replace them with better cows.

In culling, the milking conditions of all the cows in the herd have to be compared. Incorrect comparisons can easily be made if you fail to consider all the factors that influence yields.

The age, health and management of each cow has to be considered. Footrot, mastitis, or udder injury can cause low yields. The length of time between calvings and the length of the dry period also affect a cow's performance. When the period between calvings is less than 12 months, production during the following lactation is lowered. For reliable culling, keep dependable records to help you judge each cow on her merits.

*—J. SMITH,*
*Dairy Adviser.*

THE milk vat is an easily cleaned piece of dairy equipment, but this doesn't mean that it should be misused. Evidence of misuse is often found when milk vats are examined.

The tinning will be scratched if buckets of water are stood in the vat. It's unwise to mix milking machine detergents by pouring acid or detergent solutions into buckets of water standing in the vat. This leaves room for acid or detergent to splash onto the vat and commence corrosion. After normal washing, the vat should be rinsed thoroughly to remove all traces of these cleaners. Remember also, that the milk vat isn't a wash-up trough. Always provide and use a separate, galvanised iron wash-up trough.

*—J. D. ELRINGTON,*
*Senior Dairy Machinery Adviser.*

## Plans For July

Commence training heifers to ensure good milk let-down.
Tattoo calves for future identification.
Control grazing on weed-infested paddocks to minimize milk taints.
Check the mechanical efficiency of milking equipment.
Change the separator oil and renew the vacuum pump oil wicks.
Check calves for worms.

# Dairyman Fed Silage And Showed Clear Profit

By I. H. RAYNER,
Cattle Husbandry Branch.

**Within this article lies the answer to the dairyman's oft-repeated question, "Would it pay me to feed silage to my cows?"**

DURING the latter part of 1958, Mr. P. J. Cosgrove continued to deliver more milk than ever before from his farm at Pilton, on the eastern Darling Downs—while production on similar farms declined.

Over the year, he made an additional clear profit of almost £200 by feeding sorghum and cowpea silage to his herd.

In addition, Mr. Cosgrove's cows were kept in good condition to continue their lactations. While some of the benefit from having the cows in good heart was obtained in January, there was little doubt that they would continue to milk better for many months.

An important point is that the cost of this silage was high because the yield was low. It costs no more to prepare and plant land for a good crop than a bad one. The same charge spread over a heavier crop will, of course, give a lower cost per ton.

Mr. Cosgrove's yield, due to the poor season, was a little over 5 tons per acre. In a normal year more than double this quantity is the rule.

How Mr. Cosgrove got the answer to the question of silage costs may be readily seen from Table 1.

The rainfall figures in the first column of the table account for the general district decline in production. The figures for July and October do not give a true picture. In both cases, little feed was obtained because of the lack of follow-up rain combined with warm, windy weather.

Column 2 shows the production trend of four farms which were similar to that of Mr. Cosgrove. Their herd and feeding standards were similar to his, except that they did not feed silage. The figures give production for each month as a percentage of the June production. Production would undoubtedly have fallen further were it not for the greater than usual number of cows calving during the period.

Column 3 gives Mr. Cosgrove's actual production.

Column 4 gives the production which would have been obtained if the same trend had occurred as on the other farms. Mr. Cosgrove considers that his production, without silage, would have been lower than this as he was particularly short of grazing.

Column 5 shows the difference in production due to feeding silage. (Feeding commenced on August 3). It is interesting to note that actual production for July (when no silage was fed) was almost the same as the calculated figures (just 4 gal. less).

Plate 1.

**Filling the Trench.**

Column 6 shows the return from the extra production. Although feeding ended on December 13, Mr. Cosgrove's advantage over the comparable farms was greatest in January. All farmers who have fed their cows through a dry time know that much of the benefit is obtained when the herd again has plentiful green feed. This is readily explained by the difference between cows which have been kept in good condition and milking fairly well, and those whose condition and production have fallen away.

TABLE 1.

| — | (1) Rainfall. | (2) Production Trend of Comparable Farms. | (3) Mr. Cosgrove's Actual Production (gal.). | (4) Mr. Cosgrove's Production Calculated on Trend. (gal.). | (5) Extra Production (gal.). | (6) Value. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | £ | *s.* | *d.* |
| January, 1958 | 317 | .. | .. | .. | .. | .. | | |
| February .. | 274 | .. | .. | .. | .. | .. | | |
| March .. | 335 | .. | .. | .. | .. | .. | | |
| April .. | 75 | .. | .. | .. | .. | .. | | |
| May .. .. | — | .. | .. | .. | .. | .. | | |
| June .. .. | — | 100 | 1,532·5 | 1,532·5 | 0 | .. | | |
| July .. .. | 312 | 104 | 1,589·8 | 1,593·8 | −4·0 | .. | | |
| August .. | 20 | 89·6 | 1,661·9 | 1,373·1 | +288·8 | 35 | 1 | 0 |
| September .. | 75 | 91·3 | 2,099·1 | 1,399·2 | +699·9 | 83 | 5 | 0 |
| October .. | 334 | 99·7 | 2,182·1 | 1,527·9 | +654·2 | 75 | 4 | 0 |
| November .. | 20 | 94·4 | 2,065·6 | 1,446·7 | +618·9 | 72 | 14 | 0 |
| December .. | 420 | 102·8 | 2,206·2 | 1,575·4 | +630·8 | 71 | 5 | 0 |
| January, 1959 | .. | 112·8 | 2,913·3 | 1,728·7 | +1,184·6 | 126 | 3 | 0 |
| | | | Total Extra Return .. .. | | | 463 | 12 | 0 |

## How Return was Calculated.

To obtain the trend from comparable farms the monthly production of each of four farms was worked out as a percentage of the June production. The percentages for the four farms were then averaged as follows:—

Thus Mr. Cosgrove's calculated figure for September was 91.3 per cent. of his June production, that is,

$$\frac{1{,}532.5 \times 91.3}{100} = 1{,}392.2 \text{ gal.}$$

In fact, if Mr. Cosgrove's herd had been fed in the same way as those on similar farms his production would only have been the amounts shown in column 4.

TABLE 2.

| Farmers. | A. | B. | C. | D. |
|---|---|---|---|---|
| June production (gal.) .. .. | 1,464·8 | 1,262·8 | 1,231·4 | 789·5 |
| September production (gal.) .. .. | 1,398·6 | 1,148·4 | 1,143·9 | 679·6 |
| September production as % of June .. | 95·5 | 90·9 | 92·9 | 86·1 |
| | Average : 91·3% | | | |

Mr. Cosgrove's calculated production (Column 4 in Table 1) was obtained by multiplying his actual June production by the percentage for each month from column 2, for example during September production from "other farms" was only 91.3 per cent. of their June figure.

An average of 40 head—36 milkers and 4 dry stock—were fed silage from August 3 to December 13. At each feed, about half a ton of silage was

Plate 2.

**The Trench Silage is Covered with Earth by Mechanical Means.**

Plate 3.
**Cutting Out a "Bench" of Silage.**

Plate 4.
**Silage is Forked on to the Truck.**

put out for the herd. Thus on twice daily feeding the cows received an average of 56 lb. silage per head per day, while the once daily feed gave them 28 lb. per head.

Feeding was carried out as follows:—

August 3 to 20—once daily.

August 21 to October 14—twice daily.

October 15 to November 10—once daily.

November 10 to December 13—twice daily.

From October 15 to November 10 only one feed daily was given as some crop feed was available following the October rain.

## THE COST OF SILAGE.

The figure of £463 gross profit is of no value to the practical farmer unless he knows how much the silage cost. Only a net profit will increase his bank balance. In this case the cost was entirely made up in producing and feeding out the silage. There is little extra expense in milking cows producing 3 gal. a day rather than 2.

Mr. Cosgrove's total costs in producing approximately 112 tons of silage from 22 acres were as follows:—

### Allowance for Use of Land.

If this paddock had been used to grow grain sorghum for sale, a net profit of £4 an acre may have been obtained during this particular season. £4 per acre was thus the cost of using it instead to produce sweet sorghum for silage. Therefore, the total "hire" of land was £88.

### Land Preparation.

The paddock was worked with a chisel plough twice (during September and October, 1957) and scarified

twice (during November and December, 1957). The chisel plough fitted with sweeps was used as a scarifier.

| | £ | s. | d. |
|---|---|---|---|
| Chisel plough scarifier repairs, interest and depreciation .. .. .. | 9 | 11 | 3 |
| Tractor repairs, interest and depreciation .. .. | 20 | 12 | 5 |
| Fuel, oil and grease .. .. | 8 | 0 | 0 |
| | £38 | 3 | 8 |

Farmer's own labour, 30 hours.

## Planting.

Sugardrip sweet sorghum and Christaudo peas were planted on February 12 and 14, 1958, following one inch of rain.

| | £ | s. | d. |
|---|---|---|---|
| Seed .. .. .. .. | 24 | 0 | 0 |
| Combine repairs, interest and depreciation .. .. | 2 | 17 | 3 |
| Tractor repairs, interest and depreciation .. .. | 5 | 3 | 0 |
| Fuel, oil and grease .. | 2 | 16 | 7 |
| | £34 | 16 | 10 |

Farmer's own labour, 11 hours.

## Harvesting.

The crop was harvested with a flail type forage harvester at the end of May, 1958. Two extra men were employed—one to drive the tractor, while Mr. Cosgrove handled the truck, and another to spread and roll the silage, and look after the dairy herd.

| | £ | s. | d. |
|---|---|---|---|
| Forage harvester repairs, interest, depreciation .. | 32 | 8 | 0 |
| Truck registration, repairs, interest, depreciation .. | 9 | 16 | 7 |
| Tractor repairs, interest, depreciation .. .. | 5 | 3 | 0 |
| Fuel, oil and grease .. | 15 | 6 | 8 |
| Hired labour (2 men for 30 hours) .. .. .. | 22 | 10 | 0 |
| | £85 | 4 | 3 |

Farmer's own labour, 30 hours.

## Trench.

The trench was excavated by a contractor for £19 6s. 8d. This cost can reasonably be spread over five fillings.

Thus the cost in this case is £3 18s.

Plate 5.

**Feeding Out to the Herd.**

## Covering.

A ditcher was used to spread a soil cover over the silage. One man was employed on the ditcher.

| | £ | s. | d. |
|---|---|---|---|
| Ditcher repairs, interest, depreciation .. .. | 1 | 12 | 0 |
| Tractor repairs, interest, depreciation .. .. | 2 | 6 | 10 |
| Fuel, oil and grease .. | 1 | 11 | 5 |
| Hired labour (1 man for 5 hours) .. .. .. | 1 | 17 | 6 |
| | £7 | 7 | 9 |

Farmer's own labour, 5 hours.

## Feeding Out.

The task of removing the silage from the trench—often dreaded by farmers considering the use of silage—proved very easy in this case. A light dozer blade on a wheel tractor was used to push the soil cover off in strips across the trench. One blade width (7 ft. wide) was sufficient for 2 weeks' feeding. The few inches of rotted material on top of the silage prevented loss of feed value after the soil cover was removed. The silage was then simply cut in 2 ft. wide strips across the trench with a hay knife, and forked onto a truck. The truck was driven out into the paddock, where the silage was forked off in small heaps. Approximately half an hour each two weeks was taken to remove the soil cover. Feeding out—cutting, loading, and distributing the silage—took less than half an hour for each half ton load. When dry weather prevents normal farming operations, farmers can usually spare this time to feed their cows.

| | £ | s. | d. |
|---|---|---|---|
| Tractor repairs, interest, depreciation .. .. | 2 | 6 | 10 |
| Dozer blade repairs, interest, depreciation .. .. | 3 | 16 | 0 |
| Truck repairs, interest, depreciation and registration .. .. .. | 2 | 10 | 0 |
| Fuel, oil and grease .. .. | 3 | 0 | 0 |
| | £11 | 12 | 10 |

Farmer's own labour, 110 hours (spread over 4 months).

Total cost .. .. £269 3s. 4d.

Total own labour .. 186 hours.

The total cost deducted from the gross return of £463 12s. 0d. leaves a handsome profit of £194 8s. 8d.

This return of £194 would not be worthwhile if it did not more than compensate Mr. Cosgrove for his labour. Obviously his 186 hours' work was well paid for, with a good margin left over.

Mr. Cosgrove's experience was exceptional only because it was possible to obtain production costs, together with a reasonable assessment of returns. Many other farmers have reaped similar benefits from silage.

**Mr. Cosgrove is putting down a further 500 tons of silage at present. Many others are replenishing or building up reserves.**

They know that silage in the ground will return better interest than money in the bank.

# Super for Winter Pastures

Dairy farmers should be attending to the nutritional requirements of their winter pastures. Superphosphate applied following the first good rains in late autumn-early winter will stimulate the perennial legumes and will assist seedling clover development.

Clover pastures fertilized with 2 to 3 cwt. of super to the acre in early winter will be ready to produce more pasture for dairy cattle in August and September.

—*A. Hegarty, Agrostologist.*

# Dairymen Might Profit From These Winter Pastures—Part II.

By C. A. SCHRODER, Assistant Irrigationist.

**This article describes the establishment and management of the irrigated annual winter type pastures discussed in last month's issue.**

The following points should be noted particularly:—

(1) Irrigated annual type winter pastures can be expected to supply heavy quantities of attractive highly nutritious pasturage from mid-May to mid-October. One acre of such pasture, well managed, should when used as a protein supplement maintain six to seven cows in good production throughout the autumn-winter-spring period.

(2) Cool weather growth rates exceed that of perennial species, and irrigation requirements are low.

(3) Irrigation is essential to success.

(4) Effective nodulation of legumes must be obtained soon after germination.

(5) Management in the first year must be designed to obtain good seeding down.

(6) Reduction of stubble is necessary in January-February to obtain good re-establishment. This may be effected by low grazing or mowing.

(7) If there is very heavy density of summer volunteer cover, reduction by tine cultivation should be carried out every second or third year.

(8) Soil nutrient deficiencies, either of major or minor elements, must be corrected as they occur during the life of the pasture. The maintenance of a desirable amount of clover in the mixture should be the method employed to supply the grass with nitrogen.

(9) Good grazing management must always be practised.

(10) There seems to be good possibilities of utilizing the annual winter pasture land for producing certain summer crops.

In the first year of experiments along these lines a crop of maize grown for grain returned a satisfactory yield.

The pasture regenerated well by natural means among the maize. The pasture was ready for the grazing at the same date that the maize was ready for harvesting.

Throughout the season this pasture performed quite as well as an adjacent area where the land was not utilized in summer.

Maize or sorghum for silage are other crops which would probably result in good land utilization in summer and fit well into the farm feed conservation programme.

(11) The Lockyer Valley has a wide variation between summer and winter temperatures. Hot summer conditions are normal and enforce

careful management and strict attention to irrigation for the successful persistence of perennial temperate pastures based on White clover.

Crops such as maize, sorghum, lucerne, and sudan grass and grasses like paspalum and green panic do well in summer. A hazard with them is that though rainfall is predominantly of summer incidence it is unreliable. Supplemental irrigation is normally necessary to ensure sufficient moisture for reliable production.

The combination of pasture in the autumn-winter-spring period and a summer crop in the spring-summer period if it can be successfully adapted has many good points. The annual winter pasture species give better production in the winter season of growth than do the perennials. On the other hand the natural summer crops are less vulnerable in summer and make better use of the high temperatures and long days than do temperate species. Winter growing pastures are good for utilizing harvested water before the heat of the following summer. Evaporation loss from storage dams is less heavy in the autumn-spring period.

Shortage of water in summer periods due to irrigation restrictions or other reasons will have less drastic results with the deeper rooted crops like maize than with summer clover pastures.

It is not suggested that perennial pasture areas be reduced. It is advisable, however, to plan carefully the most economic use of land, irrigation water and labour on a long-term basis.

(12) Under normal average conditions on the Gatton Regional Experiment Station a programme similar to that outlined in (11) would require 12 in. per acre of irrigation per season for the pasture, and 2½ in. per acre to supplement rainfall in the summer silage crop should soil moisture stress occur.

## Pasture Mixtures

Pasture mixtures are made up of suitable clovers and grasses. Two strains of subterranean clover have been very successful on the Gatton Regional Experiment Station. These are Yarloop and Clare strains.

Both are early growers and vigorous producers and under the conditions at the station they have shown themselves superior to mid-season and late strains. Yarloop has marked ability to produce under wet soil conditions and has been better than Clare in locations where drainage is slow.

It is essential to obtain good nodulation of the clover as quickly as possible after germination. Good results will not be obtained otherwise. Inoculation with a suitable strain of nitrogen-fixing bacteria should be done carefully at planting. Suitable inoculum is available free from the Department of Agriculture and Stock and the instructions issued with each package should be followed closely.

In inoculation trials carried out on the Station, quite satisfactory nodulation has always been easily obtained with Clare strain. Yarloop has required more careful handling but has always responded if the instructions given are carefully followed.

Wimmera rye grass has performed well on the station. It is very easy to establish and does not require a well-prepared seed bed. For this reason it establishes easily in stubble.

It is a very fast grower, very acceptable to stock, and of high food value if not allowed to become old before grazing. Seed is produced freely in October-November. It germinates well.

The Gatton strain of this grass has performed particularly well on the station in the grazing trial carried out last season. The seed for this trial was increased from a few heads obtained from material that had regenerated well in the Rockhampton district.

The annual type prairie grass has been tried on the station with somewhat less success than that obtained with wimmera rye grass.

Priebe's perennial prairie grass seems to hold promise and is under trial. On the station it produces its best growth in autumn and spring. Winter growth rates are less than for wimmera rye. It is capable of re-establishing quite well in autumn from its own seed.

The inclusion of half a pound of lucerne seed to the acre is often worthwhile. This will make some growth after irrigation has ceased in October, and will provide a small amount of summer grazing.

In this way some use is made of any subsoil moisture resulting from the irrigation season as well as any rain that occurs.

## Planting

The pasture should be planted into well-prepared land at the end of March or very early in April. When this is done, good grazing is usually available soon after the middle of May. A successful stand can even be obtained by planting any time in May, but a much lighter amount of grazing will be obtained in the first year when this is done.

The seeding mixture recommended is:

| | per acre. |
|---|---|
| Wimmera rye grass .. .. | 4 lb. |
| Clare strain subterranean clover | 4 lb. |
| Yarloop strain subterranean clover | 4 lb. |

If desired, 8 oz. of lucerne per acre may also be included.

Plate 4.

**Dense Re-Growth of Louisiana White Clover on 5-5-58.** This pasture was un-irrigated from 31-10-57 to 7-5-58. This is the second grazing for the season, the first was ready on 19-3-58. No summer cropping programme was carried out in this area. The pasture was originally planted on 3-4-57.

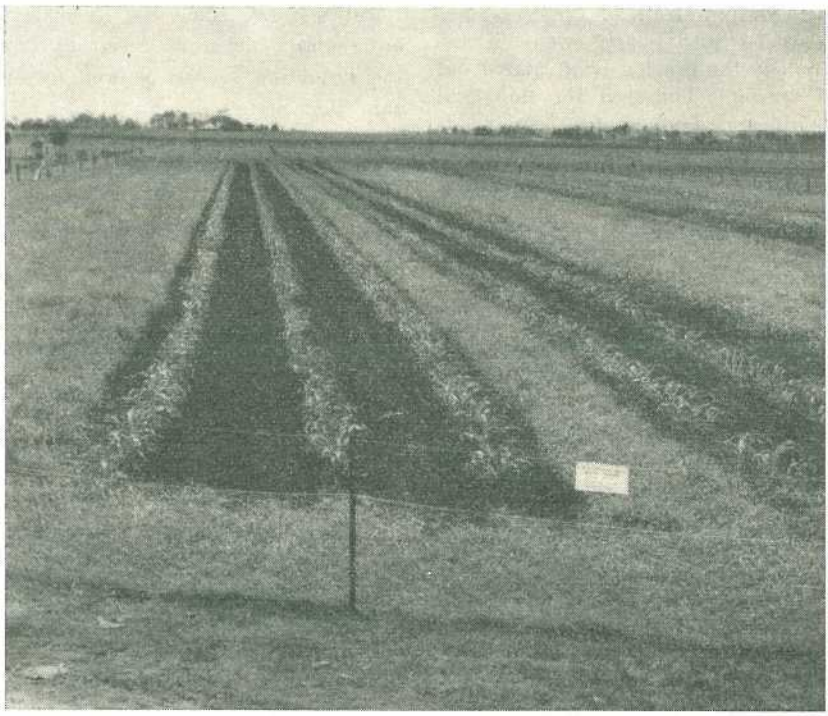

Plate 5.

**Land Utilization in Summer.** The annual pastures are cultivated for crops—in these experimental plots maize sown in January.

If the soil is well drained, Yarloop can be omitted and extra Clare included. Where drainage is poor or the soil very heavy, it is better to omit Clare and double the amount of Yarloop.

## Louisiana Strain White Clover

Trials with Louisiana White Clover strain were commenced on the station in 1957. These were referred to in Part I of this article. Several more years of experimental work are necessary before any definite recommendations can be made. The results of the first year's work, however, are most promising.

This clover is really a perennial grower. Under a full irrigation programme it will persist indefinitely, and provide good seasonal grazing throughout the whole year. However it has some excellent characteristics which recommend that it be tried as an annual winter pasture to provide grazing in the vulnerable May to October period. Irrigation would be withheld at the end of October. In this way it may serve as an alternative to the true annual subterranean clover. Perhaps in some areas it may prove superior.

Louisiana is notable for its very free seeding habit. Seed setting commences early in spring and continues throughout the growing period of the plant. The seed produced is very viable. If the parent crop dies there is an abundance of good seed at the soil surface for re-establishment of the stand when conditions become suitable.

Unirrigated Louisiana has also proved itself capable of withstanding long periods of dry hot weather without dying out.

Indications from the first year of the trials are that, if irrigation is not applied after the end of October, Louisiana though unproductive, may remain alive and then commence regrowth from old runners present in the mulch cover about the end of January. When this occurs, quite good grazing can be expected from the end of March onwards. However, it would be essential to retain sufficient pasture or mulch cover throughout summer to prevent extremely high soil temperatures which the runners could not tolerate (Grazing bare to ground level would be fatal). With this method Louisiana would provide earlier grazing than subterranean. The latter would provide faster growth and more grazing in the cold months. See Plate 4.

If death of the clover occurs in summer, the pasture can be expected to re-establish itself from seed in the same way as subterranean. Indications are that in these circumstances the first grazing of the season would be available much earlier from subterranean than Louisiana.

Thus there are prospects of using Louisiana white both as a winter seasonal pasture (irrigated as necessary during autumn to spring, unirrigated in summer), and as a true, annual, self-regenerating pasture, treating it in the same way as subterranean clover.

It appears likely that Louisiana can tolerate less shading at regeneration time than can subterranean. This may prove a limiting factor when the full subject of land utilization is considered. (This is referred to later.)

Some care is required concerning the use of clovers. Mixing of perennial and annual strains of clover almost invariably has one result. The perennial, whether used as an annual or seasonal producer, will encroach under the influence of rainfall in the


Plate 6.

**Successful Pasture Regeneration Ready for Grazing in the Summer Maize (14-5-58).**
Original sowing of pasture was 3-7-56.

period between death and regeneration of the annual. In a few years the perennial strain will take control to the detriment of the pasture.

The same result will happen at a slower rate, because of transfer of seed, if perennial and annual clovers are grazed simultaneously.

Usually if the amount of white clover by invasion becomes too great it can be controlled satisfactorily by ploughing or tine cultivation when the annual clover is dormant.

Any soil nutrient deficiences should be corrected by the application of suitable fertilizers before planting.

On the fertile alluvial soils of the Lockyer Valley, fertilizer treatment is generally not required. However, sulphur sometimes becomes deficient in the soil after a couple of years under irrigated pasture. Any deficiency will need to be remedied as it occurs.

The particular needs of the soil type in use must always be kept in mind.

## Pasture Management

The first year should be regarded largely as a period of pasture development although good grazing can be obtained at the same time.

Where soil fertility conditions are good, the rye grass will make remarkably quick growth following germination. This results in control of weeds and allows an early grazing return to be obtained by the farmer.

However, this ability to make such fast early growth also carries an element of danger. If sown too heavily and allowed to grow too freely the grass will smother the clover seedlings and prevent them from developing.

It is essential to develop a good stand of clover at an early date. The pasture should be at least 30 per cent. clover by the middle of September and finally increasing to 60-70 per cent. If this is not achieved, the wimmera rye grass will ultimately suffer nitrogen deficiency and make poor growth while clover growth will also be poor and seeding down will not be satisfactory. Thus only a poor stand can be expected in the second year.

Development of the clover can be favoured by curtailing grass growth either by grazing or mowing. As clover cannot grow if shaded, this treatment will allow the clover the necessary light for satisfactory development.

On highly fertile land it may be necessary to reduce the seeding rate of the grass. This is because of the high growth rate on such land, and particularly when planting is carried out in early April as this time of planting results in particularly rapid grass development.

Where planting is done into poor soil, little grass growth will occur until such time as the clover influence and the return of dung and urine by the grazing animals raise the soil fertility level. In this circumstance, the pasture will be heavily dominated by clover for one or even more years.

Grazing should be carried out intermittently, preferably by using the electric fence as described earlier. The grazing programme should be so arranged that the pasture is always grazed at a succulent stage. However, spell periods should be as long as possible, compatible with the maintenance of high food value and development of desirable grass-clover ratio.

Good seeding-down of all species is essential in the first year. This can be obtained by removal of stock from the time of flowering to seed ripening.

Grazing can be resumed after this has been achieved.

## Subsequent Years

In seasons subsequent to the year of planting, re-establishment of the pasture occurs naturally. No land preparation is required. Germination and establishment will occur unaided when weather conditions become suitable.

In this way production costs are cheaper than for crops like oats which require ploughing and complete seed bed preparation for every crop.

Natural regeneration results in an earlier stand than is obtained from planting in a prepared seed bed. This is because the existing stubble shades the soil surface, reducing soil temperatures and surface evaporation rates.

Regeneration is aided by the removal of any volunteer cover of summer-growing weeds. This can normally be done by grazing or low mowing. A satisfactory time is early to mid-February. After a number of years, the summer cover may become so dense and vigorous that some tine cultivation may be desirable. Such a condition however is most unlikely to be an annual one.

If heavy seeding-down is obtained in the year of planting, management in subsequent years will be simplified.

Germination among stubble is governed by temperature and moisture and light.

Cool, cloudy, wet spells occur in some seasons in January and early February. When this happens, germination of seedlings may be too early and many may be killed off by heat, or die when weather conditions return to normal. Good germination of wimmera rye grass has occurred on this station in the first week of January.

Loss of one or more crops of seedlings in this way has so far not prevented the development of a quite


Plate 7.

**This Close-Up View Shows More Detail of the Pasture Within the Maize Area of Plate 6.**

Plate 8.

**The Regenerated Pasture Being Grazed for the Second Time in the Season (20-6-58).** Note the old maize stalks in the background.

satisfactory final stand of pasture being present every year.

In 1954 two bays of pasture, originally planted in 1952, were rotary-hoed out in both February and March. Even with removal of all seedlings in this way, there was still a good final stand of pasture from later germination.

If germination occurs in January it is not worth endeavouring to maintain the seedlings. February germination amongst stubble, particularly if it occurs towards the middle of the month, is usually worth saving even if an irrigation is required.

## February-March Best

However, late February-early March is the most desirable time for regeneration, and plants germinating in these periods can normally be kept without difficulty.

The newly regenerated stand will benefit from mowing if much weed growth occurs.

## Grazing

The general principles of management will be the same as for the first year. A fairly common feature after the first year is that the grass is less vigorous, especially in the early part of the season, than it was following the original planting. This is influenced by the extent of volunteer non-legume growth in summer as a result of rainfall. The reduced grass vigour in the pasture means less shading of the clover. In this new environment the young clover makes rapid headway.

At the time of the first grazing for the season, the pasture is usually very clover dominant. Though the grass seedlings make little early growth and provide only a small amount of early grazing they do not die. Conditions for grass growth rapidly improve, under the influence of the clover and the animal return. It usually happens that by the third time of grazing the grass is healthy and vigorous and contributes a substantial amount to the grazing available.

Clover dominance will not cause grazing problems where the pasture is utilized as a protein supplement. Where full-time grazing is required, grazing in narrow strips to force the stock to eat down and utilize portion of the leaf stalks has been practised on the station.

There has been no occurrence of bloat up to the present time.

Removal of stock is necessary for a period when the clover is seeding. This ensures a plentiful supply of seed for the following season.

Farmers are particularly reminded of the dangers of over-grazing which are discussed under the earlier section "Method of Grazing".

The pasture lends itself well to the making of good quality hay. Cut at the right stage it produces soft, palatable hay of high nutritive value.

## High Nutritive Value

Also, nutritive value of the pasture is very high when grazed at the correct stage. It should be allowed to develop well before grazing, but stock should be introduced while it is still in a succulent condition and before the grass sends up flowering heads.

If flowering of the grass occurs, the pasture is reduced in food value and will mature and cease growth too early in the season. The length of the grazing season will be prolonged by preventing this flowering.

A well-balanced pasture containing about 60-65 per cent. clover and 35-40 per cent. grass, grown in fertile soil and grazed, after about four weeks' spell will contain from 20 to 25 per cent. of protein on a dry matter basis.

Three to four years under pasture confers a considerable benefit on the soil. The soil is improved both chemically and physically and following crops show marked improvement.

## Irrigation

Irrigation to supplement rainfall is essential for the successful growth of the pastures. Since growth occurs during the cooler months of the year, the demand for water is lower than with summer-grown pastures. The actual amount of irrigation needed will vary with the season.

The average requirement on the station is 12 in. each season, usually applied in six irrigations of about 2 in. each application. The amount to be applied at an irrigation will depend on the type of soil and the amount of moisture present.

The soil should be wet to the full depth of the root zone. Wetting the top few inches is of practically no benefit and costs time and money.

A few minutes probing the soil with a 1 in. auger is time well spent. By this means, the time to water can be gauged accurately and then, after watering, a few holes will indicate how deeply the irrigation has penetrated and whether too much or too little water has been applied.

The amount of irrigation necessary is usually about 2 in. per application.

No irrigation is applied during the dormant period which is about October to mid-February.

Suitable rains for regeneration usually occur during mid-February to mid-March and the first irrigation is normally applied when the pasture requires it after that period.

Farming practices in the Lockyer Valley make a heavy demand on irrigation in spring and summer, with much reduced demand in autumn and practically none in winter.

Thus the growing of irrigated winter pasture fits well into the farm programme from the irrigation viewpoint.

Plate 9.

**A Closer View of the Pasture Shown in Plate 8.**

## Use of Land in Summer

The pasture occupies the soil only from approximataely mid-February to the end of October after which the seed ripens very quickly, particularly when early flowering types are used.

This means that the land is not highly productive in the remainder of the year. Until recently the only utilization in this period has been from growth of volunteer summer plants or the small amount of lucerne included.

It is to be remembered, of course, that land used for oat-grazing crops is normally fallowed in summer.

Any plan that would give a good return from the land in this summer period would be of quite considerable economic value to the farmer.

Experiments were commenced on the station in 1957 in the growing of a summer crop of maize following the decline of the annual winter pasture. First year results are very encouraging.

Following the seeding down and drying off of an area of subterranean clover—wimmera rye grass pasture at the end of October 1957, the area was grazed fairly hard to reduce the amount of stubble. The stubble provided quite satisfactory grazing for dry cattle and sheep.

The area was chisel-ploughed and tine-cultivated in November as preparation for sowing to the maize. Irrigation check banks were not cultivated. The chiselling and tining did not interfere with land levels. As a result, the efficiency of surface irrigation in the 1958 pasture was not reduced.

Where irrigation is by spray methods, shallow ploughing with disc or mouldboard as an alternative to chiselling would be quite satisfactory.

Hybrid maize was planted on January 6, 1958. December planting was planned but was not possible under the existing drought conditions. In the absence of rain, one irrigation was given immediately after planting.

Good rainfall was received in late January and throughout February, March and April. The maize required only the irrigation given at planting.

Row widths of maize were increased to 6 ft. and the plant spacings within the rows reduced to maintain near-average population rates. The wider rows were used to afford plenty of light for the regenerating pastures.

## Pasture Phase Helped Maize

The maize crop received benefit from the pasture in two ways:

(*a*) The pasture phase improved both the soil structure and the soil fertility. This meant a better soil environment for the maize.

(*b*) Irrigation of the pasture in winter and spring 1957 provided a reserve of subsoil moisture which the maize utilized.

The resultant maize crop was harvested on May 14, 1958. A yield of 53.6 bushels of grain to the acre was obtained. This is not high though it is about double the State average. Better yields will probably result when the rows are planted closer in later trials.

Maize production for silage as an alternative to grain is to be included in the 1958 summer land utilization trials. Such a project combines well with annual winter pastures. The maize silage would take a valuable part in the overall fodder conservation plan so necessary on any Queensland dairy farm. By reason of its earlier time of harvest, maize for silage will compete with the pasture for a shorter period than maize for grain.

The irrigation facilities used for the pasture are available for the irrigation of the summer crop should such practice become necessary.

## Maize Helped the Pasture

When the land utilization programme was being considered, it was a matter of conjecture whether or not the pasture would regenerate satisfactorily among the maize. There seemed a possibility that the tall maize would intercept too much light and that satisfactory germination and early growth of the pasture may not occur until the maize crop approached maturity and commenced to thin out.

In actual practice the presence of the maize crop appeared to assist pasture re-establishment. The wide row spacing allowed a late cultivation. This kept down weeds and provided a good seed bed for the pasture components.

Under existing rainfall, the subterranean clover and wimmera rye germinated in February. The young seedlings benefited from the light shading effect of the maize.

In this environment the clover developed rapidly. See plates 6 and 7.

The clover was ready for grazing at April 30, 1958. Only a small amount of weed was present, chiefly wild millet. At this date the maize grain was not quite ready for harvest. Stock were introduced after the maize was harvested.

## Comparisons

The pasture in the maize area was equal in every way to the regenerated pasture in an adjacent area that was not utilized for any summer cropping. This equality lasted throughout the season.

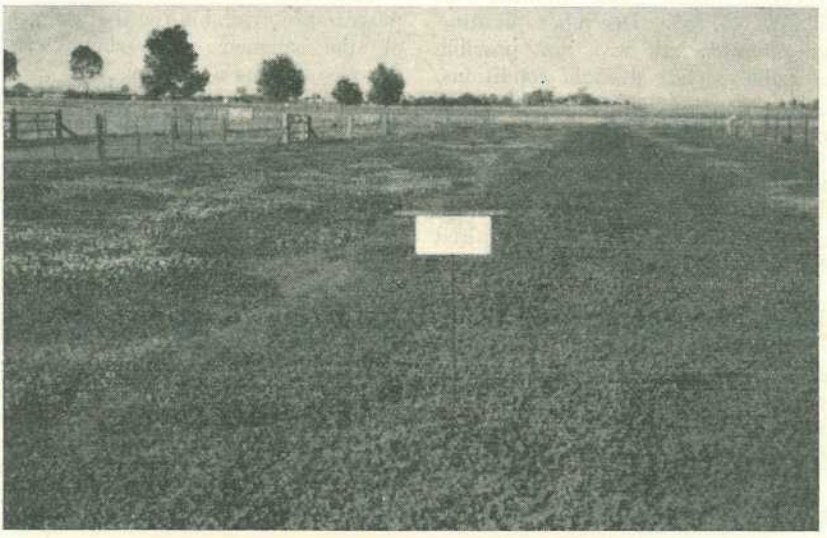

Plate 10.

**Centre and Right Show (19-9-58) the Same Pasture as Plates 6-9.** Here it is ready for the fourth good grazing of the season. The pasture was also grazed in the last weeks in August and October. Note that the old maize stalks have disappeared.

Five good grazings were obtained by late October. Thus the pasture itself maintained its usefulness as a means of helping to overcome the May to October grazing problem.

The old maize stalks broke down quickly. They proved no hindrance to grazing. Indications are that in all seasons they will have broken down completely before further chisel-ploughing is due.

No irrigation was required until May 23, 1958.

In an area of Louisiana strain of white clover treated similarly to the foregoing the yield of maize grain was 63 bus. to the acre. This was considerably better than following the subterranean clover in the same year of trial.

Louisiana clover did not germinate and grow until the maize was harvested and the old stalks removed. Grazing was not provided until September. In this way the clover contributed nothing to the autumn and winter grazing problem.

## Further Trials

Continuation of summer land utilization trials is planned. They are being widened to include maize population trials and maize silage trials. The growing of sorghum for silage will also be included.

With the failure of Louisiana white to regenerate in land chisel-ploughed and sown to maize, it is intended to try direct sod-seeding of maize into Louisiana. In this method the clover runners may persist through summer and regrow in autumn. Establishment of maize by sod-seeding may not be successful in the heavy soils of the station.

Plate 1.
Cattle Pumpkins in the Tent Hill District.

# Pumpkins, A Double-Barrelled Crop

By J. G. FULLERTON, Adviser in Agriculture.

**SOME of the advantages of pumpkins as a crop for dairy farmers are:**

**They can be sold as a cash crop, or used as stock feed on the farm.**

**No specialised machinery is required for their cultivation.**

**They can be stored for about 4 months in the winter.**

**Good roughage for grazing is available in the paddock after harvesting.**

For dairy farmers, table pumpkins can be regarded as a double-barrelled crop. When prices are attractive and markets available, they can be sold as a cash crop. Failing this, their value as a food for stock, particularly cows and pigs, is well recognised.

The practice of growing pumpkins, and then using them as markets and

Plate 2.

**Crop of Maize and Pumpkins, Norton Vale.**

seasons dictate, is a well-established one on dairy farms in the Lockyer Valley.

An area planted to pumpkins is not an area lost to fodder crops for the dairy herd. After the crop has been harvested, useful grazing can be obtained from the summer grasses and better weeds which grow during the stage when cultivation of the crop is no longer practicable. However, due to the risk of tainting milk from grazing of this nature, it should be used with caution, or better still, for dry stock only.

Plate 3.

**A Crop of Irrigated Pumpkins Nearing Maturity in the Tent Hill District.**

A further advantage to the dairy farmer is that no specialised machinery is required for pumpkin cultivation. Implements already on the farm for the growing of fodder crops can be used.

## Planting.

For planting, a maize planter can be used, but a method commonly adopted is for a man to sit on a set of tandem disc harrows, and drop the seed in front of the implement. Seeds are immediately covered, with the minimum loss of soil moisture.

With this method of planting, a spacing between seeds of about 18-24 in. is usually adopted. This allows for thinning out if necessary, and also ensures that an adequate stand is obtained.

Pumpkin crops are very frost-susceptible, and except for frost-free areas, planting is confined to the August-January period. On frost-free areas, plantings can be made as early as June, although some form of pre-germination of seed is usually required for such plantings.

Late plantings, which are harvested in late autumn or early winter, can be stored over the winter months. During this period, pumpkins can be stored for 3 to 4 months, but during the hotter period of the year, they will not store very satisfactorily.

On well-prepared land, with favourable rainfall or supplementary irrigation, yields in the vicinity of 6 to 8 tons of pumpkins an acre can be obtained. Even under adverse growing conditions, if cultivation of the crop has been good, yields seldom fall below 2 tons an acre.

Plate 4.

**Pumpkins Harvested After the Vines had been Depressed by Frost in the Forest Hill District.**

# Brucellosis-Tested Swine Herds.

(As at 1st June, 1959.)

## Berkshire.

S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
H.M. State Farm, Numinbah
G. L. Gabanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfield" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
V. F. Weier, "La Crescent," Clifton
N. Rosenberger, "Nevrose," Wyreema
L. P. Orange, "Hillview," Flagstone Creek
W. Young, Kybong, via Gympie
E. J. Clarke, Mt. Alford, *via* Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
P. F. Pfrunder, Pozieres
A. Wolski, "Carramana," Warra.

## Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabarlah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
K. B. Jones, "Cefn" Stud, Pilton road, Clifton
Barron Bros., "Chiltern Hill," Cooyar
K. F. Sturmer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba
J. C. Lees, "Bridge View Stud, Yandina
C. Assenbruck, Mundubbera
A. J. Mack, Mundubbera
J. & S. Kahler, East Nanango
C. P. Duncan, "Hillview," Flagstone Creek

## Tamworth.

D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook
J. D. Booth, Swan Ck., Warwick

## Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville
A. J. Mack, Mundubbera
J. Ashwell, "Greenhill," Felton South

## Large Black.

E. Pointon, Goomburra

# This Pasture Beat Native Grass For Beef Production

By N. E. GOODCHILD,
Senior Adviser in Agriculture.

MEASURED by the production of beef, wool, mutton and dairy products, pasture is Queensland's most important crop. However, in spite of the importance of pastures to the State's economy, only about 2,000,000 acres out of a total area of 430,000,000 acres are sown to improved pastures.

This position is changing as new information on pasture species is brought to light from trials and demonstrations. Nowhere is this happening more rapidly than on the coastal lands of the wet tropics.

Pioneer work with pasture legumes carried out by the Department of Agriculture and Stock at the Bureau of Tropical Agriculture, South Johnstone, demonstrated the value of several vigorous species including centro (*Centrosema pubescens*).

**As a result of this work, centro is being widely used in tropical coastal pastures.**

Following its successful establishment in trial plots in the Mackay district, centro is now being used, not only on dairy pastures where returns per acre are higher, but also on some beef cattle properties.

An example is found on the property of Mr. T. A. Cook, "Greenmount," Walkerston, near Mackay. Here 30 acres of guinea grass—centro pasture have been laid down under the terms of the Commonwealth Extension Services Grant, to show the advantages of this type of pasture over native grass when used for beef cattle.

## Disced and Harrowed

An area of approximately 30 acres of undulating open forest country was chosen on "Greenmount," Walkerston, about 12 miles west of Mackay. The soil is a grey-brown loam overlying a rubbly, clay subsoil at a shallow depth.

The area was first ploughed and harrowed in January, 1956, using a 13-disc cultivator with harrows attached. Heavy rains during the 1956 summer prevented the immediate establishment of the pasture. Cultivation began again in October, 1956, followed by discing and harrowing in January, 1957.

## Sod Seed Planter Used

The area was planted in February, 1957. A sod seeder planter was used with the tubes detached so that the seed was dropped directly on to the soil surface. This prevented blockages through seedheads and straw clogging the tubes.

Superphosphate at the rate of 1 bag to the acre was also applied at sowing time. It was dropped directly from the fertilizer box onto the soil surface.

The seed and fertilizer were covered in by dragging a heavy chain and light harrows directly behind the planter.

**The mixture used was guinea grass at 4 lb. to the acre and centro at 2 lb. to the acre. The grass and legume seed was mixed first in acre lots and then placed in the seed box. Very even distribution resulted from this technique.**

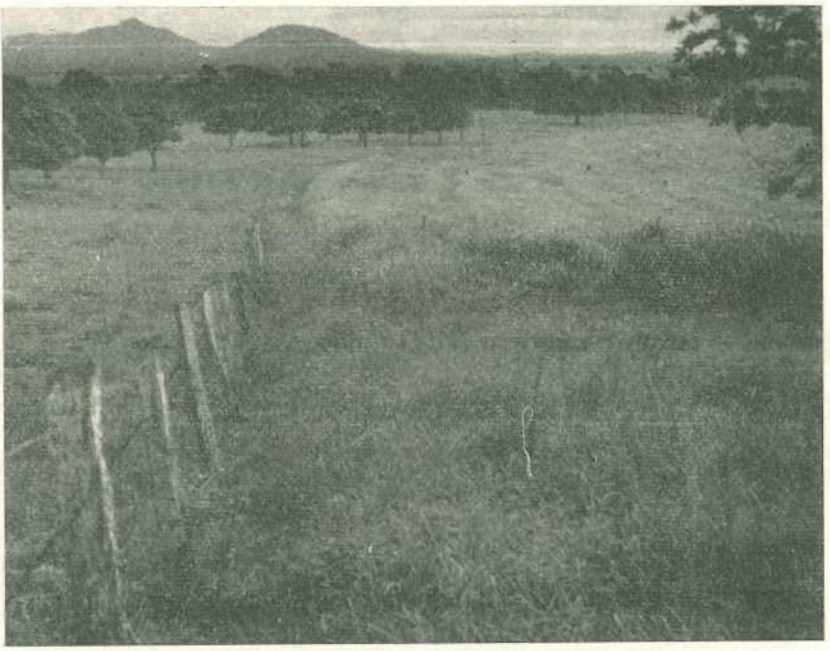

Plate 1.

**Guinea Grass—Centro Pasture Produces More Feed than Native Pastures.**

## Two-Three Years to Mature

Planting was followed by steady rain and a good even germination resulted.

Dry conditions for the rest of the year retarded growth and delayed grazing of the pasture. But, with the onset of rain in January, 1958, rapid growth developed and quick coverage of guinea grass and centro was obtained. By January, 1959, the oldest plants of grass and legume were growing vigorously and self-sown seedlings of guinea grass and centro were filling in the spaces between the stools of grass.

It is obvious that as in other districts this type of pasture takes two or three years to reach full productivity, which is then maintained for a considerable time.

## Yield Measured

A number of large enclosures have been erected to protect sections of the sown pasture and of adjoining native pasture from grazing. These enclosures are cut at regular intervals to indicate the amount of forage produced. The yields give also a picture of the seasonal growth pattern.

In general, the pastures make most prolific growth during the December-March period. The rate of growth slows down during April to July and may also be rather slow in August and September, depending on incidence of storms.

The yield from the guinea grass-centro pasture for the 12 months January-December 1958 was 23 tons 7 cwt. of green material to the acre. The native pastures yielded 7 tons 16 cwt.

During the period July to September when the native grasses *made no measurable growth,* the sown pastures produced 1 ton 7 cwt. of green matter to the acre. From September to December, the guinea grass pastures yielded 8 tons 7 cwt. of green matter to the acre, while the native grass produced 3 tons 16 cwt.

The normal carrying capacity of the native pastures is estimated at 1 beast to 6 acres. It is estimated, as the result of intermittent grazing observed on this occasion, that the sown pastures should carry nearly 3 times this number and they will provide feed of much higher protein value owing to the presence of the legume centro in the mixture.

These large differences in favour of the sown pastures have been obtained before the new pastures have reached maximum production. However, the growth pattern which has shown up will determine the method of utilization.

## Management and Use

In normal seasons, grazing would begin in April after a January planting. In this instance, dry weather prevented grazing during 1957. The exceptionally heavy rains of February-March, 1958, also prevented regular grazing which would have damaged the soil. However, heavy grazing for short periods was possible and in late March the area was cut back by mowers to a height of 9-12 in. By the end of April, the guinea grass had grown 18 to 20 in. when intermittent grazing was commenced.

The pastures were spelled from June 7-October 5, even though they produced nearly 1½ tons of green weight to the acre while native pasture growth was too small to be measured. From October 5 to November 22 they carried 1 beast to 2 acres.

The December 1958-January 1959 rains and high temperatures accelerated plant growth and in order to

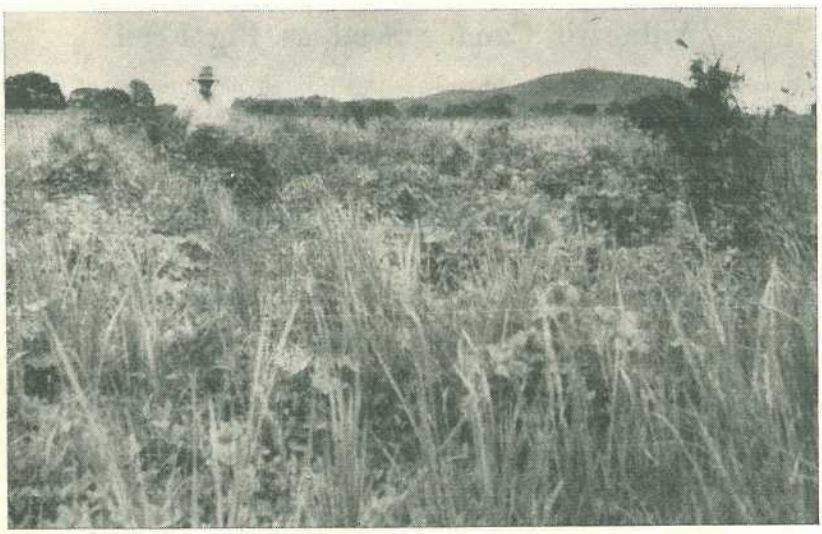

Plate 2.

**Centro Growth in Young Guinea Grass Pasture.**

prevent rank growth during the wet season the pastures were grazed by 174 head for 6 days.

This reduced grass height from 3 ft. to less than 1 ft. Stock were then removed during the most intense part of the wet season to prevent damage to the soil and pastures. As the pastures "thicken up" their carrying capacity will increase and damage by trampling will become less severe.

## Cost of Establishment

Under normal conditions only one ploughing, discing and harrowing would be sufficient for this type of pasture in this district. As mentioned earlier, abnormal seasonal conditions made it necessary to repeat this working.

**Costs based on the hiring of machinery and labour and the price of seed and fertilizer are shown:**

| | £ | s. | d. |
|---|---|---|---|
| Double working (1956 and 1957) using D.2 tractor @ £4 per hour .. .. | 192 | 0 | 0 |
| Cost of seed .. .. | 78 | 0 | 0 |
| Cost of fertilizer .. .. | 30 | 0 | 0 |
| Cost of planting using Ferguson tractor @ £12 per day .. .. .. | 30 | 0 | 0 |
| Cost of fencing @ £2 10s. per chain (approx. 68 chains) .. .. .. | 170 | 0 | 0 |
| Cost per acre .. .. | 16 | 13 | 4 |

In normal seasons when only one working was given this would be reduced by £96 or £3 4s. per acre.

## What Does the Owner Think?

Mr. Cook is so impressed with progress made by this pasture that he has planted a further 80 acres, using only one working, and has developed a plan for further pasture improvement work on the property. In this instance the landholder, who also grows sugar cane, already has the necessary machinery for handling large areas each year.

# Value of Canary Seed as Pig Feed

Canary seed fed to pigs in a recently completed trial at the Hermitage Regional Experiment Station showed the following results:—

(*a*) Up to 40 per cent. of the total ration fed to pigs could be satisfactorily replaced by canary seed.

(*b*) Good growth and a satisfactory food conversion ratio could be obtained. Canary seed has nearly the same food value as other grain.

(*c*) The carcasses had a clean, white fat which was free from any objectionable odour.

(*d*) Flesh development of the carcasses was very good. With all pigs, hams and eye muscle were well filled.

(*e*) Body length of the carcasses was good.

(*f*) Dressing out percentage was very high.

In the trial, one group of pigs was fed 20 per cent. of the total ration as canary seed and a second group was fed at a 40 per cent. level. The 20 per cent. group gave slightly better results because their growth rate, firmness of fat and food conversion ratio were slightly better. It was found advisable to crush the seed before feeding it to pigs.

# Pasture and Crop

FIFTEEN bags of barley to the acre from land that produced only 6 bags 8 years ago—that is the change recorded on Mr. A. Free's hillside farm at Cambooya. Back in 1946, when Mr. Free bought the property, uncontrolled runoff had gouged ugly gullies across his cultivation, and yields were declining.

With the assistance of Agriculture Department officers, a soil conservation scheme for the whole farm was developed.

Since then Mr. Free has seen stability gradually come into his farm enterprise.

The land is easier to work, soil losses have been halted, and more rain is entering the soil.

There has been a progressive increase in the yield of crops, and, what is most important, the property is no longer a liability, but an appreciating asset.

*—J. E. LADEWIG,*
*Chief Soil Conservationist.*

RELIABLE records are becoming essential for success in farming. They show a farmer what contribution his various programmes have made towards his overall profit and where waste or misdirection of effort has occurred.

Since every farmer's circumstances are different, no hard and fast rules can be laid down on what records should be kept. But there are two main sets—production or performance records and financial records.

Performance records will note briefly the history of your farm. They will show the treatment given to your paddocks and the yields you obtained. In much the same way, the livestock farmer can record the performance of his animals.

For financial records, you don't need a complicated system of bookkeeping. But you do need to know what you've spent on assets, and on the fuel, seed and fertilizer you've used to grow your crops.

*— C. H. P. DEFRIES,*
*Director of Economic Services.*

RUST is the silent enemy of all farm machinery. It causes breakdowns and increased fuel consumption, and will greatly reduce the working life of a machine.

The worst rust damage occurs in unprotected idle machines. Expensive machines like harvesters and pick-up balers that are used for only a short season lie idle, a target for rust, for up to 80 per cent. of their lifetime.

The first need in protecting farm machinery from rust is to store it in a dry place immediately after use. When storage space is limited, as it so often is, concentrate on putting under cover those machines that are prone to the greatest damage from rust. Don't use grease to protect the susceptible parts; instead use one of the rust-preventing preparations that are now on the market. These are cheap and they don't break down after a period like grease does.

WHEEL slip is very often the limiting factor in the performance of wheel tractors on drawbar work and is therefore one of the vital factors affecting tractor operation.

Wheel slippage, which is the degree of traction loss in a wheel over a measured distance, is not noticeable in practice, particularly with pneumatic tyres until it exceeds 30 per cent., and may even be as high as 50 per cent. before it becomes obvious.

An increase in wheel slip from 8 per cent. to 25 per cent. during ploughing, for example, may increase fuel consumption by as much as ½ gal. per acre. It is vital therefore to keep wheel slippage as low as possible, otherwise too much horse-power is lost before it reaches the drawbar for the pulling power required.

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

THERE are no short-cuts in getting lucerne established, least of all in land preparation. Failures or partial failures in lucerne plantings can all too often be traced to badly worked soil.

In coastal and subcoastal districts, the land should be ploughed in the late winter of the year before the lucerne is to be planted. In the spring, a cover crop of cowpeas, velvet beans or a mixture of either of these with one of the millets should be planted. These crops should be ploughed in before the millets seed, and the land kept harrowed until planting time in April or May.

In the dry, inland districts, fallowing is essential. This involves ploughing in the autumn or early winter of the year before it's intended to plant. To prevent weed growth and the formation of a hard crust during the fallow, the land should be cultivated until planting time.

*—O. L. HASSELL,*
*Senior Adviser in Agriculture.*

## Ensiling Grain Sorghum

Some farmers have inquired about the ensiling of grain sorghum.

*Answer*: Grain sorghum can be made into a fair silage provided it is cut at the correct stage. Generally the stage selected is the soft dough to dough stage, or while the sorghum still contains sufficient moisture to allow satisfactory fermentation of the silage in the silo.

The material to be ensiled should be either flailed or chopped, preferably the latter, as whole stalks do not pack down well in the silo.

Whenever possible the use of a tractor to aid compaction in the silo is strongly recommended as such a practice ensures the greatest possible air expulsion from the silage.

# Lucerne Halts Erosion On Dalby Plains

By R. F. S. KELSEY,
Soil Conservation Officer, Dalby.

**Erosion and flooding are now major problems on large sections of the Darling Downs.**

More than half a million acres are almost-level, fertile country. The fall is rarely more than 6 in. in 100 ft., and usually only 5 to 8 ft. in a mile. Wide stretches of uninterrupted cultivation have resulted in a large accumulation of run-off water.

Concentration of water has been aggravated as a result of the interception and diversion by fences, headlands, and road and railway formations. Concentration has meant greater depth of water and faster flows over certain sections. This in turn has resulted in wide-spread erosion and its associated evil—siltation.

The solution of the problem is not simple. Some reduction in damage could be effected by periodically placing a proportion of the plain under a perennial soil-protecting treatment such as pasture. This would be planted either in strips across the line of flow, or in lanes or waterways to carry the concentration of water. The deterrent to this is the difficulty in establishing high revenue-producing pasture on this type of country.

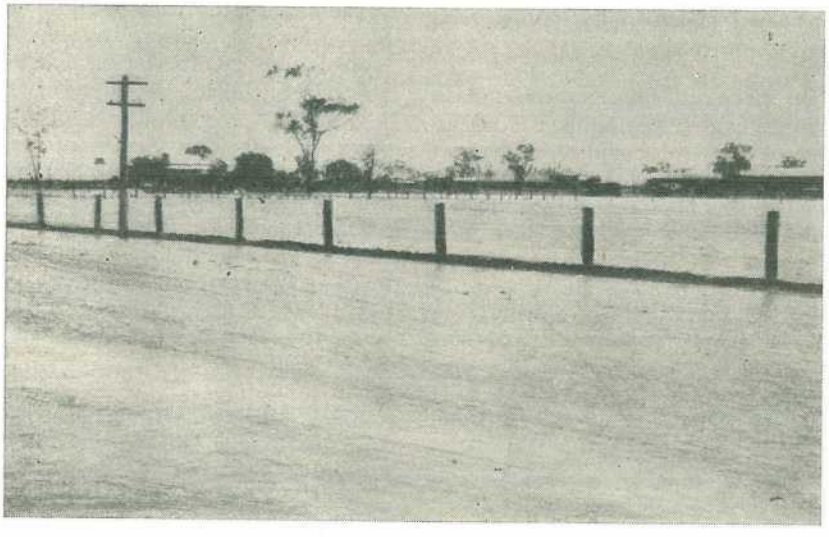

Plate 1.

**Flooding on the Irvingdale Road, near Dalby, During the Rains in March, 1958.**

Plate 2.

**This Grim Picture of Erosion on the Plains Near Dalby was Caused by a Break in a Diversion Bank.** It happened during the rains in March, 1958.

Because of the high returns associated with lucerne growing, this crop would be quite satisfactory. However, as there is normally an appreciable amount of bare soil between individual lucerne plants, it is usually considered to have only limited value for erosion control.

On steep hillsides, unprotected by contour banks, lucerne is not recommended as a complete safeguard against erosion. Neither is it recommended for planting in a waterway which will have to carry fast flows of water.

The speed at which water travels on the plain is comparatively slow and, except where contained in deep channels, would rarely exceed 3 ft. per sec. Observations in the Dalby District indicate that at this speed, lucerne is capable of holding the soil and preventing erosion.

During June, 1958, the Dalby District received a record rainfall of 781 points for the month. This caused extensive flooding and an unhappy "high" in erosion damage.

## Value of Lucerne

These damaging rains demonstrated the value of lucerne as a soil-protector on gently sloping lands by preventing the development of "scouring". A typical example was observed on Mr. A. F. Berger's property in the Kaimkillenbun area. Mr. Berger's property adjoins the north branch of Myall Creek and sections are subject to flooding caused by the overflow from the creek. In two places a major concentration of water was caused by breaks in a levee bank.

Below the broken bank was a 9 ac. paddock of two-year-old lucerne. Severe scouring was evident on the cultivated land above the bank and on the cultivated land between the break in the bank and the edge of the lucerne.

A small amount of cutting back (limited to a few feet) occurred at the bottom end of the lucerne. This was caused by the drop from the secure lucerne paddock into the scours in the cultivation below.

Elsewhere the lucerne paddock was entirely undamaged. Even though depressions, resulting from previous land use, existed and had to carry a concentration of water, no soil movement took place. On the upper edges of these depressions, where the speed of water was reduced, a small amount of siltation occurred.

The scouring recommenced in the cultivation below the lucerne, and continued through the property.

It was calculated from the evidence available after the flood that the depth of flow in the existing depression was approximately 18 in. and the rest of the paddock was flooded to a lesser extent. The average slope of the paddock was 6 in. in 100 ft.

The lucerne was 6 in. high at the time of the flood. At that stage it would have retarded the flow of water only slightly. It was calculated that the velocity of the water would have been 3 ft. per sec.

## Management of Lucerne

The 9 ac. of lucerne were sown in June, 1956, following a season of floods and worrying erosion. The rate of planting was 4½ lb. an acre. A cover crop of wheat was sown with the lucerne at 30 lb. an acre.

The following season was very dry. Rainfall records for the following two years are:

| 1956. | In. | 1957. | In. | 1957. | In. | 1958. | In. |
|---|---|---|---|---|---|---|---|
| June .. | 2·05 | January .. | 3·68 | July .. | 2·20 | January .. | 3·02 |
| July .. | 0·95 | February .. | 1·20 | August .. | 0·61 | February .. | 1·89 |
| August .. | 0·13 | March .. | 2·15 | September | 0·56 | March .. | 7·49 |
| September .. | 0·45 | April .. | 0·40 | October .. | 2·21 | April .. | 2·78 |
| October .. | 1·36 | May .. | 0·00 | November | 0·38 | May .. | 0·16 |
| November .. | 1·40 | June .. | 1·34 | December.. | 0·37 | June .. | 7·81 |
| December .. | 6·70 | | | | | | |

Plate 3.

**Soil from the Farmlands is Deposited on the Irvingdale Road, After the Rains in June, 1958.**

Plate 4.
**Severe Scouring of Cultivation was Caused by the Overflow from Myall Creek.**

Eight bags an acre of wheat were harvested in 1957 and although the 9 ac. paddock of lucerne had to struggle due to dry conditions, the following two cuttings of hay were made:

(*a*) October, 1957 180 bales of hay.

(*b*) April, 1958 400 bales of hay.

The baled hay, after being put through a hammer mill, was used on the farm as a supplementary sheep feed.

Mr. Berger is full of praise for the lucerne. He states that he has no doubts about the financial benefits of lucerne growing. He has this year extended his present 25 ac. of lucerne by a further 15 ac. and intends to further extend this acreage during the next few years.

Before September of last year, Mr. Berger carried 200 ewes and fattened and marketed 130 lambs on the 25 ac. of lucerne and 50 ac. of natural grass. The lambs averaged 75s. at 18 weeks.

The sale of lambs and wool returned over £1,000. At least £600 of this amount can be attributed to the 25 ac. of lucerne—a better return per acre than can be obtained from grain growing, which, under the same circumstances, would have resulted in serious loss of soil.

Since September, the same area, plus 30 ac. of canary, has carried the 200 ewes and an additional 80 from the carryover of lambs.

The lowering of soil nitrogen under the present cropping methods is a major problem. Mottling of wheat is one of many indications of trouble ahead.

Unlike most other crops lucerne, being a legume, does not draw to any great extent on soil nitrogen, but on the contrary after a few years in lucerne there is a build up in this all-important plant food.

## King of Fodders

Similar experiences to Mr. Berger's have been reported by many Downs

Plate 5.

**Scouring of Cultivation Ceases when the Run-Off Encounters the Lucerne.**

farmers who readily acclaim the merits of lucerne. The last drought proved its ability to carry stock under extremely dry conditions.

It is logical to expect that greater use will be made of this high revenue-producing crop in the future. Strips, planted across the line of water flow, would form an ideal basis for a crop rotation programme. A few years under lucerne will not only benefit the quality and quantity of future crops but, by giving the soil a spell from continuous cultivation, will improve its structure. Add to this its nitrogen-building ability and the fact that it is holding the soil against erosion and it will be clearly seen why this wonderful plant is known as the "King of Fodder Crops."

## Don't Let This Happen

In a southern State, a farmer was clearing land with a bulldozer when a tree brought down high electric wires on to a fence. He apparently left the dozer, walked along the fence towards a car which was parked on the other side and when climbing over the fence was electrocuted with fatal results. This accident was the result of lack of appreciation of the dangers involved when working near high tension wires.

# Orchard and Garden

IF you call an electrician because your fuses are blown, indicating a "short" or "leak" you expect him to find the fault as well as replace the fuse—not just to put a heavier fuse in. But how many of us bother to check the leaks in our fertilizer programme?

Consider these possibilities of loss one by one and ask yourself, are you doing anything to offset wastage?

Do you fertilize at the right time for the crop concerned? Have you checked your times of flowering and fruit maturity, and flushes of growth? Application too early or too late renders the fertilizer largely ineffective.

Do you use the right mixture, or just any old thing you have on hand? Remember very high applications of nitrogen have a serious effect on fruit maturity and keeping qualities generally, while insufficient phosphate or potassium can reduce yield.

Are your applications too light or too heavy? The former may be ineffective whilst the latter may not be used successfully.

Where do you put the fertilizer?—on the plant, burning it? On the ground outside the root area, so the plant doesn't get it at all? On one side as a lump, so that the high concentration kills the roots in the immediate vicinity? Or do you spread it sensibly within the drip area and in a nice even band so that all roots may have equal access to it?

What time of the year do you fertilize? Do you realize that judicious fertilizing before and after the wet season, and perhaps with irrigation during the dry season, helps to keep the nutrients up to the crop?

What reaction has your soil—acid or alkaline? Too much either way plays havoc with fertilizer usage by plants and very often results in "fixing" certain nutrients and they thus become unavailable. You should provide drainage for your soil, and lime to correct your high acidity.

There are many other points, such as frequency of application, disease, pest and moisture control, correct soil husbandry and so on which, when not watched, drag pounds of fertilizer out of your soil and pounds of money out of your pocket.

*—F. W. BUTCHER,*
*Assistant Experimentalist.*

LOPPING papaw trees after the crop has been harvested is a sound practice when the plants have grown tall and picking has become difficult. Rather than sacrifice healthy, tall trees, it's better to cut them back and force them to branch. The next crop will then be produced nearer the ground and within easy reach of the picker.

The recommended way is to cut through the stem about 3 ft. above ground level at a point where the old leaf scars are close together. Here, the stem is constricted and the internal cavity is small.

After lopping, cover the cut stem with a tin to keep out the rain. January is probably the best month to do the job. Allow no more than three shoots to develop. These should be selected for vigour and the acuteness of the angle formed with the main stem.

*—G. W. J. AGNEW,*
*Senior Experimentalist.*

*The Farm Family*

# Your saw could be a killer . . . if you let it

Compiled by A. E. FISHER,
Information Branch.

**Neglect of maintenance could make a killer of that circular saw down in your woodyard.**

True, accidents with circular saws aren't very common, but those that do occur are usually serious. Keep your saw and saw-bench in good mechanical order to rule out the risk of accidents from mechanical faults.

These days, nearly every farmer relies on the time- and labour-saving circular saw for cutting firewood. Very often, circular saws are driven by a tractor, so there's plenty of power in reserve. This sometimes gives a false impression of the sharpness and general condition of the saw, and routine maintenance is neglected.

Cracked or unsound blades are the biggest danger in using a circular saw. Inspect the blade every time you go to use the saw. Destroy any cracked or unsound blades so you won't be tempted to continue using them.

Practically all the other faults in the performance of circular saws can be traced to incorrect setting and sharpening.

## Keep It Sharp

There's a very real risk in using a blunt saw. A blunt saw quickly becomes overheated and its temper is destroyed. As the heating often takes place unevenly, some sections of the blade can become distorted and cease to run true. Saws should always run true, both in respect to their sides and to the points of their teeth. Saws that are buckled, or wobble when run at the correct speed, can be corrected by hammering. But this should be done only by a skilled saw doctor.

After a great deal of use and sharpening, some teeth may be worn shorter than others. This fault can be corrected by jointing or stripping the saw. A saw is stripped by running it at half speed and holding a piece of emery wheel or a file at right angles to the saw and just touching the tips of the teeth. This grinds down the high teeth until all the tips form a true circle. After stripping, the points of the teeth need sharpening with a file.

In filing a saw, it is first necessary to hold it firmly in a filing vice or horse. As each tooth is sharpened, the saw is rotated and the next tooth is brought to the top of the horse. When sharpening, ensure that the bevels on the backs of the teeth are maintained.

When the saw wears down from regular sharpening, gulleting becomes necessary. Gulleting is done with a round file or a small power grinder.

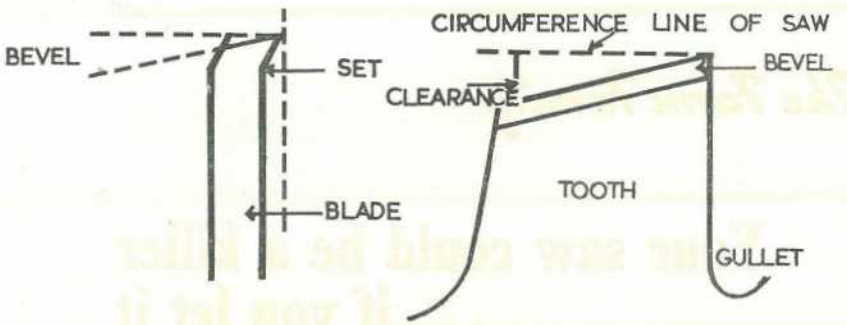


Plate 1.
Left: **Bevel and set of saw tooth.**
Right: **Saw tooth showing clearance.**

This job consists of cutting out the bottom of the gap between the teeth. Never use a file that will make a sharp angle at the bottom of the gullet, as a crack may develop when the load is put on the saw. A round gullet allows the sawdust to move freely, and the strain of the saw working is distributed evenly into the blade.

## Saw Speeds

The correct speed of a saw, in revolutions a minute, varies according to its diameter. But they must always be run at this correct speed. If saws are run too fast, there is a risk that they may fly to pieces due to excessive centrifugal force. If they are run too slowly, the load on the individual teeth is greatly increased and the saw may jam or buckle.

The power needed to drive a circular saw depends largely on the rate of feed, depth of cut and whether the sawing is ripping or cross-cutting. The usual allowance for power is ½ h.p. for each 1 in. depth of cut when cross-cutting and 1 h.p. for each 1 in. depth of cut when ripping. The accepted rule for the speed at which the rim of a circular saw should travel is 9,000 ft. a minute.

When driving a circular saw from a tractor belt pulley, determine the correct speed and make a mark on the tractor's governor control. Usually the tractor has plenty of power to spare. Because of this, you can easily choose pulley sizes that will give the saw its correct speed at a fairly low throttle setting on the tractor. Obviously, it's a waste of fuel to have a 40 or 45 h.p. tractor running at full governed revolutions to drive a saw requiring only 5 h.p.

These are the correct speeds for saws of different diameters: 12 in. diameter saw, 3,200 r.p.m.; 14 in., 2,800; 18 in., 2,150; 24 in., 1,600; 30 in., 1,300; 32 in., 1,200; 36 in., 1,100.

It's not advisable to use a general purpose saw for both cross-cutting and ripping. The general purpose saw isn't as efficient on either job as the specially designed blade. It's better to have both cross-cutting and ripping blades on hand and to change them over for different types of work.

If you're using your saw a lot, it will need setting at fairly regular intervals. Setting involves turning the tip of each tooth a little to one side—alternate teeth are turned to the left and right.

This ensures that the saw cut or kerf is a little wider than the thickness of the saw. It prevents the timber binding on the saw.

A saw set of either the gate or pliers type is used for this job. At all times, set as little of the saw tooth as possible, just the tip. Usually, the amount each tooth is turned should not exceed one-thirty-second of an inch. As you set each tooth, check the degree of set with a gauge so that all the teeth will be set to the same extent.

### Care with Firewood

Although a farm saw bench may be simple, it should be fitted with shields to protect the operator, both from the saw itself and from chips or pieces of wood that may be thrown by the saw.

When you're cutting firewood, don't place the saw among a pile of uncut wood and stand among the logs. This is a dangerous practice. It's easy to trip over a log, especially when you're carrying a heavy piece of wood. If this happens within reach of the spinning circular blade, the results can be fatal.

For reasonable safety, stack the logs neatly and choose a clear, level site for the saw and the operator. The operator should be comfortable so that there's little chance of anyting distracting his attention and causing accidents. Even with the best saw bench, sawing firewood is a risky job, and a great deal of conscious effort is necessary to ensure that you observe safe practices the whole time you're at the saw bench.

Chips and pieces of bark have a tendency to accumulate behind the saw. Occasionally, one vibrates into such a position that it is picked up by the revolving saw and thrown at the operator. Because of this danger, you should try to keep the top of the bench clear.

An added safety precaution is to fit a curved fin, about the same thickness as the saw blade, about a quarter of an inch away from the blade. This fin will prevent chips from striking the back of the saw and being flung at the operator.

## Inquiry on Pigeon Pea

A farmer in the Bundaberg district has inquired about the uses of the pigeon pea.

*Answer*: The pigeon pea is a native of Africa, Asia and some of the South Sea Islands. It is a short-lived, perennial, erect bush which has been used as a fodder and as a soil improver. As it is deep-rooted and shows considerable adaptability, it has grown successfully on semi-arid lands. There are two types; an early type having yellow flowers and a late variety having yellow and red flowers.

Planting is best carried out just before the summer rains, that is, about early December. The rate of seed to the acre varies from about 10 lb., if drilled in rows of 3 to 4 feet apart, to 15 to 20 lb. to the acre if broadcast.

In some overseas areas it is reported to make good hay and silage and recorded yields vary from 18 to 35 tons per acre.

In Queensland its main uses are likely to be as wind breaks and soil improving crops in horticultural areas and as house plants in the coastal districts where frosts are not severe.

# How to become a leader

By J. PARK, State Organiser, Junior Farmers' Organisation.

IN the last two issues we have written at some length on the role of the chairman, and we pointed out that in a Junior Farmers' Club the club leader was also the chairman. As his name implies, however, the leader has to be more than a chairman—he has to display qualities of leadership not only during meetings, but at all times.

## What is it?

It would be unwise to attempt to define here such an abstract word as "leadership". Even if it were said—as it reasonably might—that leadership is "the power to encourage others," it would still be necessary to say what form the encouragement should take in order to deserve the name of leadership. The word may be interpreted in different ways, and those who aspire to lead must decide whether they are going to use guidance or gunpowder.

To give a list of the personal qualities possessed by the perfect leader would be to describe the perfect man.

Even if we were to list a few of the most important qualities such as initiative and zeal, it could not be claimed that the leader alone is possessed of them. In this issue let us content ourselves with discussing a few of the principles of leadership that influence practice. On some future occasion we can consider the duties and responsibilities of a leader.

## Take trouble to understand

People often say and do things for reasons very different from the ones they give and the ones that seem obvious. Patience and understanding are needed if we are to discover, tactfully, the real reasons. If we take the trouble to understand an action we are not necessarily indicating that we approve it. In thus gaining an appreciation of people's actions and characters we may be encouraged to look after and foster originality, and prevent the forcing of original minds into conventional grooves.

It is a sound principle to work on that everybody has some particular ability and knowledge that distinguish him from his fellows. If we give him the opportunity to use these we make him feel wanted, and he and those with whom he comes in contact profit as a result.

However, if responsibility is given, make sure that it is genuine and that it does, at least to some extent, involve making decisions.

## Allow freedom of choice

People are, as a rule, more ready to follow a good example if they feel free to choose whether to do so or not. This sense of freedom is stimulated if, as suggested, we show trust in their fundamental good sense and a respect for their personalities.

The wish to be a leader of others should not spring from a desire to manage or possess them. People, especially young people, who find it difficult to be independent, must be encouraged in every way to develop in their own good time, self-confidence and the ability to "stand on their own feet". Young people must have opportunities to take the initiative, and when they

do so it should be welcomed, even if the results are not always perfect. We may criticize their efforts, but let us not be superior about it.

Young people need to experience danger, but they must also be given a feeling of security. A balance between the two must be preserved.

Thus whilst we should permit young people to learn by doing, to learn by making their own mistakes, it is unfair to leave them, in their inexperience, to make all their own decisions without any guidance whatever. It may at times place on them an intolerable burden. Advice, guidance and rarely intervention may be needed to prevent a serious breakdown.

However, if advice is given and not taken, and the worst happens, we must resist the temptation to say "I told you so".

## Few need special help

The majority of young people, when amongst their own kind, usually prefer to get on together rather than to fall out. The few, however, who have hidden problems that produce symptoms to stir up serious trouble, need individual help, and to discover their problems needs more than an interest in the annoying symptoms.

Sympathy is needed to distinguish between those who are unsure of themselves, those who are over-confident, and those who are at heart the one but in appearance the other.

Confidence in oneself breeds it in others, provided it is based upon a healthy, humble attitude of mind. Such an attitude is not self-effacement, but merely the realisation that we owe a lot to other people. What we are and what we can do are not due to ourselves alone.

## Growing up

A leader may find that thought given to such matters as these helps him to handle the situations that arise when people combine, as in a club, to do things.

It is experience of these situations, and others like them, that help young people to grow up. Growing up is much more than becoming twenty-one and obtaining the right to vote. It is the process of becoming mature, and at various speeds it continues throughout life. Few can claim to be mature in all ways, and as individuals differ in the rate at which they mature, age is not an accurate measure of all-round maturity.

## Characteristics of maturity

It is unlikely that there will be complete agreement as to the qualities that constitute maturity. Here are some to ponder over:

1. The possession of an open inquiring mind, and a recognition of one's own lack of knowledge.

2. A readiness to accept responsibility for one's own actions.

3. An acceptance of the fact that we all owe a great deal to the community to which we belong, and are willing to serve that community.

4. The ability to deal with people and situations.

5. To be articulate.

6. The power to concentrate and steadiness of purpose.

7. A satisfactory attitude to the opposite sex.

8. To have outgrown the self-interest which is typical of the very young.

In our next issue we will relate these characteristics to the needs and interests of young people, and determine what part the leader should play in catering for them.

## Hints for Club Members

ALL junior farmers are entitled to a copy of the official Junior Farmers' Handbook. This book contains a reasonably complete guide for the successful operation of a club. It is suggested that members might refer to it constantly, and try out the suggestions it contains. Of particular interest is the section on planning programmes.

To encourage members to think, and to express their thoughts clearly and concisely, a public speaking contest is being conducted in the junior farmers' clubs. Those taking part would do well to remember that the average audience demands three things of a speaker: sincerity, simplicity and truth. If on all occasions that speeches are made, the public are given these, then the standard of public speaking will be raised considerably, and the benefits to the nation will be incalculable.