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COVER PICTURE: Apple trees in bloom in the Stanthorpe district.

EDITOR: *E. T. Hockings*

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Feeding A Grain Supplement To Beef Cattle

By W. STUBBS and J. J. DALY, Cattle Husbandry Branch.

During the late winter and early spring of 1958, *crushed grain sorghum was used as a supplementary feed for young beef steers when grazing in a paddock of native pasture on the Central Highlands. Here is a description of the work and a discussion on results.*

The project was carried out at "Codenwarra", a property on the Nogoa River about 8 miles north-east of Emerald. The property is owned by Mr. L. J. O. McCosker and managed by his son, Mr. Neil McCosker.

Two paddocks were provided for the investigation by simply dividing an existing paddock. Each paddock comprised an area of 120 acres which formerly carried coolibah and brigalow scrub with a fair sprinkling of bauhinia. Ring barking of the coolibah and brigalow was done many years ago but the bauhinia was left for fodder and shade.

The main grasses now consist of Mitchell—mainly "bull" (*Astrebla squarrosa*) with some curly (*A. lappacea*) and hoop (*A. elymoides*), blue grass (species of *Dichanthium*) with smaller quantities of Flinders (species of *Iseilema*), early spring (species of *Eriochloa*), pitted blue (*Bothriochloa decipiens*) and umbrella grass (*Chloris acicularis*).

A water trough was provided in the line of the dividing fence and thus served both paddocks.

The trial feeding extended from July 31 to November 21. Cold weather and frosts were experienced during June and July; temperatures were then mild in August and September, warm to hot in October and hot during November and December.

Rainfall in June was 245 points, with no falls in July and August, 12 points in September, and 51 points in October. Good rain to the extent of 385 points was recorded in November, followed by 115 points in December.

When the trial began at the end of July there was a solid stand of dry grass which appeared to be little better than straw. These pasture conditions prevailed until November 7, when a fresh shoot appeared as a result of storms. The bauhinia trees and other shrubs produced a fresh growth of leaves in September and the browsing

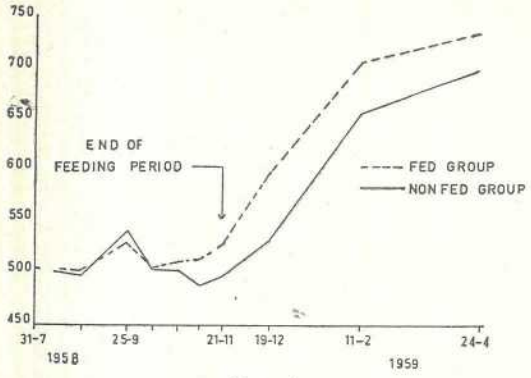


Plate 1

The Growth Rate of Both Groups During and Following Supplementary Feeding.

of these had an influence on the performance of the animals. Good quality pasture feed was available at the end of supplementation on November 21, 1958.

Animals Used

The trial animals were Hereford steers about 12 months of age and in good condition when supplementation commenced. They had been weaned 2 months previously. There were 15 animals in each group and one group (fed group) was offered the supplement while the others (non-fed group) had pasture only. All animals were weighed and paired on a basis of weight. Then one member of each pair went into each group. This gave two even groups and their average weights at the beginning of the trial were the same at 503 lb.

Type of Supplement

The supplement consisted of crushed grain sorghum to which was added 1 per cent. of crushed limestone and ½ per cent. of salt. The ration consisted of 3 lb. of crushed sorghum for each animal daily. The grain was placed out twice weekly (on Mondays and Fridays). Thus, on Mondays, when 4 days' feed was used, an amount of 180 lb. was placed before the stock.

A wooden trough, 16 ft. long by 6 in. wide and 4 in. deep, was used to hold the grain. Empty 44 gal. drums were used as a "stand", as illustrated. At this height the cattle were able to eat out of the trough while wild pigs nosed around the base of the drums in frustration!

The feed trough was located near the water trough.

In the beginning, the steers did not eat the grain although they were mustered and held around the trough. On the sixth day, a little molasses was sprayed on and around the trough and the cattle began to eat almost immediately. From that time onward, the allowance of feed placed in the trough was consumed in less than 24 hours. On one occasion the 4 days' ration was consumed in less than 6 hours.

A stocking rate of 15 head of yearling steers to 120 acres—that is, one beast to 8 acres—was maintained. Weighings were made monthly for the first two months and then every two weeks to the end of feeding. In order to compensate for any possible differences in the pasture feed available in each paddock the groups were alternated in the paddocks after each weighing.

A check has been kept on growth rate after the cessation of supplementary feeding, when all cattle were run together in one group. Weights were obtained at 4 weeks, 12 weeks and 22 weeks after supplementation ceased.

Results

The weights of both groups are shown in Plate 1. During the period of feeding (31-7-58 to 21-11-58), which was 113 days, the fed group gained 26 lb. while the non-fed group lost 8 lb. At this stage the animals in the fed group were heavier by 34 lb. a head on the average. One month after feeding ceased, this advantage was increased to 64 lb. (598 lb. compared with 534 lb.) but then the non-fed group picked up somewhat and were 37 lb. lighter than the fed group when sold at the end of April, 1959.

When examining the graph of weight gain, the rise in weights in September, followed by a fall, will be noted. The September weight was abnormal owing to all animals having had a substantial drink just before weighing.

The rapid response of the fed group to the good pastoral conditions in late November and early December is interesting. It was noticeable that the fed group showed a degree of thriftiness lacking in the non-fed group. This was apparent in the early shedding of the heavy winter coat of hair.

Plate 2

The Grain Supply Had Just Been Placed in the Trough When This Picture Was Taken.

Plate 3

An Ample Supply of Water Was Always Available in Both Paddocks.

Some Slight Scouring

The condition of laminitis or founder may occur when animals are engorged with grain or when full rations containing a high proportion of grain are introduced too quickly. Laminitis occurs following severe indigestion.

There were no severe digestive upsets amongst the fed group of animals but some slight scouring was evident. In addition, there appeared to be a good deal of undigested grain in the dung following the day of feeding.

It is thus possible that equivalent results could be obtained on a smaller ration of grain.

In twice-weekly feeding, the labour requirement is comparatively small. Troughing of some description has to be provided in order to avoid excessive waste.

The pattern of grazing behaviour of the stock did not appear to be unduly influenced by the feeding of the supplement. For instance, the animals did not stay near the trough once it was empty.

It is not suggested that grain is the ideal supplement for animals under conditions such as those described. There is some evidence available to indicate that a high-protein supplement may lead to greater efficiency on the part of the animals. However, it is obvious that there are possibilities in the use of grain in cattle production when it is cheaply produced on the property.

Supplementary feeding of beef cattle should not be looked upon as an end in itself but rather as an aid to maintaining a satisfactory plane of nutrition in the beef animal. It is associated with more intensive development where animals are kept growing steadily for the first 15 to 18 months and then fattened rapidly by the best available means.

In the trial described, it is considered that the fed group may have obtained a greater advantage had supplementation begun at or just before weaning in May. Circumstances prevented the commencement of feeding at that time but during the winter of 1959 this was done with another group of stock, and results will be reported when final weights are taken.

The Department's thanks are extended to Mr. McCosker and his son for their interest and co-operation in the work.

What To Do About Grain Poisoning Of Sheep

By R. B. YOUNG, Senior Adviser in Sheep and Wool.

Here are the facts on grain sickness that causes deaths in sheep, together with advice on what can be done about it.

Grain poisoning, sometimes called "grain fever", or "grain sickness", or "founder", (associated with lameness), is thought to be due to acidosis brought about by excessive intake of grain by sheep.

If a sheep eats large quantities of fermentable carbohydrate the ruminal contents become acid. *Streptococcus bovis,* a bacterial organism normally living in the rumen, multiplies rapidly in the presence of a carbohydrate medium and causes excessive acid production.

Poor sheep are more susceptible than sheep in good condition.

Plate 1

Drought Feeding of Rams near Muttaburra in Central Western Queensland.

Grain poisoning occurs mainly in sheep that have not been introduced gradually to intake of grain. In latter years, with a more widespread approach to drought feeding on an intermittent basis, that is twice weekly, or once weekly, it is likely that there have been more frequent occurrences of grain poisoning than with earlier observed practices of feeding daily. It is also likely that in the crop-sheep areas many cases occur that do not come up for more than a local review.

Behind the problem is the basic need for a gradual, or "conditioned", approach to any grain feeding of sheep. This would appear to be the most important point for sheepmen to to remember when any form of grain feeding is planned.

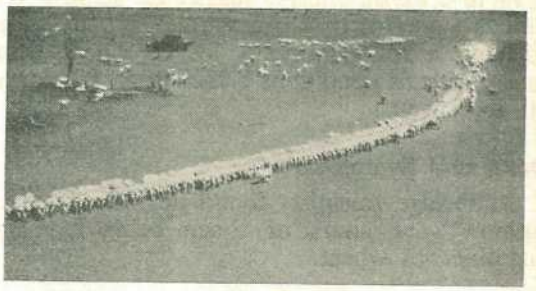


Plate 2
Drought Feeding Sheep with Wheat at a Longreach Property.

Wheat the Biggest Danger

Wheat stands high in the "risk-scale" when sheep gain access to unlimited quantities. Sorghum, maize, barley, oats, sheep nuts, all carry a danger, and it is apparent that stubble feeding, when unlimited and where a high proportion of unharvested grain remains, also carries risk.

Australian research workers carried out trials in which the toxicity of grains other than wheat were studied. Ground oats, barley, or maize were given to sheep in amounts that, calculated on starch content, were equivalent to the known lethal doses of wheat grain. All sheep developed acidosis, with low ruminal pH, high ruminal lactate, and high blood lactate, but variation was found in the degree of acidosis.

(pH is the standard of alkalinity or acidity. The range is 14, with 7 neutral. From 7 down to 1 is increasingly acid, and from 7 up to 14 is increasingly alkaline. Thus, strong hydrochloric acid might have a pH of 1, and strong caustic soda a pH of 14.)

In these trials some sheep died, others gradually overcame the acidosis and recovered. Sheep which recovered were later killed by measured lethal doses of wheat grain.

Australian reports state that the lethal dose of wheat for a normal merino sheep is 75-80 grams per kilogram of body weight, whereas only 60 grams per kilogram of body weight is necessary to kill a sheep in poor condition. (That

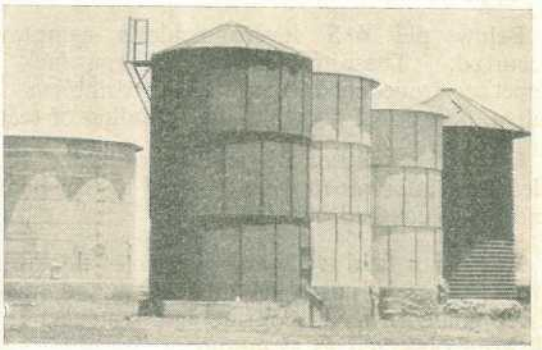


Plate 3
Grain Storage Silos in the Roma District.

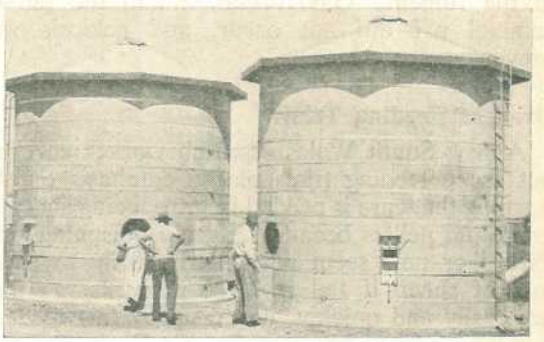


Plate 4
Showing Visitors the Grain Silos on a Central Western Queensland Stud Sheep Property.

is 7½ to 8 lb. of wheat would cause acidosis conditions sufficient to kill a normal 100 lb. sheep, whereas a little over 3½ lb. of wheat would cause acidosis conditions sufficient to kill a poor 60 lb. sheep.)

Onset and Symptoms

Cambridge scientists found acidosis occurring within 12-24 hours of sheep being fed large quantities of wheat.

Hay was given to the sheep as an initial diet for at least a week before changing to a heavy grain diet. After starving for 24 hours following the hay diet, sheep were given large feeds of wheat, oats, or maize, which they ate in about six hours. When the pH of the rumen fell below 5, mild symptoms of acidosis, dullness, and lack of appetite occurred.

Below pH 4·5 severe acidosis symptoms occurred. These comprised dullness, lack of appetite, quickened respiration, dribbling of saliva, occasional grunting, and grinding of teeth.

Of 14 sheep fed on wheat, oats, or maize, eight died after intervals ranging from 25 to 65½ hours, and six recovered.

Australian field trials and reports of flock outbreaks of grain poisoning indicate that dullness, sheep going off feed, scouring, and lameness have all been observed as symptoms.

Antibiotics Help

Australian and Cambridge scientists found that some antibiotics administered to sheep that were fed large quantities of grain limited fermentation in the rumen. Gas formation and the fall of ruminal pH did not occur, and acidosis was prevented.

Drought Feeding Trials

A new South Wales research worker carrying out sheep feeding trials placed emphasis on the warning that care is needed in introducing sheep to grain and pellets because of grain poisoning risk. Pellets or nuts seem particularly likely to cause loss of sheep if fed in large amounts, as they are easily and quickly picked up by fast feeders. A change from pellets containing bran and pollard to pellets of grain caused losses. Oats were found to be the least risky. In these trials sheep were brought up to a full ration of wheat, fed once weekly, on the following plan:

SHEEP FED IN PENS

Days When Fed	Quantity	
1 and 2	4 oz. per head	Daily feeds
3 and 4	7 oz. per head	
5 and 6	10 oz. per head	
7, 8, and 9 ..	12 oz. per head	
10 and 12	24 oz. per head (1½ lb.)	
14 and 18	48 oz. per head (3 lb.)	
22 and thereafter ..	5½ lb. per head once weekly	

It was stressed that in paddock drought feeding, it is wise to take longer than this, starting off with lower levels, such as 2 oz. per head for several days. Even if intending to feed from self feeders, start off with a trail of grain. Watch the sheep and the droppings closely as the grain ration is increased. Cut down the ration if there are symptoms of going-off-feed, scouring, or lameness.

Sick sheep should be drenched with ½ oz. of sodium bicarbonate in 3 pints of water.

Mix Chaff with Grain

Where self feeders are used, mix chaff and grain, 50/50, and this will lessen danger of acidosis.

Field Treatment

The aim in the treatment of affected sheep should be to neutralise the acidity and to control further bacterial activity.

In affected flock sheep much good could be done by dosing with sodium bicarbonate as a drench, with ½ oz. of sodium bicarbonate in 3 pints of water.

With valuable sheep such as stud or flock rams, antibiotics might also be useful, and information on the use of these is available from veterinary officers of the Department of Agriculture and Stock.

New Wheats For 1960 Sowings

By J. HART, Senior Adviser in Agriculture.

A new strain of stem rust of wheat hit Queensland recently, damaging hitherto resistant varieties such as Gabo and Charter. It was very timely therefore that the Queensland Department of Agriculture and Stock should have had available at this stage two newly named rust resistant varieties, Kenora and Hopps, to take the place of those which have fallen by the wayside. These two varieties have been released by Mr. D. Rosser, the Department's Senior Plant Breeder, following many years of careful testing by Departmental officers both at Warwick and Toowoomba.

The release of Kenora and Hopps marks an epoch.

Hopps, the original cross of which was made by the late R. E. Soutter, is the last of the great string of varieties with which the name of Soutter can be associated.

Queensland's wheat industry was virtually founded on Soutter varieties like Puno, Puora, Puseas and Seafoam. It was fitting that Hopps should have climaxed such a fine contribution to the wheat industry in Queensland's centenary year.

It is equally appropriate that the release of Kenora, the first new variety wholly bred and tested by David Rosser, Mr. Soutter's successor, should usher in our second hundred years of wheat production.

Hopps—Dual Purpose

Queensland's wheat industry has always demanded at least one variety with the ability to provide both good grazing and grain yields. Warput was an early dual-purpose favourite. In more recent years Warput has been supplanted by Lawrence.

Lawrence is still the principal dual-purpose wheat in this State. In Hopps, however, growers now have an alternative selection.

Many growers have had a preview of Hopps. It is similar to the grazing wheat which farmers have been growing for some years under the name of "K 41". The latter name is quite incorrect. It would now be preferable for all farmers who have hitherto grown "K 41" to switch over to Hopps.

Hopps should be treated in exactly the same way as Lawrence.

To take full advantage of the characteristics of Hopps, the variety should be sown early, subjected to one, two or even three grazings and then reserved for a grain harvest.

Naturally, dual-purpose crops have a greater demand on soil moisture and nitrate reserves than have quick-maturing grain varieties. To obtain the full benefit of what Hopps has to offer, then, sow only on good fallows with ample reserves of moisture.

In 1958, on a long fallow following lucerne, Lawrence provided two heavy grazings and yielded 45 bushels to the acre with a grain

protein of 14·3 per cent. to still win reserve championship in the State field wheat crop competition.

Hopps, given similar conditions, will perform as well, or maybe better.

Kenora At The Top

To Maranoa, Central Queensland and Darling Downs growers who remember Puora at its prime, Kenora will hold special appeal.

Kenora closely resembles Puora in appearance, even to the extent of being similarly susceptible to loose smut.

Kenora is a quick variety. Along with Spica and Festival it provides a varietal trio which should satisfy the needs of most growers.

These three varieties, with Kenora at the top, have consistently outyielded old favourites like Gabo, Charter, Koda, Puora and Seafoam. On account of rust susceptibility alone, these latter varieties are now risky selections.

Plate 1

The New Wheat Variety, Hopps, Which Provides an Alternative to Lawrence as a Dual Purpose Wheat.

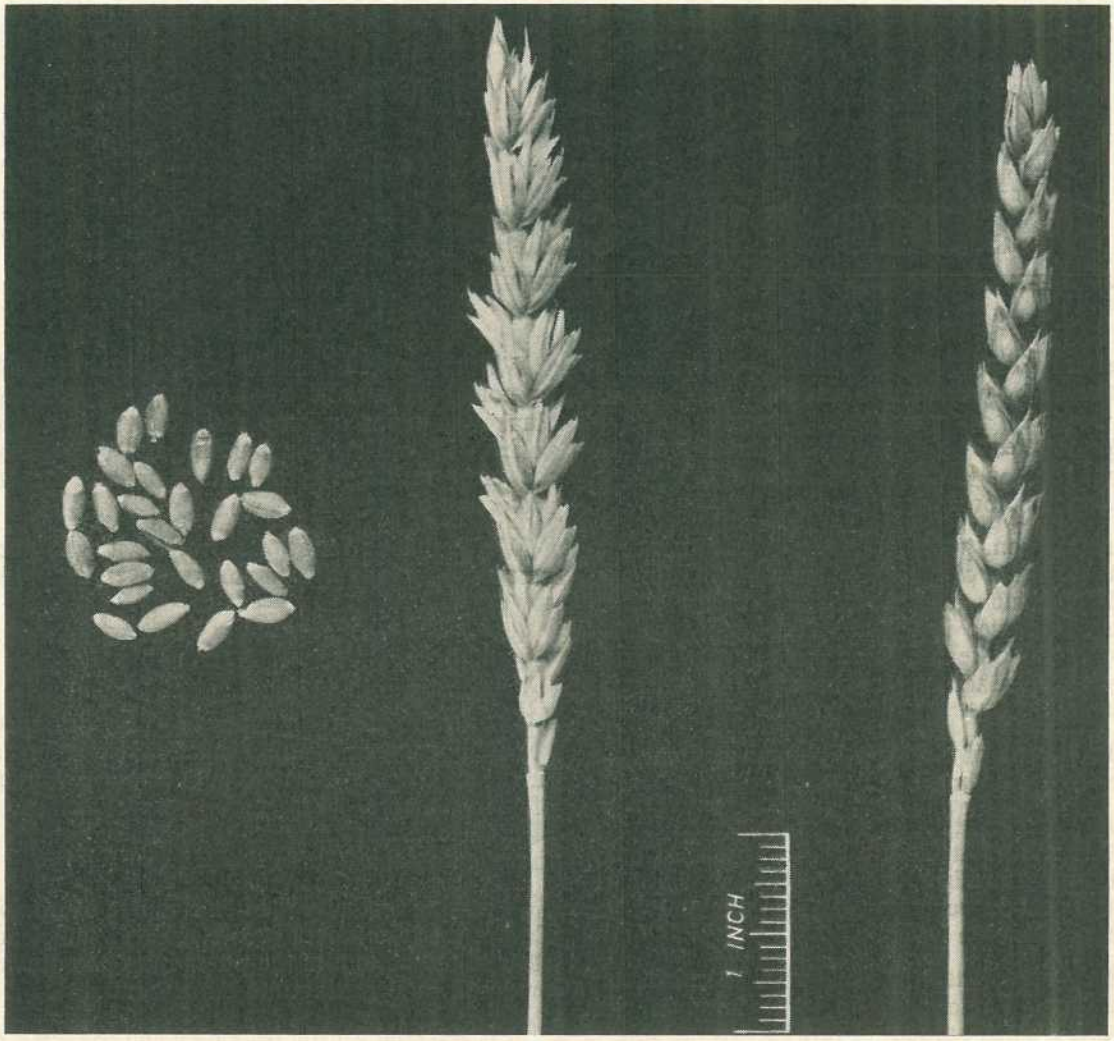


Plate 2

Kenora, a New Wheat Variety Intended as a Replacement for Gabo, Which, On Account of Rust Susceptibility, Is Now a Risky Selection.

The release of Kenora is intended as a replacement for Gabo. In appearance, however, these two varieties in no way resemble each other. Kenora, with its tall, willowy habit, looks more like Festival than any other modern variety. However, its smooth glumes, in contrast to the "velvety" glumes of Festival, will be welcomed by operators sensitive to "harvesting itch".

Kenora, as a quick maturing wheat, is a welcome replacement for Gabo and a timely addition to Spica and Festival as a safe, high-yielding grain variety.

Seed Supplies

Reasonable seed supplies of both Kenora and Hopps will be available to growers for the 1960 season.

Through the State Wheat Board seed selection scheme, high-quality seed supplies of all five varieties, Kenora, Spica, Festival, Hopps and Lawrence, can be offered.

pasture and crop

Paunch Content As Fertilizer.—There are a number of by-products of slaughter yards which can find use in agriculture. Among these is paunch content. Its value will depend on the type of feed on which the animal has lived for a week or so before slaughter.

Animals on grass roughage will produce a paunch content of low fertilizer value. Those on good food such as lucerne will produce one of somewhat better fertilizer value. Any paunch content will, like animal excreta, contain undigested weed seeds and could infest an otherwise clean field.

The degree of drying of paunch content is a factor in evaluating it.

The distance it will have to be carted is also another important feature as it is never of sufficiently high fertilizer value to warrant high cartage expenses, especially when wet as you will be paying cartage on water.

The paunch material will make a satisfactory mulch or, if ploughed in, will improve tilth and add a small amount of fertilizer to the soil.

It should be allowed to rot for a period before planting takes place.

Its value as a fertilizer is generally low and would warrant only a small outlay.

—W. WINKS, Chief Chemist, General Analytical Section.

Stop That Raindrop Erosion.—A great deal of the erosion which occurs on cultivated land can be attributed directly to the pounding and puddling effect of raindrops on the bare soil. When the soil surface becomes puddled the intake rate is reduced and the resultant runoff water carries away the soil already dislodged by the chiselling action of the raindrops.

With the onset of the wet season, it is desirable to counter this risk by providing a protective blanket of crops or crop residues. It is a wise policy to avoid stubble burning and to preserve the crop residues as a surface mulch for the protection of the soil.

Where a long fallow is involved it is a good practice to plant a leguminous cover crop like cowpeas.

—J. E. LADEWIG, Chief Soil Conservationist.

Check Irrigation Equipment.—Hot, dry spells between summer storms call for irrigation to safeguard crops against setbacks through shortage of soil moisture. You may save yourself a lot of trouble by giving your irrigation equipment a thorough overhaul before irrigating.

A leaking footvalve is often a source of trouble. Ensure that the footvalve is clean and sufficiently clear of the bottom of the water supply to prevent mud and sand getting into the system.

It is essential for the packing gland to be water-cooled. Adjust this gland just tight enough to allow water to drip slowly. Belts should be inspected for tension and wear, and replaced if necessary. Direct couplings should be aligned to prevent undue wear. Pipes and sprinklers should be repaired or replaced if necessary.

—I. N. McCLEMENT, Adviser in Agriculture.

Summer Care of Irrigated Pasture.—A ground cover of 3 to 4 in. of leafy growth is the best protection for irrigated pastures against the killing heat of summer. Its insulating effect may reduce temperatures by as much as 30 degrees. Summer grazing should always be regulated to leave this important 3 to 4 in. of stubble.

Pasture studies over the years have shown that rye grass ceases to grow when the soil temperature is between 70 and 80 deg. High temperatures also severely retard the growth of the other pasture components.

With the insulation of 3 to 4 in. of leafy pasture, temperature of the surface soil seldom rises above 80 to 90 deg. But under close grazing, the surface soil may reach 120 to 130 deg. For this reason, a protective cover of stubble in the summer often makes the difference between survival and death for most irrigated pasture species.

Pre-Crop Irrigated Pasture Land.—Grow an annual crop on newly graded land before working up a seedbed for irrigated pastures. This will give a better stand of pasture than you'll get by planting immediately after heavy grading.

The main value of pre-cropping lies in developing uniform fertility and improving soil structure. In grading, some of the fertile topsoil is taken from the high spots and spread in the depressions. This disturbance of fertility will show up as patchiness in a pasture planted immediately after grading.

On the poorer soils, annual legumes like cowpeas, velvet beans and field peas will build up the fertility. On some fertile soils, the need for weed suppression may be greater than the need to improve soil structure and fertility. For these soils suggested crops are white panicum and giant setaria in the summer and wheat and oats in the winter.

—A. NAGLE, Irrigationist.

Protein from Irrigated Pasture

High-quality, protein-rich irrigated pasture is a valuable fodder, particularly in our dry winter and spring months when native pastures contain very little protein.

Mr. A. H. Gardner, Toogoolawah, has proved the value of spray-irrigated improved pastures in recent years. This pasture was sown in May, 1954, and is still a good pasture to-day. It now consists mainly of paspalum and white clover.

Losing Baby Chickens?

By P. D. RANBY, Veterinary Officer.

Deaths of chickens up to about one week old are often disconcerting to the chick rearer, and sometimes losses are staggering. In this article, the main causes of death in baby chickens are described and suggestions for their avoidance are made.

If you are losing chickens, find the cause. Don't merely pass the blame to someone else.

Were the chickens a good batch, or were they poor and uneven in size? Are they dying in what appears to be good condition? Or are they generally unthrifty? Was the hatchability satisfactory? These various answers are a useful guide in sorting out the problem.

The more likely causes of chick losses are as follows:—

Chilling and overheating.
Yolk-sac infection (omphalitis).
Streptococcal infections.
Salmonella infections.
General unthriftiness and poor rearability due to faulty management before hatching.

In addition, numerous other diseases cause losses in chickens but are generally less important. Thus we may list epidemic tremor, chick nephritis, hereditary defects, poisoning by fumes and some nutritional disorders. There may even be others.

If you are losing too many chickens, veterinary assistance should be sought.

CHILLING AND OVERHEATING

It is well known that chickens chill easily. If subjected to cold, the chickens' lungs become congested so that they cannot function properly.

Anyone rearing chickens should be conscious of the dangers of chilling.*

Remember, the chickens themselves will let you know if they are cold by loudly expressing their feelings of discomfort. A check should be made on the chickens at night in order to ensure that they are comfortable.

How Chilling Occurs

It is usually the inexperienced chick raiser who suffers heavy losses from chilling as a result of failure to keep the young chickens warm. Chilling can also follow from overheating. This may result when the infra-red lights are lowered too close to the ground (especially with the pyramid type). The radiant heat then has a burning effect underneath and the chickens are driven away into the "cold zone".

Even where the usual heating arrangements are supplied, chilling may occur when an electric bulb fails, or the chickens are subjected to cold draughts that carry away the warm air in the brooder. Chilling may also result where occasional chickens wander away from the rest of the flock gathered near the source of heat. "Cold-brooders" are not always reliable for baby chickens in cold weather and can be a source of trouble.

* For information on this aspect, an article is available on request on "Brooding Chickens," Leaflet No. 78, by F. N. J. Milne.

If chilling is suspected, at least several chickens should be examined. Congestion of the lungs is regarded as typical of chilling. Instead of showing the normal light pink colour, the lungs become dark and solidified.

Both chilling and overheating can "trigger-off" bacterial infection. In these cases, deaths tend to persist. Harmful bacteria such as *salmonella* and *streptococci* may be present in a "latent" state without causing trouble. But when the chickens' resistance is lowered by chilling or overheating, a full-scale epidemic may be set in progress.

OMPHALITIS

Omphalitis (also called yolk-sac infection and navel-ill) refers to infection in the tissues around the navel, including the yolk-sac. A low incidence of omphalitis is often seen in batches of newly hatched chickens. Sometimes, however, 5 per cent. or more may be affected by the disorder. Chickens affected by omphalitis appear dopey, and may or may not have open navels. Deaths from the disease continue up to the eighth or ninth day of life and then cease. Deaths occurring after this age will be from other causes.

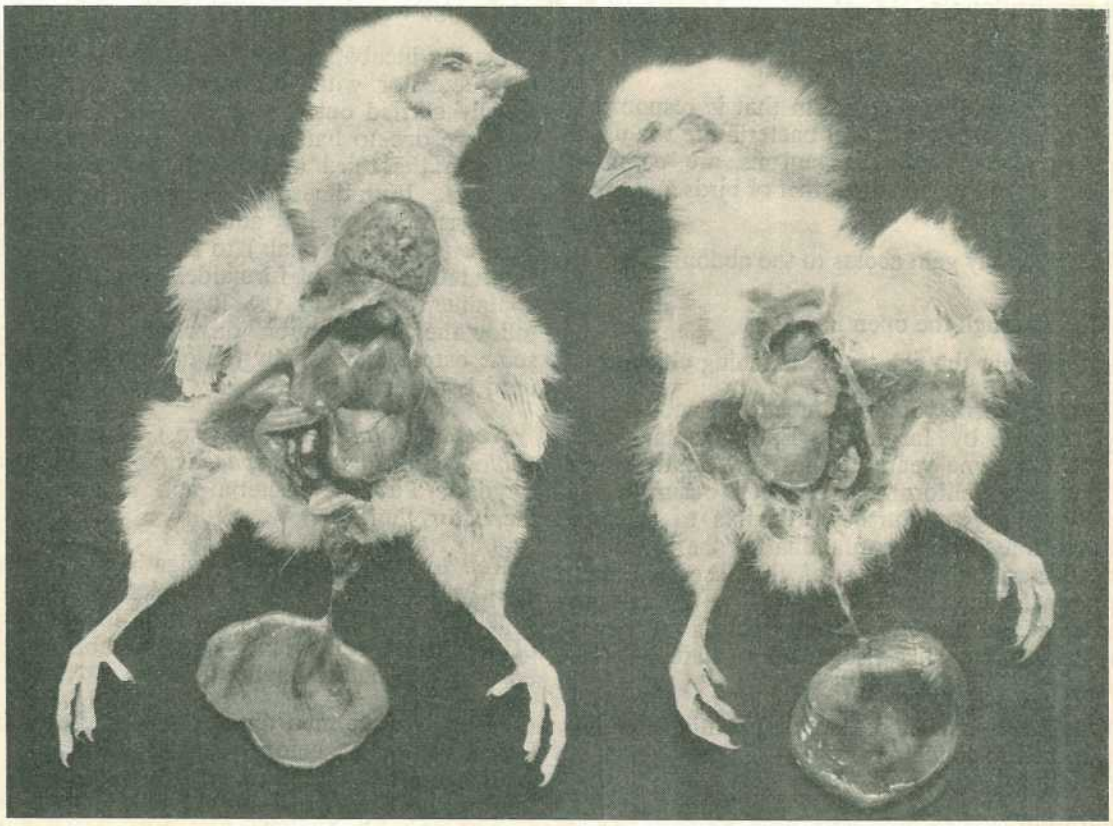


Plate 1

Omphalitis (Yolk-Sac Infection) in Two Chickens. The yolk-sacs have been brought to the exterior (seen between chicks' legs). Note attachment of the yolk-sac by a stalk to the small intestine. Both yolk-sacs contained broken down yolk which appeared as a dirty, brownish-yellow liquid. Note the dark area on the yolk-sac of the right bird—this denotes inflammation and haemorrhage in the yolk-sac membrane.

Broadly speaking, there are two types of omphalitis in young chickens:

(*a*) Infection of the yolk-sac. Here, the yolk-sac is congested and flabby, and usually contains dirty, liquified yolk (see Plate 1). This is the usual type of omphalitis seen.

(*b*) Inflammation of the abdominal wall in the area of the navel.

In older cases, the yolk-sac remains large because the contents have been unabsorbed. In a normal, one-week-old chicken, the yolk-sac should be pea-sized or less.

In both types of omphalitis, infection may spread to the cavity of the abdomen causing peritonitis. Such cases are often seen in chickens that survive longer.

How Infection Occurs

There is no single organism that is responsible for omphalitis, but coliform bacteria are the usual ones present. These organisms are common inhabitants of the intestinal tract of birds and other animals.

Bacteria may gain access to the abdomen in two ways:

(1) Through the open navel.

(2) Within the egg to the hatching chicken.

The egg-borne route of infection is not generally realised by farmers. Experimental work carried out some years ago in New South Wales showed that coliform bacteria can occur in the incubating eggs. Further, attempts to produce yolk-sac infection by contaminating the incubator with bacteria from cases of the disease failed. Dipping the eggs in cultures of the bacteria or swabbing the bacteria on the navels of newly hatched chickens likewise failed to induce infection.

This work indicated that omphalitis infection occurs before hatching.

Treatment

Antibiotics administered in the drinking water are worth trying. Oxytetracycline ("Terramycin") and Chlortetracycline (aureomycin) are the most readily available and may be given for about one week. Terramycin has been tried several times here and appeared to be of some value.

Chloromycetin in the drinking water gave promising results in an outbreak in the Brisbane area. Even dopey chickens appeared to respond and recover within 12 hours.

Hygiene Helps

(*a*) *Incubator Disinfection.*—Good incubator hygiene reduces omphalitis, and also early rearing losses in general.

The incubator should be washed or sprayed out before and after use with a suitable disinfectant. A chlorine disinfectant (as used on dairies) or a carbolic acid base disinfectant such as Lysol or Dettol may be used. All fluff and dust should be removed. Remember, cleaning of the incubator is most important and it is not sufficient to rely on fumigation alone.

During incubation, most hatcherymen fumigate the incubator with formaldehyde gas. This is usually carried out two or three days before the eggs are due to hatch. Another suitable time is between the third and fourth day after setting the eggs. Both times may be used. The formaldehyde gas is given off by adding potassium permanganate (Condys crystals) to formalin (which is a saturated solution of formaldehyde) in a suitable container placed in the incubator. One may follow the manufacturers' directions, which vary to some extent, but usually the quantity of formalin used is not sufficient.

Not less than 0·75 *ml.* (*c.c.*) *of formalin per cubic foot of incubator space is required* to obtain a good "kill" of bacteria and moulds in the incubator fluff.

Ten to 20 minutes of fumigation is required, after which the incubator doors are opened to expel the formaldehyde gas. The longer period of fumigation (20 minutes) is advisable in those types of incubators having air-vents.

Some hatcherymen dip the hatching eggs in a Dettol solution before setting them in the incubators, but the value of this measure is not known. Certainly it would kill off coliform bacteria deposited on the egg shell as a result of faecal contamination.

(*b*) *Other Points.*—Some poultry farmers blame dirty chick boxes for causing navel trouble, while some suggest excess humidity as a predisposing cause of omphalitis. We have no proof

of the importance of these factors, but on the other hand, they cannot be rejected.

In the case of using the previous season's chick boxes, it should be sufficient to remove the straw and shake any dust from the box. The box may then be re-used.

Remember, despite all precautions, a low incidence of omphalitis can still occur. This brings us back to the question posed earlier, "Where does yolk-sac infection really start?" Further research is required on this point.

STREPTOCOCCAL INFECTION

Streptococcal infection in chickens appears to be more common than is realised. These bacteria are easily overlooked and probably many undiagnosed outbreaks of sickness in the past have been due to streptococci. In recent outbreaks in Queensland, the losses were associated with the presence of streptococci in the various internal organs. Deaths varied from 5 per cent. to 95 per cent. but were most often about 10 per cent.

In outbreaks of "strep." infection, losses start any time up to the sixth day of life and continue for a week or two. In one outbreak in the Brisbane area in which chickens from two sources were mixed, the infection appeared to spread from chickens of the first source (cross-breds) to those of the second source (Australorps). Chickens kept from the same hatch at the second source hatching were unaffected.

How the streptococcal infections originate is not known.

Stress Factors Important

Many of the "strep." epidemics in Queensland last year appeared to be associated with stress factors such as slight chilling, long journeys by rail and debeaking.

In the case of outbreaks after long rail journeys, chickens from the same hatch kept at the hatchery remained well. The latter had been supplied a high level of oxytetracycline (Terramycin) in the mash. Laboratory examination of these apparently healthy chickens revealed the presence of streptococci within them.

One outbreak started after debeaking. The chickens were debeaked when one day old. Deaths started two days later and continued for five days with 50 per cent. of deaths. The debeaking wounds showed excess "proud flesh" after debeaking. Debeaking was blamed for this outbreak on circumstantial evidence.

Recognizing Streptococcal Infection

There are usually no lesions found at post-mortem in chickens affected by streptococcal infection. In certain outbreaks some of the chickens have been found to have congested lungs, suggesting that the bacterial attack has been triggered-off by chilling. The alternative could also be possible—areas of lung congestion pneumonia could be a direct effect of the "strep.".

Bacteriological examination of sick specimens should always include a check for streptococci when baby chick losses occur.

Treatment

The tetracycline antibiotics Terramycin and aureomycin supplied in the drinking water for 7 to 10 days are recommended for streptococcal outbreaks. Sulphonamide drugs have given poor results when tried here, and therefore cannot be recommended.

In one outbreak at Maleny in 1958, injections of procaine penicillin appeared to be of some value. Losses were considerably reduced, however, for three or four days following the injections but the chickens then relapsed. These results suggest that the injections may have to be repeated to obtain satisfactory results.

SALMONELLA INFECTIONS

There are a large number of *Salmonella* organisms which cause infections in poultry. Two of these cause specific disease entities, namely pullorum disease and fowl typhoid. The remainder are generally grouped together and are referred to as "paratyphoid infections". We are mainly concerned with the paratyphoid infections. Pullorum disease is very uncommon in Queensland while fowl typhoid is confined to Tasmania and does not occur on the Australian mainland.

Paratyphoid Infections

The paratyphoid group of organisms are frequently found in the intestinal tract of birds in general. "Carrier" birds, which harbour the organisms, pass them on occasions in their droppings.

These organisms may be deposited on the eggshell during the passage of the egg through the cloaca (the cavity just within the bird's vent).

It is known that these organisms can penetrate the eggshell and infect the embryo but the importance of this has not been worked out. In any case, the infections spread after the chickens are removed from the incubator, being picked up from the droppings of the infected chickens.

Losses start to rise three or four days after hatching and may reach 10 per cent. to 30 per cent. of the flock. Many chickens become dopey and deaths are fairly rapid (see Plate 2).

If an outbreak has been in progress for 5 days or more, there is a tendency for the chickens to have "pasted vents."

Presence of the organisms is confirmed by bacteriological examination, using special growth media.

Pullorum Disease

Pullorum disease is very uncommon in Queensland—due, no doubt, to the rigid policy of testing all breeding flocks for "carriers" of the causative organism.

Pullorum disease has a number of features different from paratyphoid infections. The organism *Salmonella pullorum* is transmitted from the ovary of the infected hen through the egg to the hatching chicken. Rapid infection occurs within the incubator at hatching time by inhalation of infective down particles from the infected chicken. This explains the explosive nature of pullorum disease outbreaks immediately after hatching. Deaths of over 75 per cent. can be expected.

Treatment of Salmonella

1. The more recent drug, furazolidone, is the most effective one known against salmonella organisms in general. It is supplied as directed (0·04 per cent. of furazolidone in the mash) for 7 to 10 days. Caution: Furazolidone produces some testis degeneration in cockerel chickens but complete recovery is said to follow when medication ceases.

Furazolidone is not soluble in water but a very fine suspension of the drug in water should be available soon and should be suitable for administration in drinking water for poultry.

2. Terramycin or aureomycin may be used in the drinking water for 7 to 10 days. These antibiotics are more effective than the sulphonamide drugs but less than furazolidone.

3. The sulphonamide or "sulpha" drugs have often been used for salmonella infections in the past. Supplied in the drinking water, losses can be reduced. These drugs suppress the infection during the course of treatment but do not eliminate it.

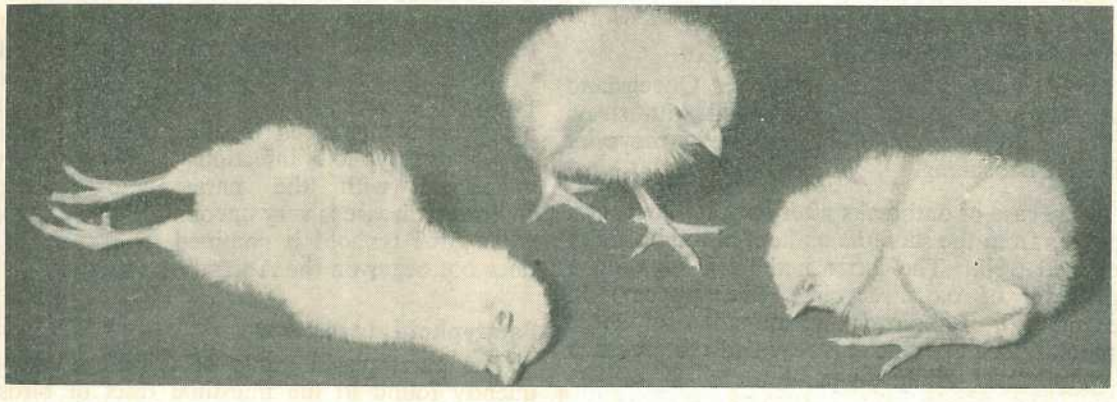


Plate 2

Sick and Dying Chickens Only a Few Days Old. These chickens were affected by a Salmonella (paratyphoid) infection.

Change the Litter

During the period of medication, the contaminated litter should be replaced by fresh litter or else the chickens should be moved to new quarters. This measure, when combined with furazolidone treatment, has resulted in the complete removal of *Salmonella pullorum* in experimental infections.

GENERAL UNTHRIFTINESS AND POOR REARABILITY

Sometimes the newly hatched chickens may be unthrifty and uneven in size. In addition, early rearability is poor. Under ordinary conditions, one can expect 1 to 3 per cent. deaths to three weeks of age. However, when deaths reach 5 per cent. or more, there is some cause for concern. These losses are more or less non-specific—that is, they are not related to any immediate cause. Infection may be absent.

This type of setback will usually be associated with one of the following:

(*a*) Faulty incubation.

(*b*) Imperfect diet supplied to the breeding fowls.

The main factors involved are described briefly as follows:

Faulty Incubation

Excessive humidity towards the end of the incubation period will interfere with the respiration of the eggs and their contained embryos. The chickens hatching are smaller, appear wet and "mushy" and are inclined to be weaker. Panting is also a feature. Early rearability is reduced.

The humidity of the incubator during the last four days of incubation should be carefully watched by means of the wet bulb thermometer. The air currents are also important in controlling humidity.

Imperfect Diet

The chick's well-being in the first week of life can be affected by nutritional defects in the diet supplied to the breeding fowls. Often, the first sign of a nutritional deficiency is reduced hatchability and poor early rearability in the chickens hatched from these eggs. Deficiencies of vitamin A, riboflavin and manganese are the most notable in this respect. Probably poor protein quality in the breeder's ration can also result in unthrifty chickens being hatched.

Other Causes of Losses

Other disease conditions also account for chick losses, but are generally of less importance.

Chick nephritis (uraemia) is occasionally troublesome and is recognised by kidney damage. Affected chickens die quickly and may not be seen sick. The cause remains unknown.

Epidemic tremor (avian encephalomyelitis) causes nervous symptoms in chickens up to three weeks of age. The main sign is leg weakness and paralysis while a smaller proportion exhibit a peculiar fine tremor. This disease is caused by a virus which attacks the brain and spinal cord.

Congenital defects account for a few losses but the proportion is generally not higher than 1 per cent. unless the chickens are inbred. Examples are twisted beaks, a leg twisted sideways, and poor feathering. Possibly one or two slow growing and undersized chickens in an otherwise healthy flock are a result of biochemical faults that are inherited. Chickens with congenital defects are generally not sold. Preferably they should be destroyed.

Poisoning by kerosene fumes containing carbon monoxide may occur with improvised heaters. However, it is of note that the new kerosene pressure burners used by some poultry farmers appear to be efficient and safe.

Crazy chick disease has been observed once in chickens immediately after hatching. The outbreak occurred in the Brisbane area in 1959. The chickens showed a spastic paralysis and 7 per cent. died in a few days. Crazy chick is rarely seen before three weeks of age.

Vitamin A deficiency in the breeding stock, if severe enough, will cause heavy deaths in the newly hatched chickens. The chickens will continue to die for about one week despite the feeding of a vitamin A supplemented ration to them.

Debeaking of day-old Australorp chickens by the mechanical method sometimes causes a setback and they are slow to start eating. This does not seem to occur with White Leghorns or their crosses.

REMEMBER THESE POINTS

Keep chickens warm, as they chill easily. However, avoid overheating. Besides deaths caused directly from chilling, exposure to cold or excessive heat will lower the birds' resistance and "trigger-off" bacterial infections.

Good hygiene reduces omphalitis but does not entirely prevent the trouble. The navel route of infection is not the only one. It is generally not realised that the coliform bacteria may occur in the incubating eggs.

Salmonella and streptococcal infections can be responsible for heavy losses. Post-mortem findings are lacking but the organisms can be isolated from suitable live specimens. The newer treatments recommended are fairly effective, especially for salmonella infections.

General unthriftiness and poor rearability in chickens may be due to faulty incubation or to an imperfect diet supplied to the breeding fowls.

Less important causes of chick losses are chick nephritis, epidemic tremor, congenital or hereditary defects, and carbon monoxide poisoning. Crazy chick disease has been seen immediately after hatching, an unusual time for this disease. Mechanical debeaking of day-old Australorps may require caution.

Talking About Bees

More than 100 people attended the Beekeepers' Field Day held at Mr. Trevor Manning's apiary at Parkhurst in the Rockhampton district. Here, modern extracting equipment is being demonstrated.

Ear Notching Of Pigs

By Officers of the Pig Branch

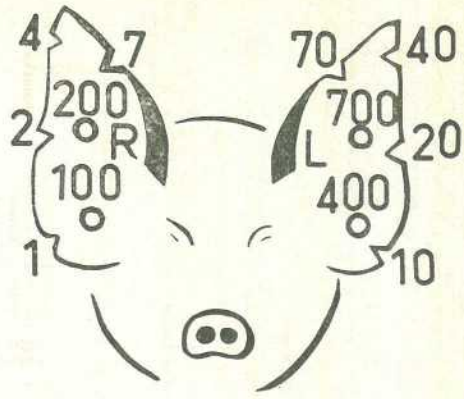


Plate 1
The Key or Guide to the Ear-Marking System.

BEFORE a litter is weaned, the young pigs should be given a permanent identification mark. Tattooing, tagging, and ear notching are common methods of identification, but of these the last-mentioned is undoubtedly the best and as nearly permanent as possible.

Notching has an advantage over tattooing in that it can be used on all breeds of pigs and if neatly done remains legible regardless of the pig's age. A pig's number also can be observed in the paddock without the necessity of yarding the animal and perhaps washing its ear.

Metal tags are not satisfactory, as they are often lost through pigs fighting or rubbing their ears against fences or other objects. With this method, also, the pig has to be yarded and the tags cleaned before the number can be read.

It is not claimed that ear notching is the perfect system of identification, for it is realised that pigs may occasionally tear their ears through fighting, thus marring the notches; their ears also may be disfigured by excessively deep and careless notching.

However, these risks may be reduced to a minimum if the following points are observed.

(1) No marks should be placed from the middle to the base of the upper edge of the ear. The cartilage in this position is quite thick and it is necessary to cut deeply into it to ensure that the notches will not grow out as the pigs age. As a result there is always a danger of the ear drooping over in an unsightly manner—a very objectionable feature, especially in show stock.

(2) The value or number allotted to positions near the point of the ear should be so designed that it is not necessary to take out more than one notch in this part of the ear for any number; otherwise the tip of the ear may droop.

(3) Round punch holes should not be used near the tip of the ear. In this position they are prone to cause tearing.

(4) Pieces removed from the ear should vary according to the size of the pig.

The ear notching system illustrated in Plate 1 has been designed to comply with the limitations as far as possible. It is one example of many systems in which notches in particular positions of the ears represent numbers, thus enabling each pig or each litter to carry a different number.

A brief description of this system, which employs both ears for notching, is as follows:—

All unit numbers are placed on the right ear and the tens in the left or near ear. Confusion between the two may be avoided by remembering that the words unit and right each contain the letter "i" and the words ten and left the letter "e."

It will be noted that numbers 1, 2, 4 and 7 are recorded by a single notch, the value being determined by the relative positions on the ear. The numbers 3, 5, 6, 8 and 9 represent a combination of the previous positions (for example, 2

SOW'S BREEDING RECORD

Name of Sow : " Sunnybrook Pearl XVI."

Breed : Large White

Date Farrowed : 3-7-53.

Earmark No. 65

Sire : " Sunnybrook Major II."

Dam : " Sunnybrook Gem V."

Earmark : 32

Earmark : 12

Litter Farrowed—	Sire of Litter	Number in Litter		Died at Birth		Date of Deaths before Weaning		Earmark and Date Weaned	Disposal of Litter: Date of Deaths after Weaning		Sold to Market: Date	Number		Average Weight	Price	Gross Return			Remarks
		Boars	Sows	Boars	Sows	Boars	Sows		Boars	Sows		Boars	Sows			£	s.	d.	
2-9-55	Sunnybrook Major	7	5	1	1	..	1 3-10-55	65 29-10-55	..	..	28-3-56	5	2	Lb. 140	s. d. 2 0	98	0	0	1 pig born dead
									..	..	10-4-56	1	1	136	2 0	27	4	0	1 pig overlain
								Boars 6 / Sows 3											1 death—pneumonia
																			9 baconers marketed
																125	4	0	

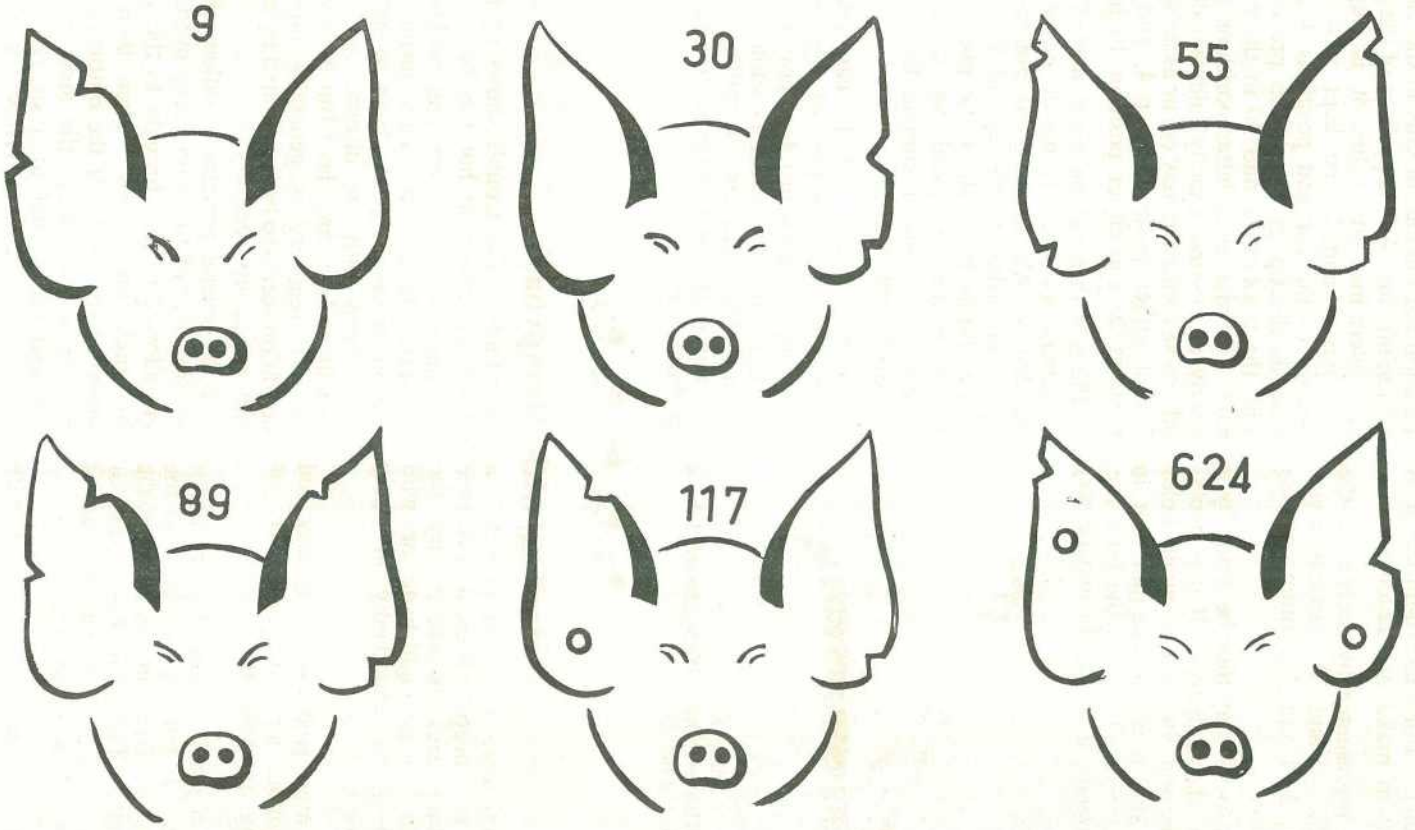


Plate 2

Diagrams Showing How Various Numbers Would be Marked.

and 1 to make 3; 4 and 1 to make 5; 4 and 2 to make 6; and so on). For these numbers it is therefore necessary to make two notches.

The tens are represented by notches in the left ear, the 10, 20, 40 and 70 positions corresponding to the 1, 2, 4 and 7 positions respectively in the right ear.

Any number up to 99 may thus be made by a combination of the above figures. If it is necessary to number beyond 99, round punch holes could be used as shown is the diagram, but in the average herd, where all pigs in the litter are given the same number, it is usually unnecessary to go beyond 99. By adopting the 1, 2, 4, 7 combination the number of cuts in the ear is reduced to a minimum. As the position of the notch on the ear determines the value, it is important that positions 1 and 10 be kept well towards the bottom of the ear and positions 4 and 40 well towards the tip of the ear to prevent confusion with the positions 2 and 20 in the middle of the ear. Likewise these latter positions should be as nearly as possible exactly midway along the ear; otherwise confusion may occur as between position 2 and either position 1 or 4, and as between position 20 and either position 10 or 40.

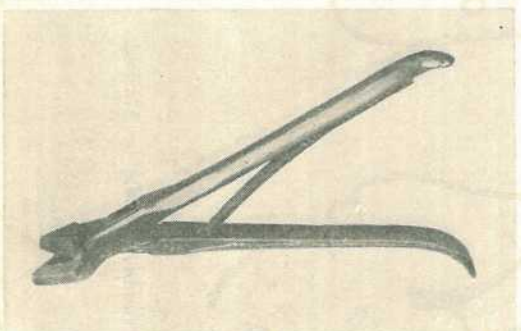


Plate 3
Ear-marking Pliers With a Cutting Piece Shaped Like a V Upside Down.

Pliers with a cutting piece shaped like a V or a narrow-bottomed U upside down are recommended for ear marking, as notches of various sizes—according to the age of the pig—can be made simply by pushing the pliers varying distances on the ear. Small pigs up to weaner age should have only a comparatively small piece removed from the ear.

Careful recording of the earmark allotted to each animal or each litter of pigs (see specimen breeding record) is just as important as the marking itself, for one's memory should not be relied upon in these matters. Identification of pigs in this way is also of value in recording pedigree and performance.

Dealing with Humpyback

Rest is the best cure for "humpyback," a summer disease of sheep. Present evidence indicates that humpyback is caused by the animals eating the quena nightshade or wild potato plant that grows abundantly in many sheep-raising districts.

The disease is most common in January and February, but trouble may start as early as December or hang on well into March.

Wild potato is a small perennial plant about 9 in. to 1 ft. high. It tends to die back in the winter, but shoots up from its roots after the first summer storms. The plant has purple or blue flowers, and small fruit about the size of a cherry that turn yellow when ripe.

Sheep affected with humpyback stand with their backs humped, and tremble violently in their limbs. The trouble shows up mainly when sheep are driven in hot weather.

Humpyback is a very real problem on many properties because it occurs during the shearing season, when the flocks have to be mustered.

If sheep with the disorder are driven, they usually collapse and die. But if they are allowed to rest, recovery is generally rapid. As the condition seems to be aggravated by heat, shearing will speed up recovery.

It is general practice to allow affected sheep to drop out of the mob being mustered. These are allowed to rest, brought to the shearing shed by truck, and shorn. Then their chances of recovery are good. If the outbreak affects a big portion of the flock, the sick sheep are best left and shorn later at a stragglers' muster.

—R. B. YOUNG, Senior Adviser, Sheep and Wool Branch.

stock and station

Arsenical Poisoning From Dip Sump.—If you use a plunge dip to control cattle ticks, make sure your cattle can't drink from the dip's sump. A Brisbane district dairyfarmer lost cattle from this cause. After losses and sickness had occurred in his herd he found that, in the night, his cows were nudging aside a sheet of corrugated iron covering the sump of a plunge dip. This allowed them to drink the liquid in the sump which evidently contained sufficient arsenic to cause poisoning.

This farmer's experience contains a lesson for every stock owner. If the sumps of plunge dips were fenced off so cattle couldn't get at them, there'd be little danger of poisoning from this source.

—P. D. RANBY, Veterinary Officer.

Vaccinate For Blackleg.—Annual vaccination of all calves is the best precaution you can take against blackleg. You can't afford to be complacent about this disease. Its incidence varies from year to year and you never know when a widespread outbreak is likely.

The loss of only one calf would be more costly than many years' vaccinations. Vaccination is a simple operation. With a needle and syringe, 5 c.c. of vaccine are injected under the skin, usually in the area immediately behind the shoulder. Full immunity develops in about two weeks.

Treatment at five to six months gives protection until the beast is two years old. If calves under four months are vaccinated, they don't acquire a lasting immunity, but require a second vaccination about three months later. In severe outbreaks older cattle may need another vaccination.

—B. PARKINSON, Veterinary Officer.

Sheep Die From Worm Treatment.—Many of Queensland's 22 million sheep graze in worm areas. Many are drenched several times annually. Sometimes because of careless drenching, sheep may be killed as well as the worms. Investigations show the main causes to be:

1. "Forced-pressure" drenching that sends fluid into the lungs.

2. Faulty drenching-gun nozzles that because they are sharp, hard, or unpliable, poke holes in the delicate throat linings.

3. Insufficiently supervised mixings of drench so that dosages are sometimes high enough to be lethal.

4. Trying to do too many sheep in a day.

5. Badly constructed and makeshift drenching races.

—R. B. YOUNG,
Senior Adviser in Sheep and Wool.

Peanuts Make Bacon Oily.—Farmers who feed their pigs on peanuts right up to trucking day run the risk of heavy financial loss. Factories pay a much lower price for peanut-fed pigs.

Carcasses of peanut-fed pigs do not become firm, even when chilled. If they are cured, the bacon is flabby and oily, and the fat melts at ordinary room temperatures. This type of bacon turns rancid quickly. Because of its messy nature and poor keeping qualities, bacon factories, retailers and consumers all object strongly to handling "peanut bacon".

Peanuts are good food for sows and litters and for weaners. But peanut feeding should be discontinued at least six weeks before pigs are marketed. This gives the pigs time to develop the firm fat necessary for a prime grading.

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

Worms Cut Pig Profits.—Wormy pigs are usually slow growers. They're likely to suffer from disease and earn farmers little, if any, profits.

The large roundworm is the most common worm parasite of pigs. Chief points in a control programme would be rearing all pigs on clean concrete floors at least to weaning age, and always using spelled paddocks for weaners. Prevent the formation of wallows, and ensure that food wastes and litter do not accumulate. Worm eggs remain infective much longer in moist areas and under rubbish than they do on dry ground and exposed to sunlight.

At the beginning and just before the end of each dry season, treat your breeding stock for roundworms. In addition, treat each litter just after weaning. Recommended drugs are sodium fluoride and piperazine compounds.

—T. ABELL, Senior Adviser, Pig Branch.

Coccidia In Chick Batteries.—Coccidia can build up in battery brooders under favourable conditions. Recent outbreaks of coccidiosis are reported in started chickens from battery brooders. Ordinarily, chickens reared on wire floors are relatively free of coccidia. But in the case of started chickens, the batteries are in constant use. Further, started chickens are often kept in the batteries longer than a month. Under these conditions, the ½ in. mesh wire floor of the brooder becomes less efficient and droppings collect. The chickens ingest the particles and the coccidial cycle is set in motion.

Where battery brooders are in constant use, hose them out between batches of chickens. After hosing, any remaining coccidia may be killed by brushing with dettol or lysol solution. If possible, don't keep the chickens in the batteries longer than a month.

—P. D. RANBY, Veterinary Officer.

Heat Spoils Eggs.—High temperatures can quickly turn a fresh egg into a stale one. To prevent this happening, you should collect eggs from the nests at least three times a day, cool them rapidly before packing, pack them in cool cases, and then store them in a cool place.

As well as being kept cool, the eggs must be kept in a humid atmosphere to cut down evaporation of the egg contents. If eggs are placed in a drying breeze, rapid evaporation takes place, and the air cell is enlarged. This will lead to the egg's being down graded.

A charcoal cooler will provide the necessary cool humid atmosphere in which to store your eggs prior to marketing. This type of cooler is inexpensive to build and costs nothing to run, but it could save you losses due to down-graded eggs this summer.

Plans for a charcoal cooler can be obtained from your local poultry adviser.

—B. W. MOFFATT, Poultry Adviser.

Feeding Feathers to Chickens

A poultry farmer at Wowan (via Rockhampton) asks, in a letter, if feathers fed to chickens will prevent cannibalism and feather-eating. Both these vices have been a problem in his broiler chickens.

He states that since he recently started feeding his chickens feathers from slaughtered birds, cannibalism and feather-eating have disappeared. The ration supplied to the birds has remained the same, apart from the feathers.

It is accepted that ground-up feathers can control both feather-eating and cannibalism. This effect is probably brought about by the increase in the indigestible material in the bird's diet as a result of feeding the feathers. However, the same effect should occur if extra lucerne chaff, lucerne meal or ground oats are given to supply extra fibre.

Our correspondent may have found an answer to his problem through feeding feathers but his results indicate a lack of fibre in the broiler ration. It may be worthwhile comparing feathers with say, good quality lucerne chaff or meal. (Oats are not usually available in his area.)

Remember, the causes of cannibalism and feather-eating are multiple and include boredom, overcrowding, nutritional imbalance and hot humid conditions. High energy-protein diets increase the tendency.

An article entitled: "Cannibalism and Feather-Eating in Poultry" is available in the December (1959) issue of this journal and will soon be obtainable in pamphlet form on request. In this article, the control of this disorder is more fully discussed.

—P. D. RANBY, Veterinary Officer.

Crookneck In Pineapples Is Not Hard To Control

By N. L. ALDRIDGE, Adviser in Horticulture.

Special fertilizer has been compounded to combat crookneck in pineapples.

The disorder known as crookneck in pineapples is common in the more important horticultural districts of Southern Queensland. It is particularly well-known in areas where the crop is grown on sandy soils which tend to be strongly acid and are rather deficient in two trace elements —zinc and copper.

Lack of available copper appears to have an adverse effect on the utilisation of the zinc by plants and, even when supplies of zinc are adequate, signs of deficiency of this element can occur when the amount of copper in the soil is below normal. If the zinc content of the soil is also low, as seems to be the case in many soil types in coastal Southern Queensland, the aggregate effect on the pineapple plant is the development of the disorder which we call crookneck.

What to Look For

The symptoms of crookneck are often not very spectacular in the early stages. The first indication of the disorder is usually a curling or twisting of the heart leaves. Later, the leaves become typically narrow, light-green to yellow in colour with a thickly-waxed surface. In acute cases, the twisted centre leaves are bunched together and bend over towards the horizontal, giving the plant a typical crookneck appearance.

An unusual feature of this disorder is that some plants are badly affected while others, even those alongside, may show no abnormalities in growth.

Effect of Soil Type

Due to the rapid expansion in the pineapple industry during the post-war years, pineapples are now being grown on a wide variety of soil types. These include the peat and sandy-peat soils which originally carried a wallum, semi-wallum or sparse forest type vegetation. These soils are usually well-supplied with organic matter, poorly drained and nearly always acid or strongly acid in reaction. They are frequently deficient in both copper and zinc. Pineapple crops established on them are very subject to crookneck unless corrective measures are applied before or shortly after planting.

Crookneck is also common in plantations established on sandy, well-drained soils which are often lacking in organic matter and very subject to leaching of plant nutrients by heavy rain.

In pineapple crops grown on heavier-textured soils, which were originally covered with dense forest or scrub, the disorder is not so prevalent but deficiencies may sometimes appear when the land has been cropped with pineapples for several years.

How to Control It

Crookneck is not difficult to control. Although outbreaks are usually associated with the occurrence of a double deficiency of copper and zinc in the soil, a deficiency of copper alone is

sometimes the cause when the status of this element is very low and available zinc is just sufficient for normal growth.

Special fertilizers have been compounded to combat the disorder. The best known is a 10-6-10 mixture containing about 56 lb. of copper sulphate

Plate 1

Healthy Pineapple Plants. These were grown from tops and are about 6 months old.

and 56 lb. of zinc sulphate a ton. Copper and zinc salts are also included in certain planting mixtures currently recommended for the pineapple crop. These fertilizers are commonly known as "Special" mixtures and are retailed as such by fertilizer firms.

When crookneck plants are found in the plantation, one of the "Special" mixtures should be applied when the crop is next due to receive a side dressing of fertilizer.

Rates of application are standard at 50 lb. a thousand plants.

Normal growth is resumed very quickly after treatment if rain falls soon after the fertilizer is applied.

Symptoms of the disorder commonly appear in spring when a flush of growth occurs in the plantation. This may involve the substitution of the "Special" mixture for one of the standard fertilizers prescribed at this period of the year.

Under normal conditions, one application of the fertilizer would correct the disorder. If, however, heavy rains occur shortly after using it and the plants do not respond within a reasonable time, it may be necessary to make a second application later on.

In some districts, the "Special" mixture is applied on the more readily leached types of soil as a routine control measure in spring, on the assumption that crookneck symptoms will appear at that time of the year.

In areas where copper and zinc deficiencies are pronounced and the land has a crookneck history, an application of the "Special" fertilizer mixture containing these elements is made in all crops at or shortly after planting. Unless the deficiency is acute, this should keep the plantation free from the disorder during the cropping cycle of one plant crop and one ratoon crop. However, if symptoms again become prevalent later on during the life of the plantation, the "Special" mixture can be substituted for one of the routine fertilizer treatments.

In some areas, growers claim good results with the "Special" fertilizer incorporated in the soil as a basal dressing before planting rather than as a side dressing after planting. This practice seems justified by recent experimental work at the Maroochy Experiment Station which indicates that the whole of the phosphorus and potassium requirements of the crop can be effectively applied in the basal dressing.

Plate 2

Pineapple Plants Showing Typical Symptoms of Crookneck. Left—early stage, note curling of the leaves at the growing point; right—advanced stage showing growing point bent to near-horizontal position.

Take This Precaution

When using the "Special" fertilizer containing copper and zinc, take care to prevent the mixture coming into contact with the heart leaves of the plant as it is liable to burn more than standard mixtures which do not contain sulphate and zinc sulphate.

Propagating The Grape Vine

By D. E. TAYLOR, Adviser in Horticulture

While the grape vine may be propagated from cuttings, layers or seeds, commercial propagation, that is, volume production of plants for new vineyards, is invariably achieved by using selected cuttings.

The raising of plants from seed is not a commercial practice; it is, however, employed by plant breeders who are interested in producing new varieties Layering also has a limited use, mainly as a method of replacing vines which have died or collapsed in an established vineyard.

Cuttings are selected from mature canes of the previous season's growth and are cut from the parent vine during the dormant season. They are taken from vines which are vigorous, true to type, free from disease and regularly productive of heavy crops of good quality fruit. Vines of this type should be marked during the growing period so that they can be identified in winter when cuttings are prepared.

Cuttings are prepared immediately after pruning. The cane is first cut directly below a node and again just above a node some 15 to 18 in. nearer the tip. Each cut should be clean so that the exposed surfaces will callous over quickly.

The better type of cutting is moderately thick with fairly short internodes and is obtained from the lower portion of the cane. If the source of supply is large enough, selection can be restricted to cuttings from canes with basal buds and dormant eyes at the end. Such canes immediately adjoin old spurs.

The cuttings are placed in bundles of about 50, and buried in soil to a depth of about 6 in. until they are required for planting. They keep best in a cool, sandy soil that is damp but not wet, and protected by shade.

An alternative method of holding cuttings is to heel them in the soil at an angle to the surface leaving the top 3 to 4 in. of the bundle above ground level.

Planting Bare Cuttings

Although cuttings can be planted in the vineyard, it is, nevertheless, much better to let them root in the nursery first. If they are established direct in their permanent positions, some failures are almost inevitable and replacements in the vineyard are rarely satisfactory

Where, however, bare cuttings are planted in the field, the work is done in late winter. A bar is sunk to a depth sufficient to take the cutting, which is then placed in the hole with one bud at ground level and one bud above the ground. The bar is again inserted into the ground a short distance from the cutting, this time at an angle, and the soil is then forced towards the cutting in such a way as to seal the hole completely from the base up. The second hole made by the bar can be filled in by tramping.

If the soil is dry at the time of planting, it will be necessary to water the cuttings. The cutting is placed in the hole made by the bar; the hole is then filled with water and firmly closed by hand after the water has soaked into the soil.

Two cuttings may be set in each vine position. If one fails to grow or makes poor growth, the second will provide a replacement vine in the right place.

Plate 1: Muscat Hamburg, an Early-Maturing Grape Which Is Popular Both at Stanthorpe and on the Coast. It is normally propagated on its own roots.

Rooting the Cuttings

Cuttings are normally rooted in a nursery, the site of which must be chosen very carefully. New land is essential and the soil should, preferably, be a well drained, sandy loam of good depth and reasonable fertility.

The soil should first be worked to a fine tilth by ploughing and harrowing. The nursery rows are then marked out by plough furrows in which the cuttings are set in late winter at an angle of 45 deg. to ground level with two buds above the surface. The furrows are then filled in and the soil is well firmed. If the soil is at all dry, the cuttings must be watered before the furrow is completely filled in.

During the following season, the soil should be kept continuously moist, by irrigation if necessary. Weed growth must be suppressed at all times and diseases such as anthracnose and downy mildew must be controlled by suitable fungicides.

Rooted Cuttings

Rooted cuttings are carefully lifted from the nursery and prepared for planting into their permanent places in the vineyard during the dormant season—about 12 months after they were bedded in nursery rows. The roots should be neatly trimmed; long roots are shortened back and lateral roots at ground level are completely removed. All damaged roots should be trimmed back to healthy tissue.

After lifting, the rooted vines should be covered with a damp sack and planted immediately in the vineyard. Each vine is set at the same depth as it was growing in the nursery.

When planting the vines, a long-handled, round shovel is a useful tool. A more or less square hole a few inches deeper than the length of the vine is made to receive the plant. A "spit" of loose earth is placed in the bottom of

Plate 2

Rupestris du Lot, a Phylloxera-Resistant Rootstock Frequently Used at Stanthorpe to Confer Vigour on Waltham Cross and Purple Cornichon Grapes

the hole and the vine inserted with the roots spread out and evenly spaced. A small quantity of soil is placed over the roots and firmed down by hand. A second lot of soil placed in the hole can be lightly rammed after which the hole is filled in.

It is a good plan to water-in the rooted vines, when the hole is about two-thirds filled with soil.

After planting, the most vigorous upright shoot on each vine is headed back to two buds and all other growth is removed. The young vine is tied with string to the bottom wire of the trellis and the new growth is trained up the twine. In this way, a straight main trunk can be obtained. If the young vine is not properly trained, the canes tend to sprawl on the soil where they are very subject to disease and mechanical damage.

Grafted Vines

Vines may be propagated either on their own roots or on phylloxera-resistant stocks. In the few localities where this aphid has been recorded a resistant stock such as Rupestris du Lot or 3306 should always be used.

However, in phylloxera-free districts such as Stanthorpe, resistant stocks are used to promote vigour in varieties such as Waltham Cross and Purple Cornichon, which seldom thrive on their own roots in the Granite Belt. The types mainly used for this purpose are Rupestris du Lot and 3306.

Phylloxera-resistant stock cuttings are rooted in the usual way and cleft-grafted when 12 months old, with selected wood of the scion variety.

How To Control Major Pests Of Apples And Pears In The Granite Belt

By M. BENGSTON, Entomologist.

Many pests of apples and pears in the Stanthorpe district must be controlled if orchardists are to obtain profitable yields.

Biological and cultural controls minimise the importance of some of these pests, but successful control of the majority depends mainly upon thorough and properly timed pesticide spray applications.

For correct timing growers must be able to recognise the pests and have some knowledge of their general and seasonal behaviours. Those of major importance are:

CODLING MOTH

The larvae or grubs of the codling moth enter the fruit and tunnel to and feed upon the developing seeds and surrounding tissues. Damaged fruit usually fall from the tree.

During spring the moths emerge from cocoons spun by over-wintering larvae under bark, in crevices on the trees, amongst refuse in the orchards, or amongst cases and packing material in or near the packing sheds. Eggs are deposited singly on the trees, and these give rise to the first generation of larvae which attack the newly formed crops.

Larval development is complete by early summer, cocoons are then spun, and moths again emerge in midsummer.

No exact time can be given for this emergence, which depends to some extent on weather conditions. It may occur between mid December and early February, but usually in early January.

In some seasons there may be a third generation.

For many years the Department has advised orchardists of the most appropriate times for spraying. This information should of course be used according to the requirements for each orchard, as moth populations may vary from orchard to orchard, depending on the efficacy of earlier control measures.

Several insecticides are used elsewhere for codling moth control, but 0·1 per cent. DDT, applied at peaks of moth activity, has proved the most efficacious in the Stanthorpe district.

LIGHT-BROWN APPLE MOTH

The light-brown apple moth, although closely allied to the codling moth, has different habits. It does not have a particular overwintering stage but breeds slowly through the winter on available hosts. A wide range of hosts, including apples, pears, grapes, apricots, plums, peaches and lupins, is attacked.

Infestations in fruit trees usually follow egg-laying on the younger leaves of leaders and terminal growth. The newly hatched larvae feed on the foliage tissues, and spin leaves together

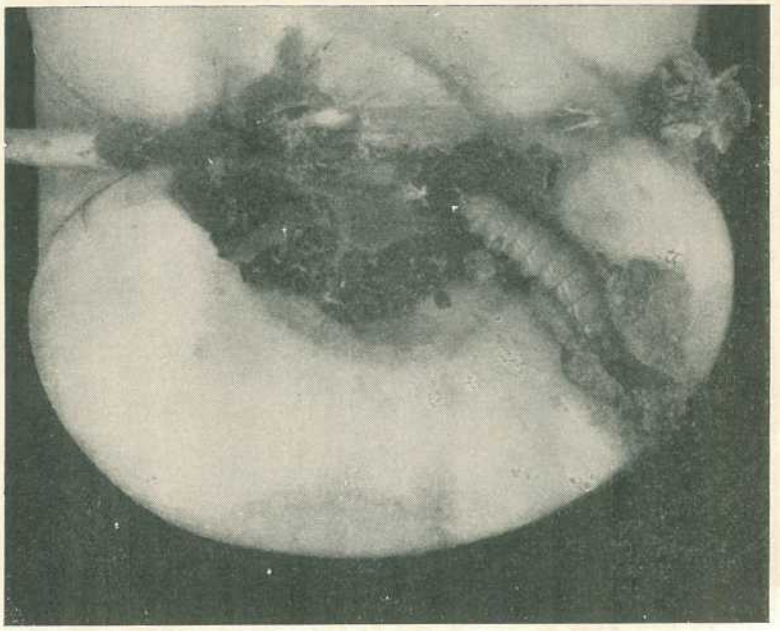


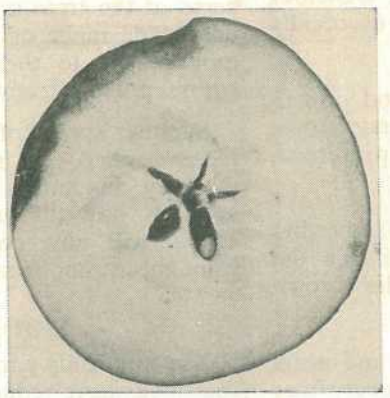
Plate 1

Codling Moth Larva Tunnelling in Fruit.

to provide shelter. Later, as populations increase, feeding becomes more general, and when fruit are attacked the larvae gouge out areas of skin and underlying tissues beneath touching leaves or between adjacent fruit.

Feeding is confined usually to the surface tissues, and burrowing into fruit seldom occurs.

Though generally of less importance than codling moth, the light-brown apple moth may cause considerable damage in some seasons. Timely applications of 0·1 per cent. DDD will control this pest. These are made to coincide with the likelihood of larval damage in the new growth.



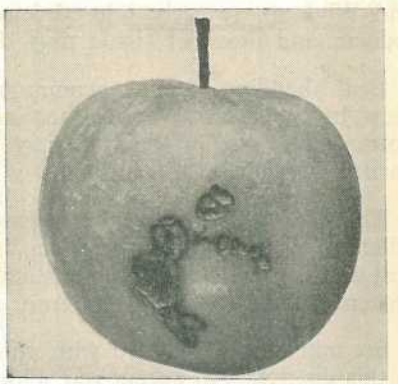


Plate 2

Light-brown Apple Moth Damage to Fruit. Note that the injury is superficial.

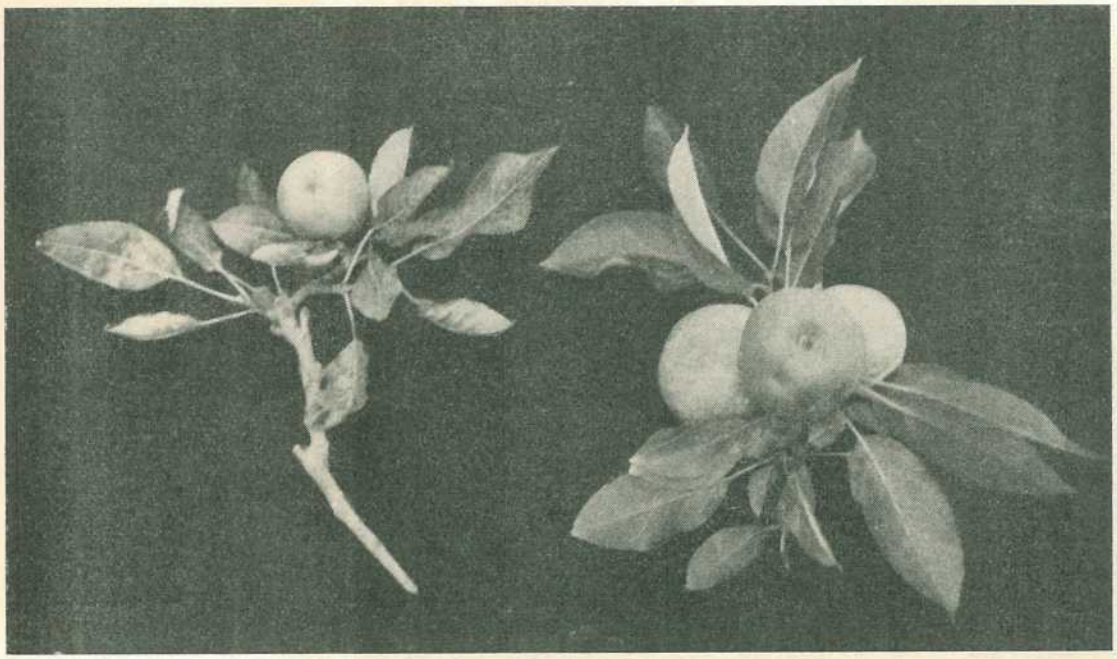


Plate 3

Mite Injury. Spurs of Delicious apple show severe infestation at left and, at right, no infestation.

MITES

Mites feed by piercing the surface tissues and extracting sap from the underlying cells. The first symptoms of damage occur on the older leaves both inside and towards the base of the tree. The normal green colour of the leaves is destroyed in the vicinity of feeding punctures and the result is a yellow mottling of the foliage.

With the more susceptible varieties, Delicious and Winesap, severely injured leaves eventually redden, and areas of tissue may die.

Leaf shedding is not uncommon, and growth may be arrested. When mites are numerous, normal colouring of the fruit may be prevented, particularly in the red varieties.

The pear leaf blister mite causes a somewhat different type of damage by feeding inside the host tissue, producing characteristic reddish-brown blisters on young leaves and fruit.

Six mites are associated with apples and pears in this district. All except red spiders overwinter on the tree, bryobia and European red mite as red eggs, pear leaf blister mite and the other eriophyids as adults in the buds.

For the control of these mites which overwinter on the trees, winter sprays are basic, that is dormant lime sulphur for pear leaf blister mite and winter oil for the remainder.

Red spiders, on the other hand, overwinter either as orange-coloured adults at or near the bases of the trees or as the green summer forms on a wide range of plants. Because this species moves back to the trees in the spring, winter sprays are ineffective.

Summer sprays of kelthane 0·05 per cent. are recommended, one in late November and another in early January. On pears and early apple varieties, only the first spray is required. These sprays will also control other mites surviving from the winter sprays.

WOOLLY APHID

The aphelinus parasite and the use of resistant rootstocks have reduced the importance of woolly aphid. It is still important, however, on trees

with seedling rootstock, particularly where sprays reduce the parasite population. Hail damage commonly causes a build-up of this pest.

Woolly aphid overwinters on both above and below ground parts of the trees, and in early spring may be found on the spurs and old pruning cuts. Under favourable conditions this pest rapidly increases in numbers, spreads to new growth and causes a characteristic galling of stems. Growth may be checked, and fruit and branches covered by a sticky secretion from the aphid. Sooty mould develops rapidly on this secretion and lowers fruit value.

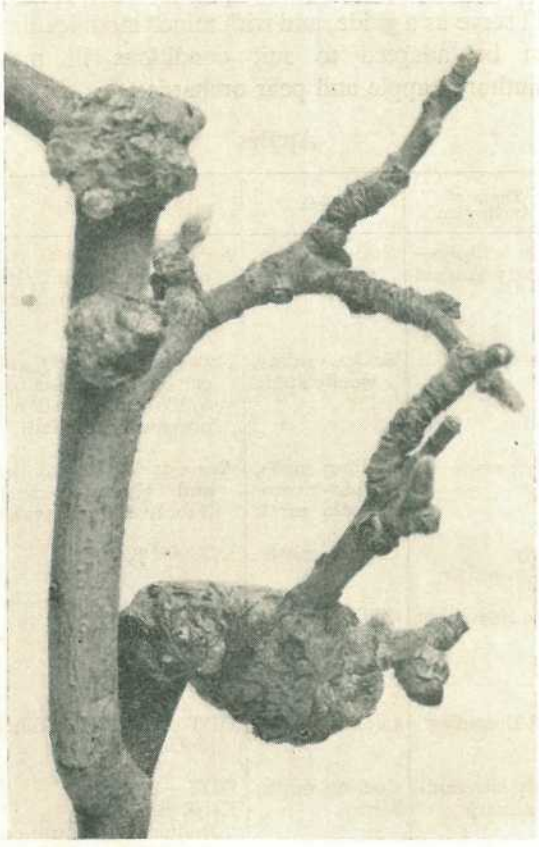


Plate 4
Twig and Spur Galling Caused by Woolly Aphid.

Winter oil partially controls this pest. Where heavy infestations persist and this usually concerns only a few trees in an orchard a BHC spray (0·1 per cent. gamma isomer) should be applied just prior to green tip.

FRUIT FLY

The general and widespread use of DDT for codling moth control, together with suitable harvesting arrangements, have reduced the importance of fruit fly as a pest of apples and pears. In years favourable to fruit fly, however, losses may occur to early and mid-season varieties in orchards where DDT has not been used during the summer months.

Furthermore, the likelihood of damage by this pest increases in late summer after DDT applications for codling moth control have ceased.

Growers should be prepared therefore to take measures against fruit fly for the protection of late-maturing varieties.

No fixed rule can be laid down concerning the possibilities of fruit fly attacks, as populations will differ greatly from orchard to orchard. The use of the lure traps will provide growers with definite information on the need for preventive spraying.

Six to 10 traps should be hung singly in leafy trees away from the direct rays of the sun. They should be placed in position well in advance of the expected date of harvest. The results from regular inspections will indicate the timing of control measures.

A reliable stock lure formula is:

10 oz. pulped orange

½ oz. rock ammonia (ammonium carbonate)

1 pint water

An equivalent quantity of other soft fruits may be substituted for the orange. This stock lure will store for several months in a well-stoppered bottle if a preservative is added. To charge the traps, 1 part of stock lure is mixed with 30 parts of water.

DDT sprays, applied soon after fly activity has been demonstrated by trapping, will minimise damage by this pest. A partial cover spray of 0.2 per cent. concentration can be used, although a 0·1 per cent. spray will suffice when populations are small, or when jointly used for codling moth control.

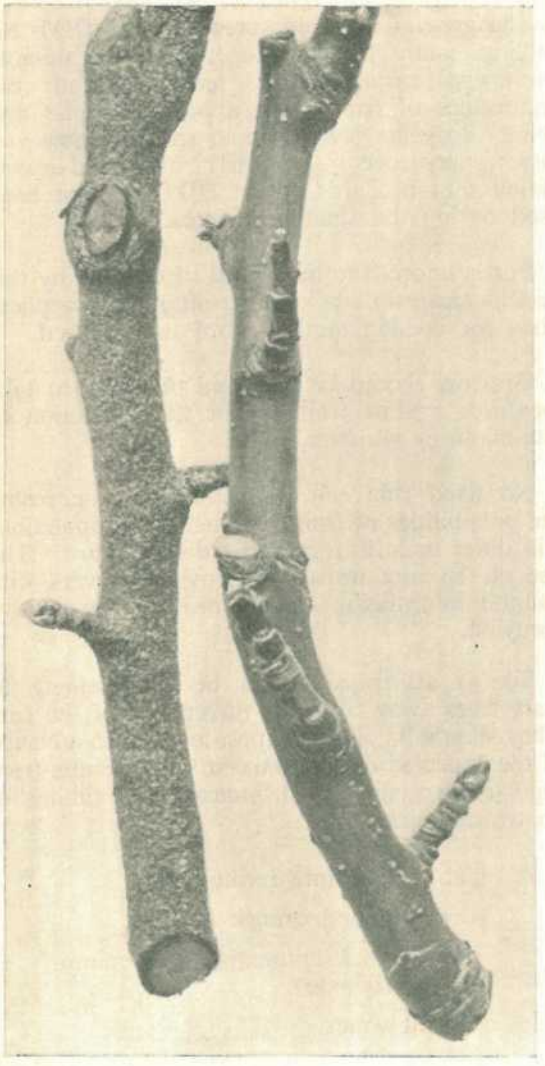


Plate 5

San José Scale. Apple twigs showing, at left, heavy infestation, at right, no infestation.

SAN JOSÉ SCALE

San José scale is potentially a serious pest but populations are normally held at low levels by the routine winter oil spray. The pinhead-sized grey scales may attack bark, leaves or fruit, but are most commonly noticed on the bark, where large numbers cause a scurfy appearance. This scale multiplies rapidly and severe infestations will kill leaders, and even entire trees.

SPRAY PROGRAMMES

It is impracticable to draw up a comprehensive and entirely effective spray programme to satisfy requirements in all orchards. Pest populations, spraying machinery and the standard of spray application vary considerably and the orchardist must regulate his programme accordingly. The following, with codling moth control as the basis, will serve as a guide, and with minor modifications can be adapted to suit conditions in most Stanthorpe apple and pear orchards:

Apples

Times of Application	Pests	Spray Formulae
Late July—early August	Scales, mites, woolly aphid	Superior oil 3/100 gal. or Dormant oil 5/100 gal. (or defer until green tip)
Green tip ..	Scales, mites, woolly aphid	Superior oil 3/100 gal. or Semi-dormant oil 5/100 gal. (if oil not previously applied)
Calyx stage ..	Codling moth, light-brown apple moth	Arsenate of lead 3 lb., and Hydrated lime 3 lb. in 100 gal. water
Early November	Codling moth	DDT 0·1%
Late November	Codling moth, Light-brown apple moth	DDT 0·1% DDD 0·1%
	Mites ..	Kelthane 0·05%
Mid-December	Codling moth	DDT 0·1% (if codling moth active)
Early to mid-January	Codling moth, Mites	DDT 0·1% Kelthane 0·05% (required only on susceptible varieties in a dry season)
Late January–early February ..	Codling moth, Light-brown apple moth	DDT 0·1% DDD 0·1%
As indicated by trapping	Fruit fly ..	DDT 0·2% (sweep spray)

Pears

Times of Application	Pests	Spray Formulae
Late July—early August	Scales, mites, pear leaf blister mite	Superior oil 3/100 gal. Lime sulphur 10/100 gal.
Green tip ..	Scales, mites	Semi-dormant oil 5/100 gal. or Superior oil 3/100 gal. (if oil not previously applied)
Calyx stage ..	Codling moth, light-brown apple moth	Lead arsenate 3 lb., and White oil 2½ pints in 100 gal. water
Early November	Codling moth	DDT 0·1%
Late November	Codling moth, Light-brown apple moth Mites ..	DDT 0·1% DDD 0·1% Kelthane 0·05%
Mid-December	Codling moth	DDT 0·1% (if codling moth active)
Early to mid-January	Codling moth, Light-brown apple moth	DDT 0·1% DDD 0·1%
Late January	Codling moth	DDT 0·1%
As indicated by trapping	Fruit fly ..	DDT 0·2% (sweep spray)

Scientific Names of Pests and Parasites

Aphelinus parasite ..	*Aphelinus mali* (Hald.)
Bryobia mite	*Bryobia praetiosa* Koch
Codling moth ..	*Cydia pomonella* (L.)
Eriophyid mites ..	*Eriophyidae*
European red mite ..	*Panonychus ulmi* (Koch)
Fruit fly	*Strumeta tryoni* (Frogg.)
Light-brown apple moth	*Austrotortrix postvittana* (Walk.)
Pear leaf blister mite	*Eriophyes pyri* (Pgst.)
Red spiders	*Tetranychus telarius* L. and T. *lambi* Pritchard and Baker
San José scale ..	*Quadraspidiotus perniciosus* (Comst.)
Woolly aphid	*Eriosoma lanigerum* (Hausm.)

Strawberry Clover

If your farm is in a "clover district", plant strawberry clover in the wet patches in your pasture and you'll get good forage instead of weeds.

Wet patches in a pasture can be a serious problem, especially when they are fairly big.

These patches reduce the carying capacity of the paddock and become breeding grounds for weeds that may spread into the rest of the pasture.

Strawberry clover is not a new pasture plant in Queensland. It has been tried for many years and has proved its ability to adapt itself to most soils where other clovers will grow. It makes its main growth in spring and early summer, producing heavy yields of good quality feed. It has done well in many coastal and near-coastal districts.

A peculiarity of strawberry clover is that it shows a liking for wet patches on heavy soils and for land subject to flooding. It will also stand up quite well to dry conditions and tolerate soils with a moderately high salt content. The plant has an upright habit of growth and can compete with the taller grasses. Another valuable property of strawberry clover is its ability to cover the ground quickly by sending out long runners that root at each node. Unlike most other clovers, it seeds only in November and December. It seeds heavily and will regenerate well from self-sown seed. It can also be propagated from runners.

Sowings can be made from early autumn until as late as July. Seed is fairly expensive and for this reason the planting rate should be kept as low as possible. Good results can be obtained from a sowing rate as low as 1 lb. to 2 lb. to the acre.

—W. J. WHITE, Senior Adviser in Agriculture.

The Fight Against Disease.—VI.

Husbandry Helps To Prevent Loss

By G. C. SIMMONS, Senior Bacteriologist.

DISEASE prevention and control is part of the practice of good husbandry methods. Inevitably poor husbandry will result in economic loss and wastage from lowered production and deaths. For example, a frequent finding in the diagnostic laboratory is the presence of many diseases on farms which are grossly overstocked.

Disease prevention may add to cost of production but it is a sound investment that will return high profits.

Management of Livestock Movements

A herd or flock is usually owned for production of primary products such as meat, milk or eggs. Less frequently it may be solely a producer of pedigree stock. In either case, farmers may exhibit their stock or may vary the number in the herd or flock to suit fluctuation in market prices, feed supply or to introduce new genetic lines. All these activities mean that diseases may be introduced. This is contrary to the ideal state of completely and permanently closed herds to which disease is unlikely to be introduced.

In both human and animal fields many examples may be quoted where a disease has become rampant following the introduction of an infected individual.

The value of a closed community is realised by quarantine officers and is the basis for our quarantine laws preventing the introduction of possibly infected animals into Australia.

Farmers should seriously consider, therefore, the risk involved in the movements of animals onto their properties and if possible adopt husbandry practices to avoid the necessity for introducing stock. If introduction must be done, good husbandry involves thorough check of the incoming animal for disease by skilled veterinary examination and laboratory checks if possible. Secondly, there should be a pen or yard isolated from the main herd where the introduced animal can be held in isolation until tests are complete and a period has elapsed during which the animal has shown no abnormality caused by disease. It is desirable that such isolation areas be built so that they can be thoroughly disinfected or so that they may be spelled for a long period after the animal has been taken from it. Case histories of disease outbreaks have shown that travelling or other stress factors may light up an infection not previously known to be present. For instance, salmonellosis often occurs in sheep after long rail or road journeys. Needless to say, support should be given to those authorities of Show and Breed Societies who insist on certain tests to indicate freedom from disease. If one infected animal is housed in a show ground with numerous other animals the infection may spread rapidly throughout valuable stud stock farms.

Livestock Nutrition

It is generally considered that the adequately fed animal is better prepared to resist infectious agents. In poultry, for instance, respiratory diseases are frequently associated with poor feeding. Dietary deficiencies that cause cattle to eat bones will increase the chances that they will have botulism. Nutritional requirements for disease resistance may not be the same as those for best production but the chances are that if the diet is not good enough for disease resistance, it is not good enough for good production.

The actual quantity and quality of feed is not the only point to consider. Variations from time to time must also be considered. Particularly in intestinal infection sudden changes in diet may alter the normal intestinal micro-flora and temporarily lower the animal's resistance to infection.

Under the heading of nutrition must be considered whether an antibiotic supplement or anti-parasite drug should be included and if so at what level and for how long it is to be fed. Drugs to prevent coccidiosis in poultry are now commonplace and antibiotic supplements in pig feeds are becoming more widely used. Important also is the provision of adequate clean water supply, not polluted by rotten carcasses or vegetation.

Livestock Management

Farmers are constantly faced with the possibility of disease outbreaks. A number of husbandry practices are directly anti-disease measures. Such practices include vaccination and treatment procedures and the splitting of the herd to decrease the risk of infection between animals.

The control over vaccines is such that few of doubtful value are marketed. Vaccines such as *Brucella abortus* Strain 19 have been proved effective and the outlay involved in having animals vaccinated is more than returned by elimination of loss if uncontrolled infection is present. Prompt treatment usually means that less infective agents are shed into the environment. Consequently there is less risk of other animals becoming infected.

Included under livestock management are the husbandry practices used to prevent transmission of disease from one animal to another. Such practices include the isolation of sick animals or those animals which are healthy but which are carrying the infection. It is desirable, of course, that such carrier animals be sold for slaughter as they are a danger to all the non-infected ones. Where such a policy has been adopted as in the eradication of pullorum disease of chickens, the industry has reaped great benefit. Spelling of areas and movement of animals at regular intervals may often be the answer to disease prevention just as crop rotation is desirable to maintain soil fertility. Some diseases affect more than one animal species. The practice, therefore, of running pigs and calves together results in many cases in the transfer of infections such as leptospirosis from calves to pigs or vice versa.

Farm Management

Finally there is the question of planning a farm to aid disease preventon practices. To mention two points: the siting of drains from pens and yards, provision of adequate shelter to counter adverse climatic conditions.

Also under farm management is stressed the necessity for farmers to obtain expert advice not only when animals die but also on the preventive measures possible.

Advisory Leaflets

As well as from the Queensland Agricultural Journal, which is published every month, Queensland farmers and graziers may secure useful information in another handy and durable form. This is the advisory leaflet. And it would be fairly correct to say that there is an advisory leaflet available today on every important aspect of every branch of primary production.

Most of the information in these leaflets is first published in the Queensland Agricultural Journal and is then reprinted in leaflet form for free distribution.

The leaflets are not printed in excessive numbers, because printing costs are high these days, so producers are asked to apply for specific information only.

Those who are interested in sheep or cattle, dairying, agriculture, or fruit growing, will find that there are leaflets covering most aspects of their work.

So, if you have a problem in your farm or station work, write to the Department of Agriculture and Stock and ask if there is an advisory leaflet on the subject. If there is one, you will get it free of charge, and it might well save you pounds.

Anaplasmosis Of Cattle

How To Identify It, And What To Do About It

By B. PARKINSON,
Divisional Veterinary Officer.

If you suspect your cattle are affected with tick fever, but you are getting no response to treatment, anaplasmosis may be the problem. Or if you have inoculated for tick fever and reactors occur at about the fourth week, your bleeder may have picked up anaplasmosis.

This article describes anaplasmosis, how it can be differentiated from other tick fevers, and what you can do about it.

A LARGE area of coastal Queensland is infested with cattle ticks. Ticks are the carriers of organisms which, in susceptible cattle, cause tick fever. Most cattlemen in ticky country are familiar with the disease, tick fever, which is more commonly called "red-water." Anaplasmosis is a tick fever, but this disease does not produce the symptoms of red-water shown by the other two causes of tick fever, referred to technically as babesiosis. For simplicity, babesiosis will be called red-water in the text.

Cause

Microscopic organisms found within the red blood cells are the cause of anaplasmosis. Two such organisms are known to occur. *Anaplasma marginale* produces the severe type of disease encountered in the field. *Anaplasma centrale* causes a milder upset, but is never found in field cases.

Spread by Cattle Tick

The cattle tick appears to be the sole vector (carrier) of the disease in Australia. Consequently the disease is confined to the tick-infested areas of Queensland and northern Australia. It has also been recorded in the tick-infested area of northern New South Wales.

In America, other vectors such as horseflies, stableflies and mosquitoes are known to transmit the disease. However, as no cases have ever been recorded outside the tick-infested areas in Australia, it is considered that other insects do not transmit the disease here.

The organisms are perpetuated in ticks and in cattle by what is known as transovarian transmission. The red-water type of tick fevers are perpetuated in this way also. This means that the resultant progeny of fully engorged adult female ticks dropping off carriers or clinically affected cases may be infective. Such larvae, on attachment to susceptible (non-immune) cattle, will transmit the disease to them.

This is the only natural means of spread in Australia. In America, the biting insect vectors transmit the disease mechanically by transfer of blood from infected to susceptible cattle.

Many Cases Unrecognised

Anaplasmosis does not occur to the same extent as other types of tick fever. It is rarely that an explosive outbreak is experienced. Little is known of the full incidence, as probably many cases go unrecognised, and losses or sickness are just put down as tick fever.

Generally, the disease is experienced only when susceptible animals are introduced onto properties where carriers exist. Mostly these introductions come from tick-free country, as in the case of stud cattle. These are readily susceptible, and as most are valuable animals, here the disease is of considerable economic importance.

Cases also occur in cattle which have been reared in ticky country. There are many properties on which the disease has never occurred, but on which the cattle are immune carriers. Cattle reared on these properties acquire a natural immunity in the same way as they do to red-water.

Again there are some properties in tick-infested country on which the cattle must be considered to be non-immune, having never been exposed. The incidence of infested to clean properties in Queensland is not known, but it is probable that the disease is present in a latent form in most of the tick-infested country.

In ticky country, it is the usual experience to encounter only an odd case of the disease at the one time. More severe outbreaks have occurred where cattle have been moved from one ticky property (apparently non-immune) to another, where carriers exist.

The disease has also been spread by tick fever inoculation, where the "bleeder" has apparently been infected.

These are the Symptoms

Symptoms are not so acute as with red-water. Affected animals lose condition fairly rapidly, with dairy cows showing a marked drop in milk production. The appetite is decreased and the beast is visibly sick. The temperature rise is not usually so severe as with red-water, fluctuating from 103 to 105 deg. F. (106 to 107 deg. in red-water). Examination of the mucus membrane of the eye or breeding passage will show the intense pallor of anaemia, due to the destruction of red blood cells. The yellowish discolouration of jaundice is also usually present.

The disease generally is a lingering one with marked emaciation. Affected animals may be sick for several weeks before death or recovery.

The incubation period of anaplasmosis is much longer than that of red-water. Under natural conditions, it is usually about 4 to 5 weeks after exposure before symptoms commence. By inoculation, this period may be reduced by a week or so.

What Post-mortem Shows

The main changes shown by post-mortem are indicative of anaemia and jaundice. The blood is extremely watery, and all internal organs are pale. The yellowish colour of jaundice can be detected throughout the body. The liver and spleen are greatly enlarged and the gall bladder is distended with thick green to brown, viscous bile.

Confusion with Other Diseases

Anaplasmosis can readily be confused with other diseases, namely, other tick fevers and leptospirosis. Often differential diagnosis in the field is quite difficult and one has to rely to some extent on history.

Differentiation from red-water is mainly on account of its more chronic nature. Cattle affected with anaplasmosis rarely die within several days and usually deaths are the result of the supervening weakness of emaciation. In contrast, most cattle affected with red-water are either dead or on the way to recovery within several days.

Probably most cases of anaplasmosis are suspected when there is a failure to respond to the specific treatments for red-water. If the urine can be observed, the absence of reddish discolouration at the height of the sickness tends to eliminate red-water. The longer incubation period in anaplasmosis often gives a lead to the differentiation of this disease also.

It is more difficult to differentiate from leptospirosis unless there are a number affected. The degrees of anaemia and jaundice are usually greater with anaplasmosis than with leptospirosis.

Laboratory Aids to Diagnosis

Microscopic examination of blood smears from an affected beast nearly always reveals the presence of the causative parasite in a distinctive form within the red blood cells. These parasites can be readily distinguished from those causing red-water. Thus the field officer, if he is uncertain, has a reliable laboratory diagnostic aid to assist him in diagnosis.

In a dead beast, examination of smears taken from the liver and kidney will reveal the parasite. The diagnosis can then be readily confirmed.

This is the Treatment

Anaplasma parasites are not susceptible to the red-water specifics (drugs used especially for the treatment of red-water). Thus such drugs as Acaprin, Babesan, Pirevan and Piroparv have no effect on the course of the disease.

In recent years, the tetracycline group of antibiotics has been found to be effective in the treatment of the disease. Oxytetracycline (Terramycin) has been used in the field in Queensland. Its use should be confined to early cases (where good results may be expected) before there is too much loss of condition.

This drug is available only to veterinary surgeons, and as treatment is rather expensive, it should not be used indiscriminately. A dosage of 2 milligrams per lb. body weight, by injection into the muscle, is recommended.

For valuable animals, supportive treatment by blood transfusion is desirable. Intravenous injections of dextrose and saline solutions are also helpful. Sick animals should be well nursed, and given good feed to hasten recovery.

Immunisation

Immunisation is a well-recognised method of controlling red-water. It is possible to adopt similar lines to control anaplasmosis.

Anaplasma centrale produces a much milder reaction than the naturally occurring *Anaplasma marginale*. Thus inoculation of cattle with blood containing the former parasite will produce a mild reaction, but immunise the animal to the more severe natural infection.

Some years ago, all bleeders issued from the Animal Health Stations contained *Anaplasma centrale* as well as the two red-water parasites. Thus inoculation of blood from these bleeders could be expected to give immunity to all tick fevers. Owing to the very low incidence of anaplasmosis, the anaplasma parasite in bleeders was left out for many years.

However, in the last few years there have been occasional losses from the disease. A demand for immunising blood rose again and stock owners, on special request, can now be supplied with blood containing *Anaplasma centrale*. It is generally recommended that this blood be used only on known infected properties, such as for inoculation of herds where the disease is occurring. Many owners also desire to inoculate any introductions, particularly stud animals, if they have experienced the disease before.

Macadamia Harvest

A thriving macadamia nut industry can be built only on confidence between growers, processors and consumers. The growers' contributions towards this confidence are production of good quality crops and harvesting the nuts in the proper condition for processing.

First job in preparation for the macadamia nut harvest is to remove last season's nuts and fallen leaves from under the trees. This simple job is easily overlooked. But if it is done properly, the new season's nuts are easily gathered and the sample is free from sub-standard nuts left over from the previous crop.

Shortly before nut-fall, the outer husk splits. This is the first indication of maturity. When the nuts start to drop, weekly harvesting is necessary to give the grower a uniform line in much the same stage of development. Nuts left lying on the ground from week to week deteriorate rapidly, especially in wet weather.

In the packing shed, husks are removed and the nuts are allowed to dry out under cover for about three weeks. They should then be graded for both size and type before being marketed. Ungraded nuts are unpopular because of difficulties involved in cracking them, and the uneven size and quality of the kernels.

—J. McG. WILLS, Senior Adviser in Horticulture.

The Answers To 20 Questions On Herd Recording

By S. E. PEGG, Chief Adviser (Herd Recording).

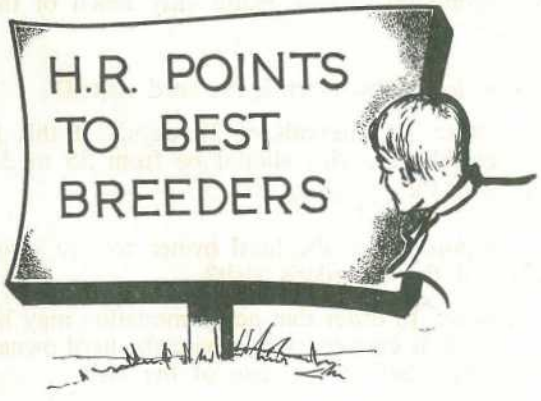
GROUP Herd Recording has been functioning in Queensland since 1948, but there are many farmers who still do not understand how it operates.

In order to outline briefly the working of the scheme, and some of its uses, a list of 20 pertinent questions has been set out together with the answers.

Should a dairy farmer require any further specific information, he should communicate with his local departmental officer.

Question: What is herd recording?

Answer: Herd recording is a service provided for the dairy farmer to enable him to obtain accurate information in regard to the quantity and quality of the milk produced by the individual cows in the herd.



Question: How is it organised?

Answer: Herd recording is operated by the Department of Agriculture and Stock. Dairy farmers wishing to have their herds recorded make application to the local dairy officer, who allocates them to a Herd Recording Group when a vacancy occurs. Each group, which operates in a restricted area, consists of 20 herds.

Question: What are the advantages?

Answer: Herd recording is essential to the progressive dairy farmer. It enables him:

(*a*) To cull low-yielding cows which are unprofitable.

(*b*) To breed from animals known to be good and regular producers.

(*c*) To gauge the worth of each bull used.

(*d*) To feed according to yield.

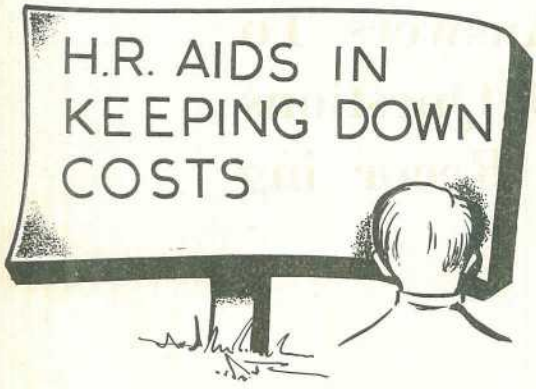
(*e*) To check on various farm practices.

Accurate information in regard to yield is essential for carrying out these five practices; and this information can only be obtained by herd recording.

Question: Who does the work?

Answer: The recording work is carried out by men, known as herd recorders, trained and employed by the Department of Agriculture and Stock. A recorder is allocated to each Herd Recording Group. The work involves the weighing of the milk of the individual cows at the evening and morning milkings once a month,

and the testing of that milk for butterfat content. The recorder also ear tattoos all heifer calves so that the owner has positive proof of their identity when they enter the milking herd.



Question: Are recorders supervised?

Answer: Yes. Recorders are supervised by the local Dairy Officer. These officers pay regular visits to all the recorders within their areas. They supervise the recorders' work and submit reports to the head office of the Department of Agriculture and Stock.

Question: Who supplies the apparatus, stationery, and so on?

Answer: All equipment is supplied and maintained by the Department of Agriculture and Stock. The recorder conveys all the necessary equipment from farm to farm. The equipment includes vacuum buckets, which are attached to the milking machine to collect the milk from individual cows, thus obviating the necessity to revert to hand milking. All stationery is supplied free of charge by, the Department of Agriculture and Stock.

Question: Has the herd owner any forms to fill in?

Answer: The entire recording work is carried out by the herd recorder.

Question: What is expected of the herd owner?

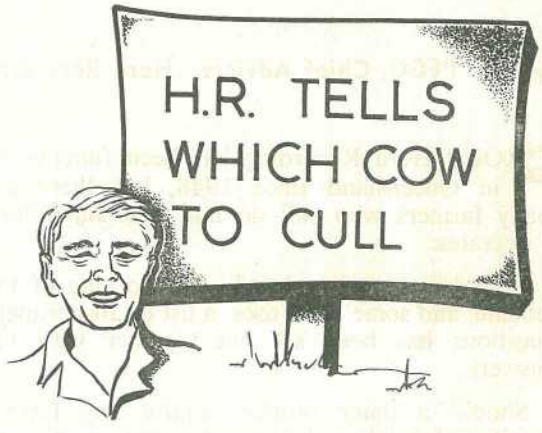
Answer: The herd owner must:

(*a*) Provide overnight accommodation and meals for the herd recorder on each occasion of a visit.

(*b*) Make sure each cow is identifiable.

(*c*) Keep records for each cow in respect to dates of mating, drying off and calving on special sheets provided for this purpose.

(*d*) Furnish the herd recorder, when each cow comes into test, with the name of the cow, tattoo markings, pedigree, age, date of calving, and so on, and see that these particulars are entered correctly on the herd record sheet.



Question: Must the herd recorder be accommodated with the herd owner?

Answer: No. It is not essential that the recorder should be accommodated with the herd owner. It is the responsibility of the herd owner to provide accommodation with either himself or one of the farm staff, or if this is not possible, at some convenient point, provided always that the accommodation is within easy reach of the farm.

Question: How often is the herd visited?

Answer: At intervals of 30 days. If this is not possible, the visit should be from 25 to 35 days after the preceding visit.

Question: Does the herd owner receive prior notice of the recorder's visit?

Answer: In order that accommodation may be available it is customary to advise the herd owner a few days before the date of the visit.

Question: How are cows identified?

Answer: Cows may be identified by tattoo numbers, numeral, fire or acid brands, or numbered tail tags. In small herds where all cows are known by name no such method is required.

Question: Must all cows be recorded?

Answer: Yes. Under the rules, all cows yielding milk in a herd must be submitted for recording. This is required for the following reasons:

(*a*) Records of lifetime production are the only reliable guide to a cow's capabilities and should be used when planning a breeding programme.

(*b*) Herd recording provides a comparison of the yields of cows in the same herd. The recording of a portion of the herd would not provide such comparisons.

(*c*) When surveying sires, it is necessary to compare the productions of the bull's daughters with the records of the rest of the herd. These records must have been made during the same year.

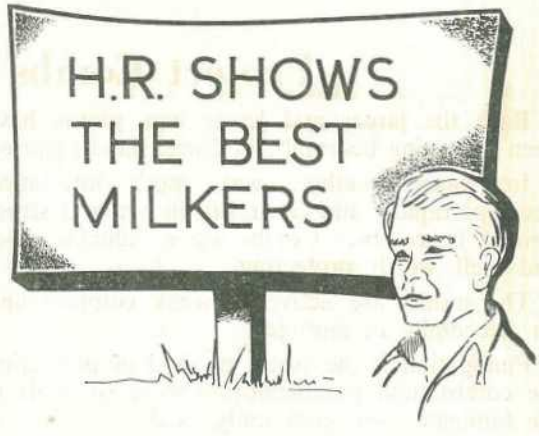
Question: Do the yields ascertained by recording represent the actual milk and butterfat produced by the individual cows?

Answer: No. To do this it would be necessary to weigh the milk at each individual milking, and under an official scheme this would be impossible. Costs would also be prohibitive. The aim of any herd recording scheme is to give herd owners an indication of the production of the individual cows as near to the actual as possible. Monthly tests have been found to give a close approximation to the total milk produced during the lactation period. Tests carried out have shown that the difference between the actual yield and the calculated yield is negligible.

Question: What happens to the records?

Answer: At each test, the herd recorder uses a shed book in which he enters the yields of individual cows as regards weight of milk and percentage of butterfat. After the weighing and testing have been completed, the yields of milk and test of the individual cows are entered on a monthly herd record sheet. The amount of butterfat for the day is calculated for each cow entered on the sheet, as also is the production of milk and butterfat for a 30-day sub-period. One copy of the record sheet is given to the farmer and one forwarded to the Department of Agriculture and Stock, Brisbane.

When the record sheet is received at the Herd Recording Office all entries are checked for accuracy, and corrections made where necessary. The record sheets are then coded with respect to breed and sire, abnormal tests, and so on. The information on the sheets with respect to each cow is then punched into cards prepared for use in special accounting machines. From these cards the total daily production of the herd is compiled by the machines. This enables the daily average production for each herd to be ascertained. The cards are next used to calculate, and type, the progressive total production of each individual cow in the herd.



A copy of this is forwarded to the herd owner and enables him to see how long each cow has been milking and her production to date.

Cows which have dried off are given an average butterfat test. The average daily production for the testing day is shown on the progressive production sheet. At the end of the herd recording year (September 30) the herd owner is given a list of lactation productions for all cows in age groups, together with the average production for the whole of the herd. He is also supplied with the results of a survey of his bull or bulls, which indicate whether the bulls are raising or lowering production in the herd.

Question: What is the cost to the recording herd owner?

Answer: The cost of recording is shared by the herd owner, the State Government, and the Commonwealth Government. The proportions of the costs are 37½, 37½, and 25 per cent. respectively. The cost to the farmer at present is 10s. per cow per lactation, or the value of 2½ lb. of butter. To this must be added the value of board and accommodation provided for the herd recorder. These costs are allowable taxation deductions. Payment is made by means of an order issued on the factory supplied by the farmer.

Question: How much longer does it take to milk the cows during the recording period?

Answer: The first time the herd is recorded it may take half an hour longer to milk the herd. However, once a routine is established the increase in the time of milking is negligible.

Question: What happens if a cow is sick, or gives an abnormal yield, at the time of recording?

Answer: If, during the recorder's visit, a cow is noticed to be sick, affected with mastitis, in season, or her yield appears to be abnormal, the herd recorder notes this on the monthly record sheet. If necessary, a production is given for the month by averaging the productions of the preceding and succeeding months. A similar procedure is adopted when the herd has missed for a month.

Question: Is it worthwhile recording a herd which is not fed on concentrates?

Answer: Yes. Even on a low standard of nutrition recording will allow the ranking of cows for culling, and breeding purposes. Experiments have shown that the cows which are the highest producers under a low standard of feeding will also be the highest producers if the standard of feeding is increased.

Question: Is it easy for a farmer to use the information supplied by herd recording?

Answer: Yes. The information is presented in a simple form. Dairy officers and cattle husbandry advisers visit recording farmers regularly and discuss the use he is making of the information.

Protect Combs From Wax Moths

Both the larger and lesser wax moths have been damaging beecombs in Queensland apiaries.

In warm weather, wax moth infestation develops rapidly and can result in heavy destruction of beecombs. Combs are a valuable asset and well worth protecting.

The moths are active in weak colonies and on beecombs in storage.

Fumigation is the surest method of protecting the combs, and paradichlorobenzene or PDB is the fumigant most commonly used.

To fumigate, stack the combs five supers high and seal any open cracks with gummed paper. PDB, which is non inflammable and therefore safe to handle, can be used at the rate of 3 oz. per stack. As this fumigant will not destroy wax moth eggs, re-fumigation is necessary about every two to three weeks in the summer to destroy subsequent populations.

—C. ROFF, Adviser in Apiculture.

bucket and bail

Tinning Inside Milking Machines.—An Agriculture Department survey on the life of the tinning inside milking machine pipes has brought some surprising results. It was popularly believed that this tinning had only a short life, but the survey has shown that it's sometimes retained for many years.

Of 41 machines four years old, 36 were still well tinned, four had lost some tin and only one had been completely de-tinned. Of 536 machines more than 10 years old, 27 per cent. were still well tinned.

The survey is being continued to determine the factors that influence the life of the tinning. It is hoped that definite recommendations on ways to protect this layer of tin will soon be available. Main value of the tinning lies in preventing the milk from picking up traces of copper from the pipes.

Milking Machine Test.—Reports are being received that some dairymen are refusing to have their milking machines tested for mechanical efficiency. Perhaps a few thoughts on the subject may be in order. Remember these points.

There is no charge for the test. The equipment was provided from Q.D.O. funds, and the dairy officers have been specially trained in its use. There is no compulsion about the officer's recommendations. Any minor faults are corrected on the spot, and if major repairs cannot be financed right away, at least provision can be made for them.

Do you know if the vacuum gauge is still correct? Or if the pulsators are still at the best adjustment? The board holding the milk lines may have shrunk and gradually moved the pulsators out of adjustment. Faults develop so slowly that they pass unnoticed.

A faulty machine can milk slower, leave milk behind, and predispose the udder to disease.

Have your machines tested when the dairy officer calls.

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

Keep Sediment Out of Milk.—Keep dust and cow-hairs out of milk and you'll also keep out many of the bacteria that spoil its keeping quality.

Quality-destroying bacteria are carried on foreign material that gets into milk, and even though most of the sediment can be strained out, the bacteria will remain.

The amount of sediment that gets into milk can be reduced by rinsing the dairy utensils, milking machines, the vat and the cooler with clean, chlorinated water before milking. This will flush away any dust and destroy the bacteria. Wash the cows' udders with a chlorine solution, and replace the rinsing water after use on 15 to 20 cows or sooner if it has become soiled. A stock-free area adjacent to the milk room and daily removal of manure from the yards and milking shed will keep down the dust nuisance.

—R. I. HUNTER, Dairy Officer.

Try Bails For Calf Feeding.—Use of calf feeding bails can save dairy farmers time and inconvenience over the years. As well as that, individual attention counts in calf rearing. Well fed and cared for calves are healthier, grow faster and come into production earlier than those given the minimum of attention.

Young calves have to be fed twice a day and in all weathers. So, any system that, at a reasonable cost, saves time and increases your working comfort is worthwhile. When you're building a

new milking shed or altering an existing one, give some thought to including convenient calf feeding bails in your layout.

The three main features of a suitable layout are:

1. A concrete floor on which both the person feeding the calves and the calves can stand.

2. Individual sword-type bails to hold the calves.

3. A roof to give protection from the weather, but high enough to allow the sunlight to enter.

There are many advantages in having sword-type bails. Each calf is held securely, and one calf cannot reach into its mate's bucket. In this way you can be sure that each calf gets its proper ration and the slow drinkers are not bullied by those that finish quickly. In sword-type bails, calves can be safely left to drink or eat without attention.

Sometimes calves are slow in learning to take grain or meal mixtures. An easy method of teaching them can be employed in this type of bail. This consists of placing a little meal in the bottom of the bucket immediately after feeding with milk. In most cases calves will soon lick up the meal.

With individual bails, you can release some calves and detain others if you need to. Routine operations such as tattooing, vaccinating and drenching can be done easily by one man when the calves are held in sword bails.

For details of construction, consult your local Adviser in Cattle Husbandry.

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

Is Your Wool Shed Gloomy?

Recently an inquiry came to the Department of Agriculture and Stock from an overseas country for typical photographs of Australian shearing scenes. These were to be used in a publication with a world wide coverage. On looking through all the shearing shed photographs, a thing that struck us very forcibly was how gloomy and ill-lighted is the average shearing shed.

Dim and gloomy woolsheds cannot do otherwise than make the work of the shearer and the woolclasser more difficult. Cut sheep, second fleece cuts, and incorrect classing of fleeces can no doubt often be fairly attributed to lack of adequate lighting, rather than to want of care in workmanship.

Certainly glare is not desired, but good indirect lighting can often be improved by better placing of skylights and windows, and by the white-washing of interiors near to the shearing board and classing tables.

Is your woolshed a bright cheery place with good visibility, or is it the sort of place that might towards the end of a busy day make a tired woolclasser feel that it was rather like the Black Hole of Calcutta?

—R. B. YOUNG, Senior
Adviser in Sheep and Wool.

Lights For Poultry

Lighting of poultry flocks has now become standard practice on many Queensland farms. March is the month when lights are generally switched on, but this varies with the age of the fowls. Birds hatched up to 10 or 12 months ago are the ones selected for lighting on account of their tendency to moult from the beginning of March onwards. Lights prevent this and keep up production.

Lights are switched on at 4.30 a.m. for the last part of March, but don't forget to drop back to 4 a.m. in April, 3.30 a.m. in May, and 3 a.m. in June. After June, lighting is generally advanced ½ hour per month until it corresponds with the sunrise. Pullets which have not made sufficient growth shoud not be subjected to lighting.

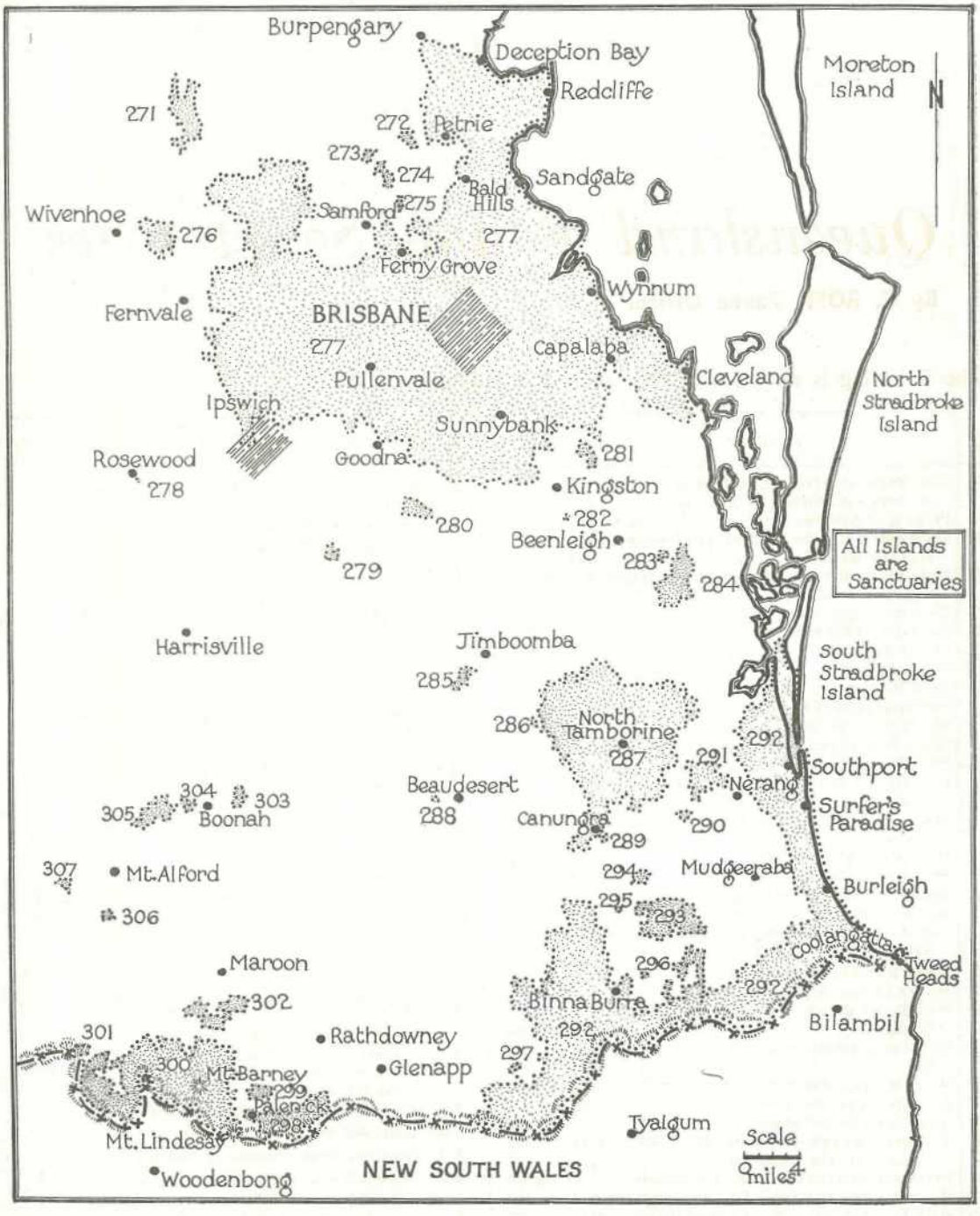
—C. MANNING, Senior
Adviser, Poultry Branch.

Queensland Fauna Sanctuaries

By C. ROFF, Fauna Officer

The following is an index of the sanctuaries outlined in Map 22.

Index No.	Sanctuary	Area in Acres
271	State Forest Reserve 808, parishes of Dundas and St. John, via Dundas	4,210
272	Property at Lawnton	284
273	State Forest Reserve 1662, parish of Samsonvale, via Clear Mountain	524
274	State Forest Reserve 1663, parish of Warner, via Clear Mountain	786
275	Property at Bunya	211
276	Properties at Fernvale	2,720
277	City of Brisbane Town of Redcliffe No. 5 Division, Old Moreton Shire Portion of Shire of Pine Old Shire of Cleveland Scenic Reserve and Properties in Deception Bay Properties at Petrie Property and Reserves, Nos. 120 and 125, North Pine The Summit and head of Cedar Creek and its tributaries Properties at Mount Glorious Properties at Closeburn Abattoirs Reserve, Wacol Recreation Reserve 359, Goodna (The area includes a number of State Forests and National Park Reserves)	423,080
278	School Reserve 246, Rosewood	12
279	Daley's Lagoon, Ripley	410
280	State Forest Reserve 446, parish of Stapylton, via Goodna	1,365
281	State Forest Reserve 215, parish of Redland, Daisy Hill	1,050
282	Water Reserve, Waterford	45
283	A Reserve in the Stapylton area	321
284	A Sanctuary in the Stapylton–Norwell area	3,926
285	A Reserve and Properties in the Cedar Grove area	892
286	"Mundoolum," via Beaudesert	196
287	Parishes of Cedar and Tamborine, Tamborine	55,680
288	Racecourse and Showground Reserve, Beaudesert	100
289	State Forest Reserve 729, parish of Witheren, via Witheren	77
290	State Forest Reserve 740, parish of Nerang, via Nerang	276
291	State Forest Reserve 571, parishes of Barrow and Nerang, via Nerang	4,277
292	South Coastal District Sanctuary "The Gorge," at Springbrook Upper Numinbah and Springbrook Sanctuary Upper Valleys of Coomera and Canungra Creeks and Cainbable Mountain Binna Burra Property at Kerry (The area includes a number of National Park Reserves and State Forest Reserves)	133,120
293	State Forest Reserve 702, parish of Numinbah, via Numinbah	4,557
294	"Tarlington," Beechmont	640
295	Reserve for Scenic Purposes, Beechmont	27
296	Property at Springbrook	160
297	"Moolabanya," National Park Reserve 617, parish of Telemon, via Lamington	224
298	State Forest Reserve 359, parish of Palen, via Palen Creek	1,440
299	State Forest Reserve 745, parish of Palen, via Palen Creek	883
300	"Mount Lindesay," "Mount Barney," National Park Reserves 737 and 738, State Forest Reserves 735 and 736, parishes of Melcombe and Palen, via Rathdowney	29,260
301	State Forest Reserve 786, parish of Alford, via Boonah	350
302	"Mount Maroon," "Mount May," National Park Reserves 322 and 760, parishes of Melcombe and Palen, via Maroon	3,630
303	Land near the Teviot Brook, Allandale	526
304	Land near Boonah and Dugandan	448
305	Land near Mount French, via Boonah	2,234
306	"Mount Moon," National Park Reserve 785, parish of Alford, via Mount Alford	295
307	"Mount Greville," National Park Reserve 755, parish of Clumber, via Moogerah	320



Map 22

Map Showing Sanctuaries in Part of Fauna District No. 1. The sanctuary boundaries (as at 31st December, 1957) are delineated by dotted lines enclosing the stippled areas.

Plate 10

Black Swan (Cygnus atratus **Latham) nesting on Brighton Lagoon, Part of the Greater Brisbane Area Fauna Sanctuary.**

Long Duck Flights

A grey teal banded on the Rifle Creek Dam sanctuary, Mt. Isa, two years ago was taken near Perth in Western Australia recently and the band was returned to the Queensland Department of Agriculture and Stock. This is the first time that a Queensland band has been received from Western Australia.

Bands have also been returned from Pillaga and Leeton (New South Wales) taken from black duck and plumed tree duck tagged at Townsville.

This work is part of the long range programme for the assessment of Queensland's wildlife. The objective is to conserve beneficial species and to restrict the damage to agriculture caused by others. Specifically the bird-banding scheme is assisting in the study of the habits and migrations of wild duck in Queensland.

Illegal Shooting At Tinaroo Dam

Atherton Tableland residents have reported that illegal shooters are active along the banks of the Tinaroo Dam. The impounded waters are an attraction to wildlife, especially waterfowl.

Tinaroo Dam is a fauna sanctuary and all hunting or trapping is prohibited. Fauna officers in the district are now keeping a close watch in order to stamp out illegal shooting on the dam.

Tinaroo Dam is an important unit in Queensland's sanctuary system. All residents and visitors are asked to co-operate in ensuring the conservation of fauna in the areas, and in all other sanctuary areas of the State.

—C. ROFF, Fauna Officer.

Producers Had A Mixed Year

By Officers of Marketing Branch

There were ups and downs in the earnings of Queensland primary producers in 1958-59. Prices of wool and sugar declined, and the market outlets for canned fruits were restricted by the heavier European crops and the liberalisation of dollar imports by the United Kingdom. Earnings from exports of meat and of dairy produce increased following both larger quantities and better prices.

Australian wool production in 1958-59 was estimated at 1,540 m. lb. greasy, an increase of 8 per cent. over the 1957-58 clip of 1,433 m. lb.

Sales of 705,657 bales in Queensland in 1957-58 increased to 725,198 bales in 1958-59, but the average price for greasy wool decreased to 50·37d. a lb. compared with 65·07d. a lb. in 1957-58. The lower average wool prices for this season were only partially offset by the increase in production.

Production of beef in Australia in 1958-59 is estimated at a record 875,000 tons, and exports at 175,000 tons. Production in Queensland in the 12 months ended June 30, 1959, was a record and 22 per cent. higher than in the previous year.

The 15-year meat agreement with the United Kingdom was last reviewed in September, 1958, when new minimum prices were negotiated. The new prices for beef and veal for 1961-64 are 9 per cent. less than the 1958-61 level, minimum prices for mutton for 1958-60 are the 1958-61 level less 15 per cent., and lamb prices for 1958-60 show a reduction of 5 per cent. on 1955-58. A welcome amendment is that the beef export free quota for the three years 1958-61 will be a maximum of 7,500 tons a year of first and second quality beef, with no quantitative restrictions on the export of lower grades.

This easing of exports of lower grades of beef resulted in the sudden large expansion of beef exports to the United States, encouraged by the upsurge in the United States demand for these lower grades which are suitable for the manufacturing trades. Beef exports to the United States trebled in 1957-58 to 6,134 tons, but in 1958-59 reached about 50,000 tons.

Another favourable influence on the beef export trade was the continued high prices in the United Kingdom. Owing in part to the decline of Argentine shipments they were on average about one-third higher than in the preceding year.

The increased demand for lower grade meat has affected cattle prices in Australia. Cull cows and bulls have brought prices better than those realised for first quality beasts 12 months ago. This should make possible younger and higher quality herds in both beef and dairy industries.

It appears that the home market will remain the major future outlet for Australian beef where over 80 per cent. of production is consumed, followed by the United Kingdom, where the 15-year meat agreement provides a guaranteed minimum price until 1967. The United States,

at present, probably offers the best scope among other markets. However, livestock numbers in that country are building up rapidly and sooner or later demand will start to flatten out under the influence of heavier home marketing.

Dairy Products

With improved seasonal conditions, production of butter and cheese in Australia increased by 11 per cent. and 21 per cent. in 1958-59 to 192,059 tons and 41,872 tons respectively. The increase in butter was mainly in Queensland and New South Wales, whilst cheese production increased in all States. In Queensland butter production increased by 27 per cent. and cheese by 58 per cent.

During the year butter prices on the United Kingdom market improved from the low level of 205s. stg. a cwt. in May, 1958, to 343s. stg. in June, 1959. The price improvement fortunately came after increased shipments from Australia, but at a time when exports from European and New Zealand suppliers were lower than in the previous year, and when local United Kingdom production was also lower. The United Kingdom cheese market has been very firm since November, 1958, as a result of a shortage of local cheeses.

The future of overseas markets will continue to remain uncertain as long as heavy stocks, although somewhat less than last year, exist on the North American continent, and a high level of milk production in the United Kingdom is maintained in accordance with the agricultural policy of that country. In Australia, attention is being concentrated on attaining improved quality and technical efficiency, and on intensified sales promotion, and in 1958 the Federal Parliament passed the *Dairy Produce Research and Sales Promotion Act,* 1958, to provide the necessary finance.

Eggs

The economic position of the commercial poultry industry in Queensland improved in comparison with recent past seasons. The availability of feedstuffs improved and at prices estimated, on average, at about 20 per cent. below those of the previous season. Net average returns to suppliers to the Egg Marketing Board also increased from 43·36d. to 44·90d. a dozen. The quantity of eggs marketed by the egg marketing boards in Queensland increased by 10 per cent. over the previous season to 8·7m. dozen.

Despite cuts by the United Kingdom Government in the last two seasons, in the guaranteed prices for eggs, production there continues to expand. The subsidy earlier in 1959, during the flush season, amounted to about a third of their market value. For 1959-60 the guaranteed price will be reduced by another 1d. a dozen.

As a result of low prices in the United Kingdom a larger proportion of exports has been made to European continental outlets. The average net return to the Australian Egg Board—which marketed exports on behalf of all State egg marketing boards except New South Wales—was 2s. 11·004d. a dozen (Australian currency), slightly less than the figure of 2s. 11·391d. a dozen realised for the previous season.

As with the dairy industry the egg marketing organisation realises the uncertainty of overseas outlets for supplies surplus to local requirements. Efforts have been concentrated on improving handling efficiency, service, quality standards and package presentation, as a means of both holding down marketing costs and promoting local sales. Growers themselves have assisted by adopting changed husbandry practices, which have resulted in modification of the production pattern. This has resulted in higher production in the later summer and autumn months and a scaling down of the spring peak.

Sugar

A new International Sugar Agreement was negotiated at the United Nations Conference held in October, 1958, to replace the agreement which expired at the end of December. As previously, the agreement is for five years, but this latest agreement will cover a larger proportion of the international trade in sugar, as some important exporters, such as Peru and Brazil, have now joined.

The total export quota of the Commonwealth group of countries will remain at the existing level of 2·5 million tons for 1959, but will be raised to 2·75 million tons in 1960 and 1961. Australia's share will increase from almost 632,000 tons to approximately 650,000 tons.

The year 1958-59 was the first in which, because of market limitation, overproduction became a problem of some magnitude. It is estimated that a million tons of cane were left unharvested in Queensland, and a considerable tonnage was again unharvested from the 1959 crop. A record 1,412,000 tons of 94 net titre sugar were produced in Australia in 1958, about 147,000 tons in excess of the aggregate of peaks.

The average price for the 1958 season, for home consumption, surplus and excess sugar, was lower than for the previous year—£46 3s. 2d. a ton as compared with £49 5s. a ton. If Fourth quota sugar is included in the 1958 figures then the average price is reduced to £45 6s. 3d. Returns were influenced by the fall in export prices, which continue low, and at the end of June reached the lowest level for the post-war period. Export quotas under the International Sugar Agreement were reduced by the maximum provided for in the Agreement, but Commonwealth countries were not affected by this restriction.

At the annual talks under the Commonwealth Sugar Agreement the negotiated price for 1959 was fixed at £45 2s. stg. a ton, an increase of £1 5s. 4d. a ton on the 1958 price. As in previous years the agreement was extended for a further year, and now runs until the end of 1966. The quantity to be sold at the negotiated price was also increased by 2½ per cent., making the quantity in Australia's case 307,500 tons.

Good progress continues to be made with the installation of bulk-loading facilities; Lucinda, Bundaberg and Townsville were brought into operation by the end of 1959, and Mourilyan is scheduled for operation in 1960.

Fruit

Pineapple production from the 1958 winter crop was the highest on record for a winter crop, and this was followed by particularly heavy production from the summer crop. Out of the total summer crop, receivals by C.O.D. canneries of 39,619 tons, were an increase of 83 per cent. on the previous year and 37 per cent. on the previous record year, 1955. The continued increase in production in Queensland, together with continued severe competition on overseas markets, led to the present difficulties in the industry. The incidence of heavy crops and the smaller and slower sales of the processed pineapples has resulted in heavier demands on available finance, and to help the C.O.D. cannery tide over this period the Government has guaranteed a bank overdraft of £2·4 million.

The price for pineapples for May-June deliveries was reduced to £15 a ton, delivered Brisbane, for 1st grade, from £22 10s. a ton for the summer crop; third grade fruit was not accepted for canning.

Strawberry plantings in 1958 exceeded the record plantings of the previous year, and deliveries to factories through the C.O.D. increased from 515 tons to 595 tons. Production was such that restrictions had to be imposed by Northgate on receivals from non-subscribers. This factor, together with the lower prices paid in 1958, led to a considerable reduction in plantings.

Banana growers suffered in the year from overproduction with consequent lower returns. Traditional outlets in southern markets for Queensland fruit were lost, due to greatly increased production in northern New South Wales. Productivity in both States has increased considerably in recent years, but present prospects appear to discourage an expansion in acreage. Although bananas are an important tropical fruit in the Australian diet the demand appears to be satisfied, and this, together with the absence of export markets, is limiting expansion of the industry.

Grains

The year 1958-59 saw a complete change in the grain supply position in Queensland. In contrast to the poor crops and semi-drought conditions of the previous year, 1958-59 crops were heavy, and substantial surpluses of the major grain crops were available for export. Local market prices for feed grains were relatively low.

The wheat crop of 16m. bus., the third largest on record, was more than double the 1957-58 crop, and was more than adequate for domestic needs, providing a surplus of about 6m. bus. for export and carryover. Export sales of some 2·7m. bus., attracted an average premium over the Australian f.a.q. price of more than 10d. a bus. However, as expected, it is proving difficult to regain flour markets lost during the previous two years, when inadequate wheat supplies severely curtailed flour exports.

The International Wheat Agreement expired with the conclusion of the 1958-59 season, and a new agreement has been written to replace it. The United Kingdom has re-entered the agreement and the quantities traded under the new agreement should be much greater than the 295m. bus. provided for under the previous agreement.

The 1958-59 barley crop of 7·5m. bus. was nearly double the previous record crop, that of 1955-56; the 1957-58 crop had reached 3m. bus. With a plentiful supply of other feed grains—maize, grain sorghum and white french millet—only a relatively small quantity of barley was required for domestic purposes. The bulk was available for export, to which market sales were made to good advantage by The Barley Marketing Board and about 145,000 tons were exported.

Although overseas barley markets have been firm, large world supplies now appear to be assured or in sight for 1959-60, and the market is expected to be more difficult.

Marked improvements have been made in the handling of the crop, with the State Wheat Board handling intake on behalf of the Board.

The grain sorghum harvest yielded about 3·8m. bus., compared with 3m. bus. last year. With plentiful supplies of feed grains available, a large surplus existed for export and about 70,000 tons were sold overseas.

With an unsatisfactory overseas market for white french millet, large quantities of this grain were used locally for stock feed, with a weakening effect on the local feed grain market. Similar conditions exist for the other birdseeds—canary seed and setaria (panicum). There has been a noticeable swing away from the growing of these crops, particularly from canary seed, to wheat and barley.

The acreage sown to linseed was small, following poor yields in 1957-58, but plantings increased in 1959.

Tobacco Leaf

Between 1939 and 1959 Australian consumption of tobacco products increased from about 36m. lb. to approximately 50m. lb. But for the expansion of the local industry the whole of this increase would have had to be met by imports. The savings in overseas funds resulting from this increased production have been about £3m. per year, a substantial saving of foreign exchange.

During the last 10 years, Australian tobacco leaf production has risen from 3·4m. lb. to 14·8m. lb., and, although all tobacco growing States have contributed to the increase, Queensland alone has accounted for half this total. This State's production has increased from 1·6m. lb. in 1948-49 to about 7·2m. lb. in 1958-59.

This increase in domestic production has had a marked effect on the composition of tobacco products manufactured and consumed in Australia. The minimum percentages of Australian leaf which manufacturers are required to incorporate in their products, in order to qualify for reduced tariffs on imported tobacco, have been progressively increased. As from July 1, 1960, these percentages will be 28½ per cent. for cigarettes and 24½ per cent. for tobacco. Ten years ago the minimum percentages were only 3 per cent. for cigarettes and 5 per cent. for tobacco.

Cotton

A major development in the cotton industry during 1958 was the establishment of a demonstration and experimental plot, of 48 acres, in the St. George irrigation area, in which the Cotton Marketing Board co-operated with the Department of Agriculture.

Farmers in the St. George area are showing increasing interest in cotton growing. Results from earlier plantings were good, and the best yielding crop gave a very good yield, for a first essay at growing this crop, of 1,300 lb. of seed cotton an acre. In another new district—Texas-Inglewood—experimental plots yielded up to 2,200 lb. an acre.

Experimental plantings have been made in Victoria and New South Wales and the Board, which has the only cotton ginnery in Australia has made arrangements to gin the cotton on behalf of these growers.

In view of the increased amount of machine picked cotton which is resulting from expansion of the industry, the Board has under consideration the installation of improved machinery in the ginneries, with the object of ensuring the highest practicable outturn of high-grade cotton lint.

Peanuts

Growing and harvesting conditions were favourable for the 1958 crop, and receivals totalled over 18,000 tons, more than twice the crop of the previous year. The final payment was made to growers on the 1957 crop, bringing the average net return to growers to 12·385d. a lb., the highest return yet received.

Increased interest continues to be shown in peanut growing, and the acreage sown to the 1959 crop increased nearly 100 per cent. over the 1958 plantings, to an estimated 60,000 acres. The crop is a record one of about 34,000 tons.

The Board is thus faced with the problem of disposing of its largest crop on record, and it has taken steps to promote the increased consumption of peanuts in Australia. There appears to be a gradual increase in the consumption of peanuts, particularly of peanut oil.

What are the lessons?

The varying fortunes of the various commodities on the export market highlight our dependence on that market, and on organised marketing as such.

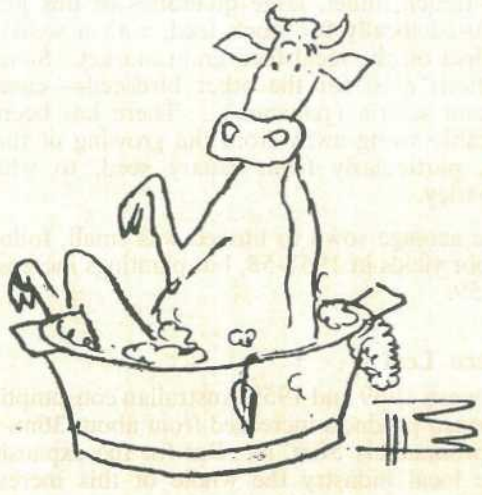
On the one hand we had the collapse of the export market for canned pineapple, the continuing decline in the wool market, the worsening of the export demand for eggs on our traditional markets, particularly the United Kingdom. On the other there was the improvement in the overseas market for dairy produce, and the spectacular, although possibly only temporary, increase in demand for lower grade meat from the United States.

These fluctuations emphasise, once again, the important role that organised marketing plays in stabilising returns to producers. By maintaining economic prices on the home market, and through the operation of equalisation schemes, marketing boards have ensured that returns to growers have been maintained at as high a level as possible.

Not only have marketing boards to expand sales on the local market, but they must have loyal support from all growers, if the benefits of organised marketing are to be taken full advantage of and shared equitably among growers, both large and small.

Farmer Brown Says:

"Good dairy hygiene is essential to protect milk and cream quality."



"Eliminate contamination; wash udder with sterilizer solution."

Queensland Beekeeping Legislation

By C. ROFF, Adviser in Apiculture.

Legislation on beekeeping in Queensland dates from 1931, when the first Apiaries Act was passed. Primarily it gave power to deal promptly and adequately with outbreaks of diseases of bees. A natural adjunct to this was a system of approval and registration of apiary sites so that inspections for disease would be facilitated. It was also required under the Act that any bees or beekeeping materials introduced into the State should be certified as free from disease.

These basic principles were maintained in *"The Apiaries Act of* 1938," and in addition, a certain degree of control of the industry was introduced to prevent overstocking of localities or encroachment between apiaries in south-eastern Queensland, where the greater proportion of the apiaries of the State were located.

The degree of protection against encroachment, under the Act of 1938, proved to be excessive, as relatively small apiaries could hold territory that was capable of carrying a greater number of hives and, consequently, of yielding a much larger crop of honey.

New apiaries could be established only at distances farther apart or farther from existing apiaries than is now considered necessary. There was also a tendency to limit the increasing number of migratory beekeepers from utilising potentially profitable areas. This was substantiated by instances where beekeepers, by mutual consent, as was allowed under the Act, positioned large apiaries at short distances without detrimental effects.

To correct shortcomings of the 1938 Act, *"The Apiaries Act of* 1947" was passed, coming into force on 31st March, 1948.

The Act is divided into parts, but for convenience it will be discussed under headings relating to requirements in declared districts, to the control of disease in the State as a whole, to the prevention of the introduction of disease and also to some general provisions.

REQUIREMENTS IN DECLARED DISTRICTS

The pastoral districts of Moreton, Darling Downs, Wide Bay and Burnett have been declared as Districts for the purposes of Part II. of the *Apiaries Act.*

Registration. Within this area of south-eastern Queensland a system of registration is provided which is somewhat different from that under the previous Act.

On 31st March in each year, every beekeeper, irrespective of the number of hives, must apply for registration and in doing so must supply certain information on a prescribed form regarding his apiary or apiaries. At a later date, he receives his certificate of registration for the period up to 31st March in the following year. No person is permitted to keep bees unless he is a registered beekeeper. No fees are charged under the Act.

Classification of Apiaries. Unless an inspector decides that a locality has become excessively stocked, no restrictions are imposed on the placing of apiaries consisting of less than 40 hives, and for convenience these apiaries are known as Apiaries Class A.

Apiaries Class B are those consisting of 40 hives or more. *The minimum distance between apiaries of this class is set down as half a mile.*

Plate 1

Beehives Loaded for Removal to a New Apiary Site.

An Apiary Class C is one consisting of at least 100 hives in which queen bees are bred for sale. A certificate indicating that an apiary is an Apiary Class C is issued only after the inspector has certified that the apiary is suitable for the purpose.

The benefit derived from this particular classification is that no other beekeeper is allowed to commence a new apiary within a radius of one mile of an Apiary Class C.

This restriction is provided to help the commercial queen-breeder to maintain the purity of his strain, but it may be noted that any apiary already established within the prescribed limits will not be affected. The holder of a certificate for an Apiary Class C may, however, give consent for any person to establish an apiary within the one-mile radius, subject always to Departmental approval.

Certain apiaries consisting of 40 hives or more may be clasisfied as Apiaries Class D. The site of such an apiary is intended to be available as a protected site in the event of the beekeeper desiring from time to time to leave it to follow a honey flow. Before a certificate will be issued, the beekeeper concerned must possess at least 150 hives, and in effect the site must be one that an inspector considers a suitable and convenient centre for that beekeeper's activities.

The owner of an Apiary Class D may remove any or all of his bees from that site to any other site without loss of rights, and in the period between this action and the re-occupancy of this site it is an offence for another beekeeper to establish an Apiary Class B within the half-mile radius.

However, in any certificate issued in connection with an Apiary Class D, conditions may be imposed to ensure that such a site is properly "worked" and that other beekeepers are not being unnecessarily restricted in that area. Certificates may be revoked at any time and the number of Apiaries Class D allotted to any beekeeper is determined by the Department.

A beekeeper having either an Apiary Class B or an Apiary Class D may give his written consent for any other beekeeper to establish an Apiary Class B or D at a distance of less than half a mile. If an inspector, after considering the local situation, is of the opinion that the establishment of a new Apiary Class B or D would not prejudice an already established Apiary Class B or D, then permission may be granted for the new apiary to be established and maintained for some determined period.

Sales and Removals. If a beekeeper sells, establishes or removes an apiary, he must advise the Department of his action within 14 days. Forms are available for this purpose.

Prohibited Sites. The keeping of bees on a site may be prohibited if any provision of the Act is being contravened or not complied with, or if the site has become unsuitable for beekeeping, or if the keeping of bees there is detrimental to public interest. Such a site then becomes known as a prohibited apiary site. If any person establishes or maintains an apiary upon such a prohibited apiary site he is guilty of an offence under the Act.

Registered Brands. It is necessary for each beekeeper to mark at least one hive in every 50 or part thereof with his registered brand number This brand number is supplied to each registered beekeeper on his certificate of registration. The marking must be in block letters and figures not less than two inches high and must always be maintained in a legible condition. The marking is to be placed on the front of the hive, and at least one of the hives marked shall be situated in the front row of hives.

CONTROL OF DISEASE

The part dealing with the control and restriction of diseases and pests affecting bees is by far the most important portion of the Act and it is in force throughout the whole State.

Frame Hives. Linked with inspectional work is the necessity to have good facilities for examining hives, and therefore beekeepers are required to keep their bees in frame hives maintained in good condition. A badly constructed or neglected frame hive makes effective examination for the presence of disease very difficult.

Disease Notification. In the event of a beekeeper noticing a disease in his apiary, he must notify the Department immediately; further, he must not sell or in any way dispose of any bees or materials while they are affected with or liable to spread disease.

Plate 2

Beehive Carrying Registered Brand Number.

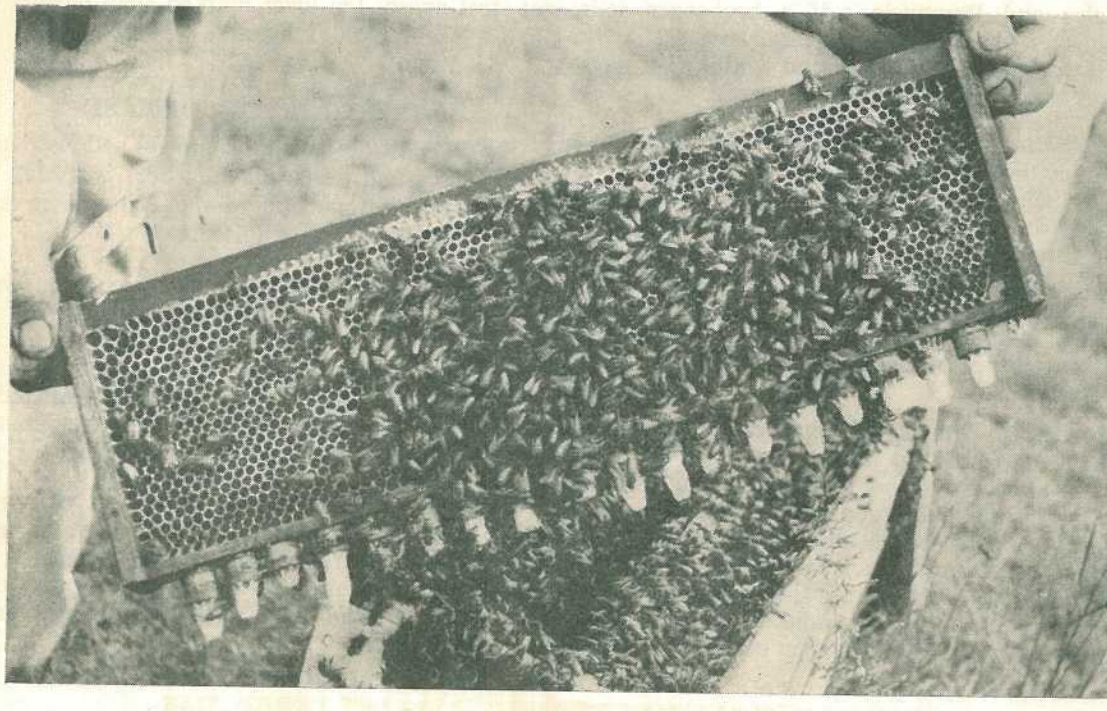


Plate 3
Well-Formed Queen Cells in a Queen-Rearing Apiary.

Destruction of Diseased Material. Under the Act power is given to the Minister to order the destruction of any diseased bees or disease-affected material. However, such action will follow only if an inspector has certified that in his opinion the diseased apiary is a source of danger to other bees and ought to be destroyed and the certificate is countersigned by the Director, Division of Plant Industry.

Quarantine. Particular areas or buildings may be declared quarantine areas for the purpose of disease control. Until a quarantine is lifted, no person is allowed to move bees or beekeeping material into, within or out of the area.

Disease Control Powers. In connection with disease control, samples may be taken by an inspector for investigation, vehicles stopped and inspected, consignments directed to a quarantine area for investigation, instructions given regarding methods of treatment to be carried out, and generally any other action may be taken or ordered that may be necessary to effect efficient control.

Queensland has been comparatively free from diseases in bees in the past and every endeavour must be made to keep it so in the future. The requirements relating to diseases were designed with this in mind, and normally they involve very little inconvenience to beekeepers.

PREVENTING INTRODUCTION OF DISEASE

Places of Entry. In coastal Queensland and along the southern border, certain towns are listed as places of entry. All bees, bee combs, beeswax, hives, honey and appliances coming into this State must come through one of these listed places. By "appliances" is meant gear or apparatus that has been used in beekeeping but it does not refer to new goods. The places of entry are Bowen, Brisbane, Bundaberg, Cairns, Clapham Junction, Coolangatta, Gladstone, Goondiwindi, Killarney, Mackay, Maryborough, Mungindi, Rathdowney, Rockhampton, Texas, Townsville, Wallangarra.

Restriction on Introductions. A consignment coming into Queensland must be accompanied by a declaration completed by the consignee and a certificate must be completed and signed by an approved officer in a Department in the State or country of origin corresponding to the Department of Agriculture and Stock in Queensland to the effect that the consignment comes from a disease-free district. A duplicate copy of this declaration and certificate shall, prior to the introduction, be forwarded to the Department of Agriculture and Stock, Brisbane.

Power to Quarantine. Upon arrival at a place of entry the consignment may be directed to a quarantine area for examination, and if found to be affected by disease, it may be detained in quarantine and treated in accordance with instructions.

Power to Return or Destroy. A consignment coming into this State without the necessary declaration and certificate shall be either returned to the sender or destroyed in quarantine.

Normally, any consignment coming to the State through a place of entry and accompanied by a properly completed certificate of freedom from disease will not be delayed.

GENERAL PROVISIONS

Beekeeper to Supply Information. A beekeeper may be required to furnish information regarding queen bees supplied by him or such statistics pertaining to beekeeping as an officer appointed under the Act may reasonably require of him.

Abandoned and Neglected Hives. In the event of an inspector being satisfied that any bees, hives or appliances have been abandoned and are neglected, he may take possession of them and dispose of them in a prescribed manner or in accordance with instructions from the Under Secretary. This provision may sometimes be very necessary, for an abandoned apiary can easily become a source of nuisance or danger to beekeepers in the locality.

Honorary Field Men. Honorary field men may be appointed and when required to do so may inquire and report on registration of beekeepers, location of apiaries, classification of apiaries, keeping of bees in frame hives, contraventions of the Act or such other matters as may be thought necessary by the Under Secretary. Honorary field men must be registered beekeepers and appointment will automatically lapse if beekeeping is relinquished by them.

SUMMARY

The main provisions of the Act may be briefly summarized as follows:—

(1) Beekeepers throughout Queensland must keep their bees free from disease and in frame hives to permit effective examination.

(2) Beekeepers in the declared districts must register, provide descriptions of their apiaries, maintain a distance of at least half a mile between apiaries of 40 hives or more, and display their brand number on their hives.

(3) All introductions of bees, honey, &c., must be certified as having come from an area free from disease.

Botany For Farmers

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

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

Tuberculosis-Free Cattle Herds

(As at 1st February, 1960)

Aberdeen Angus

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

A.I.S.

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

Ayrshire

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

Friesian

Behrendorff, E. C., Inavale Friesian Stud, M.S. 786, Boonah
Macdonald, S. E. G., "Freshfields", Marburg
Naumann, C. H., "Yarrabine", Yarraman
Pender, D. J., Lytton Road, Lindum
Stumer, A. O., Brigalow, Boonah

Guernsey

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

Jersey

Beckingham, C., Trout's Rd., Everton Park
Birt, W. C. M., Pine Hill Jersey Stud, Gundiah
Borchert, Mrs. I. L. M., "Willowbank" Jersey Stud, Kingaroy
Burrows, R. N., Box 23, Wondai
Bygrave, P. J. L., The Craigan Farm, Aspley
Carpenter, J. W., Flagstone Ck., Helidon
Conochie, W. S. & Sons, "Brookland", Sherwood Rd., Sherwood
Crawford, R. J., Inverlaw, Kingaroy
Farm Home For Boys, Westbrook
Fowler, P. & Sons, "Northlea", Coalstoun Lakes
Harley, G., "Hopewell", M.S. 189, Kingaroy
H.M. State Farm, Palen Creek
Hutton, D. R., "Bellgrath", Cunningham, via Warwick
Johnson, H. G., Windsor Jersey Stud, Beaudesert
Lau, J. F., "Rosallen", Goombungee, Toowoomba
Matthews, E. A., "Yarradale", Yarraman
McCarthy, J. S., "Glen Erin", Greenmount, Toowoomba
Meier, L. E., "Ardath Stud", Boonah
Noone, A. M. & L. J., "Winbirra", Mt. Esk Pocket
Porter, F., Conondale
Q.A.H.S. & College, Lawes
Ralph, G. H., "Ryecome", Ravensbourne
Scott, Est. J. A., "Kiaora", Manumbar Rd., Nanango
Semgreen, A. L., "Tecoma", Coolabunia
Seymour, B. T., "Upwell" Jersey Stud, Mulgildie
Smith, J. A. & E. E., "Heatherlea" Jersey Stud, Chinchilla
Tatnell, W. T., Cedar Pocket, via Gympie
Toowoomba Mental Hospital, Willowburn
Verrall, F. W., "Coleburn", Walloon
Weldon Brothers, "Gleneden" Jersey Stud, Upper Yarraman

Poll Hereford

Anderson, J. H. & Sons, "Inverary", Yandilla
Hutton, D. R. & M. E., "Bellgrath", Cunningham, via Warwick
Maller, W., "Bore View", Pickanjinnie
Maller, W., "Bore View", Gowrie Junction
McCamley, E. W. G., "Eulogie Park", Dululu
Wilson & McDouall, Calliope Station, Calliope

Poll Shorthorn

Leonard, W. & Sons, Welltown, Goondiwindi

orchard and garden

Grow Local Papaws.—The papaw is touchy as to environment, and it is preferable to grow types with proved reputations in your own district than take risks with varieties or strains with high reputations elsewhere. The top-line papaw around Mackay or Yarwun might easily prove a disappointment when tried at Redlands, on the South Coast, or in other centres.

There are few standard papaw varieties, and experience has shown that the best way to start is with seed from high-quality trees on your own farm or in your own district.

Fairly uniform types have been developed in this way. Thus, we have the well-known Brookfield and Sunnybank strains, which are suited to these areas and extensively grown there. The bisexual Guinea Gold is a major strain at Yarwun, and the recently developed Hybrid No. 5, bred by this Department, appears best for our near North Coast. In the latter case, fresh seed from an accurate source must be used for each planting.

Selection is essential, of course. The parent trees should be vigorous, giving high yields and quality fruit which is well-shaped, colours nicely, and has firm thick flesh with good flavour. Seed selected from desirable tree types will produce fairly uniform strains. With a little extra trouble which entails hand-pollination of selected trees you can produce a pure type.

The process is not difficult and is described in the papaw leaflet available on inquiry from this Department.

—D. DOWDLES, Horticultural Adviser.

Irrigating Rockmelons.—Over-watering and too-frequent watering after the commencement of flowering can be harmful to the rockmelon crop. At this stage, the crop must not be allowed to remain wet for long periods.

Normal watering schedules provide for irrigation at 14 to 21-day intervals while the vines are growing; at 10 to 14-day intervals when the plants begin to flower and set fruit; and at seven to 10-day intervals when the fruit is filling and harvesting is in progress.

Irrigation of the maturing crop is complicated by the susceptibility of rockmelons to downy and powdery mildews. The crop has to be supplied with sufficient water, yet the plants must be kept as dry as possible. This is done by irrigating in the morning of a fine, clear day.

—E. L. HASTIE, Adviser in Horticulture.

New Book

Bananas. By N. W. SIMMONDS, M.A., A.I.C.T.A., F.L.S., Senior Cytogeneticist, Imperial College of Tropical Agriculture, Trinidad.

Brucellosis-Tested Swine Herds

(As at 1st February, 1960)

Berkshire

Clarke, E. J., Mt. Alford, via Boonah
Cochrane, S., "Stanroy", Felton
Cook, F. R. J., Middle Creek, Pomona
Crawley, R. A., Rockthorpe, Linthorpe
Edwards, C. E., "Spring Valley" Stud, Kingaroy
Farm Home For Boys, Westbrook
Fletcher, A. C., "Myola" Stud, Jimbour
French, A., "Wilson Park", Pittsworth
H. M. State Farm, Numinbah
H. M. State Farm, "Palen" Stud, Palen Creek
Handley, J. L., "Meadow Vale", Lockyer
James, I. M. (Mrs.), "Kenmore" Stud, Cambooya
Kimber, E. R., Block 11, Mundubbera
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View" Stud, Yandina
Ludwig & Sons, A. R., "Beau View" Stud, Beaudesert
O'Brien & Hichey, J., "Kildurham" Stud, Jandowae East
Orange, L. P., "Hillview", Flagstone Creek
Pfrunder, P. L., Pozieres
Potter, A. J., "Woodlands", Inglewood
"Tayfield" Stud, Taylor
Q.A.H.S. & College, Lawes
Regional Experimental Station, Hermitage
Rosenberger, N., "Nevrose", Wyreema
Schellback, B. A., "Redvilla" Stud, Kingaroy
Smythe, E. F., "Grandmere" Stud, Manyung, Murgon
Stark, H. L., "Florida" Stud, Kalbar
Thomas & Sons, F., "Rosevale" Stud, Laravale
Traves, G., "Wynwood" Stud, Oakey
Weier, V. F., "La Crescent", Clifton
Wolski, A., "Carramana", Warra
Young (Jnr.), W., Kybong, via Gympie

Large White

Assenbruck, C., Mundubbera
Barron Bros., "Chiltern Hill", Cooyar
Bell & Son, E. J., "Dorne", Chinchilla
Butcher, Dr. B. J. & Parnwell, A. J., Plunkett, via Tamborine
Clark, L. D., Greens Creek, Gympie
Duncan, C. P., "Hillview", Flagstone Creek
Fowler, S., "Kenstan", Pittsworth
Franke, H. J., "Delvue" Stud, Cawdor
Garawin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield
Gibbons, A. E. H., Mt. Glorious
Gibson, H., "Thistleton" Stud, Maleny
H. M. State Farm, Numinbah
Hall, M., "Milena" Stud, D'Aguilar
Heading, J. A., "Highfields", Murgon
Horton, C. J., "Mannuem Brae" Stud, Mannuem, Kingaroy
Hutton, G., "Grajea" Stud, Cabarlah
Jensen, S., Rosevale, via Rosewood
Jones, K. B., "Cefn" Stud, Clifton
Kahler, J. & S., East Nanango
Kanowski, A., "Exton", Pechey
Kennard, R. B., "Collar" Stud, Warwick
Larsen, H. L., "Oakway" Stud, Kingaroy
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View", Yandina
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood
Mack, A. J., Mundubbera
Palmer, A., "Remlap", Greenmount
Pampling, G., Watch Box Rd., Goomeri
Postle, R., "Yaralla" Stud, Pittsworth
Powell, R. S., "Kybong", Gympie
Q.A.H.S. & College, Lawes
Radel, V. V., Coalstoun Lakes
Regional Experimental Station, Biloela
Robinson, O. R. & O. J., "Linvale", Argoon, Biloela
Skyring, G. I., "Bellwood" Stud, via Goomeri
Stanton, H. R., "Tansey" Stud, via Goomeri
Stewart, L., Mulgowie, via Laidley
Stumer, K. F., French's Creek, Boonah
Wharton, C. A., "Central Burnett" Stud, Gayndah
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah
Zahnow, W., Rosevale, via Rosewood

Tamworth

Armstrong, H. J., "Alhambra", Crownthorpe, Murgon
Booth, J. D., Swan Creek, Warwick
Campbell, P. V., "Lawnhill" Stud, Lamington
Coller, R. H., Tallegalla, via Rosewood
Fletcher, A. C., "Myola" Stud, Jimbour
Herbst, L., "Hillbanside", Bahr Scrub, Beenleigh
Kajewski, W., "Glenroy" Stud, Glencoe
Kanowski, S. E., "Miecho", Pinelands
Potter, N. R., "Actonvale" Stud, Wellcamp
Regional Experimental Station, Kairi
Salvation Army Training Home For Boys, "Canaan" Stud, Riverview
Skerman, D. F. L., "Waverley", Kaimkillenbun
Stephen, T., "Withcott" Stud, Helidon
Thomas & Sons, F., "Rosevale" Stud, Laravale
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah

Wessex Saddleback

Ashwell, J., "Green Hill", Felton South
Cooper, G. J., Neumgua
Douglas, W., "Greylight" Stud, Goombungee
Dunlop, J. B., "Kunawyn", Acacia Rd., Kuraby
Kruger & Sons, "Greyhurst" Stud, Goombungee
Law, D. T., "Rossvill" Stud, Aspley
Mack, A. J., Mundubbera
Scott, A., Wanstead Stud, Grantham
Smith, C. R., "Belton Park", Nara
"Wattledale" Stud, 432 Beenleigh Rd., Sunnybank

Large Black

Pointon, E., Goomburra

Landrace

Grayson, D. G., Killarney
Neilsen, L. R., "Sunny Hill", Ascot, via Greenmount

For Country Cooks

Notes from the JUDITH MAY TEST KITCHEN, directed by RUBY BORROWDALE for the Butter Marketing Board

Here's a creamy, rich pie you'll want to serve often when guests join the family for dinner.

Luscious Fruit Pies

While apples and pineapples are almost sure to top the poll in any quest for a favourite fruit pie filling, the stone fruits give welcome variety to what must be recognised as the most popular dessert dish.

Plums, peaches, apricots and cherries make delicious pies and combinations of two or more of these fruits together with apples and pineapples can give delightful results.

One of the advantages of pie as dessert lies in its versatility. It can be served hot or cold and so is equally favoured to follow either a hot dinner or a summer salad.

Golden Dream Peach Pie

The Pastry.—I cup plain flour, ½ teaspoon salt, ¼ teaspoon ground nutmeg, 3 level tablespoons butter and 2 to 3 tablespoons milk. Sift flour, salt and nutmeg into bowl. Add the butter and cut it in until the particles are the size of small peas, Sprinkle the milk over the mixture, tossing lightly with a fork until dough is moist enough to hold together. Press into a ball. Roll out on floured board to an 11 in. circle. Fit pastry loosely into 9 in. pie pan. Fold edge to form standing rim; flute. Peel, cut into halves and remove stones from 5 to 6 ripe peaches then place, cut-side up, in uncooked pastry shell. Prepare the following topping—Mix together 1 cup brown sugar, 3 level tablespoons plain flour. Add 3 tablespoons butter and mix with fork until mixture is evenly blended and crumbly. Sprinkle over peaches. Bake in hot oven, uncovered (425 deg. F.) for 10 minutes. Then cover with another pie plate or aluminium foil and continue cooking in a moderate oven (375 deg. F.) for 35 to 40 min. Cool thoroughly before serving with vanilla-flavoured whipped cream. Place the whipped cream around the edge of the pie and sprinkle lightly with nutmeg.

Ever-Sure Pie Pastry

A short, tender pastry to make a reputation for a beginner. Use it for deep or shallow pies or tarts.

Two and a-half cups (lightly filled), plain flour, 1 teaspoon baking powder, ½ teaspoon salt, ¾ cup (6 oz.) butter, and about ¼ cup milk. Mix and sift the flour, baking powder and salt into bowl. Blend one-third cup of flour mixture to a smooth paste with the ¼ cup cold milk. Add the butter to the remaining flour mixture and cut it in until the pieces of butter are about the size of small peas. Drop flour-milk paste here and there over the dry flour and butter mixture; mix lightly with a fork until the paste will just hold together—do not overmix. Gather into a ball with fingers, wrap in waxed paper and chill for 1 hour in refrigerator. Roll to the thickness required. This is sufficient for a large two-crust pie or two tart shells.

Egg Yolk Pastry For Pies

Three-quarters cup (6 oz. butter), 2 cups plain flour, ½ teaspoon baking powder, ½ teaspoon salt, 1 egg yolk, 1 tablespoon sugar and about 5 tablespoons milk. Sift flour, baking powder and salt into bowl. Add the butter and chop it in very finely. Beat the egg yolk in a cup then stir in the sugar and milk. Add gradually to the flour-butter mixture, blending lightly with a knife until all flour is dampened. Press particles of dough together, knead lightly on floured board and roll to thickness required.

Cherry Chess Pie

Line a 9 in. pie plate with any of the pastries given. Flute or decorate edge. Pit 1 quart cherries after first washing them quickly in cold water, then draining well. Mix in 2 tablespoons plain flour, ½ teaspoon cinnamon, ½ cup sugar, 2 tablespoons honey, a pinch salt and 2 tablespoons melted butter. Stir in 3 well-beaten eggs. Pour this into the unbaked pastry-lined plate. Bake in hot oven (450 deg. F.) for about 15 min., to set the filling and the crust; reduce heat to moderate (350 deg. F.) and continue baking for 20 min. longer; or until filling is set. Cool but do not refrigerate and then serve with a whipped cream topping.

Custard Meringue Pie (Illustrated)

Line an 8 in. pie plate with any of the pastries given and decorate edge. Cover bottom of pastry with pitted cherries, sliced sweet plums or apricots, adding a sprinkling of sugar if necessary. Dot lightly with butter.

The Custard—½ pint milk, 1 tablespoon sugar, yolks 2 eggs, a pinch of nutmeg, cinnamon or ¼ teaspoon vanilla and 1 tablespoon butter. Warm milk and sugar and pour on to the well-beaten yolks of the eggs. Add the butter and flavouring and stir till butter is melted then pour over the fruit. Bake in moderate oven (325 deg. F.) about 45 min. or until lightly set. Remove from oven and prepare Meringue Topping: Place the whites of the 2 eggs in a basin and add a pinch of cream of tartar, pinch salt and few drops of vanilla essence; beat until soft peaks can be formed, then gradually beat in 4 tablespoons sugar. When very thick, spoon over pie. Return to slow-moderate oven (325 deg. F.) and bake about 15 min. or until meringue is lightly browned.

Two-Crust Fruit Pie

Line a 9 in. pie plate with pastry rolled to about ⅛ in. thickness. Roll out remaining pastry to cover top of pie.

The Fruit Filling—Prepare 4 cups fruit and place in basin. Chopped stoned apricots, peeled and chopped peaches, apples, pears or rhubarb cut into ¼ in. lengths and mixed with a chopped apple, stoned cherries or washed and hulled strawberries. Mix together in a separate bowl ½ cup sugar and 2 level tablespoons plain flour, sprinkle this over the prepared fruit and mix well. This mixture should stand while preparing the pastry. Place this prepared fruit filling into the unbaked pastry-lined plate, piling it high in the centre. Dot generously with 2 tablespoons butter then cover with top crust. Press edges together and decorate top of pie if you wish. Brush pastry with milk and sprinkle with sugar. Bake in hot oven (450 deg. F.) then reduce heat to moderate and cook until fruit is tender, about 30 min. longer. Serve warm or cold. Serve warm with a custard sauce or cold with cream or ice cream.

Department Enters T.V.

Mrs. J. E. COWEN, of Yeerongpilly, waters bean seedlings while a Department of Agriculture and Stock camera records the scene as part of the film "Seeds That Grow," for use on T.V.

Turning Old Furniture Into New

Although it takes time and energy, you can do your own refinishing of furniture at home. Often an old piece of furniture looks shabby and dirty, but if you apply these methods of refinishing, you will turn it into a new piece that will delight your eye and enhance the beauty of your home:

Before buying second-hand furniture for refinishing, you will want to study it carefully. If it is worth refinishing it will have: (1) good work; (2) sound construction.

Supplies you'll need for removing the old finish are as follows:—

- A good grade of commercial varnish remover.
- An old can or dish for varnish remover.
- A small paint brush.
- A putty knife.
- Steel wool.
- Soft lintless rags.
- Methylated spirit.
- Old papers to cover floor.
- Old gloves.

Removing Old Paint or Varnish

Varnish and paint remover is the best substance to use for removing old varnish. The directions on the container should be followed carefully.

Glass and commercial scrapers have a tendency to cut too deeply into the wood and take too much of the natural finish acquired by the wood. The natural finish or "patina" adds to the beauty and value of the furniture.

After old finish has been entirely removed, clean thoroughly with methylated spirits.

Preparing Wood for New Finish

You have now got down to the natural wood. And you may have had the pleasant experience of discovering that you have a truly fine piece of furniture. This is often the case with old family pieces that were sometimes painted over and used rather carelessly because sometimes our forebears did not appreciate their true value.

In any case, before applying the new finish, it will be worth your while to glue loose parts and raise dents.

Supplies you'll need are:—

- Wood block for sanding—approximately 2½ in. by 4 in. and at least 1 in. thick.
- Sandpaper—fine, medium.
- Steel wool.
- Plastic wood, or putty to use for filling small holes.
- A good grade of furniture glue (casein glue).
- Strips of strong cloth.
- Clamps for holding glued parts in place.
- Small strips of thin wood to use under clamps.

How to Glue Loose Joints and Parts

1. Scrape off all old glue from all parts to be glued.

2. If wood is too smooth, it may be necessary to cut in lightly with a knife.

3. Mix casein glue according to the directions on the container.

4. Apply glue to the surface to be glued.

5. Apply clamps or tie well with strips of strong cloth. Dampen cloth so binding will tighten as it dries, holding parts together more firmly.

6. Wait at least 24 hours before removing clamps. The pieces of wood will separate if they are not thoroughly dry.

To Raise Dents and Bruises

Apply a wet blotter or woollen cloth to the spot in the wood. Hold a hot iron near the wet blotter or cloth in order to produce steam. Several applications will help to raise the dent.

Important.—This treatment cannot be applied to veneered wood as it has a tendency to loosen the veneer.

To Fill Cracks and Holes

Cracks and holes may be filled in with putty. Stainer in oil is used to bring the putty to the desired matching colour. Plastic wood may be used but it is often difficult to stain the colour of the wood.

New Finish

Always sand with the grain of the wood. Scratches made by sanding across the grain are almost impossible to remove.

Begin with a medium grade sandpaper and gradually work up to a very fine grade.

Rub carved sections and turnings with steel wool.

Some fine grained woods are best finished by using steel wool instead of sandpaper.

Be careful to remove all dust from the furniture before continuing the finishing.

Natural Colour

The colour of wood may be determined by applying a warm priming mixture ($\frac{1}{3}$ linseed oil; $\frac{2}{3}$ turpentine). Leave oil on only a few minutes and remove excess with soft cloth so that it does not become sticky.

Different Finishes

The beauty of the wood is determined by its natural grain and colour. We need to use every precaution in finishing in order to bring out these characteristics.

Stain is unnecessary unless the wood has no beauty—either of grain or colour.

Oil Finish

Raw or boiled linseed oil may be used. Boiled linseed oil penetrates more readily, but it needs to be rubbed immediately. Allowing it to stand on the wood more than about 15 minutes will cause it to dry and be sticky.

Raw linseed oil will not penetrate so readily, but may stand on the wood surface until the next day before it is rubbed. It will not become sticky.

First apply oil finish. Mix together $\frac{2}{3}$ linseed oil; $\frac{1}{3}$ turpentine. If the mixture is used hot, it will penetrate more quickly. Allow from 5 to 20 minutes for mixture to penetrate. Rub well with heavy grain sack or woollen cloth.

The surface may take from 6 to 12 applications of oil and turpentine.

For a harder finish, you may choose to use one of the following mixtures:—

For a varnish and oil mixture, rub in a mixture of 2 parts of $\frac{1}{3}$ linseed oil and $\frac{2}{3}$ turpentine and 1 part of clear waterproof varnish. (If a harder surface is desired, 2 parts of varnish may be used.)

This finish will not mar as does the ordinary varnish finish, and gives a soft sheen to the surface.

If the grain of the wood has been raised, it may be desirable to sand lightly with fine steel wool.

A final coat of wax will help to preserve this finish.

For a shellac and methylated spirit mixture rub in a mixture of $\frac{1}{2}$ shellac and $\frac{1}{2}$ methylated spirit. Apply with a soft, lintless cloth or brush. Wipe off excess before it becomes sticky. Shellac sets more quickly than varnish.

Sand lightly with fine steel wool after each application.

Wax for a final finish.

Penetrating Seal Finish

A penetrating seal finish could be used on furniture which gets hard wear. Purchase a good quality penetrating floor seal. Apply a coat to

well-sanded furniture with a lint-free cloth. Allow to dry thoroughly—allowing at least the time listed in the directions on the tin. Sand lightly with steel wool. Remove dust with a soft cloth. The piece of furniture will need at least three coats with a light sanding between each coat. Use a final coat of wax and polish well. When the furniture becomes dull, remove wax and add another coat of seal using the same brand if possible. Wax with spirit wax and buff thoroughly.

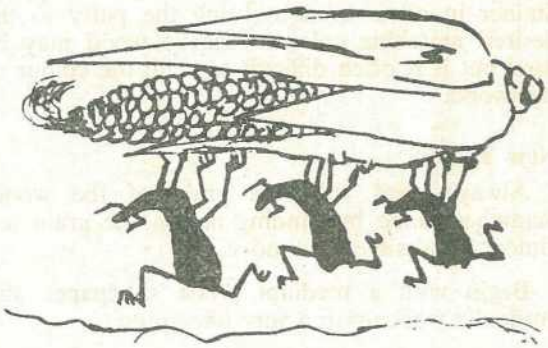
Varnish or Shellac Finishes

Varnish or shellac finishes show mars and scratches, require more care and upkeep and occasional refinishing. If staining is necessary, apply an oil base stain before applying varnish. Oil base stain needs to be brushed in with the grain, then wiped with a cloth to remove excess stain. Allow to dry thoroughly. With a good brush, flow on a thin even coat of varnish or shellac brushing in one direction only. Sand lightly with steel wool or fine sandpaper and apply a second coat.

Prepare a thick paste of pumice and linseed oil. Apply with a cloth dipped in this mixture. Rub lightly with the grain until the high gloss and brush marks are removed. Rub with a woollen cloth to remove excess oil. Finish with a wax coat.

Farmer Brown Says:

"Good roadside shelters protect dairy produce."



"For weevil control, harvest maize as soon as it matures."

Watch Out For Wrong Electrical Connections

Electrical connections, improperly effected, can make booby traps out of ordinary household appliances. In the flexible cord which connects any electrical appliance with the power point, there are three wires. One, the earthing conductor, is coloured green. If this is connected to the wrong terminal of the plug or appliance, instead of to the earthing terminal, an electrical accident threatens.

Because of the improper connection the metal frame of the appliance becomes "alive" as soon as the current is switched on, and, under certain conditions, anyone handling the appliance would get an electric shock. To guard against this, regulations provide for safety by insisting that the earthing conductor of flexible cords is coloured a distinctive green for easy identification. Earthing terminals of plugs are also distinctly marked with the word "earth" or the letter "E".

The safe connection is, therefore, GREEN to EARTH. But the best way of making sure of safety is to have all such connections examined regularly by a certificated electrician. Alternatively, portable equipment and leads may be taken along to the office or depot of the local electricity supply authority, where they will be checked free of charge.

—State Electricity Commission.

New Way Of Making Children's Clothes

WHEN Mrs. Woodrow Dorsey of Waco, Texas (U.S.A.), started making clothes for her small daughters she had no idea that she was on the way to becoming an inventor and starting a family business. A home economics teacher whose speciality was dressmaking, her original intention was only to dress her chlidren attractively and do it efficiently.

From the ingenuity that this American mother applied to solving that problem has grown a new approach to dressmaking for children. Marketed under the name of Kiddie Key, this system of creative sewing consists of a basic pattern that can be cut in any style, adjusted to a perfect fit and used time after time.

"Sometimes one pattern can be used for three years by merely lengthening the bodice," says Mrs. Dorsey, who has created as many as 100 different dress styles from one key pattern.

"I thought with three little girls to clothe, I'd have plently of use for a special pattern that could be used again and again by adapting it to the size and growth of the girls," she says in explaining the origin of her invention. "Like my mother used to do, I cut my first patterns from old newspapers and drew sketches on wrapping paper."

While she was developing her pattern, Mrs. Dorsey tried it out in a special adult class in which she taught creative sewing. She noticed that the women, although mostly beginners, were able to copy ideas from pictures and other dresses, as well as to make up their own designs.

Plate 1: Mrs. Woodrow Dorsey Puts the Finishing Touches on the Dress Worn by Little Jo Beth Jackson. Mrs. Jackson made the frock for her daughter from a basic Kiddie Key pattern which she will save, adjust to size as the child grows and adapt it to other styles. One pattern can be used for three years simply by adjusting the bodice, says Mrs. Dorsey.

To please her husband, Mrs. Dorsey wrote out her method and developed a series of patterns scaled to the chest measurements of girls from 1 to 9 years old. The chest measurement is the key to basic fit, according to Mrs. Dorsey, who points out that other parts of the dress can be changed to suit a child's dimensions. "Shoulder seams must be short enough so the armhole won't sag. Sleeves must fit the little arm or the chubby arm. Waistlines must fit snugly and full skirts must hang evenly and have nice deep hems," are among the directions the inventor gives for making a well-tailored garment.

Plate 2: These Little Girls Model Their Kiddie Key Dresses, All Made from a Basic Pattern Scaled to the Child's Chest Measurement.

Once Mrs. Dorsey was invited to New York City to meet representatives of a sewing machine company that wanted to market her product. She was delighted when nothing came of the proposition because it would have meant travelling about the country. "They thought too much of promotion and all that goes with it. I am just a country person and mother, and I intend to remain so," she says.

Recently she has been drafting a key pattern for her 12-year-old daughter Charlotte. It covers the 10–11–12 age group. "If I ever find time, I intend to add a pattern for this age group to those we already sell," she says. Like the current Kiddie Key patterns, it will feature adaptability in size and styling.

—United States Information Service.

Cooking Of Meats

You can do wonders with the cheaper cuts of meat by cooking them in ways which will make them tender and appetising, and meat cooking lessons should include more than just ways of cooking roasts, grills and brown stew. Stewing steak beaten with a meat hammer or the edge of a saucer and then braised slowly in the oven with vegetables and tomatoes, tomato puree or juice, or a little vinegar, provides a most delectable dish.

Long, slow cooking is the secret of most successful meat cookery. Liver has the highest food value of all the meats, but it is often so badly cooked that it is not as popular as it should be. It needs long, slow cooking if done in the oven, but there is a quick and easy way of doing it in the frying pan which is not very well known. Skin the liver, then cut it in very thin slices, almost paper thin, diagonally across the lobe. Dip these slices in seasoned flour or oatmeal, then fry for only a minute or two on each side in a little hot fat. Cooked by this method it just cannot be tough and is much more likely to be eaten than the bootleatherish thick slices of liver so often served.

Recipe Of The Month

Lemon Marmalade

1 lb. of thinly sliced lemon;
2 pints of water.

Prepare the lemons and place in a basin with the water, allow to soak for 24 hours (the skin and pith of lemons does not boil clear). At the end of the soaking period place in a pan and cook until the peel is soft. Measure the pulp and add an equal measure of sugar. Stir until all of the sugar is dissolved. Bring to the boil and boil rapidly until the jam will set. Remove the scum and bottle into hot jars and seal at once.

Treasurer's job is important

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

In some respects the treasurer of a club, or any organisation, is the most important office bearer. He is in a position of trust, calling for honesty, reliability and accuracy with figures. It is the treasurer's responsibility to receive and take charge of club funds, and to keep an accurate account of them. It is his duty to prepare financial statements and reports, and to keep the members reliably informed of the true state of finances of the club. Annually, the treasurer will be called upon to prepare and present to the members a statement of receipts and expenditures and a balance sheet for the year just passed. The treasurer should devise appropriate ways and means of raising funds and be ready to suggest how the funds might be spent in the best interests of the members. He should be a member of the executive, and as such he should do all he can to ensure that the club earns a reputation for honesty and trustworthiness

BOOKKEEPING

Methods.—The system of bookkeeping adopted by a club should be as simple and as effective as possible. The system used in the Junior Farmers' Organisation does not require any specialised knowledge, and may be carried out by anyone who is prepared to devote a little time and care to his duties, and who has the ability to add and subtract accurately.

The books required are:

(i) Receipt Book—Any standard type will do, provided that it permits the keeping of duplicates;

(ii) Cheque Book; and

(iii) Bank Deposit Book—
Both of which are obtainable from your bank;

(iv) Cash Book—The cash book will show receipts on the left-hand side and payments on the right-hand side. Each page should have two money columns.

Procedure.—All moneys received by the club should be handed to the treasurer who must issue a receipt for each separate amount. A duplicate of each receipt will be retained. Duty stamps are required by law to be affixed to receipts as follows:—

Exceeding £5 and not exceeding £50—2d.
Exceeding £50 and not exceeding £100—3d.
For every £100 or fraction after the first £100—3d.

The duty stamp is cancelled by the treasurer after it is fixed to the receipt. To do this the date and the treasurer's initials are written across the stamp.

From the duplicates of receipts issued the "Receipts" side of the cash book is written up. *A reminder is once again given that receipts must be issued for all moneys received.* The amounts of money received are shown in the cash book. *All* money received is banked. Let us turn to the "Receipts" side of a cash book and follow the examples through.

On February 5, a membership fee of 5s. is received from W. Brown. He is issued with receipt No. 42. On February 6, a donation is received from the firm of S. Smith and Sons who are issued with receipt No. 43. On February 7,

the gross proceeds from the annual dance are handed in by the member who was responsible for running the dance. This member is issued with receipt No. 44 (N.B.—These gross proceeds will include door takings, entry fees for monte carlos, raffles, and so on. No payments to the orchestra or other persons must be made from these takings.)

CASH BOOK

Receipts

Date	Particulars	Receipt No.	Amount			Banked		
1960			£	s.	d.	£	s.	d.
Feb. 5	Membership fee—W. Brown	042	0	5	0			
Feb. 6	Donation—S. Smith and Sons	043	2	2	0			
Feb. 7	Gross Proceeds—Annual Dance ..	044	15	4	6			
						17	11	6

On February 7, the treasurer banked the funds he had received. The amount banked, £17 11s. 6d., is shown in the appropriate column. The duplicate of the deposit slip or the entry in your deposit book is the treasurer's receipt from the bank for the money deposited.

At the end of the financial year the "Banked" column is ruled off and totalled up. This total should agree with the total credits on your bank statement for that period. Do not forget to include the interest allowed by the bank in the cash book.

It is desirable that all but the very smallest amounts should be paid by cheque. (Petty cash should be kept to a minimum.) All cheques should be "crossed", that is, two parallel transverse lines ruled across the centre of the cheque and the words "not negotiable" added. This ensures that the owner of the cheque receives the money it represents. The treasurer who makes out the cheque should make sure that the butt of each cheque is completed.

[TO BE CONTINUED]