QUEENSLAND AGRICULTURAL JOURNAL

VOL. 86 APRIL, 1960 NO. 4

Registered at the General Post Office, Brisbane, for transmission by Post as a Newspaper

contents

COVER PICTURE: **Harvesting Pineapples on the farm of Mr. Jack Gowen, Glasshouse**

EDITOR: *E. T. Hockings*

PUBLISHED BY THE QUEENSLAND DEPARTMENT OF AGRICULTURE & STOCK.

SUBSCRIPTION RATES (PAYABLE TO DIRECTOR-GENERAL, DEPARTMENT OF AGRICULTURE AND STOCK, WILLIAM STREET, BRISBANE):

QUEENSLAND FARMERS, SCHOOLS AND STUDENTS—5S. A YEAR; OTHERS—£1 A YEAR.

Close Your Herd, And Keep Out Disease!

By B. A. WOOLCOCK and R. MILLAR,
Veterinary Services Branch.

A stockowner can keep infectious diseases off his property by maintaining a closed herd. Here is some advice on how to achieve a closed herd and increase your profits by avoiding disease:

Most farmers have heard of the efforts of Australia's quarantine service to keep out diseases such as foot and mouth disease and swine fever. Have you ever thought of yourself as a quarantine officer attempting to keep disease out of your own herd?

Our veterinary quarantine officers are very careful to see that only stock which are perfectly safe are allowed to enter this country freely. Where there is any doubt they apply a suitable period of quarantine before entry, and, if there is any serious risk, they apply a total ban. You, too, can apply the same principles to your own herd and so prevent the introduction of disease!

Australia's greatest asset, as far as animal quarantine is concerned, is its boundary of shoreline and broad stretches of ocean which have to be traversed. Your greatest asset in keeping your herd free of disease is a secure boundary fence.

The Closed Herd

What is a closed herd? It is simply a self-contained herd into which only essential introductions are made and which is maintained in a state of isolation.

Those of you who have run into trouble with brucellosis and other infertility problems will know how disease can reduce profits. Yet there are many farmers in this State who, by maintaining closed herds, have kept these major disease problems out of their herds. Veterinary surgeons have frequently encountered disease-free herds on isolated farms onto which only occasional young bulls and carefully selected females have been introduced over the years. Such herds are usually free of such diseases as tuberculosis, mastitis, brucellosis and infectious diseases causing infertility.

It is suggested that you apply the three basic principles of quarantine to your own herd:

1 *Introduce only Safe Animals.*—You should avoid at all times making non-essential introductions to your herd. When you are forced to buy replacements, take advantage of Section 17 of "The Stock Acts" which, in effect, protects you for 7 days in the case of brucellosis and mastitis and for 30 days in the case of tuberculosis. You, therefore, have these periods in which to arrange

Plate 1
Poor Boundary Fences Mean Unauthorised Intruders.

for your veterinary adviser to make tests to discover these three important diseases.

You will be forced to buy periodically a herd sire. The only safe bull is one which has not been used for service. Therefore to be absolutely safe you should consider buying only very young bulls and holding these until they are ready for service. This is the only sure way to avoid the risk of introducing venereal diseases which cause infertility and abortion.

If you have to buy female replacements, the safest to buy are maiden heifers. The only other class which you should consider are springers, preferably springing heifers. In every case you must make sure that these females have been protected against brucellosis with Strain 19 vaccine. Springers are not so likely to introduce the infertility diseases but to make absolutely sure you would have to keep them away from the bull until at least the third heat period after normal calving.

2 *Apply Quarantine in Doubtful Cases.*—This principle applies particularly to introduced pigs and a quarantine or isolation pen is an essential on the farm. In the case of adult bulls you would be foolish to risk introducing vibriosis by allowing them to run with the herd without a period of isolation, during which they would be treated or test-mated with a small number of maiden heifers. All introduced cattle require isolation until tests for tuberculosis, brucellosis and mastitis are completed by your veterinary surgeon.

3 *Don't take any Risk with Disease.*—You wouldn't knowingly introduce disease into your herd, but many farmers take risks with disease by buying indiscriminately, by borrowing bulls or by allowing neighbours to bring in cows for service. All these practices lead to the introduction and spread of disease. In order to protect your own herd, you must apply a ban when there could be a risk. There is always a risk when you don't know the herd from which the stock on offer originate.

Plate 2

Calves and Pigs Grazing Together May Spread Disease.

Plate 3

Good Yards and Fences Mean Bulls Under Control.

The Closed Herd and Disease

Mastitis and infertility are our two major disease problems of the dairy industry. The economic loss to the industry in this State has not been estimated, but in 1955 in the United Kingdom the financial loss attributed to infertility alone was stated to be about £18,000,000. This staggering figure should at least stir us out of our complacency.

The infertility diseases of which you must be aware are brucellosis, vibriosis and trichomoniasis. Brucellosis you can control by adopting a policy of Strain 19 vaccination of all heifer calves. There are no vaccines available to assist you with the other two, which are venereal diseases. But close your herd and you will have no need to worry about them. Make your boundary fence stock-proof and you avoid the risk of their accidental introduction. Years of care and preservation of a herd may be lost overnight when a neighbour's cow or bull gets through a poor boundary fence.

The germs causing mastitis may be introduced by buying adult cows without taking precautions to see that they are free of this disease. Once mastitis is in it usually stays for a considerable period and it can cause a heavy financial loss.

Any of the infectious diseases may be introduced if you fail to give the matter some thought before buying. If you are in doubt, it will pay you to seek veterinary advice.

The closed herd is a means of insurance against disease and loss of production. You cannot afford to allow any of your cows to be unproductive. Unproductive cows mean larger herds and too many mouths precipitate feed shortage.

Some Don'ts.—Close your herd and strain up your boundary fence and you will have little to fear from infectious disease. Take note of these "DON'TS"—

1. DON'T buy adult bulls unless you are sure they have never been used or unless you are prepared to treat and test them under veterinary supervision.

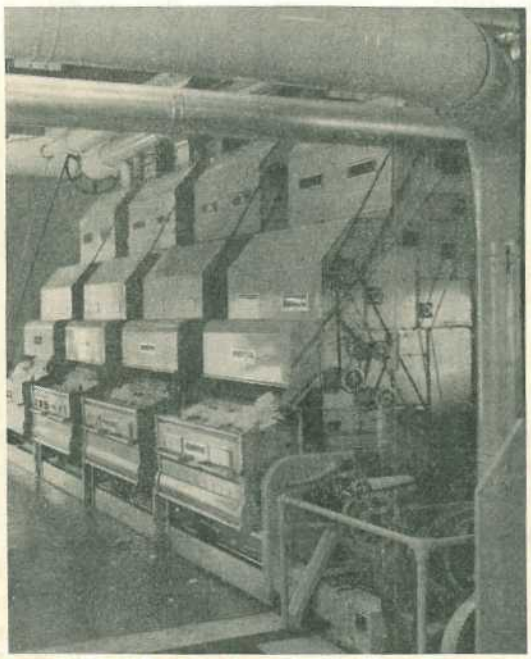
2. DON'T borrow a neighbour's bulls.

3. DON'T "hire" your bull out to a neighbour's cows.

4. DON'T buy adult cows without thorough testing by a veterinary surgeon for mastitis, fertility, brucellosis and tuberculosis.

5. DON'T let your cattle stray outside your own boundary fence and don't take the risk of letting your neighbour's bull get into your cows.

6. DON'T be complacent about disease, much of which can be prevented.



The New Gin Stand At the Rockhampton Cotton Ginnery, Showing Cotton in the Process of Ginning.

The Minister for Agriculture and Stock (Hon. O. O. Madsen, M.L.A.) Presses the Switch to Put the New Gins in Operation.

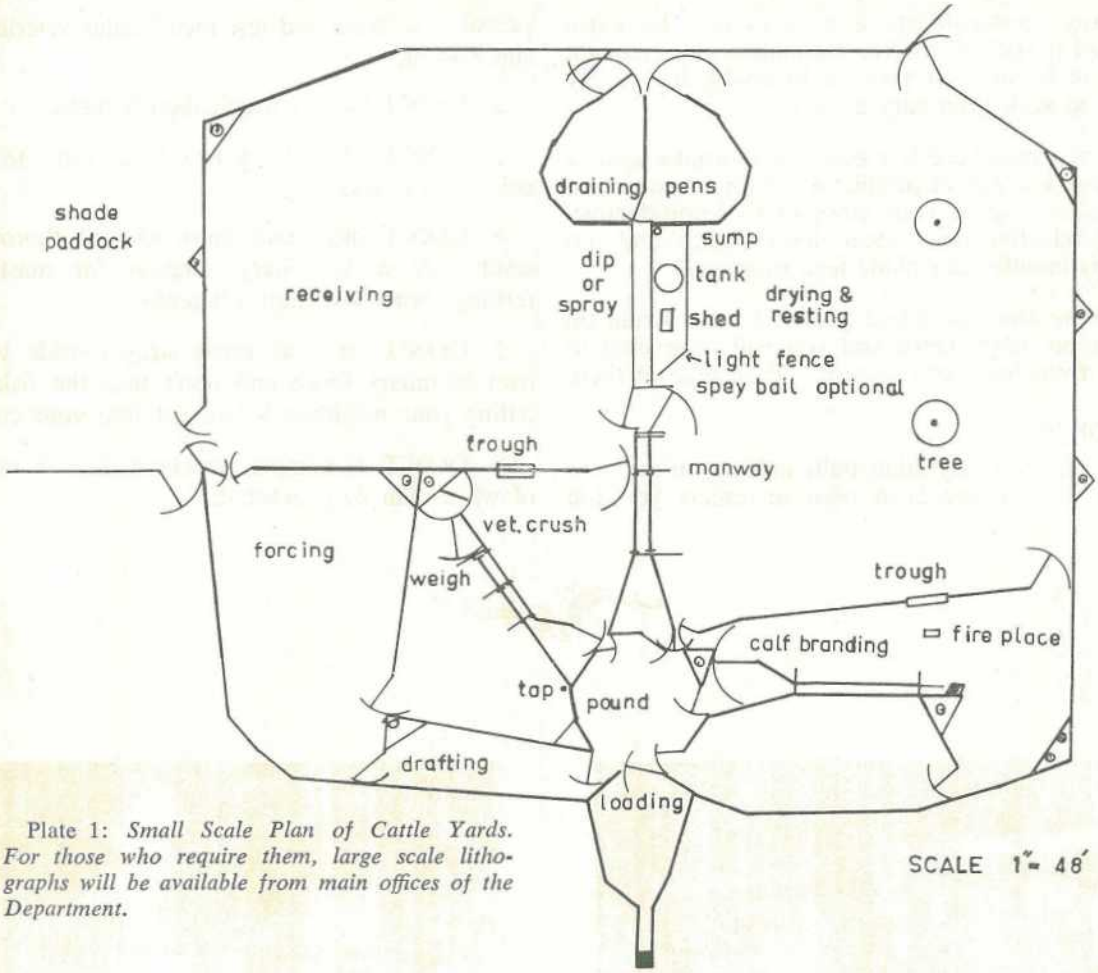


Plate 1: *Small Scale Plan of Cattle Yards. For those who require them, large scale lithographs will be available from main offices of the Department.*

Yards For Handling Beef Cattle

By Officers of Cattle Husbandry Branch

This article sets out the principles of cattle yard location, design and facilities. Included is a basic plan which can be modified to suit particular properties and types of enterprise.

Amongst cattlemen, there is a wide variety of opinion concerning the best type of yard. One reason for this divergence of opinion is that no one yard is best suited to all purposes. All agree that yards which hold stock securely and are convenient for the main operations are a necessity for the efficient working of a property.

Type of Yard to Build

The main purpose for which the yard will be used should influence the design. In ticky areas, dipping or spraying of stock will be done frequently and easy access to the dip should be a consideration. Breeding properties require good facilities for calf-branding, drafting of

weaners, speying, inoculating and dehorning. When the main enterprise consists of buying stores and fattening, then drafting, loading and holding facilities will receive top priority. In any major set of yards it is wise to make provision for a crush for work of a veterinary nature and identification of stock.

Yard size is determined by the number of stock which require handling at one time. On the majority of properties, yards to handle from 250 to 300 head will be adequate. In many cases it will not be necessary to have yards of this size. When larger numbers are being handled consideration should be given to the provision of one or two small paddocks (say 25-50 acres in size) which would serve as holding paddocks while each group of 300 head was being handled.

Available finance may have to be considered—if so, it will be necessary to concentrate on the vital facilities in the first instance.

The facilities which are required will also influence the design and shape of the yards. For example, dipping or spraying facilities are not required on all properties. Where a dip is installed, draining pens or a draining race are required. The inclusion of a draining race has a considerable effect on yard design, since a length of 100 ft. to 120 ft. is required.

The temperament of the stock will also influence the type of yards, particularly on those properties which carry only a small number of beef cattle. When stock are quiet and handled frequently, sheep yards, if available, can be modified by increasing the height of the fence surrounding two or three yards. Existing posts may also need reinforcement. On the other hand, holding yards can be made by using No. 8 wire (or two strands of No. 8 twisted together) instead of rails. A wooden cap is desirable for strength. The use of some type of wire mesh can also be considered. In all cases a properly constructed cattle crush should be built as this is essential for adequate control of individual animals.

On large properties, more than one yard will be needed. Probably the best approach is to have a main yard situated as centrally as possible, with several "outside" or subsidiary yards at convenient spots towards the perimeter of the holding. These "outside" yards should be built primarily for a specific purpose which will naturally be the main husbandry activity on the property. Thus, in tick infested areas yards may be built for the purpose of using a mobile spray plant for tick control. A breeding property would build yards for calf branding and marking while a property supplying large numbers of stores would build, not yards, but holding paddocks for groups of cattle when mustered.

Yard Location

The actual site of the yards is the next consideration.

Soil type is important. Coarse sandy soil is probably the best as it drains well, doesn't bog down and creates less dust than other types. Clay soils become waterlogged and bog easily; silty types also bog readily and are very dusty. Stony yards should be avoided because of the likelihood of injury to both stock and stockmen.

From the drainage angle, it is an advantage if the yards can be built on a gentle slope to allow surface water to run off. If the slope is too great, however, erosion becomes a problem. Slope of the ground has to be considered in the installation of a draining race in order to ensure the return of the fluid to the sump.

Stock are easier to yard up if yards are on comparatively high ground, without any obvious distractions. Cattle are naturally suspicious of secluded areas so the surroundings of the yards should be reasonably clear without being denuded of trees. Around the yards there should be no serious obstacles to the droving of stock. Thus thickets of scrub or wattles, trees with large overhanging branches, rocky ledges or outcrops and creek banks are all to be avoided. It may be necessary to fence off any small hazards which would otherwise interfere with yarding up. It is well to remember that animals prefer to work up a slope and are somewhat reluctant to move along a downward slope. The site should be above flood level and, if opportunity offers, should have protection from prevailing winds.

A supply of water is desirable at main yards. A creek or bore is the most likely source of supply and in either case the water will have to be taken to the yards by pipe line. When there are covered structures such as a calf pen, saddle shed or dip, a tank to catch the roof run-off will be useful where no other source of supply is available.

The working of a property is made easier if all yards can be reached by motor vehicle during the main cattle working season.

Water troughs should be provided in yards where cattle may be held for long periods. A water supply at the pound yard may be of use in settling dust but it is a difficult matter to eliminate dust without hard-surfacing of yards. However, frequent light waterings on dry days will reduce the discomfort caused by clouds of dust.

Good shade trees are needed in the large yards and in yards where stock are confined for long periods. All corners should preferably be rounded. By planting trees in sharp corners the tree guard serves a dual purpose. However, trees should not be located close to the draining pens or draining race owing to the blockage of return drainage by leaves.

Direction of prevailing winds should be considered in respect of the layout. A spray race should be at right angles to the wind to avoid wastage incurred when the wind blows straight through the race.

The spey bail and calf branding frame should be in such a direction that the prevailing wind carries dust from the pound yard away from these structures. This is because, normally, most dust accumulates in the forcing yard and pound yard.

Protection from bush fires is necessary each year. This can be done by having a cleared area surrounding the yards from which to "back-burn" against a fire or otherwise to burn or make a "fire-break" during a suitable time of the year.

Materials

The type of material to use in the construction of the yards will depend on availability, and cost of materials and cost of erection. The purpose for which the various yards are used should be kept in mind. When cattle are being worked at close quarters, as in a drafting yard, pound yard or crush, the fence should be absolutely secure and sufficiently strong to resist all the physical force an animal can exert. Shade, receiving and holding yards are not normally subject to the same stress since well-handled animals respect a fence when they are not rushed.

Posts will usually be wooden, of either round, split or sawn timber. The last is usually the most expensive to obtain but a little is saved in erection costs. Gate posts and corner posts are usually round, while split posts are used in the larger yards. In the case of "holding" paddocks, steel posts can be used effectively.

Rails can consist of round, split or sawn timber or galvanised piping. Plain wire of No. 8 gauge, either singly or twisted together, will be suitable under some conditions, as will wire mesh or steel mesh. Barbed wire is not favoured in the vicinity of yards. The overall cost, which includes the purchase and erection of the rails, is the important consideration. Each type of rail has its advantages. Round rails may be readily available but are comparatively slow to erect. In addition, an extra rail may be required in comparison with split rails, owing to the greater width of the split rail. In the case of split rails, extra labour may be involved in removing the splinters. Both sawn timber and galvanised piping rails are quickly erected but the purchase price is greater in many instances. The use of these materials makes for uniformity of rail spacing in the yard fence.

Specifications

Panels:—8 ft. panels from centre to centre of posts in main yards. 6 ft. panels for forcing and pound yards, crush and draining pens.

Round posts for corners and gateways:—12–14 in. in diameter, 3 ft. 6 in. in ground. Round posts used in panels: 10 in. in diameter, 3 ft. in ground.

Split posts:—10 in. x 5 in. free from heart wood, 3 ft. in ground. Split posts for shade or holding yard 7 in. x 4 in., 2 ft. 6 in. in ground. Posts for forcing and pound yards and crush 3 ft. 6 in. in ground.

Caps for forcing and pound yards and crush:—8 in. in diameter, mortised 4 in. into top of posts; remaining caps 6–7 in., mortised 3 in. into top of posts.

Split Rails:—10 in. x 3 in. free from knots; round rails 4–6 in. diameter; sawn rails 6–7 in. x 2 in. free from knots; galvanised piping 2 in.

All posts, and particularly the portion which is in the ground, should be treated with creosote or other suitable preservative.

Height of Yards

Shade and Holding Yards:—Posts 4 ft. out of ground plus cap 3 in. above post, total height 4 ft. 3 in. Spacing of wires from top of post in each case, top wire 12 in. (leaving a 9 in. clearance between underside of cap and top wire), 2nd wire 21 in., 3rd wire 30 in., 4th wire 39 in. The 4th wire is thus 9 in. from ground level.

Yards, other than forcing and pound yards and crush: posts 4 ft. 8 in. out of ground plus cap 4 in. above post, total height 5 ft. Spacing of rails (that is, the distance between rails) between cap and top rail 11–13 in., between rails 6–8 in., between bottom of lower rail and ground 11–13 in. These measurements will vary somewhat according to the width of rails. If 10 in. rails are used, two rails and a cap will suffice. When rails narrower than 10 in. are used, some adjustment will be necessary. An additional rail can be fitted or twisted No. 8 wire used. The class of cattle being handled will be the deciding factor.

Forcing and Pound Yards and Crush:—Posts 5 ft. 2 in. out of ground plus 4 in. cap, making 5 ft. 6 in. total height. When 10 in. rails are used, three rails and a cap will be ample with spacings as follow: underside of cap to top rail 12–14 in., between top and centre rails 6 in., between centre and lower rails 4 in., lower edge of bottom rail to ground level 8 in. Some variation will occur in these spacings where rails of different widths are used. As a rule, spacing between the cap and top rail may be up to 14 in., spacing of intermediate rails should be closer to avoid animals pushing their heads out between the rails, and the bottom rail should be no more than 11 in. from ground level. If young calves are handled in the pound yard, the bottom rail should be no more than 8 in. from ground level at the time of construction.

Calf Crush:—Posts 3 ft. 9 in. out of ground, 3 ft. in ground. Sawn timber rails are recommended to be fitted flush with the inside of posts. Top rail to be flush with top of posts with 3 in. spacing between rails. Four 7 in. rails are required. Distance from lower edge of bottom rail to ground is 8 in.

Fixing:—Posts to be mortised, size 6 in. x 3 in. on inside for split rails, 4 in. x 3 in. deep for round rails which are let in to fit flush with the inside of posts. When comparatively small round rails are used, it is better to reduce mortise size to 3 x 3 in. deep. Galvanised iron pipe to be fitted in flush with inside of post. Where round posts are used in panels on the inside of the crush, they are to be shaped flat on the inside and rails fitted flush with flat surface. Wooden rails to be bolted through post or wired around and/or through both rails and post.

Galvanised pipes can be held by $\frac{3}{8}$-in. hook bolts.

Sizes and Dimensions

The size of the receiving yard should allow about 25 sq. ft. of space for every adult animal, assuming that all animals will not be concentrated in one yard for any length of time. A square yard with each side measuring about 85 ft. would give the necessary room for up to 300 head of adult cattle. A circular yard with a diameter of about 95 ft. provides an area of similar size.

The forcing yard should be designed to hold about one-third of the number accommodated in the holding yard, allowing about 20 sq. ft. for each adult animal. A yard 40 ft. x 50 ft. would provide enough space.

The drafting yard should hold 20–25 head, be comparatively narrow and taper towards the entrance into the pound yard. (Note.—The terms "receiving," 'forcing" and "drafting" yards are designated in the plan in this article. These yards are sometimes referred to as "holding," "receiving" and "forcing," respectively).

Pound yard size depends on several factors and on personal likes and dislikes. When labour is scarce and cattle are quiet, many men prefer to draft into the pound, rather than out of the pound. The pound yard then becomes a centre from which even lines of stock are distributed. If the practice of drafting into the pound is adopted, a diameter of about 16 ft. will be ample.

This size is also suitable should a cattleman wish to use the system whereby one man controls all the pound yard gates by means of rods operated from an overhead platform.

However, when the pound yard is used for drafting, the diameter of the yard should be increased to about 26 ft. for efficient working. A suitable size for a square yard for such a purpose is 24 ft. x 24 ft. Inside corners of a square yard should be fenced off to ensure a smooth flow of stock around the fence.

Drafting races are an alternative to the pound yard as a means of drafting. They are of two types. One involves a straight race with gates giving access to yards on either side. Gates open into the race and thus guide the animal through the gateway. Gates can be slightly offset and lightly spring-loaded or lightly counterweighted to ensure closure. All gates can be operated by one man at the entrance of the crush by means of a light rope attached to the back of the gate and working over a single pulley.

The second type involves the use of a very small pound yard with gates giving access to several yards. Gates are operated from an overhead platform by one man. This platform should be in a location where it does not baulk incoming or outgoing cattle. In both systems the man operating the gates has a rather restricted view of the stock and requires another man calling the yard for each animal.

Crush length should provide about 5 ft. 6 in. for each adult animal and a size to hold six head will be sufficient for most purposes. When large numbers of stock are vaccinated in a crush it is an advantage for the capacity to be increased to 12 to 15 head. Stock are easier to work through a long crush than through a short one.

The width of the crush is important in order to avoid difficulties which arise when stock attempt to turn in a crush. A slight variation can be made according to the size of animals usually handled but the clear inside measurement should fall within the range of 25 in. to 28 in. A 26 in. spacing should suit most purposes. It is considered that no worthwhile advantage is obtained from having crush sides tapering outward at the top instead of being perpendicular.

Tapering of the calf crush is useful as stockmen are better able to control calves with the extra room provided by the tapered sides. However, it has one disadvantage when branding well-grown calves. On occasions, one calf may climb on his mates and try to get over the fence. It's quite possible he will fall backwards and lodge on his back in the crush. Calves are difficult to release from such a position. For this reason some consider that perpendicular sides are preferable, with an inside clearance of 16–17 in. A tapered calf crush should be 14 in. wide at the bottom and 17 in. wide at the top, both being clear inside measurements. A length of 20–24 ft. is satisfactory for a calf crush. The waiting pen, which holds the calf prior to its entry into the branding frame, is 4 ft. 9 in. in length. A length of about 6 ft. should be allowed for the branding frame with ample room at the sides for the operation of the frame.

Gates:—The main entrance and exit gateways should have openings of 12 ft. and be fitted with either one single 12 ft. gate or a set of double gates. Double gates place less strain on gate posts. For the opening between the receiving yard and the forcing yard and also the exit from the draining pen, single, 10 ft. gates can be used. Otherwise gateways of 8 ft. are suitable with the exception of those out of the pound which should be 5 ft. 6 in. for adult animals and 4 ft. 6 in. to 5 ft. for calves and weaners.

Slide gates are fitted in the crush behind the spey bail, at the entrance to the dip or spray race and at the beginning of the crush. The calf crush should also be fitted with two slide gates—one at each end of the crush. Slide gates should be of sufficient width to allow the vertical frame to fit between the round posts at both sides when the gates are shut.

Timber for gates should be 6 in. x 1¼ in., sound and free from knots. Bolts should be used in assembling gates.

Operation of Yards

Exit gates fitted to the pound yard should all open in one direction to take advantage of the tendency of stock to move along the fence. There is no general agreement regarding the opening of the gates of the pound yard. Those who advocate that gates open outwards claim that stock work better as they will walk through from either the left or right hand side and the stockmen can use the gate as protection from charging stock. Further, it is claimed that stock moving around the edge of an inward swinging gate are likely to partly close the gate on themselves.

Inward swinging of gates is usual when all gates are controlled by one operator from a platform. The claim is made that stock are easier to block when a gate swings shut against them as they tend to close the gate themselves when attempting to push through. When labour is in short supply and stock are quiet it would appear that inward-swinging gates are an advantage.

Cross Caps:—Cross caps are very useful in preventing the sagging of the sides of the main crush. Caps holding gate posts have a similar function. On the other hand, some cattlemen consider that they are an obstruction.

The nature of the ground surrounding the posts is a consideration. If there is much clay the posts will be subject to pressure and difficulty will be found in keeping them plumb. Caps are of assistance under these circumstances. When used above gateways, a minimum clearance of 6 ft. 6 in. from ground level should be provided around yards where men are moving on foot.

It is usually impracticable to provide gate caps sufficiently high to admit a man seated erect on a horse in the case of gates at the entrance to holding yards. The alternative is to either dispense with caps for outside gates or expect horsemen to be always alert in avoiding injury.

Manways:—These are narrow openings which permit stockmen to move readily from yard to yard or from one side of the crush to the other. A width of 10 in. is ample for the purpose. Manways add considerably to the convenience of working, especially around the crush weighbridge and bail. An objection which is raised is that calves can either get through or become caught in the openings. This occasionally happens and if trouble is being experienced in this way there are several means of overcoming it. One is to nail pieces of 3 in. x 2 in. on the inside of both posts to a height of 2 ft. 6 in. above ground level. This reduces the size of the opening to 6 in. which will stop calves but still allow a man's legs to go through. Another alternative is to fit a "gate" or a "flap" on the manway. This "gate" should open against the side from which the calves attempt to get through or it can be fitted with springs on each side which keep it centred. This acts as a bluff and calves make no attempt to push it open.

Manways should be provided behind the slide gate at the rear of the spey bail, at the entrance to the dip and also at the commencement of the crush. When pound yard gates open outwards, manways between the outside of pound yard fence and fences radiating from it permit quick movement from gate to gate if required.

Optional Structures

Saddle and Equipment Shed:—This may not be required on all properties but at many yards there is usually some equipment requiring protection from the weather.

Roof over Calf Branding Frame:—Opinion is divided on this point. If built, care should be taken to ensure that the posts do not become an obstruction and also that the roof is sufficiently high to permit entry of sunlight to the whole of the covered area.

Loading Yard and Ramp:—There is a trend towards increased use of motor transport of cattle. A loading yard which includes a ramp is likely to be required in most main yards. Some men prefer to build the loading ramp at right angles to the loading yard. It is claimed that cattle load up better with this arrangement. The end of the loading ramp should be fitted with a hinged "tail board" which can be used to overcome any difference in height between the ramp and the floor of the motor vehicle. The ramp should be extended on one side to serve as a platform along which attendants can walk on a level with animals.

Provision should be made for a weighing machine. The stationary type machine should be fitted into a crush but used only for weighing and veterinary work and not as part of a crush giving access to other facilities. The fittings of the crush used for veterinary work should be similar to those for a spey bail. The crush floor should be of concrete and a concrete apron extended outwards for 3 ft. on each side. The provision of a high overhanging roof is desirable. Where a mobile weighing machine is to be used a suitable approach crush in an accessible position is required. Stationary-type scales should be protected by a high, overhanging roof.

Stud properties may need facilities for work with artificial insemination. Insemination of cows can be done when the animals are restrained in the spey bail or crush, provided that a manway or gates are fitted immediately at the rear of the restraining structure. Similar facilities are needed for the work of pregnancy diagnosis.

When collections are being made from a bull for A.I. purposes it is considered desirable to have separate yards which are used solely for the purpose.

Some properties require a killing pen, which should comprise a small yard with a concrete

floor fitted with suitable arrangements for disposing of blood, waste offal and ingesta. A supply of good water is required.

A D-shaped yard for catching young horses is used on some properties. It consists of one panel of about 12 ft. built preferably at right angles to the narrow end of the forcing yard and with access from it. The curved section of the D consists of a series of short panels. A gate is fitted in such a way that it swings from an "open" position which allows a horse into the yard and then operates inside the curve of the D to eventually form a crush with the straight 12 ft. panel. The gate head should be set about 3 ft. clear from the straight panel. The D yard should be fitted with smooth rails. Fence height should discourage a horse from jumping. A height of 7 ft. should be ample for the purpose.

A Basic Plan for Yards

A basic plan in Plate 1 has been prepared by Messrs. J. J. Sullivan and S. F. Lord, of the Cattle Husbandry Branch. Alterations to the plan can be made to suit individuals. For example, the plan allows for stock to be worked anti-clockwise—this could be reversed if desired. If the shade yard is attached, it can have gates into it from the receiving yard, drying and resting yard and the draining pens.

A separate spey bail and crush is shown, but this could well be incorporated in the dipping crush.

The relative positions of the gates into the receiving yard and the forcing yard should be noted. Cattle move freely toward the exit gate of the receiving yard and in so doing will pass readily into the forcing yard when required.

This plan differs in some details from the specifications quoted earlier. It is a good illustration of a basic plan which is readily adaptable to particular circumstances.

Further Details

The following available publications give details of the listed aspects:

Advisory Leaflets—

No. 33, "Cattle Drafting Yards"—Details of methods of fastening rails, fitting gate caps and the swinging of gates.

No. 66—"Good Yards for Cattle Drafting."

No. 59—"A Crush Bail."

No. 55—"A Calf Branding Crush and Cradle."

No. 62—"Safety Catches for Forcing Yard Gates."

No. 94—"A Double Acting Sword Bail."

No. 134—"Crush and Walk Through Bail Unit."

No. 161—"A Cattle Crush Slide Bail."

Merit Register For Dairy Cows

THE FOLLOWING COWS QUALIFIED FOR ENTRY INTO THE MERIT REGISTER DURING MARCH, 1960

Breed	Name of Cow	Name and Address of Owner	No. of Lactations	Total Production		
				Milk lb.	Average Test %	Butterfat lb.
	INTERMEDIATE MERIT REGISTER (3 successive lactations)					
A.I.S.	Valera Roseleaf 48th	Sullivan Bros., Pittsworth ..	3	25,265	4·4	1,118
Ayr.	Inverell Marlene	B. Goddard, Mount Tyson ..	3	25,618	4·3	1,102
G	San Jonda Carol	M.H.R. Raabe, Brigooda ..	3	30,861	4·2	1,304
J	Carnation Countess Crystal ..	W. Spresser and Son, Rosewood	3	27,067	4·8	1,288
J	Trecarne Seashell 2nd ..	D. Wadley, Indooroopilly ..	3	20,799	5·6	1,164
J	Keystone Laura 4th	Q.A.H.S. and College, Lawes	3	28,831	5·0	1,452
J	Nindethana Golden Gift ..	D. Wadley, Indooroopilly ..	3	23,370	4·9	1,140
	LIFETIME MERIT REGISTER (Minimum 2,240 lb. butterfat)					
A.I.S.	Chelmer Honeysuckle ..	A. R. Hayes, Tarampa ..	6	54,084	4·1	2,243
Ayr.	Ainslie Rena	E. Mathie and Son, Maleny ..	8	58,984	4·0	2,343
J	Elsecar Graceful Beulah ..	T. Nock, Dallarnil	7	50,323	4·6	2,330

Heliothis Control In Linseed

By T. PASSLOW, Entomologist,
and A. W. S. MAY, Senior Entomologist.

In some seasons in Queensland, severe damage is caused to linseed crops by the Heliothis moth, which can be controlled most effectively by boom spraying with DDT, as described:

Heliothis, which attack many cultivated crops, are primarily pests during seed production. The caterpillars, or grubs, cause damage in linseed by tunnelling into the capsules and feeding on the developing seed. When seasons are early, and also in late-planted crops, terminal damage is not uncommon before flowering.

When present in large numbers Heliothis may cause almost complete loss of the crop.

Life History and Habits

The moths are stout-bodied insects with an average wing expanse of 1½ in. The forewings are coloured in shades of grey brown or pink and the hindwings in grey to grey brown with a large marginal smoky area. When disturbed, the moths have the peculiar habit of flying low and rapidly over the crop and alighting again within 50 yards.

Each female is capable of producing large numbers of eggs, which are deposited singly on the growing points and flowers.

Caterpillars hatch out after three to four days.

Heliothis larvae crawl about the plants feeding on the buds, flowers and developing seed, although small larvae sometimes feed for days entirely within a boll. When fully grown, after 18 to 22 days, they measure up to 2 in. and are green to brown with varying degrees of black pigmentation. Grubs of different sizes may be found in a linseed crop but all belong to the one generation, being the progeny of the moths which emerge from the overwintering pupae. This emergence commences with the warm weather of early spring and may continue for 3 or 4 weeks.

Control

Boom spraying, applying not less than 15 gall. of spray to the acre, is the most effective method of Heliothis control in linseed.

For best results, DDT, in emulsion form, should be used at the rate of 1 lb. of active insecticide to the acre, irrespective of the volume of spray applied. If spraying is carried out soon after moths are active in the crop, and if most of the larvae are no more than ½ in. long, ½ lb. of active insecticide to the acre is sufficient for commercial control.

In recent years aerial spraying has been used extensively on linseed; experience has shown that this method of application is at its best when Heliothis is not present in large numbers.

Heliothis is not present in pest numbers in linseed every season, the population being dependent to a large extent on the weather, and on food supply during the previous autumn. The practice of routine spraying is therefore an unnecessary expense in seasons of low Heliothis population.

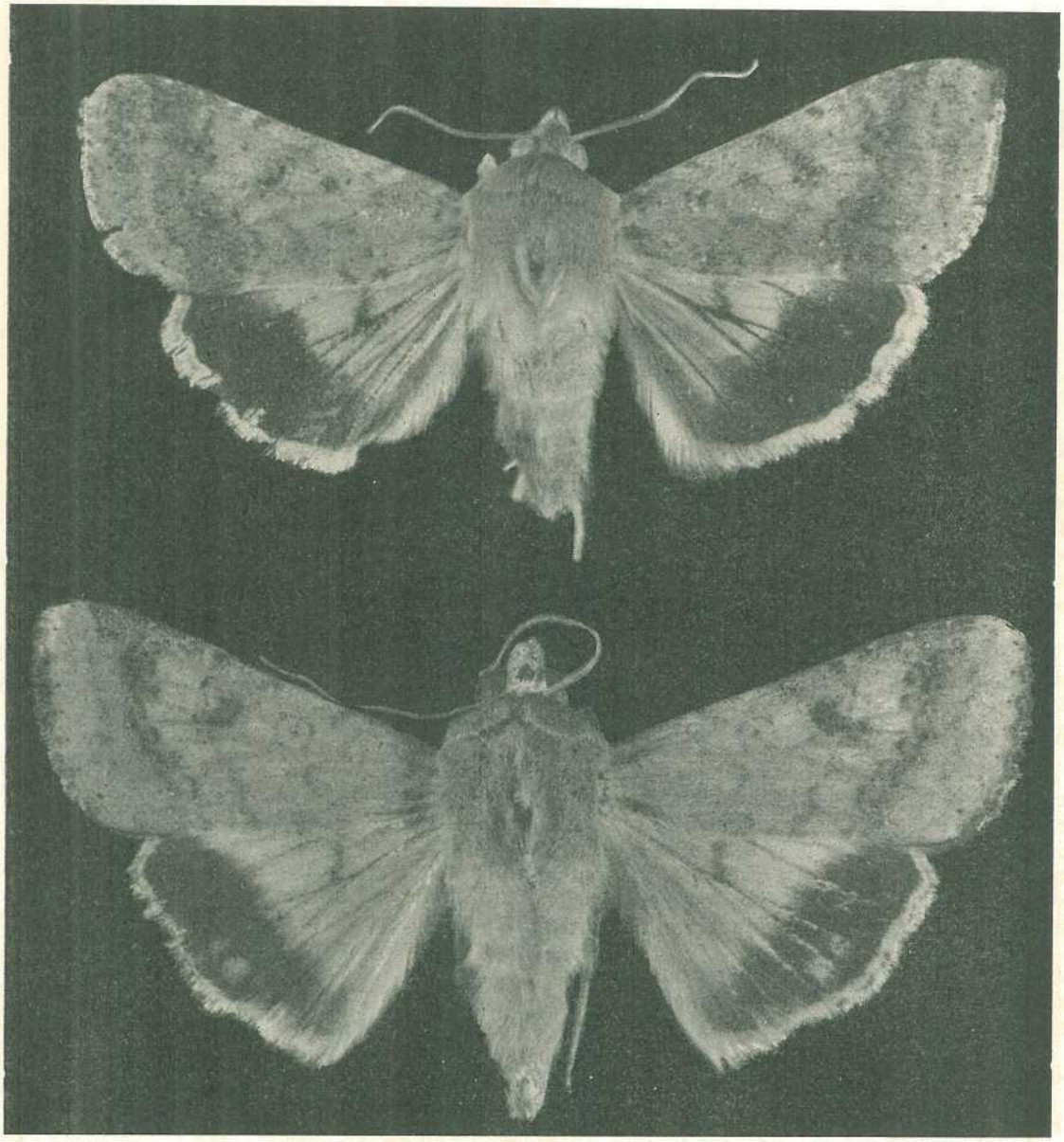


Plate 1

Heliothis Moths: *Heliothis punctigera* **Wallengr. at top, and** *Heliothis armigera* **(Hübn.).**
(These moths are 3½ times natural size.)

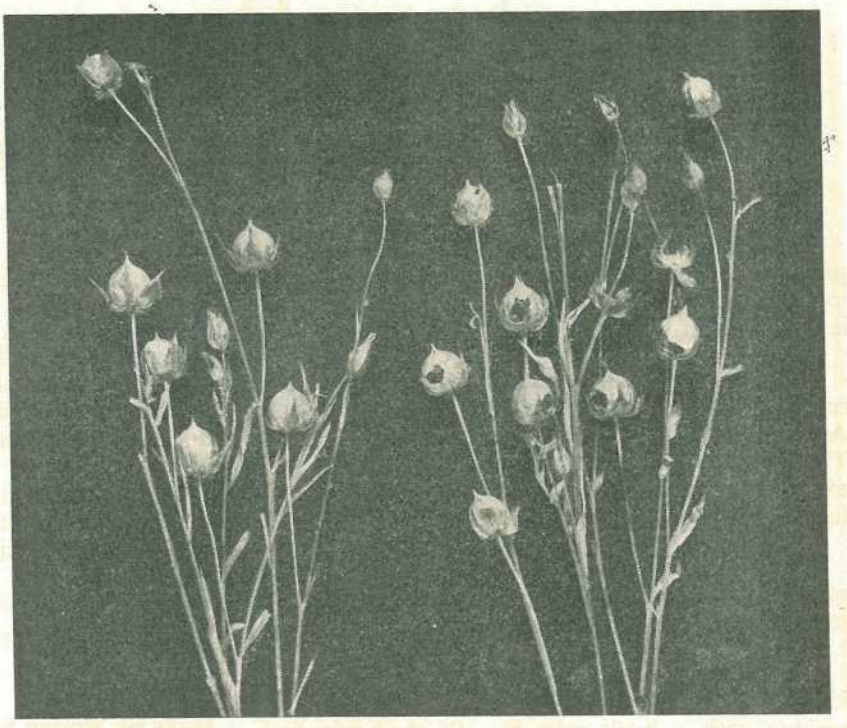


Plate 2

Linseed Bolls, Undamaged (left), and Damaged by Heliothis.

Careful crop inspections for the presence of moths, particularly during flowering, will indicate whether spraying will be necessary. If large numbers are present severe damage can be expected.

Prompt action minimises crop damage and also allows the use of the less costly dosage rate. More than one spraying is seldom required in southern districts. In Central Queensland, however, repeat treatments are usually necessary to control reinfestations.

Early planting lessens the risk of Heliothis damage as moths usually do not deposit eggs before mid-September in southern districts, and August in Central Queensland. In normal seasons such crops do not produce flowers before these times, and therefore are not attractive to the moths. Early sowing, however, does not guarantee escape from Heliothis attack and the usual crop inspections should be carried out. Furthermore, in some districts frost hazard must be given due consideration.

Spray For Bullrushes

"T.B." of Dalby, has inquired how to eradicate bullrushes growing in a dam on his property.

Answer:—Bullrushes may be eradicated by using dalapon at the rate of 10 lb. to the acre. Dissolve the dalapon in not less than 50 gall. of water and spray the rushes, making sure to wet them thoroughly. The best time to apply the spray is when the rushes have a maximum of leaf growth and a minimum of flowering stalks. It will probably be found that two applications, one in one season and another in the following season, will be required to eradicate the rushes.

Pasture and Crop

Quick Silage Making.—Often the farmer planning a fodder conservation programme wants to know which method of ensiling green material is the quickest.

An answer to this question is available as a result of an inquiry carried out by the National Agricultural Advisory Service of Great Britain. The silage-making programme of 31 farmers was examined and of these, 24 farmers were using forage harvesters of the flail type.

These are the findings—and they are well worth thinking about—but remember they apply strictly to English conditions!

In 1948, before the general appearance of forage harvesters, the average time for silage making with a buck rake was 95 man-minutes per ton. With green crop loaders (which we seldom see in Queensland) it was 155 man-minutes. Forage harvesters were giving a figure of 72 man-minutes a ton in 1955, and three years later in 1958, this figure was halved to give 36 man-minutes per ton.

The survey also suggested that where annual tonnages are below 200 the operating cost per ton may be higher with forage harvesters than with buckrakes. But these calculations do not take into account the speed and ease of getting the job done and the effects on the quality of the silage.

Remember again, this was a survey of English silage-making experience. Keep in mind too that our principal silage crops are taller and tougher than theirs.

—V. J. WAGNER, Chief Agronomist.

Organise Groups to Tackle Erosion.—Farmers can share the benefits of watershed control by getting together and presenting a united front to the common enemy—uncontrolled runoff water. Everyone lives in a watershed, and if all in each watershed work together, they will keep runoff water under control.

Formation of soil conservation groups opens the way for discussion of problems common to everyone in a watershed. After all, no one knows better than the farmer what his problems are and what are acceptable solutions. If you have a soil erosion problem, you can be sure you're not alone. Your neighbours in the same watershed are bound to have a similar problem. If you feel you'd like to form a watershed group, consult your local soil conservation officer.

—J. E. LADEWIG, Chief Soil Conservationist.

Hints on Storing Seed or Grain.—When storing seed or grain, whether in bulk or bagged lots, moisture content must be kept below 14 per cent. High moisture content causes heating and quickly leads to the development of mould, and final destruction of the seed or grain.

Special hygrometers are available for determination of seed or grain moisture content.

Insects, particularly the weevil, must be kept under control for successful storage. Insects multiply quickly in most untreated seed or grain, particularly if the moisture content is high; causing further heating and mechanical destruction.

To guard against insects, seed for planting should be treated with a dust such as BHC or DDT and for grain a fumigant such as carbon bisulphide may be used.

Small quantities of seeds, such as vegetable seeds, are best stored in a household refrigerator where they will keep for years.

So remember, for successful storage make sure of—

A low initial moisture content

Treatment to prevent insect attack

A cool dry situation, where air may circulate freely.

—J. B. LINNETT, Inspector, Standards Branch.

Are Your Contour Banks Big Enough?—Have you ever had the experience of seeing contour banks fail? First one bank breaks, then the one below it. Then the one below that—and you end up with a wash from the top of the cultivation to the bottom, and precious topsoil out on the road.

These failures can occur with an uncommonly heavy storm even on perfectly good banks. But, when all of your neighbours' banks are solid and yours break, you can't just blame the heavy rain.

Contour banks will not work properly if they aren't big enough. Build them to the specified size. Make them bigger if you like. Many of our leading growers consider the cost of building bigger-than-average contour banks is well worth while.

Remember too that your banks will gradually lose height over the years. Watch for this, particularly if you use a chisel plough.

To maintain size you can have the banks topped up every few years with a grader. You can even do the job yourself with a disc plough. Or you can use a disc plough on the banks every year, using your chisel plough in the space between the banks.

If you do all your ploughing with a disc or mould-board plough special topping up should not be necessary. But you **must** plough so as to leave a finish out furrow in the channel of the contour bank. Do this every second year and your banks will stay big.

Your banks can be big enough for 99 per cent. of their length yet have a few weak points which will cause trouble. Watch for low spots where the bank crosses old gully lines. Build the bank up extra high at such points.

—J. ROSSER, Soil Conservationist.

Cowpeas Next Best to Lucerne.—If you can't grow lucerne on your farm, you should consider cowpeas. Cowpeas have almost the same stock food value as lucerne and will grow on a wide range of soils.

Cowpeas can be used for grazing, hay or silage, and are also a valuable green manure crop. Cowpeas do best under warm, moist conditions, but once established the crop has a marked capacity to survive dry spells. It can be grown in all coastal districts and also in inland areas.

Popular cowpea varieties are Poona, Reeves, Cristaudo and Giant. In the past, the Poona variety has been preferred, but recently it has lost some of its popularity due to its susceptibility to stem rot disease. On soils with a history of stem rot disease, use the newer varieties Malabar, Havana, Santiago and Blackeye as these become available.

—V. J. WAGNER, Chief Agronomist.

Plough Early for Irrigated Pasture.—Success in establishing irrigated pasture depends first of all on early and thorough land preparation. Heavy planting rates will seldom compensate for skimpy land preparation, as germination is usually poor in a rough and uneven seedbed.

Many failures with irrigated pastures have been traced to hasty preparation of the seedbed.

Although irrigation promotes early pasture growth, it helps the weeds to thrive also. Weed competition can be especially troublesome before the pasture has made effective ground cover. Unless weeds are controlled by mowings, pasture growth will be retarded. Close mowing, however, will also check pasture growth. Weed competition can be effectively reduced by early land preparation which allows the weeds to be destroyed as they germinate.

Summer weeds can be suppressed by planting a fodder crop in the late spring of the season before it is intended to plant the pasture. The fodder crop should be grazed and turned under in time to allow the crop residue to decompose completely before the pasture is planted in April or May.

A fine textured, firm, fertile and weed-free seedbed is necessary for the successful establishment of small-seeded pasture grasses and legumes. A firm seedbed reduces the danger of planting too deeply. It also holds the moisture near the surface, giving an even germination.

Rough, spongy or trashy seedbeds can result in poor germination and unsatisfactory early growth. Weeds use up soil moisture and soil nitrogen, and should be controlled by regular cultivation. A fertile soil, well supplied with moisture promotes rapid growth of the young pasture.

If the soil is dry, an irrigation shortly before planting is worthwhile. This replenishes the soil moisture, firms the soil and germinates the weed seeds. A harrowing just before planting will destroy the weed seedlings.

—A. NAGLE, Irrigationist.

Pest Destroyers.—There are now over a thousand pest destroyers available in Queensland and farmers should make a careful selection when planning their pest control programme.

Many of the preparations have only one active constituent but in practice are effective against a large number of pests or diseases.

Other preparations contain two or more active constituents. When using these the grower should satisfy himself that each active constituent is necessary. For instance, when using a dusting mixture containing copper and DDT the copper is there to control fungus diseases and the DDT to control insects. If there are no insects present to be controlled there is no purpose in including DDT in the mixture.

Don't use preparations with unnecessary ingredients as costs are increased and no extra benefit is gained.

—N. IRWIN, Standards Branch.

Wheat Yield Trial.—Wheat yields from the dark-grey and black cultivated clay soils of the southern Darling Downs are not improved by fertilizing with superphosphate.

In fact, average results from five years' trials by the Agriculture Department showed that yields were actually reduced slightly. The trials were at the Hermitage Regional Experiment Station on a gently sloping paddock which had been under cultivation for the previous 30 years.

Eighteen experimental plots were established, superphosphate at the rate of 2 cwt. to the acre being applied to one half of each plot, the other half remaining unfertilized. During the plough-under of the stubble in early summer, depths of 4 in., 6 in. and 8 in. respectively were used. As the fertilizer was applied in the plough furrows, its placement was also at the three depths.

Average yields over the five-year period showed that plots which had received applications of superphosphate were outyielded, to a small but statistically significant extent, by those receiving no fertilizer. In two years this did not apply. In the first year, when heavy and excessive rain caused severe lodging, particularly in the fertilized and deeper ploughed plots, no differences in yields existed.

In 1957, which was the driest year on record for the district, plots treated with super significantly outyielded the "unsupered" ones. The average yield over the five-year period for the fertilized plots was 29 bus. to the acre while the untreated plots yielded 30¼ bus. to the acre.

Results from the different depths of ploughing were inconclusive. However, it was established that on these soils and slopes, in dry seasons, better yields can be expected from ploughing deeply, but that this benefit does not obtain in years of good rainfall.

Growth responses to depth of ploughing were observed during the first three years. In the first three years the deeper ploughed treatments generally made a bulkier growth than the shallower ploughed plots. Tiller production tended to be more numerous in the deeper-ploughed treatments. The two latter years of the trial were very dry years and no differences in growth of the crop were evident.

Very little growth response to the application of super was noticed, although in 1954, growth was generally more bulky in the fertilized plots, while in 1956, maturity was advanced by 2 to 3 days by the application of phosphate.

The results indicate that an increase in wheat yields cannot be expected by applying superphosphate to the heavier soils of the hillside areas. There are, however, many favourable yield responses to super reported from this district. But all of these occurred, as far as is known, on other than the shallow dark-grey to black clay soils. If the use of superphosphate is considered, some exploratory work should first be carried out by the farmer. He could quite easily add some super to the fertilizer box on a few odd runs during planting operations and judge for himself whether he gets any worthwhile response.

There were no significant changes in protein content of wheat due to depth of ploughing or to the addition of 2 cwt. to the acre of superphosphate.

Castor Bean in More Trial Plantings

By G. H. ALLEN,
Senior Agronomist, and
W. A. R. COWDRY,
Senior Experimentalist.

With industrial advancement there is usually change in demand for raw materials, and consequently the potentialities of likely new agricultural products are under constant review.

Oil obtained from castor bean (*Ricinis communis*) is one such product and although the main producing countries are Brazil, India, U.S.S.R. and the U.S.A. it is possible that eventually commercial production could be undertaken in Queensland.

The demand for castor oil has been increasing over the past 15 years and although its main use is for lubrication of jet engines, it is being utilized in the manufacture of plastic coatings for electrical equipment, special low temperature lubricants and in paints, varnishes and textiles.

Seed of the castor bean is poisonous and the residue left after oil extraction is not suitable for stock fodder.

There are several varieties of castor beans that are growing wild in Queensland. The most common one is that which is found growing quite vigorously along the banks of streams. This is of the same species as those discussed, but because of its habit of growth and indeterminate seed setting, it is not suitable for development as a crop.

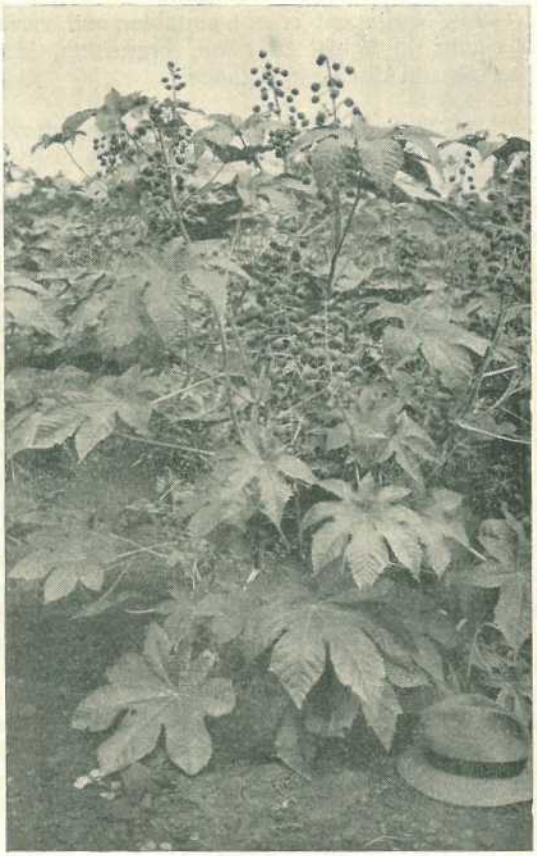


Plate 1
A Typical Plant of French Castor Bean 10 Weeks After Planting.

Other plants, known locally as "wild castor bean" and "devil's apple," belonging to quite a different genus, are often confused with the commercial strains. They are more poisonous and cannot be compared in any way with the genuine species.

Problems of Production

Commercial production has not been undertaken in Queensland and results from a number of experimental plantings have indicated that although the crop can be readily grown, yields of seed have been extremely variable and unreliable.

The crop requires a frost-free period of 150 to 200 days and in the more tropical regions where these conditions occur, diseases are likely

to cause considerable damage. Conventional harvesting equipment is not suitable, and variation occurs in height of plant, branching, seed shattering and disease resistance.

Several varieties of castor bean were grown some years ago by the New South Wales Department of Agriculture, but none proved suitable for mechanical harvesting. (*N.S.W. Agric. Gazette,* 67: 1 and 3.)

Preliminary trials in Queensland indicated that the available varieties and equipment for harvesting were unsuitable for commercial castor bean production.

However, the Commonwealth Department of Primary Industry has assisted in obtaining new varieties from America so that further studies on this crop can be initiated.

Work in the U.S.A. since 1947 has resulted in the production of improved varieties which combine disease and drought resistance with a growth form suitable for machine harvesting. The industry is still in the establishment period but one of the larger areas (7,000 acres) in Texas gave an average yield of almost 2,000 lb. to the acre, while in California average production of 2,600 lb. to the acre has been obtained. Prices to the American grower appear to be about £60 a ton for the hulled seed.

Tests on a small scale were commenced by the Department of Agriculture and Stock in Queensland in 1949. Eight varieties were grown on the Regional Experiment Stations at Biloela and Ayr and a variety known as Ricin d'Anjou, obtained from France, was grown at Biloela in 1951 and 1952.

Yields were not outstanding, but over 1,000 lb. to the acre of hulled kernels were obtained at each of the Stations in two of the four seasons in which the crop was grown. The oil content varied from 38 to 41 per cent.

Because of the habit of growth of the castor bean plant, difficulty was foreseen in the harvesting of the crop by mechanical means. Detailed observations of the plants themselves were therefore taken, so as to assess the relative value of the varieties for mechanical harvesting. Such factors as leafiness, branching, height, size of stalk, placement of the flowering spikes, rate of maturity both as a plant for final yield as well as in the individual seed head, were each taken into consideration, while the capsule shattering and kernel hardness after maturity were also examined.

Considerable variation was found in each of these plant characters. Heights varied from 36 to 70 in. and the size of stalk varied also. The colour of the stem, leaves and seed capsules varied from green through bronze to orange, while leafiness varied according to the vigour of the variety. The rate of maturity also differed and was closely connected with the relative size of the plant. This was also reflected by the size of the stalk and it was shown that the shorter varieties with thinner stems tended to branch earlier and to set their seed more quickly. Moreover, the setting of the seed was spread over a shorter period of time and, as would follow, a smaller distance up the plant than in the case of the taller, more vigorous varieties. This is of greater importance when considering their value for mechanical harvesting and would outweigh other quite important factors.

Effect of Plant Spacing

Varieties Q2893 (South African thornless) and Q2804 (from California) matured more evenly and seeded in a short period at both stations. It was therefore presumed that closer spacing, with an attendant close watch on moisture supply both during the growth of the crop and in the critical stage when approaching maturity, might give the best returns for acre.

At Ayr a test was carried out using Q2804 and an increase in yield was obtained by spacing the rows 24 in. apart instead of the usual 42 in., but closer spacings at Biloela did not give increased yields.

Q2893 possessed the added advantage of having practically spineless seed capsules, but they were small and rather tight-fitting around the seed.

A small area was headed mechanically. The result was not encouraging as the capsules were not threshed properly at the reduced speed necessary to avoid cracking. Later work on other crops, however, shows that this may be overcome by better timing of the harvest in relation to the maturity of the plant.

The French variety Ricin d'Anjou proved to be of suitable height and fruiting habit for straight heading, the leaves shedding as the pods became mature. However, the soft capsule and kernel caused unsatisfactory harvesting. Of the seed harvested, it was found that approximately 50 per cent. germinated if undamaged, but that even slightly damaged seed was not of much use for planting purposes. The oil content was not impaired greatly by seed damage during harvest. The seed capsules of this variety do not shatter readily and while this is a decided advantage if harvesting has to be delayed for any reason, it makes threshing difficult and was the cause of the poor sample of seed obtained.

Present Trials

Seven newer varieties of castor beans from the U.S.A. are under trial at the Biloela and Millaroo Regional Experiment Stations and two other varieties obtained from the Agriculture Department of the University of Queensland will also be grown.

Dr. P. J. Skerman of the Queensland University carried out trials with a number of these American varieties at Redland Bay during 1959 and obtained hand-harvested yields varying from 196 to 2,256 lb. to the acre. Three of the dwarf types which grow to a height of 3 to 4 ft. were reported upon favourably for mechanical harvesting.

Harvesting Problems

It is unlikely that commercial production of castor bean could be undertaken successfully here until suitable varieties are available and special machinery has been developed.

Some special harvesters have been built in America but cost about £2,500. Harvesting is done by beaters which knock the matured capsules and seed onto trays from which they are elevated to a hulling and cleaning mechanism. The crop is not harvested until the bulk of foliage is removed by frost or by chemical defoliants.

Information received from the Department of Primary Industry also states that special equipment is being developed in America to adapt conventional harvesters for castor bean crops.

Farmers' Questions

Storing Seed Potatoes.—A recent inquiry seeks information about storage methods for holding seed potatoes.

Answer:—Seed potatoes have been successfully held in cold storage for lengthy periods. It is essential to maintain a constant temperature of 45 deg. and to spread the tubers out on storage racks which permit good ventilation.

As a general rule Queensland potato growers select their seed potatoes for summer or autumn plantings from the spring crop lifted during the October-November period.

Should any of the tubers being stored show any signs of disease or be suspected of being diseased, separate these from the whole and forward a sample to the Department of Agriculture and Stock for investigation and report.

Elephant Grass.—Several inquiries have been received seeking information on elephant grass.

Answer:—Elephant grass is a highly productive plant producing a large bulk of feed. It is a good grass for dairy production in frost-free areas of coastal Queensland. The most satisfactory way to use it, is as "chop-chop", though, with careful management it can be successfully grazed. The protein content of young elephant grass is about equivalent to that of mature lucerne, about 20 per cent.

The use of farmyard or nitrogen fertilizers together with irrigation usually improves the yield of this grass which, in various parts of the world, ranges from 10 tons to 40 tons per acre per annum. High yields have been recorded in Queensland.

It is planted in rows 4 to 8 ft. apart with 2 ft. between the plants in the rows.

Good management will allow elephant grass to ratoon well and of course this will improve its production.

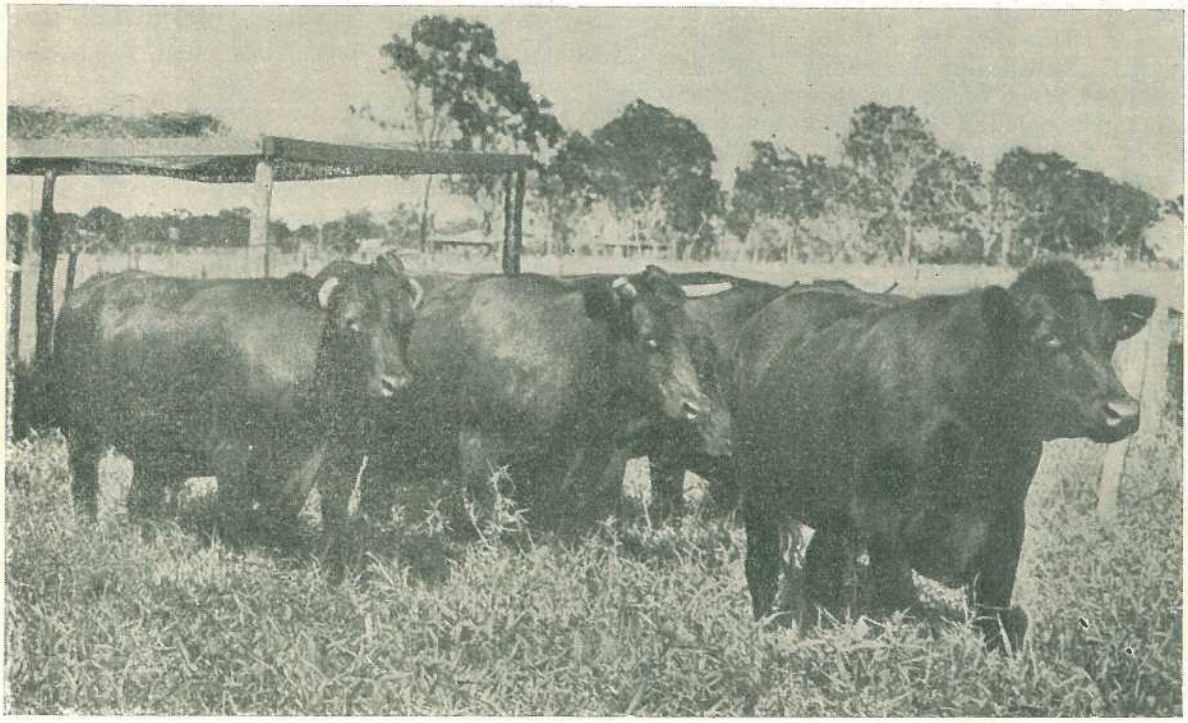


Plate 1: Fattening on Irrigated Pasture at Ayr Regional Experiment Station.

Helping To Find The Answers For Dairyman And Grazier

Almost every day, science helps in some way to make less arduous and more rewarding the job of carrying on the vital food-producing industries in the tropical and sub-tropical areas of Queensland. At the hub of scientific activity in the twin worlds of dairying and cattle raising is a small band of men working in the Cattle Husbandry Branch of the Queensland Department of Agriculture and Stock.

This Branch of the Department, in the brief 12 years of its life, has already helped to bring about some unique and worthwhile advances in our dairy and beef cattle industries.

It would be hard to measure just how much these contributions mean in money saved or earned. They are recognisably valuable, however, and have done much to alter favourably the thinking and planning of many thousands engaged in the two industries—worth in conjunction a cool £88 million.*

Starting from scratch, the Branch has so far—

- Developed artificial insemination for dairy cattle in this State.
- Found facts on the feeding of dairy stock.
- Defined a growth rate pattern for beef cattle.

* The 1958 figure.

- Found at least part of the answer to the economically important question of how to turn off a young beast for slaughter.
- Performed a lot of other useful services in both dairy and beef cattle spheres.

Little Work Before 1948

Before the setting up of the Cattle Husbandry Branch in 1948, very little research work had been done in Australia in dairy and beef cattle husbandry. Few facts on the growth rate of beef cattle or the production of dairy cows had been recorded. Knowledge of cattle husbandry was confined to temperate countries; only South Africa could contribute some information on adapting cattle to hot climates and on phosphate deficiency.

Departmental officers collected what they could from these sources; then set to work to find out for themselves what the conditions were here in Queensland.

Only after the Branch had planned this approach to the husbandry problems besetting Queensland's 20,000 dairymen and 6,000 graziers did these essential members of the State's primary producing community receive any real assistance in husbandry matters.

And today the wide and vital help available to them is restricted only by limitations of staff and funds.

At present, officers of the Branch are stationed at 18 centres in the State and there is a demand for men at more centres.

In its pioneering efforts, the Branch set out to—

- Get to know the producer's problems and win his confidence.
- Apply overseas findings to our conditions where advisable.
- Discover the basic patterns of production in herds.
- Recruit and train staff.

Work With Dairy Cattle

One of the first problems to be tackled by the Branch was that of infertility in dairy cattle. Few facts were available. Little or no information could be found on the exact nature and causes of infertility; whether cows and bulls or cows only were involved; the interval between calvings; the number of services required for each conception, and the influence of the plane of nutrition on the onset of oestrus, or heat period.

But when work started in 1952, about 100 co-operating farmers in all the main dairying districts began keeping full breeding records of their herds—and the number has now grown to 160.

Research workers looked into the large volume of information collected and drew up reports of "normal reproductive behaviour" of the herds of a district. Eleven such reports have been issued, plus two on a State basis.

From this work, the extension worker is able to advise producers when they should seek further advice on the breeding performance of their herds and also give advice appropriate to the particular district and the individual herd.

For instance, it has been found that 85 per cent. of cows come in calf within three services, so if a cow doesn't conceive in that period veterinary advice should be sought. Another interesting discovery is that on the coast the problem of a cow going five months without a heat period is believed to be due to its low plane of nutrition.

Present work on fertility takes in the study of those herds that have been able to use artificial insemination. The effect of A.I. in controlling infertility will be readily seen in such herds.

Artificial Insemination

Artificial insemination of dairy cattle in Queensland has been carried out in particular districts since 1955, and up to November last, over 16,000 dairy cows have been mated. It was used first as a means of progeny testing of bulls, in order that a number of bulls could be proved for production before being used to inseminate dairy cows in Queensland herds.

The first scheme began in the Nambour area, where about 50 herds are included. The co-operating farmers undertook to production-record the female progeny of the bulls used and to rear as many of the heifers as possible. Four Jersey bulls are used each year, and the aim is to have each bull represented by heifer progeny on each farm.

The A.I.S. breed is being used in a group of herds in the Kingaroy district, where otherwise the scheme is similar to that at Nambour.

To date, 25 Jersey and 9 A.I.S. bulls have been used. Each bull has been mated to not less than 250 cows in one season. Production records of the progeny of the first four bulls will be available shortly.

A new step was taken in November 1956, when a trial of artificial insemination in a group of herds in the Atherton area was begun. Both chilled and frozen semen were airfreighted from Brisbane. Satisfactory results led to the setting up of a small A.I. unit at the Department's Kairi Regional Experiment Station, in which three bulls of each of the Jersey and A.I.S. breeds were used. This resulted, early in 1958, in the formation of a co-operative farmers' group known as "The Tableland Artificial Breeders Association". The Cattle Husbandry Branch has helped and guided this association, which conducts A.I. field work over the dairying area of the tableland, keeping its own records, employing inseminators and collecting fees.

The supply of semen from the Jersey and A.I.S. breeds has been ample for needs and so far about 4,000 cows in 130 herds have been inseminated.

Nutrition in Dairying

A great deal of research and advisory work has been done in the subject of nutrition of dairy cows.

Studies have led to the present belief that in dairy herd nutrition the important thing is to maintain a reasonable standard of feed throughout the year. Dairymen are shown how to make the best use of the feed that is available to them. Advice is tendered on supplementary feeding—when to feed, and what feeds to use, having regard to the prices and food values of available fodders, and other factors which determine whether feeding is a practicable proposition.

Areas in the State that are deficient in phosphate and copper have been located. At the same time, dairymen have been advised that general nutrition must be checked before mineral deficiency can be treated successfully. For instance, phosphate deficiency is very often associated with a protein and energy deficiency, and adequate production levels cannot be obtained unless all three deficiencies are corrected.

The feeding of grain supplements to dairy cows on pasture has also been given a lot of attention and valuable information given to dairy farmers.

Producers, especially those in the milk zones, have been enabled to keep down cost of bought feed by the discovery and correction of small but important deficiencies in rations.

Other ways in which dairymen have been helped have been in the rearing of dairy cows on limited amounts of milk, also in the dehorning of herds. Advice on the dehorning of beef herds has also been given.

Queensland cattle husbandry officers continually keep watch on developments overseas and test those that have application here. In this work they receive the eager co-operation of producers, recent examples being the use of hormones in the fattening of beef cattle, and the tallow spraying of pastures as a means of bloat control.

Help to Beef Industry

Getting facts on growth rate patterns has occupied a lot of man-hours on the beef side of cattle husbandry work. Studies have been made on stock grazing native pastures in different districts and on different breeds in similar conditions. From this work has sprung information on the shortcomings of native pastures and on fattening by other methods.

At present being investigated are methods of supplementary feeding of young stock during winter and spring months, and fattening on improved pastures and crops such as oats and sorghum.

In the work on winter weight loss, various supplements are being tried in different parts of the State. The question of which animals to feed, what feedstuffs to use, when to start feeding and how much and how often to feed are all being investigated under field conditions. Once again seasonal conditions militate against the obtaining of reliable results in a short space of time.

At this juncture it would appear that a protein supplement will be the most useful.

The value of supplementary feeding is partly influenced by the later management of the animals. It will only be made to pay if the advantage produced by the use of the supplement is held until the animal is slaughtered.

Working with the Bureau of Agricultural Economics, the Branch started an investigation in 1958 on the costs and returns in crop fattening ventures. Studies on 18 properties in the Darling Downs, Burnett and Rockhampton districts have shown the relationship between meat price, meat gain for each acre of crop, and cost of producing an acre of crop.

From the following table, which is applicable to market conditions for stores and fats in 1958, it was demonstrated that for a crop producing 100 lb. of meat to the acre, the "break-even" cost above which it would not pay to produce the crop was £6 an acre where beef was £5 a 100 lb. carcass, or £8 8s. an acre when beef was £7 a 100 lb. carcass, and so on.

This table will also show that: If the crop is produced for £7 5s. an acre and the meat gain an acre is 125 lb. the meat would have to be sold at £5 for 100 lb. to break even, and anything above the £5 would be profit.

"BREAK-EVEN" CROP COST
(*£ per acre*)

Beef Price per 100-lb. Carcass Wt.	Meat Gain per Acre						
	50 lb.	75 lb.	100 lb.	125 lb.	150 lb.	175 lb.	200 lb.
£3	1·8	2·7	3·6	4·5	5·4	6·3	7·2
£4	2·4	3·6	4·8	6·0	7·2	8·4	9·6
£5	3·0	4·5	6·0	7·5	9·0	10·5	12·0
£6	3·6	5·4	7·2	9·0	10·8	12·6	14·4
£7	4·2	6·3	8·4	10·5	12·6	14·7	16·8
£8	4·8	7·2	9·6	12·0	14·4	16·8	19·2
£9	5·4	8·1	10·8	13·5	16·2	18·9	21·6
£10	6·0	9·0	12·0	15·0	18·0	21·0	24·0

Investigations are continuing, bearing in mind that no general recommendations can be made on the basis of one year's work. Apart from seasonal conditions which will alter crop productivity, the relationship between buying price of stores and selling price of fats will also vary from year to year.

Ways of supplying phosphate supplements to beef cattle have been tried and so far an improvement has been noted in animals receiving supplements.

Officers of the Branch have helped in feed-lot fattening enterprises by working out returns and weighing the cattle. They have also collected a volume of valuable and reliable local information that will benefit producers who are thinking of going in for feed-lot projects.

A lot of data have been gathered from work in carcass evaluation by measurement, and these may serve as a basis for a more objective method of commercial appraisal.

A valuable service to breeders and buyers of stud bulls is the weighing and measuring of animals. This service, carried out by the Branch at each Brisbane Show, had helped the grazier by showing the importance of weight for age in beef cattle production. The Branch has also developed a useful formula for calculating the weight from girth measurement. (This only applies to British breeds that have been reared and fed for show conditions.)

From observations on two properties over three years, reliable information has been gleaned on the age at which cattle erupt permanent teeth. Cattlemen now know how far they can rely on the "tooth test" in estimating the age of animals between 18 months and 3½ years.

Other research work has been done on the yield of milk from beef cows. Further results will help in finding the time of the year most favourable for the calving of beef breeders, and also the best time at which to wean the calves.

The Branch advises on all aspects of goat husbandry and on the feeding of horses used commercially.

Co-operation From Producers

So far as the man in the street is concerned, the work of the Cattle Husbandry Branch goes unrecognised, but the magnitude of its activities is known to many men in the industries of cattle raising and dairying. And those in the Branch know that they will be busy for many years to come on problems as yet unsolved affecting the husbandry side of the two industries. Most important is that they have earned the goodwill of large numbers of producers without whose co-operation their work could not be carried to fruition.

Bucket and Bail

Strain 19 Controls Brucellosis.—The severe abortion storms due to brucellosis which commonly occurred a little over 10 years ago, when over 30 per cent. of pregnant heifers and cows in a herd aborted, are met with only occasionally today. This is due mainly to the widespread use of Strain 19.

Strain 19 is a live vaccine which has a low virulence for stock, but has the ability to confer a high degree of immunity in vaccinated animals. The best age for vaccination is between four and eight months.

The majority of animals inoculated as calves with Strain 19 mantain their immunity for most, if not all, of their life. There is no advantage in giving booster injections at later dates. Adult stock may be vaccinated under special circumstances. For several reasons, however, it is much better to ensure that all of the female calf crop are vaccinated annually.

Brucellosis, or contagious abortion as it is commonly known, is due to a bacterium known as *Brucella abortus*. Infection is mainly picked up by stock eating contaminated pasture. In cold weather, pastures can remain contaminated up to three months. Therefore adopt hygienic measures when a cow aborts. The organism usually lodges in the womb and udder. Brucellosis results in calf loss, retention of afterbirth and often complete loss or reduction of the subsequent lactation. Furthermore, in cows that do not abort, udder infection may seriously decrease milk production.

If some abortions do occur in your herd despite Strain 19 vaccination, don't abandon vaccination. Rather, have the trouble investigated by your local Veterinary Officer or Stock Inspector. It is probable that another disease agent is responsible.

It has been proven without doubt that Strain 19 does not cause infertility in heifers. Vaccination is a worthwhile insurance that you cannot afford to be without. Your private veterinarian does Strain 19 vaccination rounds regularly and will include you on his list if you make arrangements with him. You cannot expect to get maximum production from your herd when brucellosis is not properly under control.

—S. G. KNOTT, Divisional Veterinary Officer.

Check Milking Machines Each Year.—Have the efficiency of your milking machine checked by the Agriculture Department at least once a year. Regular checks will detect minor faults before they become costly.

Milking machine testing is a free Agriculture Department service. All the farmer has to do is to approach his local dairy officer. This officer will arrange to make the test at some convenient time.

Milking machines usually get out of adjustment very slowly. Often a farmer has no idea that his machine is not efficient until the cups begin falling off or large amounts of strippings are left behind. Before this stage is reached, the machine, gradually getting further and further out of adjustment, may have caused a great deal of loss. Faulty machines can cause cows to dry off too soon through slow milking and may even cause mastitis.

You need not wait until the slack season to have your machine tested. Testing can be done between milkings and will not interfere with the normal milking programme. The dairy officer will make any minor adjustments on the spot, but major repairs, like reconditioning the vacuum pump, will have to be done by a milking machine company.

The equipment for testing milking machines is accurate and gives an impartial assessment of the machine's efficiency. Many farmers have already proved that it pays to have their machines tested each year.

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

Dairy Water Affects Cream Grades.—Cream grades are influenced strongly by the quantity and quality of the dairy water supply. Shortage of water can lead to inefficient cleaning, and poor quality water can cause scaly deposits to form on dairy equipment.

Rain water is recommended for dairy use. It's soft, and if stored properly, is free from harmful bacteria. Many wells and dams, however, also supply water suitable for the dairy.

At least 2,000 gallons of water should be stored at the dairy. This is more than a month's supply and will carry the farmer over a short dry spell. A few hours spent in repairing roofing and cleaning guttering could mean additional valuable water in your storage tanks later.

—W. D. MITCHELL, Dairy Technologist.

Soldering Cracked Seams in Can Lids.—It is no secret how hard it is to rid a can lid of fat in order to successfully solder and seal the cracked seam. This is easily done using a fat solvent similar to those used in dry cleaning.

This should be applied with a small paint brush to the area to be soldered and the inside of the lid thoroughly washed. It may be necessary to give several washes with the solvent to gain the desired result and washing should be continued until the solvent is clear.

It is then a simple matter for the home plumber to run solder around the seam. However, if bubbles persist in coming through the solder, further washing in solvent is necessary.

The use of motor spirit or kerosene in this operation is not recommended as both leave undesirable residues; from motor spirit a stain and from kerosene a bad taint.

Whatever the solvent used, the repaired lid should be cleansed after with a good detergent as used in general dairy cleansing.

—A. R. BROWN, Dairy Officer.

Using Chlorine Sterilizers.—Chlorine sterilizers are used to destroy bacteria that have entered the milking plant or equipment between milkings. These chemicals are not a substitute for boiling water or steam sterilization after milking.

In using a chlorine sterilizer, rinse the equipment with the chlorine preparation between 5 and 20 min. before milking starts. Don't flush the remains of the chlorine rinse off the machines with other water, but be sure all equipment is well drained before use. Run the solution into the milk vat, over the cooler and into the cans.

Follow the manufacturer's directions closely in mixing up the chlorine solution. Weak solutions are ineffective and over-strong solutions unnecessary. A concentration of 150 to 200 parts per million is satisfactory for sterilizing all dairy equipment.

—A. MURRAY, Senior Dairy Adviser.

Sire Surveys.—Many farmers complain that sire surveys reveal the value of a bull after it has been sold or is dead.

Unfortunately in many cases this is true, but, even so, the information obtained is still valuable. From an industry point of view it is important to know that bulls from certain strains are either raising or lowering production. This information allows farmers to select bulls from various strains or families within a herd. It is often found that bulls from one particular family raise production whilst those from a different family within the same herd are not so successful.

It is always advisable to buy a young bull as a replacement a few years before dispensing with the chief herd sire. The young bull can be used sparingly at an early age. If his daughters are recorded as soon as they come into production, an early assessment of his capabilities can be obtained and he can be retained or culled as the results warrant. By this method it is possible to limit the damage which a poor bull can do. His low-producing daughters can be sold and the higher-yielding older cows retained for breeding replacements.

The requirements for sire surveying are to have all the bull's daughters identified, and to production-record the whole herd.

—S. E. PEGG, Senior Adviser, Herd Recording.

Brushes for Dairy Cleaning.—Thorough brushing during washing up is an essential part of keeping your milking machine and other dairy equipment spotlessly clean. For this reason, selection of dairy brushware has an important bearing on the efficiency of dairy cleaning.

Brushes with nylon bristles are recommended for dairy use. These are fairly resistant to heat and to the chemicals usually contained in dairy

cleansers. Nylon bristles are stiff, and recover quickly after bending. Stiff bristles also are less likely to become matted than pliable ones. A full set of dairy brushes should include a general purpose scrubbing brush, a milk dropper brush, claw tube brushes in two sizes, and a spout brush for separator spouts.

You can't expect to clean dairy equipment with worn or matted brushes. And remember, a dirty brush soils everything it touches.

—J. Wilson, Dairy Officer.

Herd Recording.—A farmer member of a Herd Recording Group on the Downs shows an impressive enthusiasm when discussing his herd and individual cows. He has been in the group long enough to begin to see the results of his culling programme and management reflected in production increases. He has lifted his average herd production from 210 lb. butterfat per cow in 1957-58 to 273 lb. butterfat per cow in 1958-59. Recording has given him an objective to aim for in production and he is building his farm programme around this.

Perhaps you may not have given sufficient consideration to joining a group. It costs 10s. to record each cow per lactation and this is equivalent to about 3 lb. of butterfat per cow per year. For this you have the actual production of each of your cows and can see the "boarders" and remove them.

With recording you do not guess at production but cull with certainty. Discuss recording with your Dairy Officer who will give any information that you desire and who can also arrange for you to be incorporated in a group.

—S. W. IVERS, Adviser, Herd Recording.

Mange in Pigs.—Sarcoptic mange could be a source of trouble in your piggery about this time. This skin complaint is more common in winter and spring, when the weather is dry and good green feed is scarce. One preventive spraying this month may well keep your piggery free of mange, and the discomfort and slow growth which accompany it.

This mange is caused by tiny mites which burrow under the pig's skin, and cause an intense itching. Affected pigs will keep rubbing against any solid object to obtain relief; sometimes they rub until patches of skin are scraped off.

If your pigs are constantly rubbing, and their skin is scaly, thickened, and cracking, or with raw areas, they probably have mange. Ask your veterinary officer or adviser in pig raising to take skin scrapings from the pigs to make sure.

You can clean up mange easily by spraying ALL pigs with a B.H.C. mixture, which should contain from 0·1 to 0·2 per cent. of the gamma isomer; a mixture two or three times the strength recommended for ticks on cattle will cure pig mange. Wet every pig thoroughly with the spray, and don't forget to spray floors and other places where the pigs lie. Repeat the sprayings at 10 to 14 day intervals until no signs of mange remain.

As mange is so readily eliminated by B.H.C. sprays it is surprising that it remains so common during the winter and spring months.

Can Fowls Run on Lawn Treated for Grass Grubs?—Many people have sprayed their lawns this summer and autumn to control grass grubs. The usual insecticide used for this purpose is DDT. Some people also keep fowls in their backyard and run them out onto the lawn for a "pick" just before dark.

A correspondent asks whether this practice is safe and whether grass grubs affected by the DDT would be poisonous to fowls eating them.

Lawns treated with DDT should be safe to fowls providing the spraying has been even. If one prefers to be cautious, the birds may be kept off the lawn for a week. The quantity of DDT taken in by the grubs would be extremely small and of no danger to the fowls. Slightly more DDT would be eaten with grass-shoots (a fowl could eat up to one quarter of an ounce of lawn clippings). But even here, the amount of DDT eaten would be very small. A further point is that DDT is less poisonous to animals than are other insecticides.

—P. D. RANBY, Veterinary Officer.

More Milk By Testing, Culling And Feeding

By A. R. BROWN, Dairy Officer

Mr. J. H. Fletcher, of Emu Vale, near Warwick, has raised the production of his 30-cow A.I.S. herd from 253 lb. of butterfat per cow in 1956 to 374 lb. in 1959. He attributes this increase to herd recording, culling and an improved feeding programme.

The farm of 164 acres is sub-divided into 13 paddocks ranging from 80 acres to 5 acres. About 12 acres are used for lucerne hay production and 14 acres for improved pasture. A further 20 acres are cultivated for maize and winter crops. The 80-acre paddock consists of native pasture on hillside country.

Dairying is the main source of income. Enough grain and fodder (baled lucerne hay) is produced on the farm to ensure sufficient feed for the herd. Some surplus is sold to defray expenses incurred at harvest time.

Establishment of Herd

Mr. Fletcher purchased his Emu Vale property in 1950. An 18-month-old A.I.S. registered bull, "Penrhos Showman", was purchased in 1951 and continuous herd recording commenced in 1955. Old cows with low production were culled. Some were replaced with registered animals which were bought from studs in the district. The rest were replaced with heifers bred on the farm.

"Penrhos Showman" was used until 1957. Many of the progeny of the pure bred replacements, mated to this bull, are the top producers on the farm today. The present herd sire is 4-year-old "Wenlock Bright Star."

Feeding Programme

A 5-acre paddock of irrigated improved pasture was established in 1954. This was grazed for the first time in the late spring of the same year. The area of irrigated improved pasture has since been increased to 14 acres. The pasture is a mixture of white and red clover, phalaris, cocksfoot and H1 ryegrass.

The amounts per acre of the various components of the improved pasture seed sowing are as follows:

	lb.
Perennial ryegrass	4
H1 ryegrass	2
Phalaris tuberosa	2
Cocksfoot	2
White clover	2
Red clover	1

The clovers are inoculated before sowing. Mr. Fletcher says it is wise to always plant more grass seed than clover. His suggestion is 1 lb. clover to 5 lb. grass seed.

These pastures are strip grazed with the aid of an electric fence. A back fence is used to prevent the stock grazing over the regrowth and freshly watered areas.

In addition to grazing on irrigated improved pastures, a 5 lb. mixture of lucerne chaff and grain is fed to each cow twice a day in the bails. All grain used in the feeding programme is home grown and is used at the rate of about 1½ bags a day. This grain is crushed or milled and a small proportion is fed to pigs. Mr. Fletcher considers that this bail-fed supplement, apart from balancing the ration, makes the cows more

contented while they are being milked. In addition to the chaff-grain supplement, a bale of lucerne hay to every 10 cows is fed twice a day in the paddock.

The irrigated improved pastures provide the bulk of the feed from late July until the following April. During the frosty winter months these pastures enter a period of semi-dormancy and have to be spelled for longer periods. As most of the cows are dry in the early winter, all dry stock are kept on native grass and only the few remaining milkers are grazed in the pasture. The only fodder actually fed to the milking cows is lucerne (chaff and baled hay) and improved pastures.

Husbandry Practices

The herd is culled on the basis of (1) production, (2) temperament. As there are times when Mrs. Fletcher and the children milk the cows, temperament is an important factor in this herd. Any fractious animals are immediately culled, irrespective of production.

The following table will give an idea of how Mr. Fletcher has culled his herd with regard to production figures and cows' temperament. Some had injuries and were considered a nuisance in the herd.

TABLE 1

No.	Name	Reason for Culling	B/Fat (lb.)	Lactation (days)
8	Pansy II	Lack of production, bad temperament, short lactation	238	210
11	Sally ..	Bad temperament ..	349	300
12	Pansy I	Short lactation, bad temperament ..	248	210
14	Girlie ..	Bad temperament (kicker)	271	270
16	Joan ..	Badly cut teats—one quarter unsatisfactory as result	228	120
20	Plum ..	Mastitis	367	300
27	Rosie ..	Lack of production ..	182	180
34	Lily ..	Lack of production, short lactation ..	97	120
36	Meg ..	Lack of production, short lactation ..	174	210

These cows were culled during the 1958-59 season.

The reasons for culling in the 1957-58 season were mainly to prevent overstocking because of the drought conditions. Heifers are culled if they fail to produce at least 250 lb. butterfat in 270 days except in the case of sickness or injury, in which case the heifer is given another chance.

The level of production for culling has been increased according to the general rise in production throughout the herd.

The progress achieved in average cow production during the more recent years of recording is demonstrated:

TABLE 2

Year	No. of Cows	Milk (lb.)	Fat Test (%)	B/Fat (lb.)	Lactation (days)
1955–56 ..	19	6,246	4·1	253	221
1956–57 ..	35	7,274	3·9	283	252
1957–58 ..	34	7,150	4·1	291	277
1958–59 ..	26	9,406	4·0	374	285

The spectacular increase in per cow production from 1957-58 to 1958-59, that is, 291 lb. to 374 lb., occurred as a result of Mr. Fletcher's decision to reduce the stocking rate. Owing to heavy culling at the end of the 1958 season, instead of feeding 34 cows on 14 acres of improved pasture, 26 cows were fed on the same area of pasture. As the cows had more to eat they naturally produced more. It was possible to produce a similar total production, 9,724 lb. of butterfat compared with 9,874 lb. during the previous year, from approximately 25 per cent. fewer cows.

The herd sire is confined in a 3-acre bull paddock to ensure controlled mating and grazes on oats and sudan grass. He also gets a supplement of 20 to 30 lb. of hay a day.

The cows are mated to calve in June and July each year. Twenty-five of a total calving of 42 were dropped in this June-July period, the remaining 17 being born either a month prior to or after this two-month period. This is the period when the irrigated improved pastures are emerging from their winter rest period thus providing ideal feeding conditions for fresh cows.

Mr. Fletcher considers that by testing, culling, selecting and improving his feeding programme he has:

(1) increased the period of lactation from 221 days in 1956 to 285 days in 1959,

(2) raised his production from 253 lb. butterfat per cow in 1956 to 374 lb. in 1959—an increase of 121 lb. fat.

Breed For Better Egg Shells

By B. W. MOFFATT, Poultry Adviser.

Hatcherymen can gain by breeding to improve the quality of egg shells. Two ways of testing egg shells are described:

Every year the poultry industry loses thousands of pounds through eggs being broken before they reach the consumer. The average farmer would probably be surprised at his own loss from cracked and broken eggs if records were kept even for a short period. Some of this loss can be prevented by ensuring that the birds' ration contains adequate amounts of vitamin D3, calcium, phosphorus and manganese.

However, from trials carried out at the Poultry Section of the Rocklea Animal Husbandry Research Farm, it is becoming evident that this egg shell problem may be largely a breeders' problem. This explains why some farmers still have trouble with poor shell quality, even though their rations are properly balanced. If a strain of fowls has an inherited tendency to lay thin-shelled eggs, then no matter how good the ration and mineral supplements these fowls cannot produce eggs with sound shells.

Fortunately it is not a difficult matter to improve egg shells by breeding. The work involved is not great and progress can be rapid. On the hatchery where single testing is not carried out, the hatcheryman cannot expect progress to be quite so rapid as on a properly organised breeding farm, but he can still obtain reasonable reward for his efforts.

What Is Involved?

In most hatcheries a good deal of selection is carried out on eggs before they are incubated. This is done by setting only those eggs that are regular in shape, of standard weight and free from obvious shell defects. Improving egg shell quality involves taking this selection just one step further. It involves the use of an efficient method of detecting thin shells.

There are two methods available. The first method is not practicable on a hatchery, but is used overseas on many of the large breeding establishments where individual birds are scored for internal quality in addition to shell quality. Using this method a number of eggs from each bird are broken out and the thickness of shell is measured with a paper gauge to within one-thousandth of an inch. See Plate 1.

The second method does not involve the breaking out of eggs and can be used where single testing is not carried out. This method is

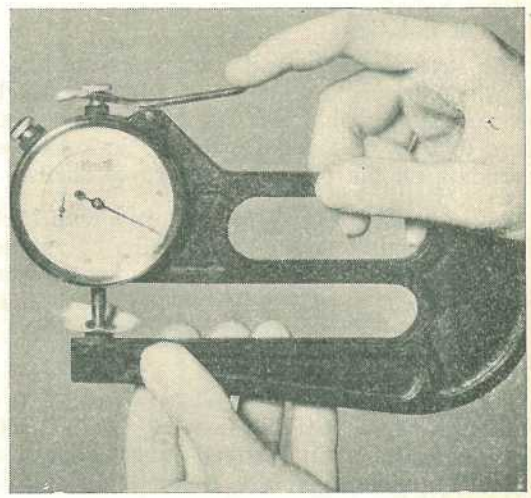


PLATE 1

This Paper Gauge Will Measure Shell Thickness Satisfactorily But the Eggs Have to be Broken Out.

based on the fact that the specific gravity* of a fresh egg is very closely related to the thickness of shell. This therefore provides a very efficient but extremely simple means of finding shell thickness and no calculations are involved.

The Specific Gravity Method

To find the specific gravity, the eggs are immersed in a solution of common salt and water of a certain concentration. Some of the eggs will float and others will sink. By altering the strength of the salt solution any percentage of eggs can be made to float. The eggs that float will have thinner shells than those that sink. There is one exception. Eggs that have porous shells, although these shells may be relatively thick, will float. As porous shells give poor hatchability, because of loss of water through the shell it is an advantage to have these eggs float. Detecting thin shells therefore becomes an easy task. All that has to be done is to make a salt solution of a certain strength and immerse all eggs in this solution when they are fresh. The eggs that float are rejected as having thin or porous shells and the ones that sink are selected for hatching. The task is simplified even more by carrying out this test only on eggs that are required to produce replacement breeding chickens. The chicken customer will eventually benefit if the hatcheryman improves his own breeding flock in this regard.

The Salt Solution

The strength of the salt solution is the key to the whole procedure. It is determined only by the percentage of eggs the hatcheryman can afford to reject. It will vary from flock to flock depending on the present standard of shells.

It is generally considered that eggs with shells less than about fourteen-thousandths of an inch are likely to crack in transit to market or when being handled. The hatcheryman should therefore aim to eliminate as many of these eggs as possible.

It has been determined that a salt solution of specific gravity 1·080 will float eggs with a shell thickness of less than fourteen-thousandths of an inch. If possible, therefore, a solution of similar strength or stronger should be used. This strength can be obtained by adding 19 oz. of salt to 1 gal. of water. A large glass container is ideal for this work. The eggs are visible through the walls of the container and the glass is not affected by the salt.

The strength of the salt solution is easily measured by means of a specific gravity hydrometer. A suitable hydrometer with a range of 1·050 to 1·100 can be purchased for less than £1 from a laboratory equipment firm. To obtain a specific gravity of 1·080 salt is dissolved in the water until the hydrometer floats with the 1·080 mark level with the surface of the water.

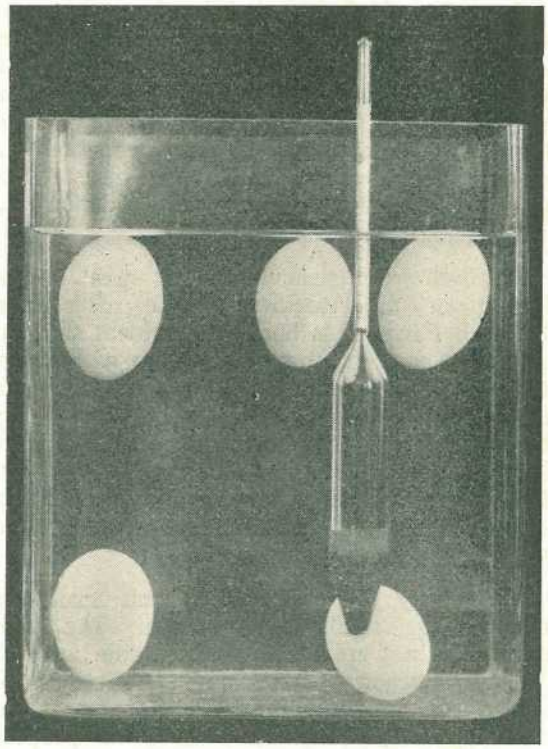


PLATE 2

The Specific Gravity of the Salt Solution can be Measured with a Hydrometer. In this solution (S.G. 1.080) the eggs floating have a shell thickness of less than .014 in.

See Plate 2. If the solution is being kept from day to day, then the specific gravity should be checked before use and after every one hundred

** The specific gravity of an egg is the number of times heavier it is than an equal volume of water. The average specific gravity of eggs is* 1.090.

eggs have been immersed in it. There are just a few points that need careful consideration:

1. Check that all the salt has been dissolved before the specific gravity is read.

2. Ensure that no air bubbles are adhering to the shell as these may cause the egg to float.

3. Do not immerse too many eggs at once or some with thin shells may be carried to the bottom.

4. Check the specific gravity at intervals and adjust the solution to the original value.

5. Test only fresh eggs. As an egg ages, its air cell increases and this might cause it to float. If eggs are set weekly this test should be carried out on eggs not older than 3 days.

On The Breeding Farm

Where birds are being singly tested then the procedure can be carried one step further. Individual birds can be scored for shell quality by testing a number of eggs from each bird. Those birds with a high percentage of eggs that float are then rejected from the breeding pens. The strength of the salt solution can be increased from year to year as progress is made.

This procedure will give slightly more rapid progress than can be obtained on a hatchery where no breeding plan is in operation.

What Standard Are Your Birds?

In a recent test conducted at the Rocklea Animal Husbandry Research Farm, 16 different strains of fowls were tested for shell quality by the specific gravity method. The percentage of eggs that floated in each strain varied from 12·2 per cent. to 52·5 per cent. The average was 30·76 per cent. This indicated that there is great variation between strains in shell quality.

By applying selection for this character, the hatcheryman has much to gain. His hatchability should increase and his losses from cracks and breakages of eggs will be much reduced. Also he will have confidence in the stock he sells and his reward will be a satisfied customer.

Tuberculosis-Free Cattle Herds

(As at 1st April, 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
Power, M. F., "Barfield", Kapaldo
Messrs. Mitchell and Mulcahy, Rosenthal
Queensland Agricultural High School & College, Lawes
Radel, R. R. & Sons, "Happy Valley", Coalstoun Lakes
Roche, C. K., Freestone, Warwick
Sanderson, W. H., "Sunlit Farm," Mulgildie
Schloss, C. J., "Shady Glen", Rocky Ck., Yarraman
Scott, M. E. & E., "Wattlebrae" A.I.S. Stud, Kingaroy
Scott, W. & A. G., "Walena" A.I.S. Stud, Blackbutt
Shelton, R. A. & N. K., "Vuegon" A.I.S. Stud, Hivesville, Murgon
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

Taking The Stress Out Of Poultry Farming

By **A. H. OUTRIDGE,** *Poultry Adviser.*

Stress factors in relation to the keeping of poultry may be classed broadly under such headings as genetic, nutritional, disease, climatic, and others.

These stress factors may also be viewed as agents or allies which, with an infectious or non-infectious agent that may also be present, can act together to depress growth and production and often help to precipitate disease.

Some factors are related to management and in particular to the personal factor. For example, some dogs of a litter may be friendly, docile and happy beings in one home, whereas their litter mates in another home may grow into savage or irritable animals.

The good stockman and poultry farmer moves amongst his birds in an easy and friendly frame of mind that produces a similar and desirable state in his birds from day-old onwards.

Such men also seem to have the gift of a sixth sense that gives an instant warning when troubles first appear within their poultry flock. They are thus able to take immediate action to determine the cause and remedy it.

Usually, a healthy bird can adjust to a single, or even more than one stress factor. It is, however, the sum of all stress factors that determines whether or not there will be an upset in the flock. So the placing of a minor stress perhaps unwittingly on the birds may be the "last straw that breaks the camel's back."

There is a well-known saying that a good farmer could get better results from an average flock than a poor farmer from birds of better breeding.

Thus, management is a key factor in the profit picture of a flock, and management includes the reduction of stresses to which birds are subjected at any time during their lives.

Some Things A Farmer Can Do

Rough treatment at the day-old stage places a stress on healthy chicks right from the start. A delay in getting chickens to eat and drink is another. Let these youngsters get overheated or chilled once during the brooding stage and again they are faced with a third factor that may cause troubles.

Faulty ventilation is another stress, no matter what the age of the birds. The alert farmer can notice weather changes and go quietly about any necessary adjustments.

In the matter of climatic stresses, the poultry man of course has no direct control over weather changes and the extremes of temperature that can upset his flock. He can, however, provide well-designed sheds on a site suitable for poultry. The farmer who plans and builds for ample ventilation, paints galvanised roofs and walls white or uses fibro cement for roofing material and the walls of his sheds, together with the provision of spray systems, protects his birds in hot weather and increases his returns.

Inadequate feed and watering space can really put a stress upon the flock. Let the birds run out of water for an hour or two on a hot day

and it will do more damage than a six-hour break without food.

The careful farmer who makes available 30 lineal feet of feeding space, together with 6 lineal feet of watering space or 15 drinking nipples to 100 adult birds, removes quite a stress from his flock.

The shock and fright that could result from a farmer's charging up to a shed full of his birds and dropping a load of timber or a bag of feed is a stress that can be so easily avoided.

A Question of Management

Wet and caked litter, a change in routine, competition at the waterers and feed troughs and lack of perching space are all stress factors. Their removal is a question of management.

Insanitary conditions are the breeding grounds of disease stresses. An efficient sanitation programme that employs plenty of elbow grease can throw a spanner into the life cycle of a host of disease agents that can attack poultry.

The farmer who adheres to routine in the matter of sanitation, rat-proofs his farm, cleans out waterers regularly and removes dust and cobwebs from his sheds, transfers the stress from the poultry to the many disease agents by depriving them of the dirty conditions they like to thrive in.

Overcrowding of poultry loads a particularly vicious stress on the flock. This fault in management does not pay at any time and, sooner or later, nature cuts the flock down to size.

Worms, lice and mites and the treatment for these are other stresses. The flock should be handled quietly with as little disturbance to the birds as possible.

Internal parasites such as round worms can build up unnoticed in a flock and rob the birds of valuable nutrients. When present in sufficient numbers, the poisons excreted internally by these parasites can affect the birds' health. External parasites can also worry and depress the vitality of the flock.

The farmer who adheres to a routine for the eradication of these parasites can prevent a stress building up in his flock that too often goes unseen.

A badly balanced or inadequate ration is as severe a stress as any flock can face up to. Poor rations mean poor returns for the farmer.

In this matter of stress, anything away from the ordinary is of real importance to the poultry flock. Yet it may pass unnoticed by the farmer in the bustle and work of every day.

Being kind to ones poultry flock and preventing any undue strain on the birds means a happier, healthier and more profitable flock that is a tribute to its owner's care and management.

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.

Stock and Station

Hormones for Cattle.—Several graziers have inquired recently about the use of hormones for fattening cattle on native pastures. The hormone is prepared in tablet form and implanted under the skin at the back of the ear. The Department has made observations and recorded weight gains on hundreds of treated cattle and these comments are based on those results:

The hormones which are used for fattening cattle are not a food and they don't replace a foodstuff. In effect they divert the food nutrients from fat production to muscle or meat production. This effect lasts for up to 5 months but reaches a peak at just over 3 months from implantation. Fattening stock which have plenty of good quality feed available to them for up to 5 months after implantation are likely to gain more weight than untreated stock.

Trials have shown an average of about 20 pounds extra weight in favour of implanted stock. To get the benefit you need fattening stock, plenty of good feed for them and a turn-off within 5 months. Only male slaughter stock should be treated. Hormone treatment won't start the fattening process. It may well prove a disadvantage if you can't be sure of having plenty of feed to carry the cattle until they are fit for slaughter 3 to 5 months after implantation.

—W. MAWSON,
Senior Adviser in Cattle Husbandry.

Fertilized Green Panic Pastures.—Fertilizers containing nitrogen and sulphur have increased yields from green panic pastures at Gayndah by more than half a ton an acre in eight weeks. This response was obtained in fertilizer trials at the Brian Pastures Research Station.

In 1958 and 1959, pastures were fertilized in March in an attempt to lengthen the growing season and to provide high quality feed in times of shortage. Results have been surprising.

Nitrogen was applied at eight rates up to 460 lb. of urea to the acre. Greatest increase in growth for each 1 lb. of urea applied came from a dressing of 65 lb. of urea to the acre.

Eight weeks after treatment with 65 lb. of urea to the acre, the pasture produced an additional 900 lb. of dry material an acre in 1958, and 1,500 lb. in 1959. From light fertilizer dressings the response lasted six months, but big dressings gave increased growth 12 months later.

On this basaltic forest soil, pastures responded to sulphur if nitrogen was applied as well, and nitrogen, too, gave much better results with sulphur. The yield increased by 50 per cent. after sulphur had been applied at 20 lb. to the acre.

A feature of the trials was the failure of the native grass species to respond to fertilizer. In a sown pasture paddock, the proportion of green panic to native pasture increases substantially after nitrogen and sulphur have been applied.

When pasture growth slackens off the cause is usually thought to be unfavourable weather, but often the cause is really a shortage of nitrogen. The responses recorded at Brian Pastures were obtained in years of below-average autumn rainfall. This provides further evidence that nitrogen, either from legumes or out of bags, could prolong the productive season of sown pastures.

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

"Hobby" Plots.—Small pasture "hobby" plots on sheep and cattle properties in Western Queensland are helping to increase large-scale sowings of improved pastures.

They are an Agriculture Department move to give graziers pasture demonstrations on their own properties. As well as showing the merits of various commercially available pasture plants and promising species, the plots also give graziers experience in establishing and managing improved pastures.

Altogether, 44 of these plots have been established between Toowoomba and Quilpie in the last three years. They have been put down in the Millmerran, Quilpie, Maranoa, and Warrego districts under the guidance of Mr. R. G. Wilson, an Adviser in Agriculture at Toowoomba,

who initiated the scheme. Similar-type plots have been established in the south-west by Mr. W. Bott, Experimentalist, of Goondiwindi; and more recently in the Gulf by Mr. I. Sillar, Agrostologist, of Cloncurry.

A recent survey of the 44 plots under the supervision of Mr. Wilson has shown that half have now been in progress for a sufficient time to make an assessment of their value. Of these, 15 have been successful and landholders have followed up the promising demonstrations with larger plantings.

The plots have indicated that buffel grass and even green panic, blue panic and Rhodes grass had a place on the various soil types in these areas. Observations show that in the drier Maranoa-Warrego area, successful establishment depends largely on timely rains, cool weather and good soil structure rather than on fertility.

Results of the hobby plots so far are encouraging. The plots are cheap, simple and informative, and the landholder can become interested in the performance of different pasture plants on his own land. At the same time, performance of the various pasture plants on a range of soil types can be assessed. If the grazier decides to make any large-scale plantings he can choose the species he has found to be most suitable for his particular property.

The fact that graziers were already expanding these plots into larger plantings was proof of their value.

Poisonous Plants Kill Stock.—Poisonous plants continue to take their annual toll of stock in Queensland, and it has been reported that, of the numerous specimens tested by the Poison Plants Committee, no fewer than 26 different species of plants have been proved by feeding experiments to be toxic.

In some cases the poisonous principles have been determined and these include prussic acid, oxalate, nitrate and certain alkaloids.

Two disease conditions of stock suspected of being caused by poisonous plants are under special investigation in Queensland at the present time.

The first, which manifests itself as either a heart condition or a skeletal malformation, is thought to be caused by blue parsnip (*Trachymene glaucifolia*) although feeding trials to date have not yielded conclusive results.

The second condition is a blindness in sheep that occurs on certain holdings in the Maranoa district. Goats are also affected although horses and cattle do not appear to be susceptible. The disease occurs in April and May and the lesions appear to be restricted to the nerves of the eyes.

Melioidosis—A Tropical Disease.—Melioidosis is a tropical disease which for many years was known chiefly as a fatal disease of man in south-east Asia. It was first recorded in Queensland in 1949 in an outbreak in sheep in the central western area of the State. Since that date five further outbreaks have occurred among sheep, and work carried out at the Animal Health Station at Oonoonba near Townsville has shown that the disease also occurs in goats, pigs, cattle and horses.

Symptoms are mainly loss of appetite, fever, difficulty in breathing, coughing, discharges from eye and nose, loss of condition and lameness due to arthritis. Wet conditions appear to favour an outbreak.

As a result of four years' work at Oonoonba Animal Health Station, research workers have now developed a diagnostic test to the stage where it can be used under field conditions. Success in this will mark yet another step forward in man's conquest of disease.

New Disease in Pigs.—What appears to be the first authentic case recorded in Australia of oedema disease in pigs occurred recently on a south-coast property in Queensland.

The outbreak occurred on the property shortly after it had changed ownership. The new owner bought 25 pigs from six to eight weeks of age at a saleyards and these brought the total number of pigs on the property under four months of age to 40 head.

Trouble started a week after the introduction of the new pigs and some 12 animals were lost; four in one day. Pigs that appeared quite healthy in the morning dropped dead a few hours later.

A post mortem examination of one pig revealed, among other symptoms, that the membrane between the coils of the large intestine was full of fluid and in places gelatinous. Bacteriologists at the Animal Research Institute, Yeerongpilly, recovered a bacterium (*haemolytic Escherichia coli*) that was considered to be the cause of the condition.

The disease mainly affects young pigs in the post-weaning period; owners suspecting the presence of this ailment in their herd should contact the nearest veterinary officer as soon as possible.

Irrigated Pastures For Southern Darling Downs

By G. R. LEE
and A. G. MARTIN, Agriculture Branch.

For those who are interested in growing irrigated pastures within the boundaries of the southern Darling Downs, the recommendations in this article will prove valuable:

Active interest in irrigated pastures is increasing in the southern Darling Downs. Some 300 acres of highly productive irrigated pastures are now grown in this region. These are located mainly on fertile soils close to watercourses and in areas where an assured supply of good quality underground water is available. Along the Condamine River and tributaries there is still ample scope for the planting of irrigated pastures and the present area may well be doubled in the near future, using water harvesting techniques and surface irrigation methods.

A very large increase in acreage of irrigated pastures could be expected if the proposed Sandy Creek dam is constructed.

Irrigated pastures are a long-term asset and the initial cost of establishment is not excessive when we consider the productive life, which may vary from 6 to 10 years. To obtain a nutritious, balanced pasture over this period, establishment and management must be carried out efficiently. Before establishing an irrigated pasture it is necessary to decide which method of irrigation will be adopted.

METHODS OF IRRIGATION

Both spray (sprinkler) and surface (flood) irrigation are used in this district to irrigate pastures. Until recently, spray irrigation was used almost exclusively, but both border strip and contour ditch irrigation are now rapidly gaining in popularity where suitable water supplies and soil types exist.

There is a large area of land suitable for border strip irrigation on the southern Darling Downs, the limiting factor being the lack of suitable water facilities. Border irrigation is at present confined mainly to properties adjacent to the Condamine River, properties possessing water harvesting facilities, or those having subartesian bores with a capacity about 10,000 gallons per hour. Some small farm projects will, however, be supplied from bores of only half this capacity. The larger capacity is to be desired as watering can be carried out more quickly and therefore larger acreages can be handled more efficiently.

Spray Irrigation

Portable spray plants are in general use on the smaller streams and on low capacity bores where the water supply is limited. They are also used on land that is unsuitable for flood irrigation such as porous sandy soils and very uneven areas.

The type of irrigation plant used varies from low pressure sprinkler to high pressure spray units. Most of these plants have been designed for portability, one automatic rainline being self-propelled.

All of these units share the disadvantages of high initial cost coupled with a high evaporation rate during hot dry summer months. With most

of these plants the labour involved in shifting and setting up spray lines is considerable.

For these reasons, many district farmers who possess suitable land and have access to adequate water facilities are now either in the process of preparing for border irrigated pastures or they are already irrigating by the border method.

Border Strip Irrigation

Briefly, this method of surface irrigation involves the application of water to borders which are separated by earthen check banks spaced 22 to 33 ft. apart.

The water is pumped to a head ditch which conveys it to the top of the area to be irrigated. Gates or outlet boxes are installed in the head ditch bank to regulate the flow of water into individual borders. These outlets are constructed with metal slides to regulate or close off the water supply as needed. Siphon tubes of plastic may also be used to deliver water from the head ditch. The borders are designed so that they run with the fall of the land; the fall or slope from the head ditch to the far end where a tail drain is located may vary from 2 in. to 2 ft. per chain. Care is needed to control water flow on the steeper grades.

When the water enters the bay on land that has been properly prepared, it spreads out from one check bank to the other and flows down the bay wetting the soil as it goes. During periods of high summer rainfall, excess water is carried off the area by the tail drain.

Plate 1

A Lush Irrigated Pasture on Messrs. T. G. & L. M. Matthews' Goomburra Property.

A relatively heavy clay soil such as the black soils of the southern Darling Downs is ideal for border strip irrigation, and farmers with little experience in irrigation have the minimum of difficulty in obtaining an even distribution of the water. These soils, with natural rainfall supplemented by an extra 24 in. of water applied annually, are capable of maintaining production of 35 to 40 tons of highly nutritious pasture an acre a year.

Before land can be developed for border strip irrigation it is necessary to select an area of suitable topography and suitable soil type. This area can then be surveyed on a grid pattern so that spot heights can be obtained every chain. This will enable a contour plan to be prepared on which a suitable design can then be imposed. Such a plan is essential for subsequent land preparation. It enables levelling to be carried out efficiently and the location of head ditches, tail drains and check banks is simplified. The surveying may be carried out by officers of the Department of Agriculture and Stock or of the Irrigation and Water Supply Commission.

Land Preparation for Border Strip Irrigation. During late winter the land should be ploughed to a depth of 5 to 6 in., ploughing being carried out in the direction of the slope, that is at right angles to the contour lines which appear on the farm plan. The soil can then be worked with tine and disc implements followed by harrows to produce a fine tilth. The land should be levelled before the commencement of summer rains using a land leveller.

The Department of Agriculture and Stock has an automatic land leveller working in the Warwick district. This machine is made available to farmers free of charge to assist with the development of land for surface irrigation. The leveller can be pulled by a medium horse-power tractor and will level land very quickly and efficiently. It can also be adjusted to construct the check banks.

The first grading is carried out down the slope after serious irregularities have been corrected.

The soil can be brought to a fine tilth using tine or disc implements and harrows. The check banks are then marked in with a light plough. Cross grading is now carried out, depositing soil on the site of each check bank. The check banks are then crowded using either a wooden crowder

or the modified land leveller with crowder attachment. A light grading can then be given each bay by running the leveller up and down the bay parallel to the check banks, thus correcting slight irregularities in sidefall.

On most land prepared for border strip irrigation in this district, land preparation has been very straight-forward and the cost very low.

It is emphasised, however, that the soil must be worked to a fine tilth to facilitate levelling. Rain during this latter period can compact the soil and make it difficult to grade for the construction of check banks. Another working would therefore be necessary under such circumstances.

Tail Drain. The tail drain is normally constructed early during the preparation of the land for levelling and the soil removed can be graded into any low spots.

Head Ditch. The head ditch is constructed last using a two or three furrow disc or mouldboard plough to remove most of the soil, this being followed by a delver to clean out the remaining soil and give the ditch its final shaping. A wide shallow ditch is to be preferred, the size depending on the volume of water to be handled. The head ditch is constructed from the point of delivery of water to the area to be irrigated and it runs across the high end of the bays.

When irrigating, temporary (bag or canvas) or permanent checks are used in the head ditch to bank the water up above the level of the outlet boxes. The outlet boxes, which are constructed of 6 in. x 1 in. hardwood, are imbedded in the side of the ditch, one to each bay.

Precropping is Desirable. It is advisable to grow an annual crop on newly graded land before attempting the final seedbed preparation.

This is necessary to correct unevenness of soil fertility caused by movement of soil in the grading operations. Precropping will help in developing uniform fertility and will improve soil structure.

Growing an annual crop after grading will also give the filled areas a chance to settle before planting permanent pasture. After the crop has been grazed and ploughed in, the land should be given a light corrective grading to remove any small depressions caused by settling of the filled areas. If the corrective grading is neglected, inefficient and wasteful use of water must follow.

Planting the Pasture. Planting can usually be carried out using a combine after the final corrective grading without cultivation. It is sometimes desirable, however, to give a last shallow cultivation to produce a suitable seedbed following the final grading. Such a cultivation would be carried out between the check banks running with the direction of fall so as not to damage the check banks unnecessarily.

The planting machinery is operated across the borders on most areas to improve the spread of water later on. On land possessing very little fall the planting is carried out with the slope so that the water will travel down the bays satisfactorily.

Contour Ditch Irrigation

The highly successful contour ditch method of flood irrigation was introduced to Queensland by Mr. A. Nagle, Irrigationist with the Department of Agriculture and Stock. This system has enabled farmers to successfully flood irrigate country possessing a slope between 3 and 10 per cent. Contour ditch irrigation is not expensive and it saves labour. It offers great scope to farmers and graziers in this district.

As with border strip irrigation, pumping cost is only two-thirds that of spray irrigation. Little levelling is required for this system and the ditches and spreader furrows can be easily constructed using a light tractor and double furrow mouldboard plough.

Water is either pumped from a bore, river or dam, or, alternatively, gravity-fed from a storage dam above the area. The contour ditches have a slight fall and carry the water across the slope. By means of checks in the ditch the water can be banked back along the ditch enabling it to flow down the slope by opening up the wooden outlet boxes. These outlet boxes are similar to those used with border strip irrigation and they are normally spaced 11 yd. apart along the ditch.

Land Preparation. Before ploughing, it is usual to have an officer of the Department of Agriculture and Stock survey the contour ditches and, if necessary, a diversion bank should be constructed above the area to be treated.

The land can then be cultivated parallel to the ditches, finishing out in the middle of each bay. The contour ditches should also be constructed

as they will then provide some protection to the cultivated land. In constructing the ditch, approximately 6 furrows are ploughed throwing the soil downhill. The soil from the top four furrows is then worked down onto the bottom furrows to give a wide shallow ditch and a well-compacted bank on the lower side. The ditch is finished off with a delver.

Precropping. Where the risk of soil erosion can be overcome and where soil structure will not suffer, it is desirable to carry out precropping before laying down the pasture.

In most cases the sloping soils used for contour irrigation are less fertile than the heavy soils on the flats. The growing of a fodder crop including annual legumes will result in a considerable increase in soil fertility which will give quicker pasture establishment.

Planting. During early autumn a fine seedbed can be prepared and a light levelling can be carried out working parallel to the ditches.

Planting is carried out working on the contour. When the pasture is sufficiently well established spreader furrows can be surveyed and ploughed in. These furrows follow the true contour and are so placed that they spread the water laterally as it moves down the slope. The first furrow is spaced only 3 ft. from the contour ditch and the remainder 15 to 20 ft. apart. They are ploughed in with a single or double furrow plough, the soil being thrown up the slope. These spreader furrows soon grass over again and do a very effective job. The pasture is usually established under natural rainfall, the first contour irrigation being carried out when the pasture has given sufficient cover to the soil.

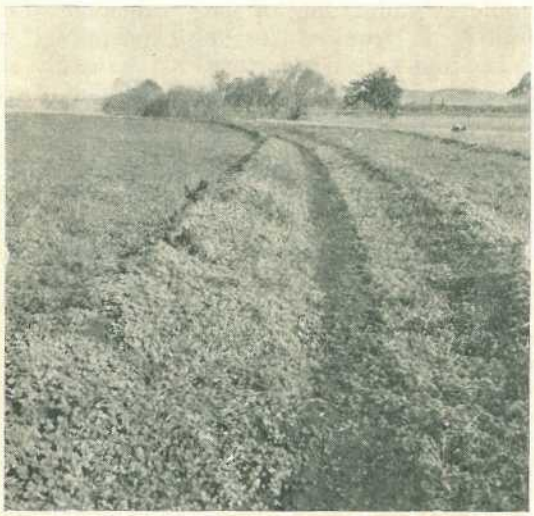


Plate 2

A Newly Established 7-Acre Flood Irrigation Project on Mr. S. Nicholson's Property, Murray's Bridge; Border Strip on the Left and Contour Ditch Irrigation on the Sloping Country to the Right of the Head Ditch. Note the broad shallow ditch.

Technical Advice and Surveys

The Irrigation and Water Supply Commission provide an advisory service for farmers and are responsible for the administration of the Farm Water Supplies Assistance Act.

Advances under this scheme are made to farmers for the construction of storage dams and sinking of bores for irrigation; also for the purchase of irrigation and pumping plants. Designs for these works are also provided.

The Irrigation and Water Supply Commission exercise control over pumping of water from streams and a license must be obtained before irrigation from a stream can be commenced.

Technical advice on suitable soils, pasture mixtures and management is available from officers of the Department of Agriculture and Stock. Surveys for border strip and contour ditch flood irrigation are carried out free of charge by this Department.

Establishment and Management

Pasture Planting.—Thorough seedbed preparation is necessary in order to produce a weed-free seedbed with a fine surface tilth. Levelling of the paddock is rather important even for spray irrigation systems so that full benefit from the irrigation water will be obtained. The best planting time is from March to early May. However, later sowings until August have usually been quite successful. Rain falling after planting ensures good germination. In the event of dry weather, the pasture can be planted into dry soil which is then spray irrigated. If border strip irrigation is being used, the area may be watered before planting under certain conditions, for example, when soil moisture is inadequate following a dry autumn. This will enable weed seeds to germinate and be controlled at the time of planting.

A small-seeds box mounted on a drill or combine is ideal for pasture planting. The depth of the machine is adjusted to place the seed about ½ to 1 in. under the soil surface. However, broadcasting and covering by harrows is usually quite satisfactory. Some modern combines which have a reduction gear attachment for the grain box dispense with the need for a small-seeds box.

Seeds Mixture.—The choice of suitable pasture species is of much importance and is governed to an extent by the availability of water.

1. Recommendation for limited water supplies:

Lucerne 2 lb. to the acre.

Priebe's Perennial Prairie grass 10-12 lb. to the acre.

This mixture has proved to be capable of heavy production and is able to withstand prolonged dry spells when irrigation water may be unavailable.

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

	Per acre
(*a*) Irrigation White Clover, Ladino White Clover	1 lb.
Phalaris tuberosa, Phalaris arundinacea	1½ lb.
H.1. Ryegrass	2–3 lb.
Perennial Prairie Grass	2 lb.
(*b*) Irrigation White Clover, Ladino White Clover	1 lb.
Phalaris tuberosa, Cocksfoot	3 lb.
H.1. or Perennial Ryegrass	2–3 lb.

Production from these mixtures has been outstanding, but it is essential that an efficient watering schedule be adhered to.

Management.—The young pasture must be permitted to establish itself properly before grazing is commenced. From a March sowing, grazing is usually possible within 10 weeks, but this time may extend to 12-14 weeks with a later sowing.

If grazing dairy cows, maximum feed utilization is invariably obtained when an electric fence is used.

Heavy grazing is possible during the spring months, this time corresponding to the period of heaviest pasture production. Grazing should be adjusted in order to maintain a good ground cover at all times. This is of particular importance during the summer in reducing the temperature of the soil surface.

Temperatures of 130 deg. on bare ground are not uncommon and considerable harm to the pasture species can result. The maintenance of a ground cover will reduce the soil surface temperature by as much as 30 deg.

Spelling of the paddock during late summer and early autumn is advisable, following which grazing during the winter months is then possible.

District pastures have maintained an annual production of 35 tons of green material to the acre for several years.

Drastic renovation of irrigated pastures is unnecessary and often quite harmful. The prairie grass mixture might respond to light scarifying early in the season to promote seedling regeneration, but this is only necessary if the grass component is diminishing. Such a renovation would do more harm than good to the white clover mixture and the light renovation resulting from the use of pasture harrows for manure spreading is quite sufficient.

Motor car tyres, cut in half around the tread and fastened cut side down to a drawbar, have proved to be cheap and efficient for manure spreading.

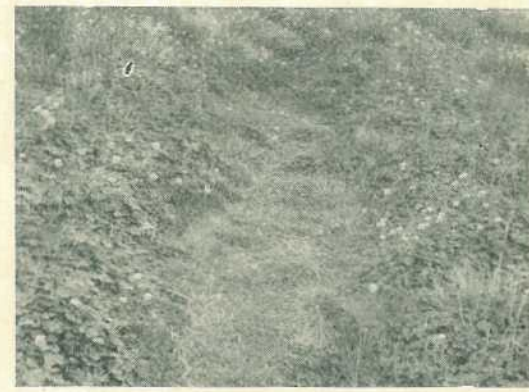


Plate 3

Response to a Mixed Nitrogen/Phosphorus Fertilizer is Demonstrated on Messrs. T. G. & L. M. Matthews' Pasture. Either side of untreated strip was fertilized at the rate of 187 lb. per acre.

The use of fertilizers is important on the lighter soils of the district. In these cases, dressings with superphosphate or even mixed fertilizer containing nitrogen can be of considerable value. Superphosphate is best applied at planting time at a rate of approximately 1 cwt. per acre (Plate 3).

If using a nitrogenous fertilizer to promote rapid grass growth, it should be topdressed onto the established pasture. If applied at planting time, establishment of the legume portion could be adversely affected.

There is evidence suggesting that applications of potash could be beneficial. However, this work is still in the experimental stage and a firm recommendation cannot yet be made.

QUALITY OF IRRIGATION WATER

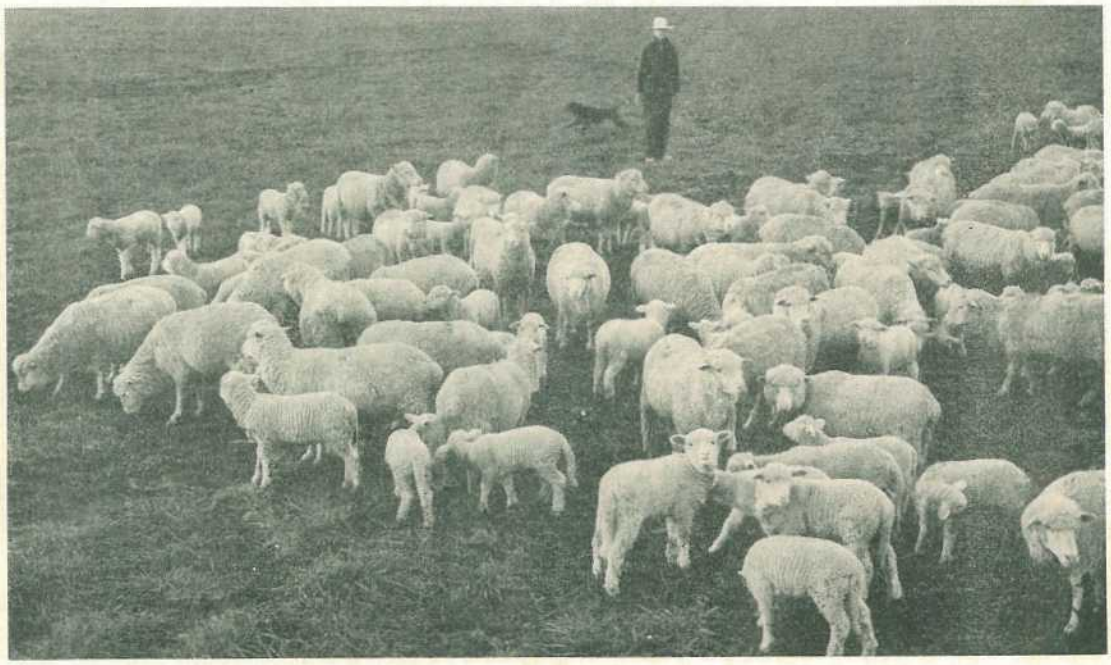
The quality of irrigation water is of extreme importance where the water is obtained from an underground supply. An excessive salt content will result in rapid deterioration of the pasture, and, consequently, samples of water should be analysed before commencing an irrigation project. The analysis is carried out by the Department of Agriculture and Stock in Brisbane.

WATER APPLICATION

The greatest limiting factor to pasture production is insufficient watering, so it is essential that efficient irrigation practice be adopted and adhered to. During hot dry weather it could be necessary to irrigate every 12 to 14 days in order to maintain a satisfactory level of moisture in the root zone. A soil auger is of considerable value in determining when it is necessary to irrigate, and a soil probe to determine when to cease watering. For pastures the soil should be wet to a depth of about 2 ft. This can be achieved by application of 2 to 3 in. of water, the quantity depending on soil type.

During the cooler weather, applications can be lighter and less frequent because evaporation and transpiration are at a minimum. As the weather becomes warmer, heavier and more frequent watering is required to offset this moisture loss.

Because the pastures are dormant from mid- to late summer, a frequent mistake is to stop watering during that period. This can result in loss of clover from the pastures.



Polwarth Ewes and Lambs on Oats at Carinya Stud, Bindango.

A Ready Reckoner For Tax Concessions

By E. O. BURNS, Agricultural Economist

Most farmers are aware of the special concession which permits them to treat certain capital expenditure as a deduction from taxable income. Clearing, weed control, dam construction, and so on come into this category.

This concession should always be borne in mind when considering whether a development project is worthwhile or not, as it has the same effect as a direct reduction in the cost of that project.

Table 1 has been drawn up to provide farmers with a quick and easy guide as to the saving they can expect to offset against the cost of the work. Because of our progressive system of taxation, this varies in accordance with the taxable income level.

The table is based on rates applicable to the 1959–60 financial year, and applies to incomes which are not subject to averaging.

To use the table, first find, in the left-hand column, the approximate taxable income you would expect to obtain if you did **not** incur the particular development expenditure you are considering. Then find the approximate cost of the project at the top of the other columns. Where

TABLE 1

SAVING IN TAXATION PAYABLE FOR YEAR IN WHICH SPECIAL CAPITAL EXPENDITURE IS INCURRED

(*Nearest £*)

Estimated Taxable Income before Expenditure	Capital Expenditure Allowable as Deduction								
	£100	£200	£300	£500	£1,000	£1,500	£2,000	£3,000	£4,000
£	£	£	£	£	£	£	£	£	£
200	2	2	2	2	2	2	2	2	2
300	5	8	8	8	8	8	8	8	8
500	10	18	24	26	26	26	26	26	26
700	13	26	35	48	51	51	51	51	51
900	17	31	45	67	83	83	83	83	83
1,200	21	41	59	91	140	143	143	143	143
1,600	26	51	75	119	202	240	240	240	240
2,000	30	61	89	143	257	332	357	357	357
2,400	33	67	101	165	303	409	477	492	492
2,800	36	73	109	180	341	472	572	637	637
3,200	39	78	118	193	370	526	653	792	794
4,000	44	87	132	218	420	608	779	1,036	1,136
5,000	49	98	147	245	480	697	900	1,259	1,515
6,000	52	105	157	261	528	768	1,002	1,422	1,781
8,000	55	110	165	276	551	826	1,100	1,623	2,102

TABLE 2

REDUCTION IN TAXATION PAYABLE AFTER PURCHASE OF ASSETS SUBJECT TO SPECIAL DEPRECIATION

(*Nearest £*)

Estimated Taxable Income before Purchase	Value of Assets Subject to Special Depreciation									
	£100	£200	£300	£500	£1,000	£1,500	£2,000	£3,000	£4,000	£5,000
£	£	£	£	£	£	£	£	£	£	£
200	1	1	1	2	2	2	2	2	2	2
300	1	2	4	5	8	8	8	8	8	8
500	2	4	4	10	18	24	26	26	26	26
700	3	6	8	13	26	35	44	51	51	51
900	3	7	10	17	31	45	57	75	83	83
1,200	4	9	12	21	41	59	76	105	126	140
1,600	5	10	15	26	51	75	98	140	174	202
2,000	6	12	18	30	61	89	117	168	216	257
2,400	7	13	20	33	67	101	135	196	252	303
2,800	8	14	22	36	73	109	145	213	280	341
3,200	8	15	24	39	78	118	157	230	302	370
4,000	9	17	27	44	87	132	176	258	342	424
5,000	10	20	29	49	98	147	197	295	387	480
6,000	10	21	31	52	105	157	209	314	418	533
8,000	11	22	33	55	110	165	220	330	440	546

the columns meet is the amount you can offset against the expenditure by savings in taxation.

For example, if you expect your taxable income to be £700, and you are considering the expenditure of £500, you could expect to save £48 in taxation, which would reduce the real cost to £452.

Where averaging provisions apply, the table will still be fairly accurate where the expected taxable income is not very much different from the average income. Where there is a substantial difference, find in the left-hand column the two amounts representing taxable and average incomes, and the saving will be somewhere between these two levels.

For example, with an average income of £1,200 and a taxable income for the year of £2,000, an expenditure of £500 will reduce taxation by something between £91 and £143.

Special Depreciation Allowance

Primary producers are required to claim as a depreciation deduction one-fifth of the cost of practically all newly-acquired assets.

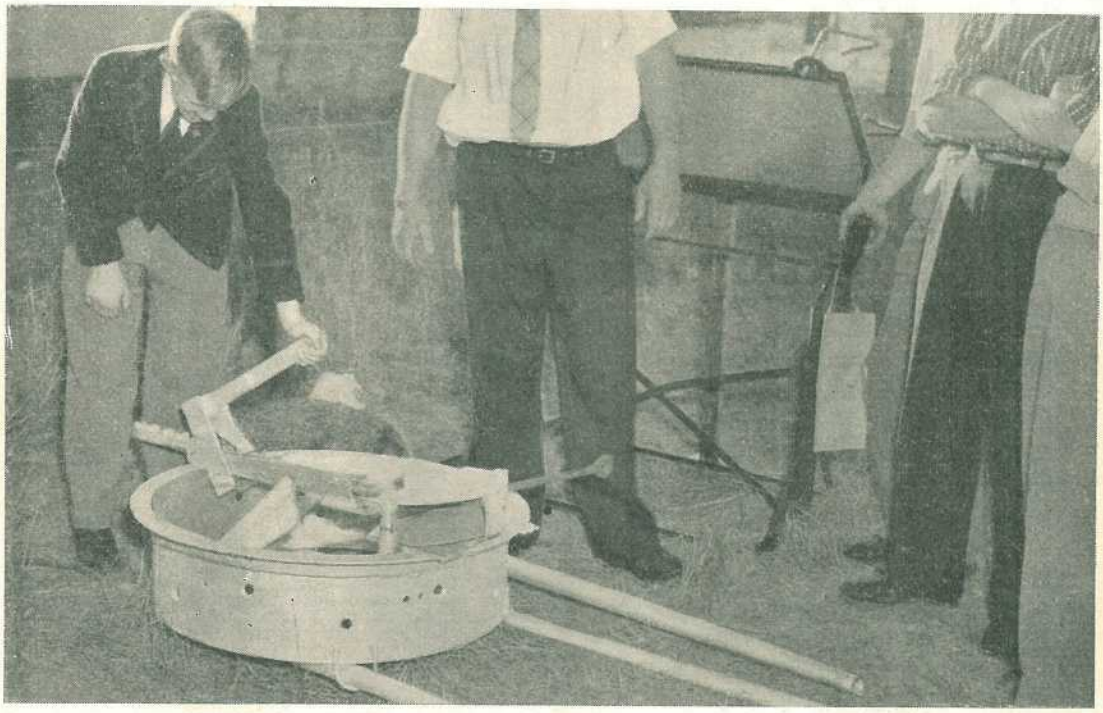
This is not as clear-cut a concession as is the deduction for capital expenditure. Depreciation of assets is a normal business expense, and the 20 per cent. rate does not result in any greater deductions in total than a rate based on the normal working life of the asset.

The special rate is designed to speed-up farm investment by increasing farmers' liquidity.

Table 2 is designed to assist in investment decisions by showing the reduction in taxation payable on the purchase of an asset subject to the 20 per cent. depreciation rate. Remember that this deduction only applies for five years, and thereafter no further deduction may be claimed for this asset.

The table is read in the same manner as Table 1. For example, if taxable income is estimated at £1,600 before making the investment, the purchase of an asset worth £2,000 will reduce taxation by £98 for the first year. The reduction for the next four years will depend on the taxable income for those years. In the absence of averaging provisions, if the taxable income the next year is £700, taxation will be reduced that year by £44.

Land May Be Levelled for Flood Irrigation Simply and Effectively by Using the Johns Leveller.



A Home-Made Pipe Bender Entered by Mr. R. H. HINZ (Brookstead) at the 1959 Toowoomba Farmers' Festival.

Brucellosis-Tested Swine Herds

(As at 1st April, 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
Handley, G. R. "Lochlyn" Stud, 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., Ascot, via Greenmount
"Tayfield" Stud, Taylor
Q.A.H.S. & College, Lawes
Regional Experimental Station, Hermitage
Rosenberger, N., "Nevrose", Wyreema
Schellback, B. A., "Redvilla" Stud, Kingaroy
Smyth, E. F., "Grandmere" Stud, Manyung, Murgon
Stark, H. L., "Florida" Stud, Kalbar
Thomas & Sons, F., "Rosevale" Stud, Laravale
Traves, G., "Wynwood" Stud, Oakey
Weier, V. F., "La Crescent", Clifton
Wolski, A., "Carramana", Warra
Young (Jnr.), W., Kybong, via Gympie

Large White

Assenbruck, C., Mundubbera
Barron Bros., "Chiltern Hill", Cooyar
Bell & Son, E. J., "Dorne", Chinchilla
Butcher, Dr. B. J. & Parnwell, A. J., Plunkett, via Tamborine
Clark, L. D., Greens Creek, Gympie
Duncan, C. P., "Colley", Flagstone Creek
Fowler, S., "Kenstan", Pittsworth
Franke, H. J., "Delvue" Stud, Cawdor
Garawin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield
Gibbons, A. E. H., Mt. Glorious
Gibson, H., "Thistleton" Stud, Maleny
H. M. State Farm, Numinbah
Hall, M., "Milena" Stud, D'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., "Karajoy", East Nanango
Kanowski, A., "Exton", Pechey
Kennard, R. B., "Collar" Stud, Warwick
Larsen, H. L., "Oakway" Stud, Kingaroy
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View", Yandina
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood
Mack, A. J., Mundubbera
Neilsen, L. R., "Sunny Hill," Ascot, via Greenmount
Neilsen, A. R., Ascot, via Greenmount
Palmer, V. P. & Son, "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
Radel, R. M., 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
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, A. R., Ascot, via Greenmount
Orange, L. P., "Hillview," Flagstone Creek

Build This Tank For Your Dairy

By P. McCALLUM, Senior Dairy Adviser,
and H. WOODINGS, Silo Construction Officer.

A plaster concrete tank for storing water at the dairy shed was recently constructed on the farm of Mr. J. C. Naylor, Ferny Grove. The tank is the first of its kind in Queensland, and was built as a demonstration under the Commonwealth Dairy Extension Grant.

Lack of sufficient water suitable for cleansing dairy equipment is a problem on many dairies. It is recommended that provision be made to store a minimum of 2,000 gallons at the shed, such an amount ensuring adequate water during short dry spells.

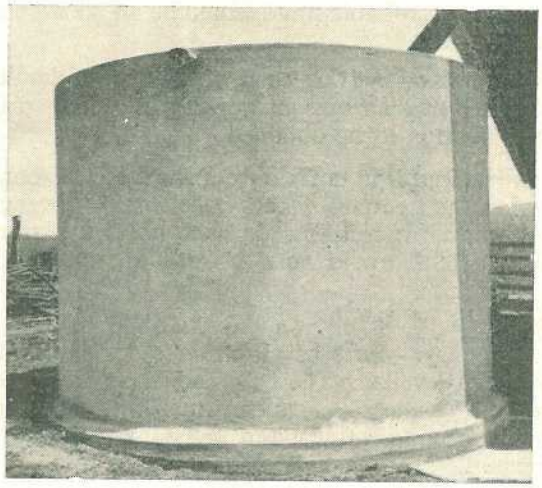
The purpose in erecting this plaster concrete tank was to demonstrate that a concrete tank can be built without the need for any boxing or heavy moulds, and with a minimum of materials. The principle of the method is first to build a "cage" or "basket" of welded steel reinforcing materials as used in the building industry. This "basket" is then placed in position on a concrete base and plastered with a sand and cement mixture. The farmer who has some experience with cement work should be able to do the plaster work satisfactorily. The result is an exceptionally strong tank which will not rust and which is economical of materials.

The dimensions of the tank are: height 6 ft.; diameter about 8 ft.; capacity 2,000 gallons approximately.

Materials

The materials required were as follows:—

1. *Major items*—
   - 16 bags of cement
   - 1½ yards of coarse sand
   - 1½ yards pit sand (or plaster sand)
   - 1 yard gravel, ⅜-in.
   - 35 ft. of 7 ft. 6 in. reinforcing fabric (6in. x 6 in. mesh)
   - 13 sheets of K-lath sheeting 98½ in. x 28 in.



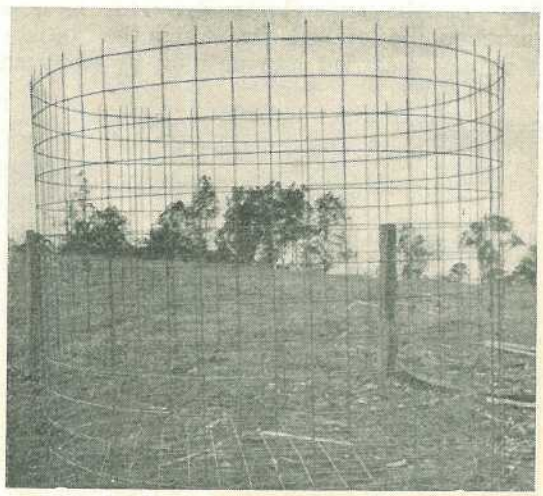


Plate 1 (Top): **Plaster Concrete Tank Built on the Dairy of Mr. J. C. Naylor, Ferny Grove.**

Plate 2 (Bottom): **The Wire Basket and Bottom Ring Ready to be Put in Position for Concreting to Start.**

2. *Sundry items*—

4 to 5 ft. x 1 in. G.W. piping
1 water tap
1 gauze strainer
16 x 5 ft. lengths x ⅜-in. steel rods for roof
1 overflow pipe
½ gal. mortar waterproofer.

The materials used cost about £34 (Brisbane). The cost of a 2,000 gallon galvanised tank made up is approximately £35 to £40 (Brisbane). The erection of a suitable stand would be an additional cost.

It is pointed out that costs of equipment should be related to their normal working life if any real comparison is to be obtained.

Galvanised iron tanks have a short life in some districts, and certain waters considerably shorten their normal useful life. In such cases a plaster concrete tank would be a suitable alternative.

Sequence of Work

First Day.—First of all the site for the tank should be levelled. The base should be level and firm. It is possible to construct this tank on sloping ground provided a satisfactory base is prepared.

The next step is the construction of the wire "cage" or "basket" (Plate 2). This is done adjacent to the levelled site. Later the "basket" can be easily carried into position by two men.

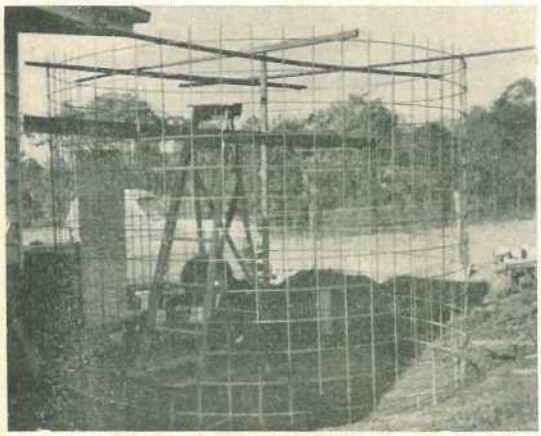


Plate 3

Basket Cemented into the Base and Ready to Take the K-Lath Sheeting.

A 26-ft. length of the 6 in. x 6 in. mesh reinforcing fabric is cut off the roll and made as near round as possible. This section is overlapped on the join by 6 in. (one mesh) and firmly wired at the seam from top to bottom. The bottom ring is cut out of this basket with a pair of steel cutters and the 6 in. vertical strips are then bent towards the centre. These turn-ins are then securely wired to the floor reinforcement.

A circle is marked on the levelled earth with a stick held at the end of a cord attached to a central stake. The radius of this circle should be about 4 ft. 6 in. This allows the base to extend some 6 in. beyond the wall of the tank. The circle is then boxed on the outside to a height of 6 in. Strips of hardboard, three-ply or light timber can be satisfactorily bent to shape.

Concreting of the base can now commence. Three inches of concrete are laid over the base. The mixture should be 4 parts gravel, 2 parts sand, 1 part cement. The steel basket is lifted bodily and immediately lowered on to the wet concrete base.

At this stage the water outlet pipe should be laid in position. This pipe should be set into the concrete bottom and not in the plaster wall, as any subsequent movement could crack the wall. This pipe should be bent at right angles beforehand and be of the desired length. To provide for complete drainage of the tank when necessary, a union connects the horizontal and vertical portions of the outlet.

A further 2 in. of concrete are now floated over the surface and finished with a mortar top of about 1 in. before the concrete has had time to set hard. This mortar top is made of 2½ parts of clean sharp sand and one part of cement (Plate 3).

Second Day.—Before plastering can commence, provision must be made to enter and leave the tank without disturbing the soft plaster. A step-ladder or trestle is suitable.

A wire mesh plaster reinforcement with paper backing, known as K-lathing, is now firmly fixed with tie wire to the inside of the steel basket, working from bottom to top (Plate 4). As the width of the K-lathing is 28 in., three widths cover the inside nicely.

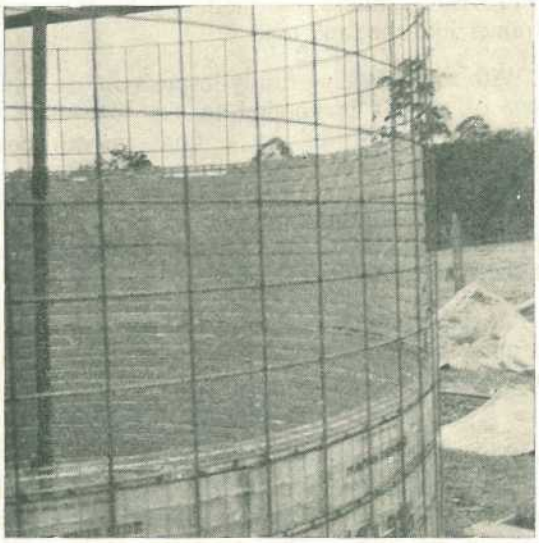


Plate 4
K-Lath Sheeting Being Wired to the 6 in. x 6 in. Wire Mesh.

This should be secured to the steel mesh about every foot so as to provide a firm backing when applying the plaster.

The overflow pipe is next fitted in position.

In Mr. Naylor's tank the roof reinforcing was not fixed in position until the walls were plastered, but it is recommended that the ⅜-in. reinforcement rods for the roof be now fitted. These rods should be bent to the desired shape beforehand. Six inches on one end of the 5-ft. rod is bent at nearly a right angle, and 3 in. on the other end bent at the same angle. These short ends are later tied to a ring in the centre of the tank roof.

Each bent rod is now fitted, with the 6 in. bent section being fastened firmly with tie wire to the top of the wire basket. When all the rods are wired in position they are firmly tied in the centre to a ring. Alternatively they can be satisfactorily joined with wire.

Further reinforcement to the roof is not laid until the plastering of the wall is carried out.

In Mr. Naylor's tank the rods were hooked in the centre to a 1¼ in. pipe which was previously set upright into the base when it was poured (see Plate 3).

A batch of plaster mixture is now prepared from 2 parts of plaster sand, 1 part coarse sand, 1 part cement. This is mixed with water to plaster consistency. Experience on the first mix or two will show the desired consistency. It is a sound precaution to sieve all the sand used for the plaster work.

The first outer coating is now commenced. The interspaces in the 6 in. mesh are first filled. An ordinary plasterer's float is used. This coat should not be smooth, and it does not matter even if patches of daylight can be seen through it (Plate 5).

The first rough coat is immediately followed by a second coat, which should completely cover the steel mesh. Before this coat dries it is scratched and roughened to help the final coat to take the next day (Plate 6).

Before finishing this day's work it is recommended that the bottom of the wall both inside and out should be suitably smoothed with a sloping join (coved) to prevent water leakage at the wall and floor junction.

Third Day.—Enter the tank and tear off as much of the paper backing as possible from the K-lathing. Then plaster the inside. Two coats are advised. A mortar water-proofing compound should be incorporated in the second coat.

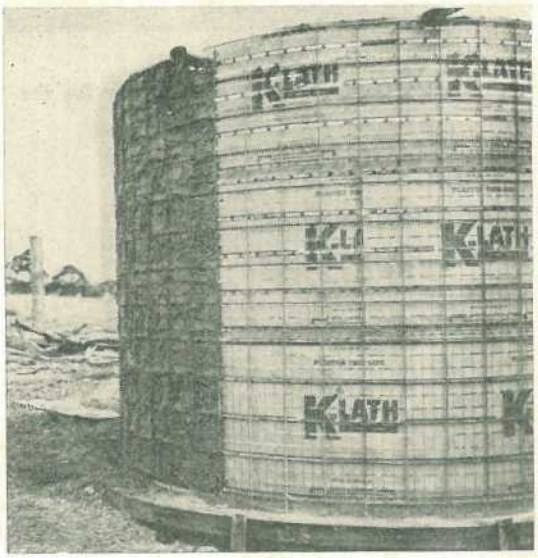


Plate 5
First Plaster Coat Applied to Part of the Reinforcing Material.

In Mr. Naylor's tank only one coat of plaster was applied to the inside. This was later painted with two coats of a water-proofing compound.

Neatly cove the wall to the bottom of the tank.

A final coat is now put on the outside wall. This should be as smooth as possible and make a wall about 1¾ in. thick.

Fourth Day.—The roof or top is now built. Some wire can be laced to the ⅜-in. rods at their widest spacings to give extra support to the K-lathing.

K-lathing is now placed over the roof reinforcement. The edges are trimmed to shape and firmly tied at the top of the reinforcement to the wall.

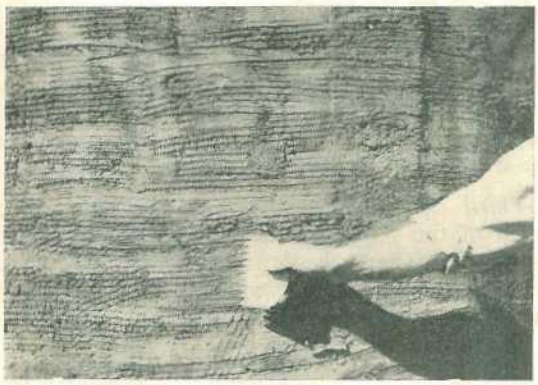


Plate 6
Roughened Second Plaster Coat Ready for the Final Coat.

Provision should be made to fit the gauze strainer into the tank top.

With the K-lathing firmly in position, a scratch coat of plaster is applied to the top. This is immediately followed by a final smooth coat. This gives a top of 1 in. to 1¼ in. thick.

If desired a protective coat of paint could be applied internally to the exposed reinforcing rods of the roof to minimise rusting.

All plaster must be moistened for a few days to cure, but no storage water allowed to enter until curing is complete.

Labour Costs

The time taken to build this plaster concrete tank was 4 days, and it was erected by working between milkings. The plasterer requires the assistance of one man throughout to prepare continuous supplies of plaster.

If a plasterer is employed he would be required for 2½ days. This would add considerably to the cost. However, as mentioned earlier, the plastering work in this tank requires no more skill than that possessed by the "handy" farmer.

Should any farmer contemplate building a plaster concrete tank similar to this unit, further information and guidance can be obtained from the Department of Agriculture and Stock, Brisbane.

Common Weeds of Farm and Pasture

by S. L. Everist, B.Sc., Government Botanist.

A handbook that contains brief descriptions of about 110 of the common weeds of Queensland with notes on their distribution and control.

Price to Queensland farmers . . . . . 5s.
To others . . . . . 7s. 6d.

Available from Department of Agriculture and Stock, Brisbane.

Orchard and Garden

Land Preparation for Beans.—Vegetable crops will always do better on land that is nicely cultivated and in good tilth.

And the important French Bean crop is no exception. Many poor stands, indeed, can be attributed mainly to casual or last-minute soil preparation.

There is no substitute for thorough preplanting cultivation. At least two ploughings are needed. The first, about 9 in. deep, should be made to turn in the green manure crop, about six weeks before sowing. This interval is essential for proper decomposition of the organic matter.

The second ploughing, normally to 6 or 8 in., can be left until shortly before sowing. This reduces the soil from the rough to a more friable condition. Then a few good harrowings will produce the texture and tilth desirable for seed germination and plant growth.

The soil is then ready for drilling and planting of the seed.

Soils vary, of course, as does the amount of tillage required. Self-mulching types break down to a tilth easily, while others require more handling; clodding may be more persistent. Whatever the soil type, however, make sure that final preparation produces conditions favourable for quick germination. If the soil is rough, lumpy, and cloddy you can only expect poor germination, uneven, slow growth, and, worst of all, low yields.

Harvesting the Meyer Lemon.—The Meyer is not a true lemon but actually a lemon-orange hybrid with a mixture of parental characteristics. When the fruit matures on the tree the colour is light orange and the shape is roundish. Again, tree-coloured fruit does not keep nor carry well.

These are obvious disadvantages; features without appeal to lemon buyers.

However, if the Meyer is picked in the early, green-mature stage and then artificially coloured in a suitable chamber, the fruit has an acceptable lemon shape and the rind a good lemon tint. In this condition, the fruit attracts buyer interest, particularly during the January to early March period when supplies of Villa Franca and Lisbons are normally scarce.

Meticulous and careful harvesting is essential with the Meyer.

Each fruit should be double clipped. Do not pull the fruit. Stem-end injury will only open the way for disease infection. The rind, too, is soft and easily injured; handling should be gentle right from tree to packed case.

The Meyer must be really dry before colouring is attempted. Moist fruit is very prone to scald and breakdown.

—D. DOWDLES, Adviser in Horticulture.

Grafted Passion Vines.—Grafted passion vines have given a big boost to passionfruit plantings on farms and in home gardens. But although the golden passion rootstock is resistant to the serious disease Fusarium wilt, the plants are just as susceptible as ordinary purple passion vines to other pests and diseases.

Many people seem to expect their grafted vines to be resistant to all major pests and diseases. But this is not the case, and precautions must be taken to avoid losses. The Agriculture Department has recently received many inquiries from farmers and gardeners about damage by fruit fly, woodiness virus and brown spot.

The vines must be pruned each year, and in the warmer months, sprayed regularly with zineb or a copper fungicide to control brown spot. Fruit fly is controlled by spraying with 0·2 per cent. DDT, and pests like red scale and mites must also be combated when necessary.

Timing Banana Cropping.—In North Queensland, bananas will usually mature their first bunch in 12 to 15 months from planting. Timing of the first crop is, therefore, a fairly easy

matter by adjusting the planting. For commercial production the winter market is most profitable to North Queensland growers so planting between April and August is indicated. The period in the middle of the winter should be avoided because establishment of the plants then is very slow and they may make only weak growth.

The big problem, however, is in timing the ratoon crop to obtain winter harvesting too. If suckers are allowed to grow naturally on plants set to obtain a winter crop they will produce the ratoon crop in the following summer. This is most undesirable for the farmer because harvesting conditions are unsatisfactory then, the fruit is soft and difficult to transport to the market in good condition, there is grave risk of loss from fruit fly, thrips and caterpillars, and, to cap it all, the prices obtained are likely to be poor.

Of course, these early suckers can be destroyed and later produced suckers can be left for the ratoon crop. But the difficulty in this is that the later suckers are frequently weak and lacking in vigour so that they cannot produce a good bunch. It is only the early suckers that can be depended upon to have the necessary vitality.

The solution to this apparent difficulty is to retain the early, vigorous sucker as a nurse plant and take out all the later suckers. By the time this nurse plant is about one third to one half grown it in turn will throw up a vigorous sucker some time between about April and August. The nurse sucker should then be cut off and its growing point destroyed so that its follower will become the plant to produce the ratoon crop at the time it is wanted in the following winter.

—S. E. STEPHENS, Horticulturist.

Electrical Conductors Save Life and Property

Just as the lightning conductor protects the building from nature's electrical outbreaks, so does the earthing conductor protect the home from any unnatural electrical breaks. Therefore, it is not surprising that when electrical accidents do occur, the most common cause is a lack of effective earthing of electrical installations.

For instance, should a fault develop in the wiring of an installation, and the earth connection happen to be broken, then the exposed metal parts of the installation become "alive." This happens because the earthing failure prevents the fuse or circuit breaker from operating and cutting off the defective part of the installation from the supply.

Such an occurrence can cause electrical shock in the most unusual circumstances. Cases have been recorded of shocks received from clothes lines which had been in contact with energised earth wires.

More commonly, people receive shocks when they come into contact with metal portions of the installation including the disconnected earth wire.

Periodic Checks

Of course such accidents should never happen. Earthing conductors on electrical installations are put there for protection purposes, not injury, and the electrical safety of a home depends on periodic checks of the wiring to ensure that the earthing conductors have not been interfered with or damaged in any way.

A faulty lightning conductor only constitutes a hazard during an electrical storm, but a faulty earthing conductor is an ever-present menace to the whole household. For this reason there should be no question of doubt concerning the safety of household wiring.

Any local electricity supply authority will arrange inspection of house wiring and household appliances upon receiving a written request. What is more they will conduct the inspection at their own expense, and continue the free inspections once every five years.

Thus, the initial cost of electrical safety is the price of a postage stamp.

—State Electricity Commission.

GRACEMERE

A Queensland Fauna Sanctuary

By **C. ROFF,** Fauna Officer

Gracemere is linked with the early history of Central Queensland, and is the oldest in the coastal chain of waterfowl sanctuaries.

On May 7, 1853, Charles and William Archer, when on a land selection expedition from Eidsvold on the Burnett River, arrived in the area now called Gracemere. The following extracts from letters written in 1853 by Charles Archer to their father William Archer in Laurvig, Norway, describe the locality:

"Three miles further in a northerly direction we struck the Lake, which to our surprise was—for this country—a most magnificent sheet of fresh water about 2 miles long and ¾ mile wide—as near as we could guess. Near its western end we found a well watered creek, with scrub a few hundred yards to the edge of * Farris, as we named the Lake. The edges round Farris are of whinstone. Rich flats also run down to the lake exceedingly well adapted for cattle."

"It is almost covered with water fowl such as pelicans, swans, geese, ducks in endless variety, coots, etc., etc."

In 1855, the land was taken up for grazing by the Archer Brothers. They were impressed by the lagoon and birdlife which reminded them of their native Norway and immediately established a private sanctuary. During 1885 the

* The name of the Lake was changed from Farris to Gracemere about 1855 in honour of the wife of another brother, Tom Archer, who had arrived at Eidsvold by bullock wagon in 1853.

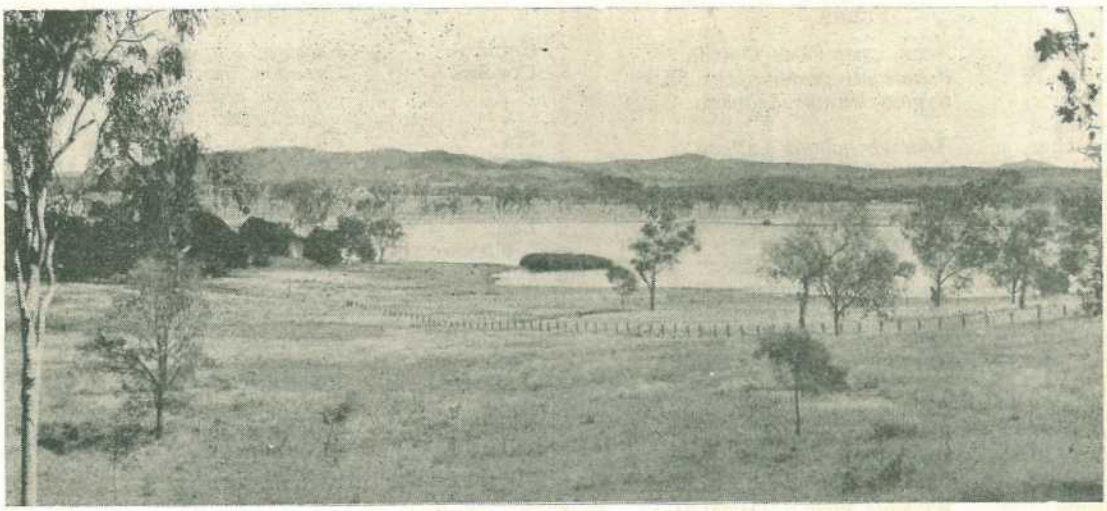


Plate 1

Gracemere, A Queensland Fauna Sanctuary

locality was declared an official sanctuary for birds, and in 1916 this was extended to include mammals.

The waters in this 1,400-acre sanctuary come from Gracemere Creek which spreads into the extensive natural Gracemere Lagoon and adjacent swamps now fringed by grasslands and some cultivation. Since 1853 Gracemere has dried out on only three occasions: 1902, 1942 and 1945.

The sanctuary is situated south west of Rockhampton about six road miles along the Gogango Highway. The access road turns off half a mile before Gracemere Railway Station and runs a mile westwards to the picturesque old homestead standing on a small peninsula jutting into the lagoon. This shingle-roofed hardwood-slabbed homestead was built in 1858 and is still occupied.

In 1880 Carl Lumholtz, a member of the Royal Society of Sciences of Norway, mentioned 37 species of birds on Gracemere and during a survey in 1959, John Warham, an ornithologist, recorded 89 species. Today flights of grey teal, black swans, black duck, white-eyed duck, blue-winged shoveller and maned geese, are the principal fauna. Coots, musk duck, and the occasional graceful lotus bird occur and the migrant pelican is often on the waters of the lagoon. Possums, wallabies and native water rats are also present.

Harmless green tree snakes and large goannas are common together with occasional brown and black snakes. In the waters, sleepy cod, mullet, garfish, bony bream and freshwater jew abound.

The ridges are sparsely covered by silver-leaf ironbarks, long-fruited bloodwoods, poplar gums and coolibahs; a few trees such as yellowwood, Leichhardt and fig remain as evidence of the original riverine vine-scrub.

Along one edge of the lagoon is a small area of papyrus introduced from the Nile River (Sudan) in 1870.

Nearer the edges are paper-bark tea-trees, sedges and couches, with the cleared flats and slopes covered by grasses such as red Natal grass, Rhodes grass, and the cultivated para grass and green panic.

Gracemere is one of the few refuges in Queensland in which wildlife has been protected constantly since the early days. Accordingly the area is well known and respected by the game-shooting community of Central Queensland. It is a splendid example of natural habitat in proximity to an urban population.

SCIENTIFIC NAMES OF FAUNA AND FLORA

Fauna

Black duck	*Anas superciliosa* Gmelin
Black snake	*Pseudechis porphyriacus* Shaw
Black swan	*Cygnus atratus* Latham
Bluewinged shoveller	*Anas rhynchotis* Latham
Bony bream	*Nematalosa eribi* Gunther
Brown snake	*Demansia textilis* Dumeril and Bibron
Freshwater jew	*Neosilurus* sp.
Garfish	*Arrhamphus sclerolepis* Gunther
Goanna	*Varanus varius* Shaw
Green tree snake	*Ahaetulla punctulatus* Gray
Grey teal	*Anas gibberifrons* Muller
Lotus bird	*Irediparra gallinacea* Temminck
Maned goose	*Chenonetta jubata* (Latham)
Mullet	*Tachystoma* sp.
Musk duck	*Biziura lobata* Shaw
Pelican	*Pelecanus conspicillatus* Temminck
Possum	*Trichosurus vulpecula* Kerr
Sleepy cod	*Oxyeleotis lineolatus* Steindachner
Wallaby	*Wallabia bicolor* Demarest
Water rat	*Hydromys chrysogaster* Geoffroy
White-eyed duck	*Aythya australis* (Eyton)

Flora

Coolibah	*Eucalyptus microtheca* F. Muell.
Couches	*Cynodon dactylon* (L.) Pers., *Paspalum distichum*. L., *Pseudoraphis spinescens* (R.Br.) J. Vickery
Fig	*Ficus* sp.
Green panic	*Panicum maximum* Jacq. var. *trichoglume* Eyles
Leichhardt tree	*Nauclea orientalis* L.
Long - fruited bloodwood	*Eucalyptus polycarpa* F. Muell.
Paper - barked tea-tree	*Melaleuca leucadendra* (L.) L.
Papyrus	*Cyperus papyrus* L.
Para grass	*Brachiaria mutica* (Forsk.) Stapf.
Poplar gum	*Eucalyptus alba* Bl.
Red Natal grass	*Rhynchelytrum repens* (Willd.) C. E. Hubbard
Rhodes grass	*Chloris gayana* Kunth.
Sedges	*Eleocharis* spp. *Cyperus* spp. *Fimbristylis* spp.
Silver-leaf ironbark	*Eucalyptus melanophloia* F. Muell.
Yellowwood	*Terminalia oblongata* F. Muell.

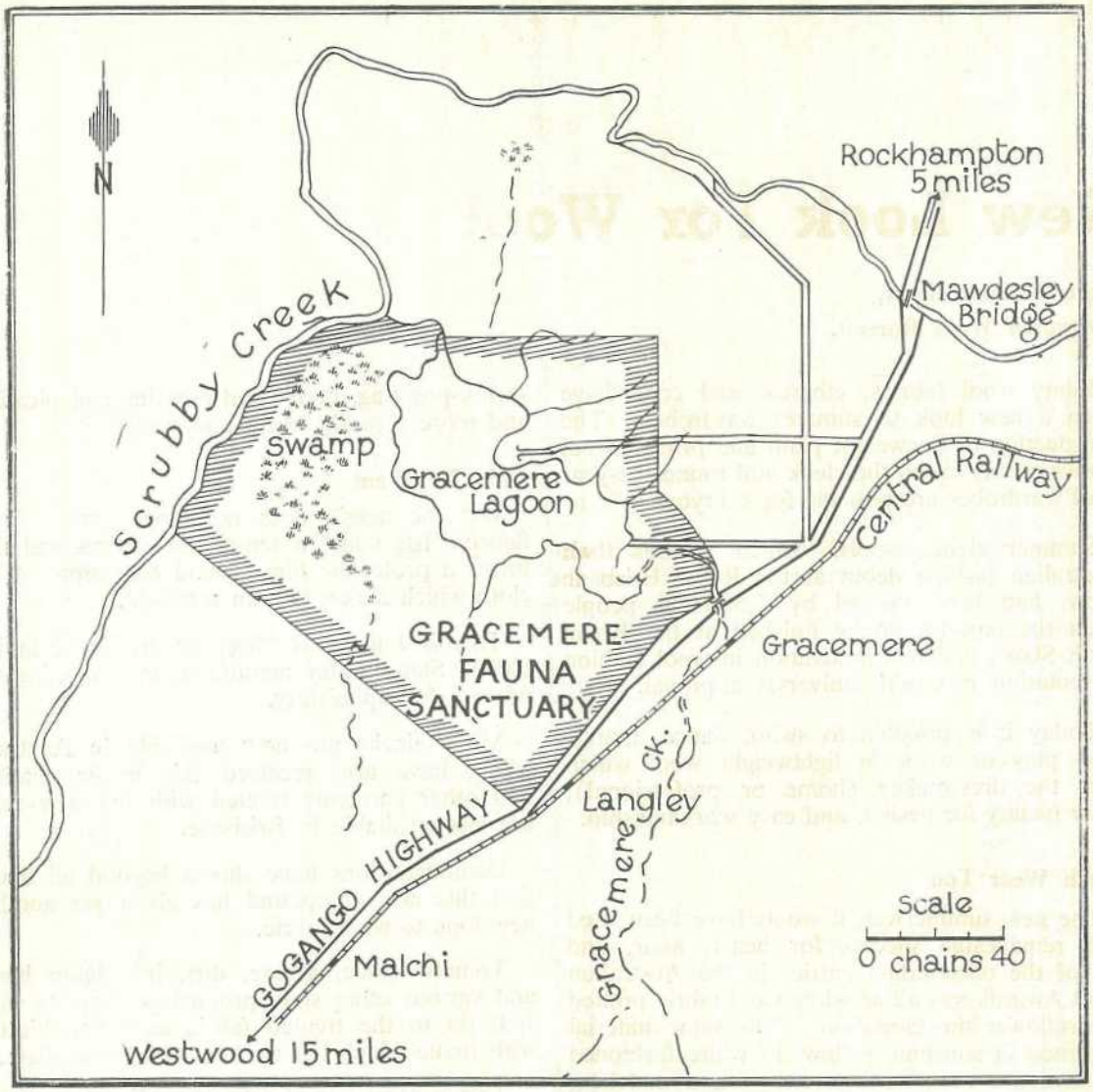


Plate 2

Map Showing the Gracemere Fauna Sanctuary

QUEENSLAND BUSH BOOK CLUB

The Queensland Bush Book Club will supply reading material to anyone living beyond the reach of a town library. For a fee of 3s. 6d. a year, subscribers may receive parcels of 10 books, and some magazines and illustrated papers. Parcels will be consigned to the subscriber free of cost to the nearest railway station but subscribers will make their own arrangements for delivery from the station. Each parcel contains about three months' reading but exchanges may be made more often if required.

Write to Secretary, Bush Book Club, Victory Chambers, Adelaide Street, Brisbane, enclosing 3s. 6d. and you will be enrolled as a member. If living north of St. Lawrence write to Bush Book Club, Box 475 G.P.O., Townsville, and if in the Brisbane Valley to Bush Book Club, Ipswich.

New Look For Wool

From Eleanor Knox,
Australian Wool Bureau.

Filmy wool fabrics, ethereal and cool, have given a new look to summer wardrobes. The introduction of fineweight plain and printed wool fabrics means round-the-clock and round-the-year wool wardrobes are possible for everyone.

Summerweight wools, which made their Australian fashion debut at the Royal Brisbane Show, had been viewed by 1,500,000 people when the parades finally finished at the Royal Perth Show, and this innovation in wool fashion presentation met with universal approval.

Today it is possible to swim, dance, marry, dine, play or work in lightweight wool which offer the dressmaker (home or professional), every facility for design, and easy workmanship.

Beach Wear Too

The new summerweight wools have been used with remarkable success for beach wear, and one of the outstanding entries in the Australian Wool Awards was a fine white wool fabric printed in cornflower blue carnations. This same material patterned in sunshine yellow on white fashioned an attractive race frock, worn with a matching yellow coat.

Vividly patterned wool fabric re-embroidered in matching sequins was used in a dramatic evening gown, which was submitted for judging, and a wonderfully draped and embroidered wedding gown, with matching wool gloves, headdress, and shoes, equally emphasised wool's place in the fashion world.

But wool's new look is not confined to the fashion field. The band of magicians, the scientists who work with wool, have developed in recent months a new technique for moth-proofing, shrink-proofing, permanent creasing and pleating, and more recently, wash and wear.

Stain Repellent

But the magic does not stop there. From fluorine has come a remarkable compound that forms a protective film around each fibre of the cloth which makes it stain repellent.

This is known as "Scotchguard" and in the United States today manufacturers are using the process for upholstery.

Many slacks are now available in Australia which have also received this magic coating, and other garments treated with the new resin are also available in Brisbane.

Demonstrations have shown beyond all doubt that this new compound has given yet another new look to wool fabric.

Tomato sauce, grease, dirt, ink, lamp black and various other stain producing elements were spilt on to the treated fabric and then blotted with tissue which left the material immaculate.

This process has also been applied to a range of wool fabric covered women's shoes with satisfying results.

Wool's ability to breathe, coupled with its safety factor, makes it ideal for children's wear. It is equally valuable as an aid to easy travelling, and the variety of wool fabrics offering will be substantially increased next year when the mills extend their already wide range.

The home knitter will find new and exciting colours in the popular chunky-knit weight for winter wear, or in cobweb-fine wools for evening sweaters.

"Um . . m; it's good!"

Honey Deserves a Place in the Diet

Honey, a food that generates energy quickly, deserves a place in your family's diet all the year round. Especially is this so when, these days, the industry markets varieties of honey to please all tastes.

Flavour and colour of honey vary with the flowers from which the bees gather the nectar. Ironbark and box honeys have wide appeal as these are light-coloured and have mild sweet flavours. Golden honeys from blue and river red gums also have excellent taste. Ground flora yield deeper, full-flavoured honeys.

While the greatest amount of honey is sold in a liquid form, some honeys are also marketed candied or creamed; these are becoming more and more popular because their firmer texture allows easy spreading.

As a variation, honey is marketed in attractive 1 lb. honeycomb sections taken direct from the hive. Honeycomb is also packed in jars surrounded by clear fragrant honey. In these packs, the honey retains all its natural floral bouquet.

Honey is about four-fifths simple sugars which are easy to digest because they are already in a form that can be absorbed by the human body; the remaining weight is water with small amounts of proteins, minerals and vitamins. Among honeys there is little difference in energy value but the full flavoured honeys contain most minerals and vitamins.

Variety of Uses

As an adventure in good eating, honey has a wide variety of uses. It provides a new taste thrill in breakfast cereals, pancakes, toast and waffles; in cooking it can be used in sauces, cakes, biscuits, custards, puddings, confectionery and beverages.

Honey today has all the qualities that have made it a favourite sweet throughout the ages and those who eat honey are enjoying one of Nature's treats. There is no mystery associated with honey; it is a simple, pre-digested food prepared by the bees from the nectar of flowers

for their own use and which is harvested from them by man for his use.

In addition, beekeepers and packers have modern ways of handling and packaging honey that make it appealing to the taste and convenient to use.

As a Spread

Use *honey* on buttered bread, toast, pancakes, waffles or other hot breads.

For sandwich fillings, after spreading bread with butter, prepare and use small servings of any of the following:—

Peanut paste and *honey*.

Dates, figs and raisins mixed with *honey* and a little lemon juice.

Honey topped with finely chopped apple or sliced or mashed bananas.

Honey sprinkled with grated raw carrot or grated orange peel and dusted with nutmeg.

Honey spread with chopped nuts.

Honey and thinly sliced cheese.

Honey mixed with whipped cream.

In sandwich fillings the most suitable honeys are the candied or creamed.

At the Breakfast Table

Honey with Grapefruit. Halve grapefruit. Free from rind with grapefruit knife and separate sections. Drizzle *honey* over cut sections. Place in refrigerator overnight.

Honey with Cereals. Honey enhances the flavour of breakfast cereals and porridge. Some prefer to sweeten by drizzling *honey* over the dry cereals before adding milk.

Try it this way! Warm the milk and, before using, stir in sufficient *honey* to give the desired degree of sweetness. *Honey* blended with warm milk is delicious.

For the Cake and Biscuit Tin

Walnut Cake

- 2 tablespoons *honey*
- 1 cup brown sugar
- 4 oz. butter
- 2 eggs
- 1½ cups S.R. flour
- ½ cup milk
- ½ teaspoon vanilla
- ½ teaspoon cinnamon
- ½ cup chopped walnuts

Cream butter and sugar, add egg yolks and beat in well. Sift flour and cinnamon. Mix *honey*, milk and vanilla. Add dry ingredients alternately with the liquids, mixing lightly. Add nuts. Beat egg whites till stiff, and fold lightly into mixture. Bake in 7-in. round tin in moderate oven about 40 min. When cold, ice with lemon icing and sprinkle with chopped walnuts.

Light Honey Sponge (No milk or butter)

- ½ small cup *honey* (melted)
- 4 eggs
- ½ cup sugar
- ½ cup arrowroot
- 2 teaspoons plain flour
- ½ teaspoon cream of tartar
- ½ teaspoon bicarb. soda

Separate whites of the eggs (into mixing bowl) from yolks (into a cup), beat whites till stiff, add sugar gradually. Add beaten yolks and beat till stiff and spongy. Sift arrowroot, flour and bicarb. soda 3 times, add to egg mixture. Lastly, add hot melted honey, stir thoroughly with knife. Cook in well-buttered 9-in sandwich tins in slow oven until the cake sets and begins to leave side of tin. Join with creamy filling. Dust top of cake with icing sugar. This is a luscious cake, but watch carefully as it burns easily.

Honey Cinnamon Rolls

- 1 tablespoon *honey*
- ½ lb. S.R. flour
- ¼ teaspoon salt
- 1 dessertspoon castor sugar
- 2 oz. butter
- 1 egg
- ⅔ cup milk

Sift S.R. flour and salt; rub in butter, add sugar; combine honey, beaten egg and enough milk (slightly warmed) to make ¾ cup liquid. Mix into fairly firm dough and knead slightly; press or roll out to ½ in. thickness, cut with round cutter and fold half over; glaze with remainder milk. Sprinkle with sugar and cinnamon. Bake in hot oven for 10 to 12 minutes.

Honey Crisps

- 2 oz. *honey*
- 3 oz. butter
- 1 oz. brown sugar
- 4 oz. cornflakes

Melt butter and honey together in large saucepan, but do not let mixture get very hot. Stir in the sugar, then the cornflakes at once. Stir till they have blended with the other ingredients, then turn the mixture into a well-greased *oblong* tin. Flatten down evenly with back of large spoon, and bake in moderate oven till pale golden brown. Run a sharp knife around the edges of the tin, and leave till cold. Then cut into shapes and turn out.

For Dessert

Honeyed Fruit Jellies

- 3 tablespoons *honey*
- ¼ cup lemon juice
- ⅔ cup orange juice
- ⅔ cup hot water
- 1½ dessertspoons gelatine
- Sliced fruit such as bananas, oranges and whole strawberries

Dissolve gelatine in hot water. Add fruit juices and honey, pour into a mould. Sliced fruit may be set in jelly, or served with jelly. Serve with cream or custard.

Steamed Honey Pudding

- 2 level tablepsoons *honey*
- 1½ rounded tablespoons butter
- 2 teaspoons sugar
- 2 eggs
- Bare ¼ cup milk
- Few drops essence lemon
- 4½ tablespoons S.R. flour (heaped)

Beat butter and honey to a cream, add eggs, beat well. Add milk and lemon essence, then flour (sifted). Steam for 1½ hours. Serve with cream or custard. Sultanas, nuts or dates may be added or chocolate and vanilla essence.

Honey Baked Custard

- 1½ tablespoons *honey*
- 1½ cups milk
- Salt
- 2 eggs
- A little vanilla

Beat eggs with honey, add other ingredients. Pour into buttered pie-dish, sprinkle with nutmeg if desired. Cook gently till set.

Honey Pears and Lemon Sauce

- ¼ cup *honey*
- 1 tin pears
- 1 tablespoon butter
- 1 cup crumbed sponge cake
- ¾ cup cold water
- ¼ cup lemon juice
- 1 cup sugar
- 1 egg

Lemon Sauce:

- 1 oz. butter
- 2 level tablespoons cornflour
- Grated rind of 1 lemon

Drain pears and dry well. Cream butter, add honey, mixing well. Dip pears in honey and butter mixture. Roll in cake crumbs. Place in well-greased shallow dish. Bake in rather hot oven, with decreasing heat, about 20 min. Serve with lemon sauce.

Lemon Sauce.—Mix cornflour with cold water in saucepan. Heat, stirring until thick. Add lemon rind and juice, sugar and lightly-beaten egg. Cook about 3 min., stirring all the time. Do not boil. Add butter, mix in well.

Honey Lemon Butter Tart

Pastry:

- 1 cup S.R. flour
- 1 heaped tablespoon butter
- 2 tablespoons sugar
- 1 beaten egg
- Pinch of salt

Lemon Butter:

- ⅓ cup *honey*
- ¼ cup lemon juice
- ½ cup sugar
- 3 beaten eggs
- 2 tablespoons butter

Pastry.—Sieve flour and salt. Rub in butter, add sugar and mix well. Stir in beaten egg to make a soft dough. Roll out and line a pie plate. Decorate outer edge and prick bottom with fork. Bake in hot oven till golden brown.

Lemon Butter.—Blend all ingredients in a saucepan. Cook in double boiler till thick. Pour into tart shell, top with whipped cream when cool.

For the Children

Honey Toffee Apples

- ½ lb. *honey*
- ¼ lb. butter
- ½ lb. brown sugar
- Cochineal
- Apples

Melt butter in saucepan, add honey and sugar. Stir slowly with wooden spoon till boiling. Add enough cochineal to give a bright red tint. Boil about 10 min. Test a little mixture in cold water. It should be crisp. Mount apples on sticks, dip each in, and turn it round till well coated. Stand in a rack to dry.

Honey Gems

- 1 tablespoon *honey*
- ½ cup brown sugar
- 1 egg
- 1 cup S. R. flour
- 1 teaspoon cinnamon
- 2 tablespoons butter
- A little vanilla
- ¼ cup milk
- Pinch salt

Cream butter and sugar, add vanilla and egg, beat well. Then add milk and honey. To this mixture add the flour, salt and cinnamon sifted together. Place the mixture in teaspoonfuls in warm greased gem irons, and bake in moderate oven about 15 min. Ice with lemon icing. Makes two gem irons full.

Honey Crackles

- 1 tablespoon *honey*
- 3 oz. butter
- 4 cups cornflakes (or any whole puffed grain)
- 2 tablespoons sugar

Bring honey, sugar and butter to the boil and boil 3 min. in a large enough saucepan to take the cornflakes. Then put cornflakes with a

Honey on Fresh Bread and Butter Replenishes Energy After School; and it Tastes Delicious.

pinch of salt into the toffee and mix quickly. Have paper cups ready and put in mixture. Let dry for a few minutes in the oven.

Honey Chocolate Fudge

⅔ cup *honey*	2 cups sugar
¾ cup cream	¼ lb. grated milk chocolate
Nutmeats (walnuts best)	

Combine sugar and grated chocolate, add honey and cream. Mix well. Cook slowly until a little of the mixture will form a soft ball when tested in cold water. Remove from stove Beat until creamy and it begins to lose its shiny appearance. Pour on buttered plates and cut in squares before it becomes too cold. Store in a cool place. (May be rolled in finely-chopped walnuts, or nuts may be omitted altogether.)

Honey Caramel Toffee

½ cup *honey*	¾ cup sugar
½ cup vinegar	

Place ingredients in saucepan and boil briskly until small quantity dropped into cold water becomes crisp. Turn into greased dish to cool.

For Afternoon Tea

Honey Mince Pies

1 tablespoon *honey*	2 cups S.R. flour
Pinch salt	1 heaped tablespoon sugar
¼ lb. butter	
Mincemeat	1 egg

Rub butter into flour sifted with salt, add sugar and lastly beaten egg mixed with the honey. Make into stiff dough and roll out.

Cover greased patty tins with pastry, fill with mincemeat, cover with pastry and nip the edges close together. Put pies in brisk oven and bake for 25 min. or less if required.

Honey Scones

1 teaspoon *honey*
1 tablespoon butter
Enough milk to mix
3 cups S.R. flour
Pinch salt
1 teaspoon grated orange rind

Rub butter into flour, then honey and milk. Mix roll, and cut into scones. Cook on a hot slide in hot oven for 10 min. An egg may be included if desired. (Do not mix too dry.)

Monte Carlo Biscuits

1 dessertspoon *honey*
½ cup sugar
2 cups plain flour
½ cup butter
1 egg
1 teaspoon bicarbonate soda

Cream butter and sugar, add egg, beat again, then add honey. Lastly add flour and soda sifted together. Break off small pieces and roll into balls, place on greased tray and press flat with fork. Bake in moderate oven. When cold, join by spreading jam on one side of biscuit and icing on another. Store in airtight tin, and better if kept for a while before eating.

To Quench the Thirst

Honey Fruit Punch

4 tablespoons *honey*
1 cup orange juice
½ cup grapefruit juice
½ cup lemon juice
2 cups water
1 tablespoon sugar

Blend ingredients well and chill. Serve in tall glasses with ½ orange slice to garnish.

Honey Egg Flip

1 teaspoon *honey*
1 egg
Milk
Flavouring

Beat egg, add honey, fill glass with milk, and add vanilla. (Better warm than cold.)

Honey Gingerade

½ cup *honey*
4 teaspoons lemon juice
1 cup water
½ teaspoon ground ginger
1 tablespoon sugar

Put the water, ginger, honey and sugar into a saucepan, boil till it syrups, stir in the lemon juice and leave till cold. Strain. Serve with iced water.

At Any Time

Honey Salad Dressing

1 teaspoon paprika
½ teaspoon powdered dry mustard
½ teaspoon salt
½ teaspoon celery salt
½ cup liquid *honey*
3 tablespoons lemon juice
¼ cup vinegar
1 cup salad oil

Mix the dry ingredients. Add the honey, lemon juice, and vinegar. Slowly add the salad oil, beating until well blended. Makes about 2 cups.

Potato Cakes

1 small dessertspoon liquid *honey*
½ lb. plain flour
1 small teaspoon yeast
Raisins
2 lb. potatoes
1 small tablespoon butter or lard
Pinch salt

Cook potatoes in their jackets, peel, mash, and mix with flour, butter, yeast, honey, salt and a few raisins. Put into a basin and leave to rise for good hour. Then divide into small oval buns and bake in a fairly hot oven. Would be good with curry dishes (makes 24). A useful supper dish with cheese and chutney.

Honey Baked Ham

Brushed or drizzled in ham during the last half hour of baking, honey adds flavour and gives a golden glaze.

Savoury Stuffed Veal

Four potatoes
1 cup grated cheese
1 cup breadcrumbs
2 tablespoons lemon juice
Pepper
1 large onion
½ cup *honey*
1½ to 2 cups stock
2 tablespoons flour
1½ lb. veal steak (cut in one piece)
2 bananas
Salt
1 tablespoon bacon fat
1 tablespoon chopped parsley
Nut of butter

Line greased casserole with parboiled potatoes cut into slices ⅛ in. thick. Mix flour and cheese, rub well into steak. Cut a pocket in steak and fill with breadcrumbs mixed with roughly chopped bananas, lemon juice, salt and pepper. Sew up with coarse thread. Brown well on all sides in hot bacon fat, place in casserole. Brown the onion and place on top of meat, add balance of flour and cheese mixed with parsley. Warm honey and butter, pour over the steak, then add stock. Cover and bake in moderate oven 1½ hours, removing cover for last 15 min. Serve piping hot garnished with parsley.

Save Your Child From Lead Poisoning

In Queensland, there is a total prohibition in paint of white lead, outstandingly the main cause of lead poisoning.

Because certain colours used for trimmings (mainly yellows and greens) are usually obtained from lead chromates, the use of these will be allowed, subject to certain conditions. They must not contain more than 5 per cent. soluble lead, and they must not be used anywhere easily accessible to children.

While the most recent legislation will eventually remove all danger of lead poisoning from paints in Queensland, certain lead hazards will still exist for some time. In some places there is still old, powdered lead paint within reach of children.

Lead Danger Spots

Examples of typical danger spots are:—

(*a*) Verandah rails.
(*b*) Inside walls of verandahs.
(*c*) Gates and fences.
(*d*) Brightly-painted furniture and interiors (especially greens, yellow and orange).

By touching such places in their play, children get powdered paint on their hands. This can be transferred easily to the mouth especially by nail-biters and thumb-suckers.

Examples of contact with lead paint are:—

(1) Children climbing on and peering through gates.
(2) Small children holding on to verandah rails, and sometimes licking raindrops from them.
(3) Older children drawing on painted walls and then licking their fingers to rub drawings off.

Effects of Lead Poisoning

A very small amount of lead taken into the system daily can be dangerous. There may be no immediate effects, but amongst these children affected by lead, about one-third develop chronic nephritis (Bright's Disease) later in life. Fatalities from this usually occur between the ages of 20-40.

Amongst those children who are affected early by lead poisoning, these are the progressive stages:—

Stage 1.—The child loses appetite and is generally off colour.
Stage 2.—Weakness of the legs and feet, often enough to impair walking.
Stage 3.—Headache and double vision.
Stage 4.—Convulsions, blindness and then death.

Do not forget that even without these early signs, a child can suffer the grave delayed effects of lead poisoning, with chronic nephritis later in life. So don't wait for symptoms before carrying out the protective steps outlined here.

What Parents Can Do

Make sure the paint you buy for any surfaces within possible reach of children is free from lead. To ensure this, read the label carefully, and as a further assurance, ask about it when purchasing.

If you are employing painters or a painting contractor, discuss the observance of the regulations concerning lead paint.

Suspect old, powdered paint, and get advice about it from your health inspector. All powdered and peeling paintwork should be repainted if at all possible. The old paint should be removed first.

Get advice also about brightly painted furniture and especially any greens, yellows and oranges, within reach of the children.

Do your best to stop children from chewing or sucking painted surfaces. Explain to older ones the danger of drawing on powdery paint walls, and teach them to wash their hands immediately they become powdered at any time from old paint.

Get your doctor's advice about nail-biters and thumb-suckers.—*Queensland Health Education Council.*

How to handle your show exhibit

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

Show time is coming round again and this usually means exhibit time for Junior Farmers' Clubs. In the belief that most show societies are anxious to permit clubs to erect the best possible type of display, these few suggestions are offered as a guide:

Your exhibit should have some definite purpose; preferably only one idea should be highlighted, with details reduced to a minimum. Consider your exhibit as a shop window, and the public as the people to whom you wish to sell something—in this case, an idea. If you fill your window with a mass of different vegetables, fruits, grains, fodders, preserves, cookery and needlework, the effect will be to confuse your viewers. Present only striking material which will draw attention, stimulate imagination, and lead people to think.

Planning your exhibit

The planning and preparation should be left entirely in the hands of an organiser and a small but competent sub-committee. Naturally, they should have the full support of the club members. These points should be observed:

1. The sub-committee should determine the purpose and type of the exhibit to be erected.

2. Decide what materials you will need after you have considered the schedule, the time at your disposal, funds available, location, floor and wall space of the exhibit.

3. Decide what methods you are going to use to attract attention to and retain interest in your exhibit. (Remember that the sights and sounds of other attractions at the show have to be overcome.)

4. Make a rough drawing on a large sheet of paper of the space available for your exhibit. Mark on the plan the details of your display. Show the plan to club members and invite their suggestions for improvement. Prepare this plan over several weeks—you will find that continued thought about it will lead to improvement. Finally, draw the exhibit to scale—if necessary make small models of the background, panels, cases, shelves, pillars, pictures and so on. Mark in on the final drawings the detailed arrangements of all materials and the wording of your charts and labels.

5. Draw up a list of the materials required for the exhibit; determine which can be supplied by members and which will have to be purchased. Keep an accurate record of costs.

6. It should be clearly understood that the advice of experts should be freely sought as the exhibit is being planned. If the central idea deals with any subject relating to the farm or home, consult specialists for their ideas, and ensure that the information you present is authentic and up-to-date.

7. In constructing the exhibit ensure that the viewers' eyes are attracted to those sections of the exhibit which are most important. This "eye guidance," as it is called, should be achieved by the use of continuous or broken "lines" within the exhibit itself, pointing to the centre of interest. Try to avoid using too many arrows or ribbons in your exhibit—rows of objects, or groups of words lettered in the same colour act as guides which the eye will naturally follow. Make sure that the "lines" in your exhibit do not break it

up into a number of separate sections, or if there are sections to your exhibit "tie" them together with some natural connecting link.

8. Do not be afraid to use captions or title signs, and make them stimulating. They should serve the same purpose as headlines in the newspaper, and if they contain agreeable recommendations, they will lead the viewer to investigate further.

So, in brief:

Use your exhibit to "tell" the public something rather than merely as a display.

Limit your exhibit to the portrayal of one central idea.

Think up some "new" idea for your exhibit each year, and give members a chance to illustrate to the public what their organisation is really doing.

Recipe Of The Month

Sauce Mornay

(For Steamed or Boiled Fish)

Ingredients:

1 tablespoon butter
1 tablespoon (heaped) of flour
1½ cups milk
1 heaped teaspoon grated parmesan cheese
½ teaspoon salt
½ saltspoon pepper
¼ saltspoon grated nutmeg
1 yolk of an egg

Method:

Melt butter in saucepan, stir in flour with wooden spoon after taking off stove. Add milk and stir in salt, pepper, nutmeg. Put on stove and just bring to boiling, stirring to avoid burning. Take off stove. Add cheese and egg yolk. Put on stove for 2 minutes, stirring all the time. Serve hot by pouring sauce on fish. Garnish with parsley.

An Unusual Sight on the Tambo-Blackall Road Is This Neat and Attractive Mail Box.