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THE MILK BAR AT HODGKINSON BROS.' HAIDENWELL PROPERTY.

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Contents

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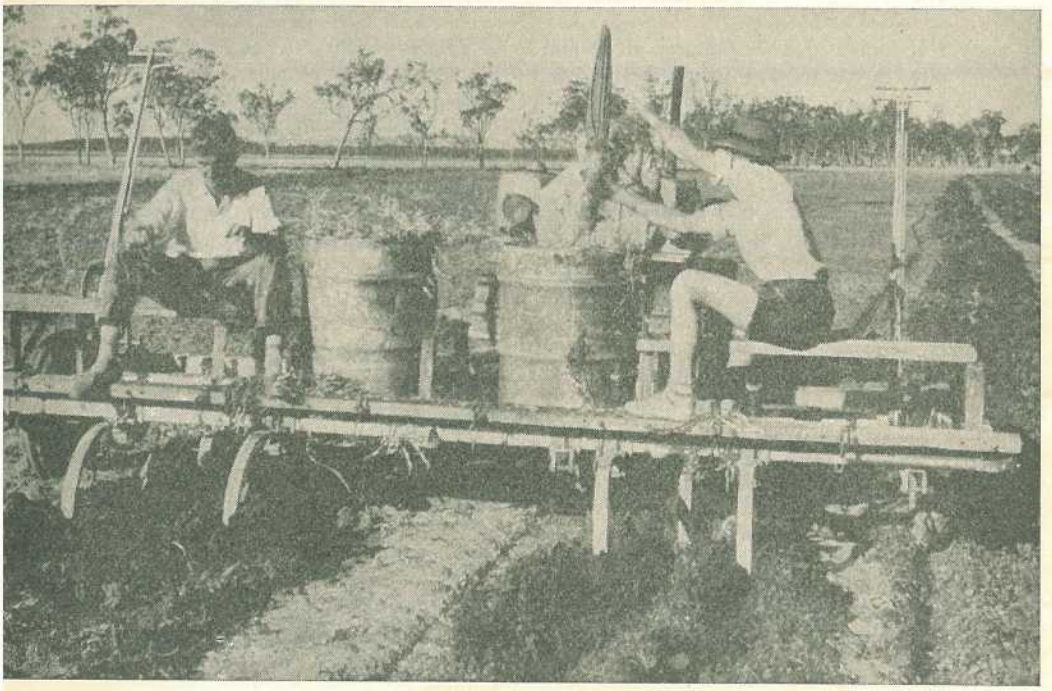


Plate 1: Dropping African Star Grass Roots into Open Furrows made by Built-Up Duck-Feet on Tines on the Second Bar of Chisel Plough.

Chisel Plough Plants Grass Roots

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

THE planting of grass root cuttings can now be done mechanically without any great expense or effort. Mr. Ron Wall, of Jimbour Road, Dalby, proved this when he planted African star grass on more than 6 ac. of drainage line in less than 6 hours.

The grass was planted through a trailing chisel plough from which most of the tines were removed. Two rows 6 ft. apart were planted at a time. Four tons of planting material were used.

Need for Root Grasses

It is often necessary to plant a grass that will spread rapidly over the ground, providing early protection of the soil. Such conditions exist in drainage lines, in waterways, and on steep or eroding hillsides. Few of the grasses normally established from seed are suitable for this purpose. Some do not provide a sufficiently "close" ground cover. Others are too "bulky" and in drainage lines on flat country may hold water back, forcing it in a different direction and causing erosion in areas not prepared to carry runoff flows.

Some of the most suitable grasses for the purpose can be established only by roots. Kikuyu has proved its worth on numerous occasions. African star grass is proving ideal under drier conditions. Both these grasses have excellent soil-holding properties. The star grass offers little

resistance to the passage of water, allowing it to pass over freely, which is a very desirable feature. Both grasses are nutritious and palatable.

While African star grass is always likely to cause prussic acid poisoning, feeding trials carried out at Rockhampton and Biloela by the Department over a number of years have not resulted in any stock losses. It should be realised, however, that this grass, like the sorghums, must always be regarded as a possible danger.

Kikuyu and African star grass are both established from roots or runners.

In the past, only limited use has been made of these grasses because of the amount of labour required to plant the roots. Now, Mr. Wall's successful experiment has shown that this work can be done mechanically with improvised equipment.

Departmental officers elsewhere are carrying out trials with a modified Bermuda sprig planter which is specially designed for planting grass roots, and eliminates the need for labour to drop the roots. However, Mr. Wall has shown what can be done by using conventional farm equipment.

Machinery Used

The equipment used was a standard chisel plough and the modification was very simple. The chisel plough used had three rows of tines. Only two tines were left in the front row. These were located 6 ft. apart (each 3 ft. off the centre line of the machine). They were fitted with chisel points.

In the second row, there were again only two tines used. These were located immediately behind the tines in the front row. These tines were fitted with 16 in. duckfeet. The duckfeet each had two plates 7 in. by 8 in. welded in an upright position along the cutting edges. These plates formed two sides of a box which opened up a furrow. They acted like a small "middle buster" plough. On the third cross-bar of the chisel plough, and immediately behind each of the built-up duckfeet of the second row, two tines were located, one on each side of and about 1 ft. off the centre-line of the second row duckfeet. These were fitted with standard duckfeet (Plate 1).

Planting the Roots

On the top of the frame, two cut-down 44 gal. drums were used to hold the grass roots. Seats were improvised for the comfort of two men who dropped the roots on to the wet soil bottom exposed by the built-up duckfeet.

The dropping of the roots into the right position behind the duckfeet was simple and the task did not prove tedious.

The roots were effectively covered by the two following duckfeet.

Function of Planter

The two leading chisel points just broke the ground for the built-up duckfeet which followed immediately behind.

For three-point-linkage chisel ploughs, or any implement in which only two rows of tines are available, the front "opening" chisel points need not be used. This would leave the front row carrying the built-up duckfeet and the following row with the "covering" duckfeet.

Alterations and Improvements

Many alterations and improvements to this arrangement are possible.

For further planting Mr. Wall would weld a plate, possibly 12 in. by 3 in., on to each of the covering duckfeet so that they would pull in more soil to cover the roots. It is also possible that better results would be

obtained if smaller duckfeet were built-up for the furrow opening as these might penetrate deeper into the wet soil and not disturb as great an area as the 16 in. duckfeet.

Rolling

Rolling is an all-important part of the operation, especially if dry conditions are experienced after planting. Mr. Wall spaced his rows so that the rubber tractor wheels would cover the planted rows. These rows were rolled with the tractor tyres and with a field roller the day after planting.

Conditions at Planting

The planting at Mr. Wall's was done in a heavy black soil. There was reasonably good soil moisture Following the planting, however, extremely hot and drying conditions prevailed. No rain fell from the time of planting (October) until 2nd December, 5½ weeks later.

Temperatures during the week following planting daily exceeded the 100 deg. mark and reached 108 deg.

Results of Planting

Because of the hot, dry conditions which followed the planting it was not anticipated that the roots would survive. However, the results have been very good. In sections where the ground was loose, giving satisfactory planting conditions, a good emergence of grass was obtained and a quick cover seems assured. Elsewhere the results were patchy but sufficient grass appears to have emerged to ensure a cover over most of the area. At the last inspection, new shoots of grass were appearing and the results of the first good rain on this plot will be watched with interest.

There is no doubt that the retention of soil about the roots of the planting material greatly assisted the grass under the adverse conditions.

Advantages

The advantages of this method of planting are:

1. The arrangement of equipment is simple and inexpensive.

2. More than 1 ac. an hour can be planted. A wider spacing of rows would allow greater coverage.

3. The planting is not arduous or tedious—the great objection to the manual planting of roots.

4. The rooting material is not damaged to any extent and most of the clods dropped retain soil about the roots, which greatly assists the chances of success.

5. Breakdowns are not likely to occur to the simple equipment.

6. The machinery would not be troubled by blockages to any extent even in "dirty" ground as the few tines used give good clearance. However, good preparation to a reasonable depth would greatly improve the chances of success, especially if dry conditions were experienced after planting.

Collection of Roots

The task of collecting grass roots has not been fully mechanised and requires a considerable amount of labour.

The local method of collecting African star grass is to arrange for a farmer in the Bell district who has a large area of the grass to plough it out with a mould-board plough. It is then loaded by hand. Some farmers have found a front-end loader suitable for digging out and loading kikuyu. It is probable that this method could also be used for the collection of African star grass.

Some breaking down of big clods is necessary to simplify planting but the retention of some soil by the roots is desirable.

Costs

The cost of this type of planting varies with the distance to be travelled in order to obtain roots.

In this case, Mr. Wall and two men were half a day collecting the roots and travelling to and from the source of supply.

The cost of the roots was £5 10s. The equivalent of two man-days was used in preparing and planting the material.

The total cost of material, labour and the planting of the grass was about £21, or £3 10s. an acre.

With planting material now available on the farm, any future planting would cost only a fraction of this amount. The work would also be much easier and the chances of success greatly increased.

Practicable

The work done by Mr. Wall has shown that it is practicable to plant large areas to grasses that can only be established from vegetative material. No special equipment is required. The total cost of collection, purchase and planting of the grass was no more than the cost of seed alone for some improved pasture mixtures.

What Strain of Buffel?

"D.J." of Quilpie asks what buffel grass strains would be suitable to plant along bore drains in the area?

Answer: It would be necessary to avoid planting any strain in waterlogged soils as buffel grass is not suited to such conditions. Experience shows that some bore waters are not suited to irrigation purposes because they are too heavily mineralised. However, buffel grass in Western Australia has been seen growing in sands near high water mark and so it may have some tolerance to salt. It would nevertheless be to advantage to have a sample of the bore water analysed before buying seed.

If the water is suitable and the bore drains are not waterlogged, planting any of the following strains may prove satisfactory: Biloela, Gayndah, American, Cloncurry, and perhaps the Western Australian strain.

If the water is heavily mineralised it would be wise to make small trial plantings first.

Evening Primrose

The establishment of a winter-growing pasture for the St. George district is the subject of an inquiry from "A.G.," who seeks information on Evening Pimrose.

Answer: A winter grass such as perennial veldt grass planted during February-March at 1 to 2 lb. per acre should be useful in the area. Although it requires a moisture-retaining soil it grows on poor land. Being a winter-growing species, the winter rainfall at St. George may not always be sufficient for the successful growth of the grass.

A useful legume to grow with the veldt grass is barrel medic or barrel medic strain 173. The spines on this medic are short and should not be troublesome in the wool of sheep. Lucerne could be tried with some certainty of success. With lucerne, however, it is essential to get the plants well established before grazing or the crop will be rapidly grazed out.

Evening Primrose is a cold climate species and is regarded as being suitable for growing on the poorer classes of soils. As it is not a legume it will not have the beneficial effects on the soil associated with leguminous plants. It is green when the summer grasses are dry. Plant during February-March at 1 to 2 lb. per acre.

Cotton Can Pay For Improved Pastures

By K. V. HENDERSON,
Senior Adviser in Agriculture.

FARMERS know that native pastures afford only limited feeding value each season. In times of stress, such as during drought or at the beginning of winter, they let us down quickly.

On the other hand, sown pastures provide well-balanced high quality grazing, and are available for a great part of the year, especially in late winter and spring when rainfall is normal or slightly above average. They are also economical because they are perennial and apart from the initial cultivation required in establishment, annual chisel plough renovation may be all that is necessary for a number of years.

Nearly every dairy farm in the State has some land unsuitable for frequent cultivation. This would be best employed in growing improved pasture. Much of the existing native grass on this type of soil is thin, weedy and low in productivity. It is possible to restore the productivity of these grasslands by inexpensive methods.

Plate 1.

Cotton Grown Following Grass is Usually Better Suited to Machine Harvesting.

Plate 2.

Good Crops of Green Panic Like This Can Be Obtained on Grassland Following Cotton.

Cotton's Place

In many instances, cotton can be planted on these grassland areas. Then with good cultural practices during the growing season, the physical condition of the soil is greatly improved, pasture weeds are controlled and the land is brought into good condition for re-sowing with improved pastures.

Usually two crops of cotton are required for a complete renovation of the area.

In Queensland, cotton is a crop which enjoys no fear of overproduction for many years to come, and furthermore, a guaranteed price of 14d. per lb. by the Commonwealth Government is assured until the 1962-63 season.

Under normal circumstances, the returns from two crops of cotton would provide good supplementary annual incomes and would finance an adequate amount of grass and legume seed for sowing the pasture.

In the second season under cotton, the cultivator should be used frequently so that after picking operations are finished, two thorough disc cultivations should place the land in good tilth for planting.

Where land is not suited to regular cultivation, the chisel plough can be put to good use by cultivating the area two or three times on the contour during spring and late summer months.

Planting of grasses in central Queensland is usually carried out in mid-January, just before the monsoon rains. Earlier plantings are hazardous, as the young seedlings are

apt to be burnt off by the extreme heat in November and December, especially if rains have been light.

Mixtures to Use

Suggested combinations for improved dryland pastures in central Queensland are:

(1) For better class soils—
- 3 lb. green panic or 5–6 lb. Rhodes grass per acre.
- ½ lb. phasey bean.
- 1–2 lb. lucerne.

(2) For sandy loams or poorish soils—
- 3 lb. buffel grass (Gayndah or Biloela).
- 1 lb. Townsville lucerne.
- 2 lb. lucerne.

In the wetter coastal areas of this region, centro is suggested for trial as the legume component in the pastures. This tropical legume is proving versatile and is being grown in wetter coastal frost-free areas from the Daintree to the Currumbin hills.

These combinations are suited to most types of soil other than the heavy alluvial loams. If these loams hold their soil moisture well, or are inclined to be wet, 3lb. per acre of scrobic with centro (1 lb.) and phasey bean (½ lb.) as component legumes should give good results.

Correct Management

Improved pastures should be subdivided into convenient areas according to the size of the dairy herd to be grazed, and according to the area of pasture available. Where a definite pasture-crop rotation is planned, paddocks should be large enough to plough and cultivate for cash crops. Temporary electric fencing will provide a cheap method for confining stock to smaller areas. Rotational grazing protects your pasture, and helps to eliminate selective grazing by individual animals. This is very important where plants of differing palatability are used in a mixture. For example, in a Rhodes grass–lucerne mixture, the

Plate 3.

Rhodes Grass Growing on Old Cultivation.

lucerne would be quickly destroyed under continuous grazing because it is more palatable than the Rhodes grass.

In addition, controlled grazing permits more efficient use of pastures where the available area is limited.

After an area has been grazed to a safe level—no lower than 6–7 in.—the chain harrows may prove helpful in breaking up and distributing droppings over the area, otherwise rank and unpalatable growth will result around a dropping.

It is often not practicable to harrow tussocky type grasses such as green panic and buffel unless they are grazed to a dangerously low level. Harrowing the pastures in which centro is making really good growth is seldom satisfactory.

So here is the story in brief:—

(1) Don't pay rates on unproductive native pastures; plant the area to improved grasses and legumes.

(2) Reduce your production costs considerably by returning old cultivations to pastures.

(3) Grow cotton for two consecutive years to renovate the soil and provide finance for sowing pastures.

(4) Don't flog your pastures—graze them rotationally and give the more palatable plants a chance to recover from the grazing. Like us, pastures require a holiday regularly.

(5) Maintain productivity and palatability by the frequent use of the harrows where the pastures are suitable in order to improve rain penetration and distribution of droppings.

(6) Sound practice—Three or four years grass then two years annual cropping, then back to grass. If you have a good legume in your pastures they will last much longer. Crop rotation pays good dividends.

Velvet Beans v. Cowpeas

"P.R.," of Caboolture, has inquired about the relative values of velvet beans and cowpeas.

Answer: Both these crops can produce excellent feed and there is little, if any, difference between the two as fodder crops.

All the commercially available varieties of cowpea as susceptible to stem rot. Once this disease has become established in the soil it can destroy a crop of cowpea.

Some stem rot resistant varieties have been produced; these are being grown in seed multiplication plots, and will be released when sufficient seed is available.

The best of the resistant varieties are Malbar, Santiago and Havana.

If cowpeas have been grown on an area for many years, try velvet beans which are not affected by stem rot. As velvet beans are liable to frost, they should not be planted until the danger of frosts has passed. They have a longer growing season than cowpeas.

Machinery for Hay And Silage—III.

By Officers of Agriculture Branch.

Transporting Chopped Fodder.—Chopped materials may be carted from the paddock to the place of storage in farm waggons, farm trailers or farm trucks. All of these are fitted with high sides and ends made of wood, wire netting or sheet steel. Wooden sides may be complete or may be a framework covered with tarpaulins or jute material. Specially built trailers or trucks can be used and these may be side-tipping or end-tipping.

The number of trucks or trailers used to carry the chopped material from paddock to silo depends largely on the quantity to be handled and the labour available. In order to achieve a quick turn-round of trailers, some type of mechanical unloading device is usually employed. Sliding, or conveying the material to the rear of the trailer, is a common practice. End or side-tipping wagons or trailers are also employed in filling pit and trench silos.

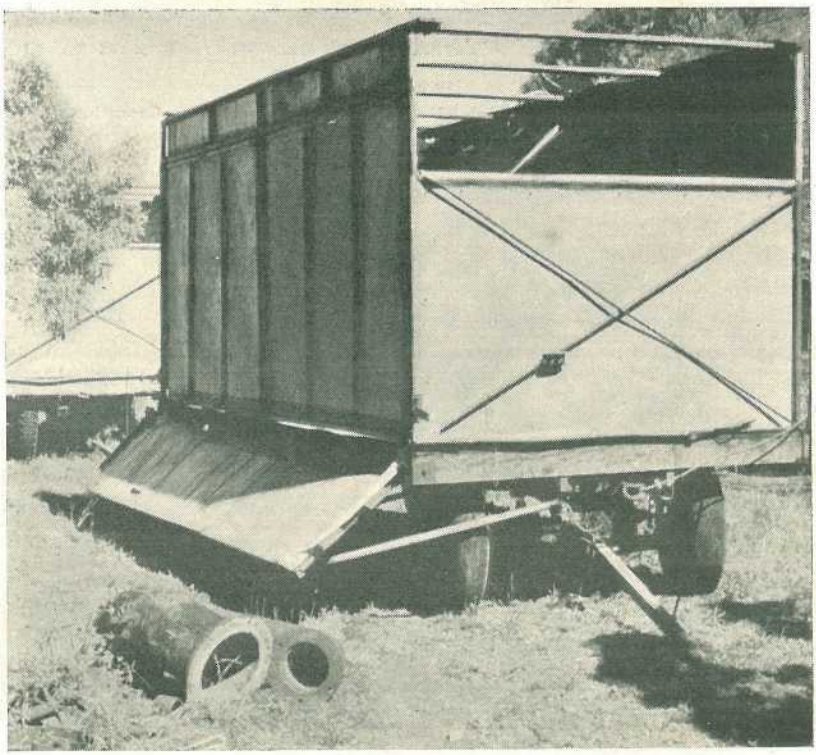


Plate 30.

Side-tipping Trailer, with Apron and Hinged Side Doors. Tipped by Cable Hoist Operating on Side of Trailer Opposite Apron.

Plate 31.
Conventional Tip Truck with High Sides Tipping Chopped Sudan Grass into a Trench Silo at Yelarbon.

Plate 32.
A Tipping Trailer after Tipping a Load of Chopped Sweet Sorghum in a Trench Silo at Wetherby, near Richmond.

Four types of rear unloading devices for non-tipping bodies are used: (1) the sliding front endgate, (2) the canvas apron conveyor, (3) the endless steel chain and slat conveyor, and (4) the chain wire lining.

The sliding front endgate consists of a movable front endgate attached to cables or chains which in turn are attached to a pipe roller which serves as a winch at the rear of the trailer. Sometimes these cables are attached to a tractor or vehicle which draws the load off more quickly.

The canvas apron conveyor consists of a canvas apron spread on the trailer floor. The rear end of the apron is attached to a pipe roller. As the canvas is wound up on the roller the load is moved to the rear of the trailer.

The endless steel conveyor is similar to a manure spreader apron. It may consist of a single wide conveyor or two narrow conveyors side by side.

The chain wire lining is firmly attached at one end to the rear of the floor of the vehicle. It is wide enough to cover the full width of the vehicle and long enough to cover the full length of the floor and the front wall. A spreader bar is attached to the free front end of the wire. A cable attached to this bar is used to roll the load off the rear of the vehicle.

The sliding front endgate type is the cheapest of the types mentioned above and reasonably satisfactory in performance. The canvas apron is moderate in cost and very satisfactory, but requires a little more care in use to avoid damage. These two types, however, can be easily attached and removed from the trailer.

Plate 33.

A False Floor and Front Endgate Hauled off Truck at Side of Trench Silo, Using a Cable Attached to a Land Rover.

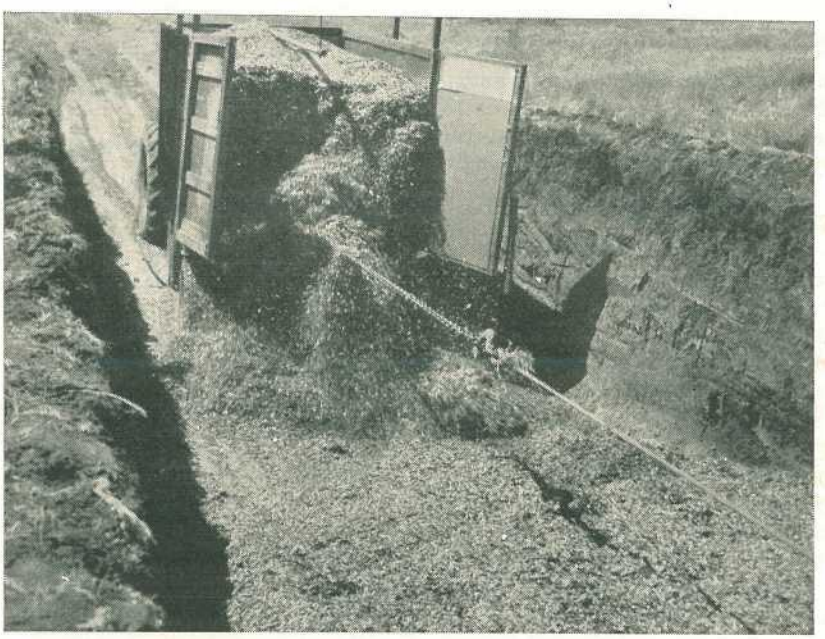


Plate 34.

A Load of Silage being Unloaded into a Trench Silo by a Chain Attached to an Anchor Post at the End of the Trench and to a False Front in the Truck Body. The False Front is Attached at Each Corner by Cables to an Old Tyre which Absorbs the First Shock of the Pull of the Cable. This False Front is Guided in Part by Pipe Suspended Centrally over Load.

The endless steel conveyor is more expensive, more durable and more efficient.

The chain wire is relatively cheap to install and if strong enough will give good service. An external source of power is required for this method.

The rate of unloading will vary with the material, size of load and capacity of the blower—5 to 10 minutes per load is common. Unloading into pits or trenches can be accomplished more rapidly.

Table 5 is a useful guide with regard to rate of operation and man-hours per ton for the various methods adopted in the conservation of fodder as hay or silage.

TABLE 5.

COLLECTING AND STORING HAY AND SILAGE.

Method or Equipment.	Haul-age Miles.	Crew Size.	Rate per Hour in Tons.		Man-Hours per Short Ton.
			Range.	Average.	
Hand loading—dry hay ..	½	3	0·7–1·5	0·86	3·5
Sweep rake—dry hay	⅓	2	0·8–1·7	1·1	1·8
Sweep rake—dry hay	⅓	3	1·2–2·0	1·4	2·1
Sweep rake—silage	⅓	1	1·5–2·2	2·0	0·5
Sweep rake—silage	⅓	2	..	2·0	1·0
Sweep rake—silage	½	1	1·2–1·7	1·5	0·7
Hay loader—dry hay	½	2	..	0·9	2·2
Hay loader—dry hay	½	3	1·0–2·5	1·2	2·5
Baler—dry hay	¾	5	to 3·5	2·5	2·0
Forage harvester—dry hay ..	¾	4	1·5–4·0	3·0	1·3
Forage harvester—silage (grass)	¾	5	3·0–7·5	5·0	1·0
Forage harvester—silage (crop)	¾	6	5·0–10·0	7·5	0·8

Source: Central Experimental Farm, Ottawa.

(CONCLUDED.)

Pasture and Crop

FAILURES with hormone weedkillers can be avoided by using these preparations at the right time and at the right strength. Damaged crops or undamaged weeds suggest a mistake in either mixing or applying the weedkiller.

Modern weedkillers work because you apply them at a rate sufficient to kill the weeds, but not sufficiently heavy to kill the more tolerant crop. The recommendations for using hormone weedkillers are expressed in pounds of active ingredient to the acre, and not as a percentage concentration. This is because the water in the spray fluid is employed only to get a uniform spread.

The important things to know are how many gallons of water to the acre your spray delivers, how many pounds of hormone to the acre are needed to kill the weeds, and the right time to spray. If you're in doubt, consult your local Adviser in Agriculture.

Chemical sprays make easy work of weeding onions. Trials in the last three years have shown that the use of these preparations will halve the back-breaking job of weeding onions by hand.

Until chemical weedkillers became available, a young onion crop needed at least two hand weedings before it was big enough to be cultivated mechanically without the risk of burying the plants. When chemical sprays are used, you can cut the number of hand weedings to a single, very light one.

Common weeds controlled by these sprays are stagger weed, potato weed, dead nettle and carrot weed. If you're interested in weeding onions with chemical sprays, consult your local Adviser in Agriculture. He will tell you the kind of spray to use, the rate of application and the best time to spray.

—V. J. WAGNER,
Chief Agronomist.

WHEN a grower harvests a 24-bushel crop of wheat, he removes from every acre approximately the equivalent of 170 lb. of ammonium sulphate, 26 lb. of superphosphate and 12 lb. of muriate of potash.

Fortunately the normal Darling Downs soil is richly endowed with phosphorus and potassium, and it would take many decades of intensive farming before these elements were seriously depleted. In the case of nitrogen, the loss is quite considerable, and over a shorter period of time, would result in the lowering of quality and yield. As nitrogen is an important factor for wheat growing, it is essential that it be maintained at a satisfactory level in the soil.

This can be achieved by following the recommended crop rotations and also by fertilizer application. Information on replacing nitrogen in your soil can be obtained from your local Adviser in Agriculture.

—W. T. KELSO,
Senior Cereals Chemist.

AS tobacco leaf is appraised according to its position on the plant and its quality, all farmers should know the descriptions applied to the different kinds of leaf. This will help him in his grading because he knows what to look for when sorting his crop.

Lugs are leaves from the bottom part of the plant. Normally they are thin, dry-natured, dull and open grained. The surface of the leaf is slightly crinkled and feels something like crepe paper. Lugs vary in size—some of them can be quite large, but they all possess the same appearance. The term "lugs" should not be applied only to the thin, dry, trashy leaf from the first pickings. These propably are lugs, but they are only one type. They have been affected by blue mould, insect damage or have been allowed to become overripe before harvesting. Lugs can be very good quality tobacco if harvested at the correct time.

Cutters are from the position above the lugs. They are glossy and very rich in appearance. They are soft and elastic. They show some open grain on the leaf surface. Cutters are the most valuable leaves on the plant.

Leaf comes from above the cutters but below the tips. They are heavier bodied and do not have the lustre and gloss nor the open grain of cutters. They are narrower than cutters and do not have their elasticity.

Subdivision leaf is not a natural group. It is the term applied to leaves from the middle portion of the plant which do not fit either into cutters or leaf. They are thin and can vary from somewhat elastic to dry natured. When the growth of the plant is affected by nematodes or excess water, or the leaf becomes overripe, this thin cured leaf is known as sub leaf.

Tips are from the top part of the plant. They are mostly short and narrow, and generally are heavier bodied than leaf. To be of any value, tips must be very ripe.

Farm grading is done according to the way the leaf was picked. That is, first pickings are graded first and so on, and the texture of the leaf is regarded as the first important point. This divides the leaf fairly closely into these named groups. For example, in, say, a third picking, there may still be dry natured leaf, which are lugs. There will be glossy, wide, elastic leaves, which are cutters. There may be heavier bodied leaf with less stretch. These are the leaf. The difference in texture divides them into their natural groups. Each group then has to be separated according to the variation in colour, size and freedom from damage.

Don't forget to destroy the tobacco stalks on *your* farm as soon as possible. This will help to control insect pests and diseases during next season. Also destroy the tobacco waste around barns, stringing shed and grading room.

—*E. J. McDONALD,*
Adviser in Tobacco Culture.

Don't Let This Happen!

A man was operating a wheel-type tractor pulling out scrub with a ¾-in. wire rope about 30 ft. long. He accelerated the tractor suddenly, causing the resistance in the rope to overturn the tractor backwards. He was killed instantly.

The drawbar had been removed and the wire rope was attached to the axle while the machine worked down a slope.

This type of accident proves how simply death can follow wrong use of wheel type tractors. It would not have happened if the drawbar had been used.

Tuberculosis-Free Cattle Herds.

(As at 1st May, 1959.)

Aberdeen Angus.

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

A.I.S.

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

Ayrshire.

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

Friesian.

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

Guernsey.

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

Jersey.

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

Poll Hereford.

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

Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi

Dairymen Might Profit From These Winter Pastures

By C. A. SCHRODER,
Assistant Irrigationist.

South Queensland dairymen with autumn-winter-spring feeding problems might well profit from reading this article on irrigated, annual-type, winter pastures.

The problem of maintaining dairy cows in satisfactory condition and at a good level of production for a lengthy lactation period is a major one for all dairy farmers in the State.

In very many instances, production drops seriously in the autumn-winter-spring period.

Very commonly too, many animals lose condition in this period. They either go dry or drop so low in milk production that they are unable to get back to a profitable level when favourable conditions recur.

When the economics are investigated, there are too many cases found where the dairy programme is being carried on at either very low profit or no profit at all during the period.

Problem in Lockyer Valley

Rainfall in the Lockyer Valley, in common with the remainder of the State, is predominantly of summer incidence.

Records for 57 years to December, 1956, show the average annual rainfall to have been 29.38 in. Of this amount, 20.05 in. fell in the six months, October to March.

Under such conditions of climate, it naturally follows that the pastures are dominated by summer-growing species such as paspalum, Rhodes and green panic grasses, and the native blue grasses.

These pasture types make rapid growth following the annual onset of the summer rains. They quickly produce large quantities of succulent, attractive, highly nutritious pasturage capable of giving high production in the dairy herd.

Excellent as these pastures are, they retain their succulence and high food value for a short period only. There is a rapid decline in growth rate, palatability and nutritive value following the summer flush, and this decline in the pastures results in a serious fall in the production of the herd.

The Missing Link

Pasture research workers, and dairymen too, know only too well that we in Queensland have not got a pasture plant that will grow solely under natural conditions and provide a reliable source of quality feed in this period of scarcity.

Any such plant would need to be able to survive the competition of the vigorous summer-growing species and still be capable of growth in winter in a soil much depleted of moisture and plant nutrients and under light, erratic and unreliable rainfall. We have not yet got such a plant.

Only too conscious of the problem and the need for an answer, the dairymen and scientists of this State have

attacked the task, and some new practices have been added. Very briefly, these include:

(1) Improved methods of pasture management, including fertilizer treatment.

(2) Cultivation of crops, such as oats, for supplementary grazing.

(3) Conservation of silage and hay.

(4) Purchase of concentrates.

(5) Maintenance of an area of permanent irrigated pasture to act as a protein supplement.

(6) Management of the herd so that maximum feed requirements coincide with maximum pasture growth; for example, seasonal calving practices.

Filling the Gap—New Methods

In recent years, marked success has been achieved at the Gatton Regional Experiment Station by replacing the oat grazing programme with irrigated, annual-type, winter pasture. This method, which has been in use since 1952, has given good results every season. It is described in detail in this article.

Trials using other methods have been in progress since 1957. Early results are promising. Some brief notes regarding these are included later for those who may wish to try the practices for themselves.

What are irrigated, annual-type, winter pastures? As the name implies, this type of pasture comprises winter-growing, annual pasture species grown under irrigation.

Being annual in habit, the components of the pasture grow from seed, complete their growth cycle, ripen their seed and die off within the one season.

Species that have been used include early strains of subterranean clover, such as Yarloop and Clare, with Wimmera ryegrass. In some instances, small seedings of lucerne—up to 8 oz. an acre—have been included to provide some summer grazing from natural rainfall.

Annual and perennial prairie grasses both have possibilities for use in such pastures.

Who can grow irrigated pastures? Successful production of this type of pasture can be achieved by anyone

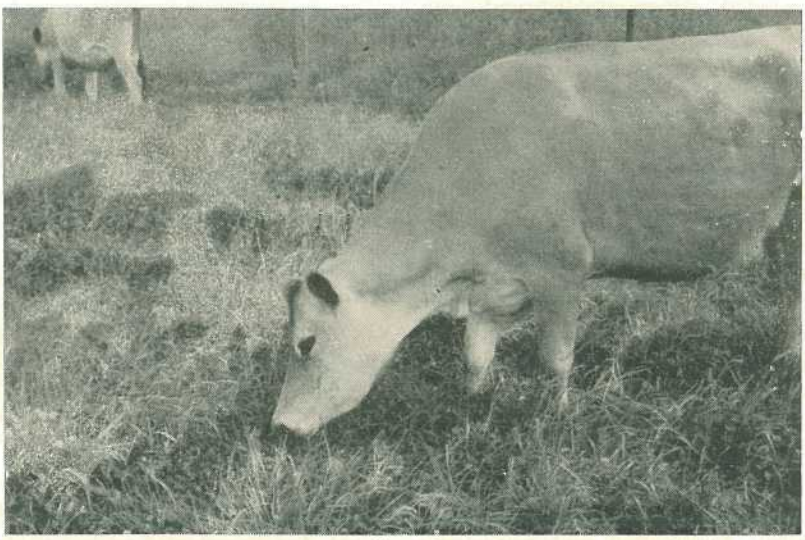


Plate 1.

High Winter Production is Obtained from Cows at the Gatton Regional Experiment Station.

who has a supply of irrigation water and suitable land.

Irrigation is essential.—It is emphasised at the outset that irrigation is essential in almost all seasons.

Any attempted growth of such pastures is definitely not recommended if this condition cannot be met.

It will be noted later that irrigation requirements are low. This is a big factor in keeping production costs down.

Permanence of the Pastures.—Although the components of such pastures are of annual habit, they have the ability to regrow in successive years from the seed produced in the previous years.

Re-establishment occurs naturally each year in the existing stubble. Plowing or other cultivation is required only under exceptional circumstances. These rarely occur more often than once in three years.

This annual re-establishment by natural methods takes place when suitable conditions of temperature and moisture occur. February is the month for this.

Thus, such pastures, in this sense of annual self-re-establishment, can be regarded as permanent annual winter pastures.

When do they grow? Initial sowing is usually carried out into well-prepared land during the first week in April.

When this is done, grazing is usually available approximately seven weeks after planting, that is, about the third week in May in the year of original planting.

In subsequent years, germination, occurring naturally from the seed produced in the preceding year, usually takes place in late February or early March. In some years it is even earlier.

Early germination and persistence of seedlings in an area set aside to pasture is helped by the existing stubble, which reduces soil temperatures and delays the drying out of the soil surface after rain.

The first grazing of the self-regenerated pasture stand is generally ready very early in May.

How long is the season? High quality pasturage is normally available until mid-October.

After this date, seeding down and death of the components occur.

The dried-off stubble is incapable of giving good milk yields. It is, however, quite a good source of roughage, and fed alone is quite a satisfactory feed for dry stock.

Growth rates of annual species.—Cool weather growth rates of the annual winter species are considerably in excess of those of the perennial species.

Growth rate comparisons were made on the Gatton Station from June to August inclusive, as this represents the period when pasture production is of great significance.

During this period, the average growth rate of a third year irrigated annual winter pasture was 1·15 tons green weight per acre per week. For this same period the average growth rate of a permanent irrigated mixed pasture of the same age was only 0·646 tons per acre per week.

Annual Production

The total pasture yields each season have been very encouraging.

These have been regularly 2½ times greater than that of oats grown on the Station in the same seasons on a well-prepared fallow without irrigation. However, where the area of irrigible land is small or water supplies limited, oats or other grazing crops should be grown under natural rainfall conditions to supplement the irrigated pastures.

Some actual yield details are given to indicate high yielding potential:

(1) A new irrigated annual pasture comprising Gatton strain Wimmera ryegrass and Yarloop and Clare

strains of subterranean clover was planted on April 2, 1957.

The pasture was subsequently grazed five times during the season.

Pasture yield determinations were made before the introduction of stock at each grazing period. Pasture yields were as follows:—

These figures are for the third year of the pasture. They show that high production is not confined to the year of planting but continues in the succeeding seasons.

On account of climatic conditions, the first grazing was not available until June 3, 1954, an unusually late date.

—	Pasture Green Yield Tons/acre.	Average Weekly Growth Rate Green Tons/acre.
First grazing 20–5–57	4·77	·70
Second grazing 11–6–57	4·88	2·14
Third grazing 17–7–57	5·68	1·17
Fourth grazing 9–9–57	9·31	1·23
Fifth grazing 22–10–57	6·89	1·12
Total Green Yield	31·53 Tons/acre.	

Average weekly green growth rate from planting date to 22–10–57 was 1·09 tons/acre.

(2) A Wimmera rye-Yarloop subterranean clover irrigated pasture was planted on April 28, 1952.

This was the original of this type of pasture planted on the Station as a grazing trial.

The first grazing was ready on June 30, 1952, giving a quick return under the winter conditions. Actual production in the first year was quite comparable with that already detailed.

The pasture was grazed each year until seeding occurred.

Irrigation was then withheld, and the pasture allowed to set seed for the following year's regrowth.

The only cultural treatment applied was a low mowing in February each year to reduce growth of volunteer summer weeds.

Excellent stands of pasture were obtained by natural re-establishment each year.

Towards the end of the fourth season, the pasture was ploughed out to provide an area of improved soil for other experimental work. It was still highly productive.

Yield determinations for the season 1954 are tabulated.

Grazing Date.	Pasture Green Yield. Tons/acre.	Weekly Growth Rate Green Tons/acre.
3– 6–54 ..	6·3	First grazing
23– 7–54 ..	7·47	1·07
31– 8–54 ..	5·62	1·24
26–10–54 ..	5·53	0·79

Total production for season 24·92 green tons.

Average weekly green growth rate from June 3, 1954 to August 31, 1954 was 1·15 tons per acre.

Results were of a similar order every year.

Yields From Other Crops

Oat varietal grazing trials are carried out on the Station each year.

No irrigation was applied.

SEASON 1957

Total green yields in tons/acre.

Variety.	
Belah	10.28
Benton	11.42
Bovah	10.90
Clinton	11.65
Bonda	11.12
Mindo	11.96
Vicland	10.44
Average	11.11

The following yields were obtained in the seasons quoted:

SEASON 1954.

Variety.	Green Yields when Grazed (Tons/acre).			Total Yield of Three Grazings.
	1st Grazing 22–6–54.	2nd Grazing 24–8–54.	3rd Grazing 28–9–54.	
Garry	3·61	2·11	0·53	6·25
Klein	3·05	1·45	1·63	6·13
Vicland	3·59	1·86	0·41	5·86
Belah	3·93	2·34	0·57	6·84
Algerian	3·47	1·26	0·60	5·33
Bovah	2·88	1·36	0·46	4·70
Means	3·42	1·73	0·70	5·85

(With rainfall below normal, this crop was given one irrigation of 3 in. following planting.)

The yield from these crops was much less than that obtained from the irrigated pastures.

Production from Grazing Angle

Grazing schedules were kept each year.

The capacity of the pastures to provide a heavy amount of grazing is revealed by these records.

The pasture of which yield details were given in 1957 provided the very heavy amount of 441 full days of cow grazing per acre for the season. Dairy cows in milk were used in this trial.

The pasture of which the yields are given for 1954 provided 377 full days of cow grazing per acre. Forward steers and dry cows were grazed in this trial.

What Does This Mean in Practice?

The actual grazing results obtained on the Gatton Station show that one acre of such pasture properly managed can be expected to provide full grazing for 2½ cows in full milk per acre from the time that the first grazing is available—about the third week in May—until just after the middle of October.

However, the method of grazing that would be most suitable to most dairymen would be to use the pastures in conjunction with whatever other feed was available. In this case the pasture would be grazed twice a day for a period up to one hour per grazing. In this way the pasture would be regarded as a high quality protein supplement to the ration. Of course, it would have a much wider benefit than just as a source of protein—the mineral content and the succulence are of much benefit to stock, particularly as they are supplied in a period when most feed is dry and of poor quality.

Under such circumstances cows eat greedily. A cow will probably obtain at least ⅓ of her total daily food intake from the irrigated pasture.

Grazed for two hours a day, one acre of pasture will provide grazing for six to seven such cows over the period mentioned.

The food thus obtained will normally improve the quality of the ration to such an extent that the addition of concentrates is not required.

Method of Grazing

Best results are obtained by using an easily movable electric fence.

Grazing should be done in narrow strips to prevent wastage by trampling and fouling.

Most efficient usage with the electric fence is obtained in these densely growing pastures if the cows are made to graze "under-the-fence." This means just moving the fence to the edge of the ungrazed area; the cows

will then reach under the fence to graze. For this method it will be necessary either to employ a long strip if practicable or else to shift during the grazing. When making such a shift, the end points of the fence can be left unmoved and it is a matter of just lifting out the posts used (these are very serviceable if made out of ⅜ in. round mild steel) and moving them back 2 or 3 ft. It is not necessary even to switch off the current to do this.

However, care must be taken not to allow stock to remain long enough on any strip to allow it to be too heavily grazed.

As with all pasture grazing, care must always be exercised to prevent over-defoliation of the pasture at any time of grazing.

Over-defoliation (grazing down too hard) will very quickly reduce the vigour and growth rate of the pasture and if continued will very soon render the stand unprofitable.

The harmful effects of hard grazing cannot be over emphasized.

Pasture harrowing should be carried out after each time of grazing. This operation should achieve effective smearing of manure. No cultural effect should be aimed at. If the amount of ungrazed residue is extensive it should be trimmed back with the mower.

The Economic Result

With a good average herd, well cared for and grazing the pasture full time, each ton of the pasture under consideration will provide 14 lb. of commercial butter.

A return of 390 lb. of commercial butter an acre of pasture should be obtained per season with such a herd.

With a factory return of 3s. 6d. a lb. for butter this represents a gross income of £68 an acre a season from the pasture.

Rather more than this would be obtained if the dairy supplies warm milk instead of butter.

Pasture Production Costs

Irrigation.—Pastures grown on the Gatton Station are surface irrigated.

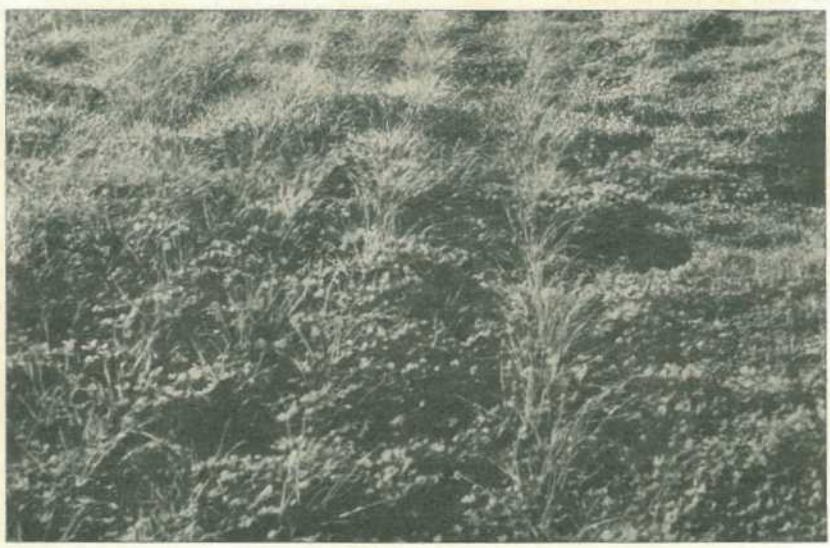


Plate 2.

Abundance of Winter Feed is Produced by Irrigated Pastures. Photographed on July 24, 1956.

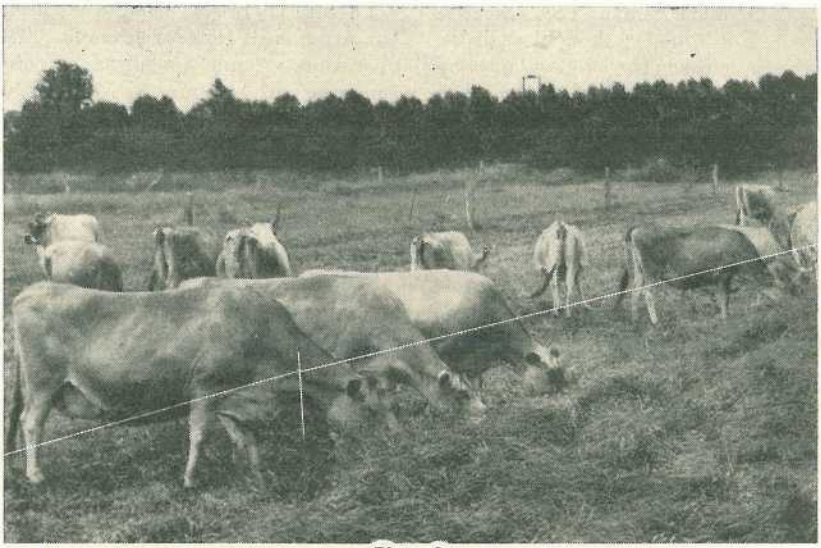


Plate 3.

Strip Grazing Under the Fence Results in Proper Pasture Utilisation.

Usually about 12 in. of irrigation water are necessary in addition to rainfall in a normal season.

The cost of applying this, including costs for capital outlay on plant, preparation of land for surface irrigation, power and labour amounts to less than £4 10s. an acre.

If irrigation is applied by spray irrigation methods the cost would rise to approximately £11 an acre.

Seed Cost.—The cost of seed an acre (July 1957 prices) for original planting of the pasture would be:—

	£	s.	d.
Wimmera ryegrass—			
4 lb. at 1s 6d. ..		6	0
Yarloop strain sub-clover—			
4 lb. at 3s. 9d. ..		15	0
Clare strain sub-clover—			
4 lb. at 9s. 3d. ..	1	17	0
Lucerne—			
8 oz. at 5s. 7d. ..		2	10
Total ..	£3	0	10

Seed purchase is necessary in the first year only, as the pasture provides its own seed for subsequent years.

Cultural Operations.—As with seed costs, the cost of preparing the land occurs for the year of original planting only.

Some other cultural operations may become necessary in succeeding years.

Mowing to remove volunteer growth of summer grasses and weeds is necessary to enable germination of the fallen seed. One mowing about the end of February is usually all that is necessary. However, the pasture area can often be grazed short at this period. This would dispense with the need for mowing.

If the presence of this summer growth becomes heavy enough to interfere with the natural re-establishment of the pasture, some tine cultivation with a chisel plough or tine cultivator is beneficial. This should not usually be necessary more frequently than every second or third year.

(TO BE CONTINUED.)

Pointers to the Greater Use of Buttermilk

By W. D. MITCHELL,
Dairy Technologist.

The current price of £70 a ton suggests more buttermilk powder could be made to meet the steady demand from the animal and the food-processing industries.

THE present economic difficulties confronting the dairying industry in Queensland demand a detailed examination of all phases of dairy production whether on the farm, in the factory or associated with marketing operations. Returns to producers have varied widely because it has become necessary to dispose of significant quantities of surplus produce, particularly butter, on an unstable export market.

In these circumstances, one phase of dairy production which warrants consideration is the utilization of what are normally termed by-products, that is skim milk, whey, and buttermilk. Buttermilk is of major importance in Queensland where each season some 10 to 13 million gallons are available for disposal.

There are many questions to be asked in relation to this large quantity of surplus produce.

What are the main avenues of disposal?

Are existing avenues being adequately supplied?

Are new avenues of disposal available, and if so will it prove profitable to supply these markets?

These questions must be answered before an assessment of the true value of buttermilk to the industry can be obtained.

Plenty of It

The quantities of buttermilk available each season throughout the state are listed in Table 1 and these values indicate the seasonal fluctuations which can occur for example during the 1957-58 drought season.

This table shows that large quantities of buttermilk are available for either human or animal consumption each season, even during drought

TABLE 1.

Period.	Total Butter Production. (tons).	Total Choice Butter. (tons).	Total B/Milk (gallons).*	Total Choice B/Milk (gallons).*
1943–48	42,529	26,663	12,176,000	7,664,000
1948–53	43,924	28,176	12,575,000	8,067,000
1953–54	41,798	24,821	11,967,000	7,106,000
1954–55	45,915	27,113	13,145,000	7,762,000
1955–56	48,189	28,235	13,797,000	8,084,000
1956–57	41,089	24,437	11,764,000	6,996,000
1957–58†	32,280	19,078	9,242,000	5,462,000

* Quantity estimated on basis of 2,863 lb. of buttermilk being discharged from 1 ton of butter
† Drought period.

periods, and of this a significant amount is of good quality.

How It Is Used Now

Present supplies are used either in the natural liquid form by direct sale to established piggeries or else manufactured into buttermilk powder and sold mainly for animal and poultry foods. By far the major portion is disposed of in the liquid form, only an estimated 16 per cent. being used for powder production during the five year period 1953-58.

(*a*) *Liquid Disposal.*—The usual system of utilization of liquid buttermilk is for nearby piggeries to contract to remove all buttermilk and waste water from the vicinity of the factory. The liquids are either pumped direct to the piggery or else bulk stored in special vats outside the factory buildings proper for subsequent removal by truck. The disposal of waste water along with surplus buttermilk is a feature which must be considered where the conversion to manufacture of buttermilk powder is contemplated. Disposal of waste water in these circumstances becomes the responsibility of the factory and local conditions will largely determine if this can be undertaken without serious difficulties.

(*b*) *Powder Production.*—The only type of buttermilk powder produced in Queensland is the roller dried type. While only small quantities of powder are being manufactured in Queensland at present, some 80 tons a year were being processed as long ago as 1943-44. The development of buttermilk powder production in Queensland is shown in Table 2 which lists the number of factories and the quantities produced annually during the two 5-year periods 1943-48 and 1948-53 and the 5-yearly period since.

How It Is Made

To produce buttermilk powder, buttermilk is collected directly from the churn at the completion of churning and pumped to special holding vats.

TABLE 2.

Period.	No. of Factories.	Total Quantity (tons/year).
1943–48 ..	2–3	154
1948–53 ..	3–4	233
1953–54 ..	6	481
1954–55 ..	7	712
1955–56 ..	7	811
1956–57 ..	7	672
1957–58 ..	7	563

From here it is pre-heated to temperatures approximating 180 deg. F. and then fed onto special rollers designed for the purpose of drying. Along the length of each drum a finely ground knife blade is fitted, which when lightly pressed onto the roller surface peels off the dried milk film. The powder falls into collection troughs and is transported to flues leading to the packing equipment.

The average composition of good quality buttermilk powder together with the composition of liquid buttermilk for comparison is listed in Table 3. A useful rule-of-thumb formula to estimate quantity of powder available is to allow 1 ton of powder for each 10 tons of butter manufactured.

TABLE 3.

Constituent.	Buttermilk Powder.	Buttermilk Liquid.
	Per cent.	Per cent.
Moisture ..	4·0	90·5
Fat	10·0	·8
Protein	35·0	3·5
Lactose ..	42·2	4·4
Acidity (per cent. Lactic Acid)	·8	·10
Ash	8·0	·8

What It Costs

Costs of production of roller-dried powder vary between individual factories. Estimated costs for 1957-58 obtained from factories at present engaged in powder production indicate that a return of £35-£45 per ton is required to meet what may be termed "manufacturing costs" that is wages, fuel and containers. These costs are

listed in Table 4. They indicate a wide variation between factories for such costs. This could result from a difference in the tonnage manufactured and the geographical position of the particular factory.

TABLE 4.

Factory.	Item (£ per ton).			Total Manufacturing Costs.
	Wages.	Fuel.	Containers.	
	£	£	£	£
A	17½	17½	4	39
B	15½	22	5	42½
C	21	14	5	40
D	12	17½	5	34½
E	19	10	4	33
F	17	22	5½	44½

To commence the manufacture of roller-dried buttermilk powder a large expenditure must be incurred. Where suitable premises and boiler capacity are available this capital expenditure would be markedly reduced.

TABLE 5.

ESTIMATED CAPITAL EXPENDITURE TO COMMENCE BUTTERMILK POWDER PRODUCTION FROM 1,200–1,400 TONS OF BUTTER.

Equipment.	Expenditure. (£)*.
Holding Vats (2)	3,000
Pumps	18,000
Preheater	
Rollers, Hoods (3) ..	
Power Conveyors, etc. ..	
Packaging Equipment ..	
Piping, fittings, etc. ..	
Boiler Power (5,500 lb. steam/hr.)	8,500
Building (42 ft. x 40 ft.) ..	4,500

* Estimates supplied by James Bell Machinery Co.

Its Uses For Stock

The main uses of existing supplies of buttermilk powder are in animal and poultry feeding. Its high protein content, together with calcium and B-group vitamins, riboflavin or B_2 in particular, make it a valuable food for young stock and lactating animals.

A second advantage with powder is its storage properties. This minimizes the risk of disorders among young animals which can occur from contamination when liquids are stored.

The main sources of utilization are—

(i.) *Calf feeding.*—Buttermilk powder can be used to replace the whole milk in a ration after a few days, and the usual method of feeding is to reconstitute powder to liquid milk consistency at the rate of 1¼ lb. powder to 9 lb. water. It is particularly valuable for calf rearing in periods of low milk production or on market milk supply farms.

(ii.) *Pig feeding.*—Use of powder in the pig industry is determined by the economics of feeding in view of competition from high protein meat meals. It is possible, however, to have as high as 40 per cent. buttermilk powder in feeding mixture for young pigs.

(iii.) *Poultry.*—Buttermilk powder is used extensively in the poultry industry because of its high riboflavin content and the high biological value of its protein. It is fed to breeding stock to improve the hatchability of eggs, and is claimed by poultry keepers to have a beneficial effect on the quality of the flesh of table poultry. It is particularly valuable in the ration of chickens to prevent the the paralytic disease arising from riboflavin deficiencies. The general feeding rate is 3–8 lb. of powder to 100 lb. of feeding mixture, this being fed from day old to 8 weeks.

It must be appreciated that demand for animal feeding, particularly calves, is of a seasonal nature being heavy during winter months. With adequate packaging it is possible to store powder manufactured in the flush summer months for sale in this winter period.

Some quantities are used by certain food processors but to date only in small amounts.

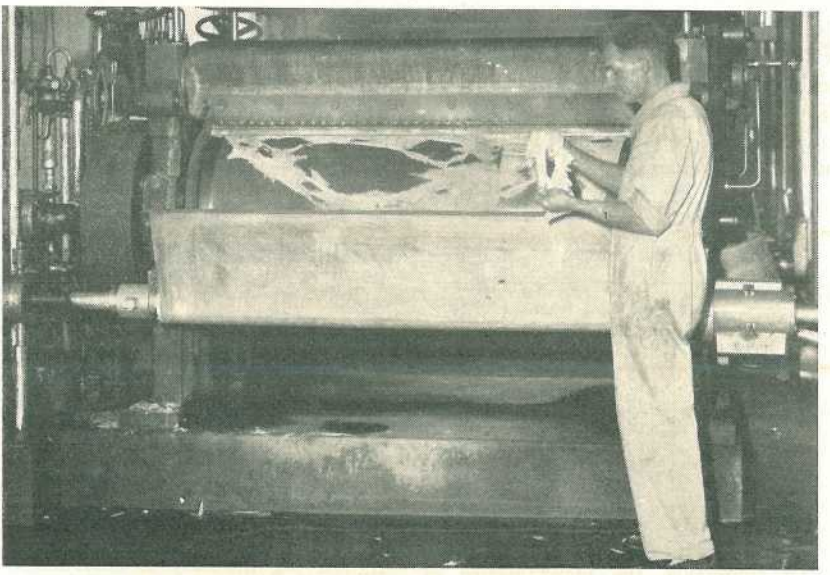


Plate 1.
Buttermilk Powder Film as it Leaves the Roller Surface and Falls into Collection Trough.

Can More Be Used ?

The continuous demand for buttermilk powder for animal feeding and a possible increase in human demand indicates that more attention could be given to the conversion of this valuable by-product into the powder form.

Table 6 lists the gross return per ton which has been obtained in powder in two factories in recent years.

TABLE 6.

Year.	Factory (£/ton).	
	1.	2.
1954–55	53·6	56·1
1955–56	53·2	75·6
1956–57	71·2	72·6
1957–58	71·3	74·7

A second avenue which promises to provide a means of utilization is the baking industry. Recent legislation to permit the manufacture and sale of milk bread provides conditions which warrant close examination by the industry. Baking experiments conducted in Sydney have indicated that if shortening is added to buttermilk powder a satisfactory milk loaf can be manufactured. It should be possible to include this shortening and/or emulsifying agents in the milk prior to actual drying operations. Should the production of such powder become a reality it is recommended that only quality buttermilk be used for drying to ensure that no undesirable off-flavours are transmitted to the subsequent bread.

The current price of £70 a ton suggests that more powder could be manufactured to meet the steady demand from the animal and the food-processing industries. These conditions suggest that several of the larger factories with their large surplus of buttermilk could profitably manufacture supplies of such powder if their present contract price for the sale of liquid milk for pig feeding is not high.

Acknowledgements.—The co-operation and supply of the relevant information from James Bell Machinery Co. and the several dairy associations at present manufacturing roller dried buttermilk powder is gratefully acknowledged.

Herringbone Shed Used By Gympie Farmers

By R. R. FANNING, Dairy Officer.

Two Gympie dairy farmers have found that an elevated herringbone milking shed they have just built removes much of the drudgery from milking. It is neat, solid and convenient, and there seems little doubt that, in the years to come, herringbone sheds will be widely used by farmers with big herds.

The elevated herringbone milking shed was described in the March *Journal* by J. D. Elrington, Senior Dairy Machinery Adviser.

The farmers are Messrs. W. and H. Mahaffey, of Goomboorian, near Gympie. The type of shed they have built is new to Queensland. The idea came from Massey College in New Zealand, but this shed was built for Queensland conditions. Not only is it soundly constructed, but it contains all the conveniences of a modern dairy.

This dairy has many good features. A large roof with an overhang of 2 ft. 6 in. provides extra protection from sun and rain. Excellent ventilation is provided by glass louvres, which also allow regulated ventilation and give maximum light for the interior. The internal lining of the roof means cool conditions during the summer.

Tempered hardboard has been used to line and ceil the entire building resulting in a well-finished interior. This has meant that crevices and joints which are traps for dust and manure have been eliminated. Fluorescent lighting adds to the modern appearance and provides adequate light.

These features are illustrated in Plate 1. This illustration also shows the milker's alley, the herringbone

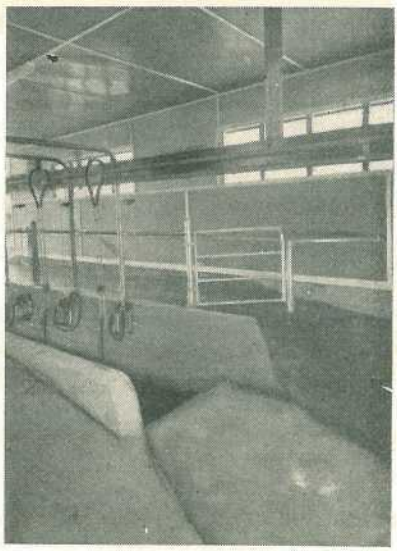


Plate 1.

Inside the New Herringbone Milking Shed. The picture shows the milker's alley, the herringbone arrangement of the bails, and the gate through which the cows leave the ramp. Tempered hardboard lining and fluorescent lighting add to the modern appearance.

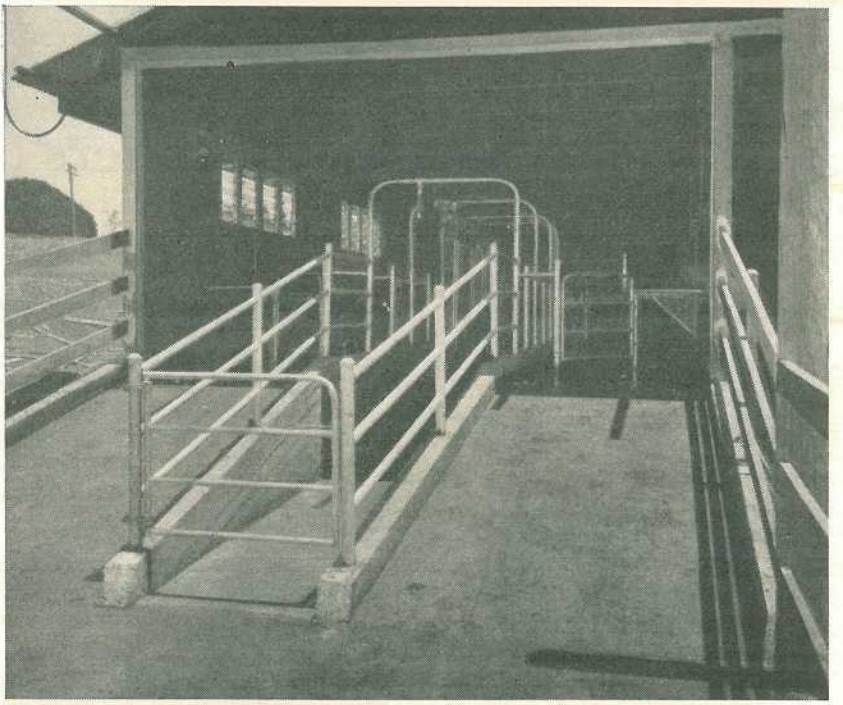


Plate 2.

The entrance to the milking shed. The combination of concrete, steel and timber is strong, durable and neat.

arrangement of the bails and the gate through which the cows leave the ramp. It will be noted that the floor of the shed is constructed on three levels at the exit or milk room end of the building. In this way, the grade of the exit race is greatly reduced and minimises slipping.

Tubular Steel

Galvanised wrought iron pipe has been used extensively in the bails and is rigidly erected in concrete. Plate 2 shows the tubular rails on the sides of ramps, the gateway at the top, which prevents cows backing out, and the gate between the small holding yard and milker's alley. The combination of concrete, steel and timber is strong, durable, neat and clean, and also provides an attractive appearance.

Plate 3 shows that the building is in a good position for drainage and sunshine.

Plate 3.

The building has been put up on a sunny, well-drained site.

The roof of the milking shed (Plate 4) extends over the two holding yards which have concrete floors. In order to obtain maximum sunlight and ample protection from rain, the

roof was built so that the fascia boards would be 13 ft. above floor level. The size of the two holding yards are 32 ft. by 30 ft. and 18 ft. by 16 ft.

After the cows have been milked, they leave the shed by a side door and emerge, either into a concreted laneway leading to the pastures, or into a small holding yard.

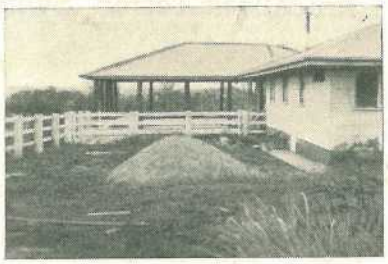


Plate 4.

The roof of the milking shed extends over two holding yards with concrete floors.

Modern Equipment

A modern six-unit milking machine has been installed.

All the separator room fittings are metal. The milk vat stand, double-decker draining rack and milk vat rack are very neatly made from galvanised wrought iron piping. Individual electric motors on mountings above the floor drive the stainless steel separator, skim milk pump and machines.

A separate room has been built to house a steam sterilizer and to keep a quantity of wood dry during wet weather. This sterilizer provides adequate steam both for heating water used to clean the equipment and for steam-sterilizing the utensils after they have been washed. Two rooms have been provided at the front of the building, one for the installation of a refrigerator and the other for the storing of spare cans, veterinary supplies, and other items commonly used in the milking shed.

The solid construction of these premises, the neatness of work, the herringbone layout and the installation of good quality equipment add up to a dairy shed which removes much of the drudgery from milking.

Timely Hint For Winter Grazing

You can plant your winter grazing crops up till June. It is a good idea to stagger the plantings to allow continual grazing through the winter.

Oat varieties recommended are Benton and Saia, which are resistant to crown rust and best suited to coastal conditions. For inland areas plant Belah, Fulghum or Algerian.

If planting wheat, sow during May the varieties Lawrence, Celebration or Charter; for June planting, sow Gabo or Spica.

Legumes such as Dun field peas and Golden tares should be included in any plantings.

—D. L. HASSELL, Senior Adviser in Agriculture.

Brucellosis-Tested Swine Herds.

(As at 1st May, 1959.)

Berkshire.

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

Large White.

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

Tamworth.

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

Wessex Saddleback.

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

Large Black.

E. Pointon, Goomburra

Bucket and Bail

CROPS of grazing oats are the dairy farmers' standby during Queensland's normally dry winters and springs. Yielding up to five or six grazings, oats will cushion a herd's production against the sharp decline in pasture quality from early autumn onwards.

Farmers know that the planting season extends from late February to mid-June. Sown on well-prepared land in which adequate moisture has been conserved, oats will give about 400 cow-grazing-hours to the acre.

Every year, Queensland farmers plant about 300,000 acres of grazing oats, making this the top grazing crop in the State. Heaviest plantings are on the Darling Downs and in the Maranoa, but worthwhile acreages are also grown in the Moreton, Gympie, Maryborough, Rockhampton, Callide, Mackay, and Atherton districts.

Selection of the variety to be grown has an important bearing on the success of the planting.

In coastal districts during years of higher-than-average rainfall, crown rust can ruin oat crops. While there are no varieties completely resistant to crown rust at present available for planting in coastal districts, Bovah and Benton possess a fairly high degree of resistance. These can be relied upon to produce worthwhile grazing. Both of these varieties have also performed well on the Darling Downs, and in the Lockyer, Burnett, Callide, and Atherton districts.

In the drier, inland districts, Fulghum and Belar have been widely used for plantings from April to June. Algerian is a late-maturing variety which may be sown from February to April, and will often provide grazing through a dry spring. Vieland is also a popular variety for inland districts. It is mid-early and may be sown at any time during the autumn.

Grazing oats are usually sown at 40 to 60 lb. to the acre. For continuous grazing, plant an area equal in acres to one-third or one-half the number of cows being grazed. That is, for a herd of 36 cows, plant 12 to 18 acres of oats.

—Dr. L. G. MILES,
Director of Agriculture.

SHOCK cooling cream before placing it in a refrigerator will preserve its flavour and keeping quality. This operation cannot be neglected, or the even consistency and sound flavour usually found in refrigerated cream will be largely lost.

Some dairymen with cream refrigerators have stopped using the shock cooler supplied with the unit. Attention was first drawn to this when cream deliveries at factories failed to measure up to the standard expected of the refrigerated product. A check back was made, and in every instance it was found that the shock cooler had not been used for some time.

Because bulk cream cools only slowly in air, the use of shock cooling is a most important phase of this type of refrigeration. If it is discontinued, there is no aeration of the cream, and no rapid removal of animal heat. This means the existing cream in the can is being heated unnecessarily by the fresh quantity being separated. When cream in this state is placed in the enclosed cabinet of a refrigerator, off flavours develop.

Acid development takes place when a large quantity of warm cream is placed in a refrigerator. The prevention of acid development is one of the aims of refrigeration.

To outlay capital for a refrigerator and then fail to make the most effective use of it is clearly unwise. You can't expect to get your money's worth out of your refrigerator unless you use the shock cooler and use it efficiently.

—*T. W. SMITH,*
Dairy Adviser.

Plans For June

Prepare suitable calf paddocks for rearing young stock.
Commence training heifers to ensure good milk "let-down".
Tattoo calves for future identification.
Re-tin and repair cans during the winter months.
Ensure that cows have 4-8 weeks' dry period before calving.
Concrete holding yards and races to overcome dust and mud problems.
Dehorn cattle.

Clean, Dry Cans and Lids are an Important Factor in Quality Milk Production, as Demonstrated by Mr. A. Stepheson, of Jaggan, via Malanda, N.Q.

Cans have been stored upside down to ensure adequate drainage and prevent the entry of dust. A piece of 3 in. by 1½ in. timber with double width saw cuts makes an ideal lid rack. The saw cuts are about 9½ in. apart. During the slack period this winter, a few hours' effort could supply similar storage conditions on your farm.

Beef From Dairy Cows

By K. F. HOWARD,
Adviser in Cattle Husbandry.

RAISING of beef yearlings can be profitable either as an alternative to, or in conjunction with, dairying. Poor producers in dairy herds could often be more profitably used as breeders for beef when land is available.

When Messrs. N. D. and L. O. Bahnisch of Guluguba, north of Miles, switched over from dairying, they retained their cows for beef production. On their brigalow-box country they have been able to produce heifers and steers with an average dressed weight of 350 lb. at 12 months. These animals average £24 a head on the property when yearling beef is realising £7 10s. a 100 lb. at Cannon Hill.

At present ruling prices (3/3/59), their average net value on the property is about £28.

The time saved by allowing the calves to milk their mothers is used by the Bahnisch Brothers to improve their property and so increase its earning capacity.

How They Are Fed

At the Guluguba property, the A.I.S. mothers are run on brigalow and box country which grows natural grasses and Rhodes grass. Up to date, a Hereford bull has been used as a sire but a Zebu cross bull is now being tried.

The secret of success lies in having good feed for the calves when they are weaned. The Bahnisch Brothers rely mainly on non-irrigated lucerne,

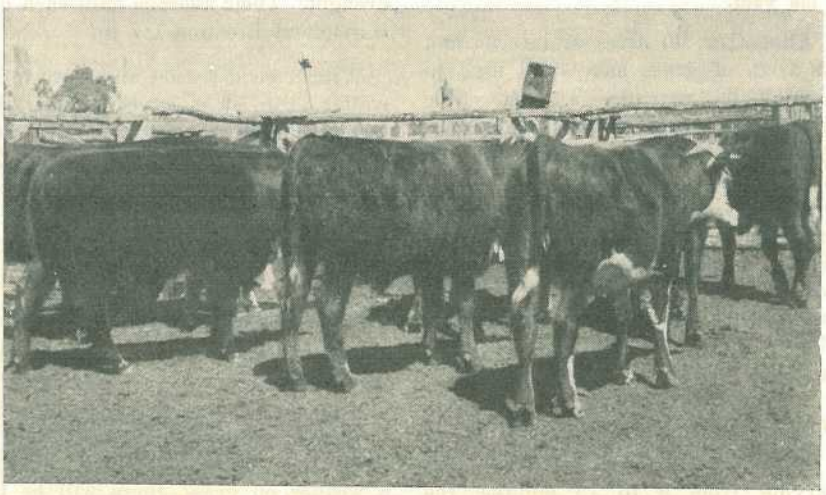


Plate 1.

Yearlings at Time of Marketing. They made average daily gains of 1.7 lb. throughout life. Without the drought it is considered they could have dressed 400 lb. at 12 months of age.

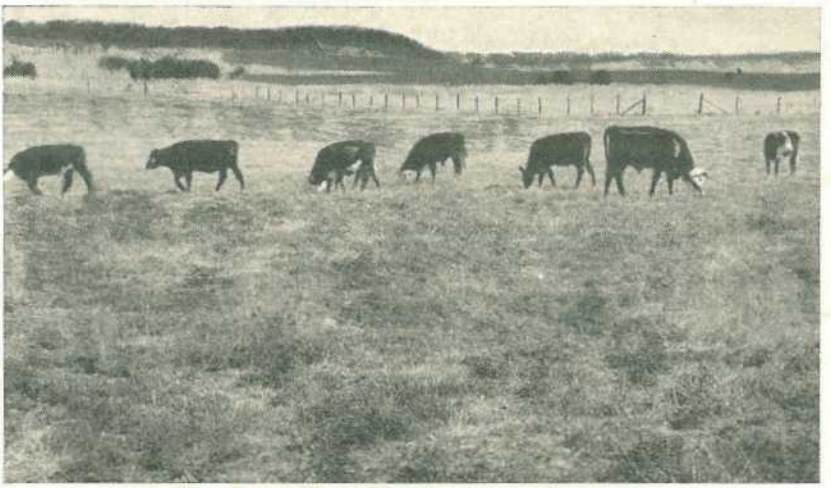


Plate 2.

These Yearlings are Grazing Non-Irrigated Lucerne. Because of the drought they were not weaned in prime condition. However, lucerne, Rhodes grass and native grasses produced sufficient weight gains to ensure marketing as fat yearlings.

together with Rhodes and natural grass. They aim at marketing all of their yearlings between July and December when prices are generally higher than in the first six months of the year.

Altogether, 40 acres of lucerne and 35 acres of grass have been used to top off 60 yearlings a year. The calves were weaned in two lots, so that the 40 acres did not carry the 60 calves at the one time. They have found a winter crop an advantage—particularly for the feed produced from June to September. To market good quality steers and heifers at 12 months of age, feed must be provided throughout the life of the animal.

Marketing and Weight Gains

The calves are marketed at ages varying from 9 to 15 months, the average being 12 months. The age of selling differs according to the condition of the cattle and the prevailing price. If the yearlings are always kept in marketable condition, advantage can be taken of any rise in prices.

The Guluguba calves that dressed 350 lb. had to weather the 1957-58 drought. Their average gain each day throughout life was 1·7 lb.

With a good season and by using a winter crop, it is expected that this property will produce yearlings capable of dressing 400 lb. at 12 months. This includes heifers and steers.

Such cattle will average a gain of 2 lb. each day through life.

The Cost of Feed

On experience, 60 calves would have ample feed if allowed 40 acres of lucerne, 35 acres of grass and 30 acres of winter crop. This means that in addition to the normal cost of running a weaner on grass, there will be the cost of two-thirds of an acre of lucerne and half an acre of cultivation. A conservative cost for establishing an acre of lucerne or cultivation is £4.

Assuming the lucerne lasts for four years, this means that there is an additional cost for each yearling of 13s. 4d. for lucerne when it costs £1 per acre per year. The cost of half an acre of winter crop is £2.

The total additional cost per yearling is therefore £2 13s. 4d.

It is possible to provide this feed for a smaller cost if machinery is used efficiently.

A Difficulty

In flush periods when the calves are young, some cows will be burdened with an oversupply of milk. In such a period in 1959, only one out of 120 cows had to be brought in and milked out and she gave 4 gal. in the afternoon and 3 gal. the following morning. Such cows are soon recognised and could either be milked out or put on a restricted diet during the flush period.

The Bahnisch brothers, have gradually expanded their area of lucerne and crop and are now running 120 dairy cows for the purpose of turning milk into beef.

Beat the Fly

Do you Mules your weaner sheep as a simple routine job each year? If you don't, you are certainly missing out on one of the surest forms of protection against fly. Mulesing and mid-season crutching lay the foundation for immunity from fly waves long before they occur; jetting and spraying are mainly expedient measures used in an effort to stop the rot once the fly has built up its numbers. Mulesing once done lasts a lifetime; jetting only protects for a few weeks. Perhaps the best form of jetting at present is to use one of the Diazinon preparations at a concentration of 0.04 per cent. April and May are often peak periods for blowfly trouble, and from a few primary strikes untreated a vast flood of blowflies can spread to cause trouble to you and many flocks in your area. Reduce the number of these primary strikes that tend to crop up each spring and autumn, by having your flock Mulesed in readiness.

Station Identification

Floods sometimes cause isolation to man and animals, and western station owners might have to call on aircraft relief—the flying doctor—or the food plane. Can your homestead be identified from the air? The name of your property is best painted on the largest building; if it is gabled it should be on both sides. Air pilots say the best colours are black letters, 6 ft. high, on a yellow background. Smoke fires for showing position of an airstrip, or site for a drop, should give off black smoke, not white. Burning rubber or oil will give off black smoke.

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

Looking After Cattle Dips . . . And Taking Samples

By F. H. D. MARSHALL,
Technical Officer, and
C. W. R. McCRAY,
Senior Toxicologist.

IF you own a cattle dip you don't need to be told that modern dipping concentrates are more costly than the arsenical preparations with which we were so familiar prior to their advent. Probably you have also learned by this that the use of these newer tickicides presents problems concerning dip management and maintenance that were unknown in the old arsenic days.

The Department's advisory leaflet No. 147 deals with some of these problems, especially as they relate to DDT dips, but as new preparations continue to increase in number and complexity a few timely hints may help you to obtain the full 20 shillings worth of value for every £1 spent on your dipping programme.

Modern Tickicides

Unlike arsenical dipping fluids in which the tick-killing ingredient is in solution, like sugar dissolved in a cup of tea, the active material in modern tickicides, most of which are known as chlorinated hydrocarbons, is suspended in the dip in the form of minute crystals. For this reason, it is most important that you adhere strictly to the manufacturer's specifications when charging or "topping up" the dip.

Plate 1.
Dip Sampler Developed by Department of Agriculture and Stock.

Many of the crystals attach themselves to particles of mud, hair or dung in the dip and so long as the quantity of these is not excessive this is a desirable state of affairs. However, like all good things, this can be overdone and excess of foreign matter in the dip can cause loss in both efficiency and hard cash.

Keep Dirt out of Dip

The water in an average size dip weighs about 11 tons, and the wave action in this fluid tends to pack silt at the junction of the floor and the

Plate 2.

Close-up of Lower End of Sampler Showing Jar in Position and Permanent Lid on Rod. Two lock nuts on the underside of the lid prevent it from working loose.

vertical wall at the plunge end of the dip. This silt, if allowed to remain undisturbed, can trap a great deal of active material, and eventually become almost as hard as rock. This may be minimized by filling this sharp corner and rounding it off with a mass of concrete as illustrated in Plate 6.

Fouling is mostly caused by the dung and dirt that is carried into the dip by the feet of the cattle.

To reduce fouling to a minimum:

1. As far as is practicable, avoid dipping after rain, while the ground is still damp and easily picked up.

2. Build a concrete foot-bath in the first panel or two of the crush, or better still, convert the whole forcing pen into a foot-bath as some dip-owners have done. You will be amazed to see how much dirt your cattle will leave behind, which would otherwise be carried straight into the dip. A wide-bore drain pipe built into the foot-bath will greatly facilitate its cleansing.

3. Use a stiff yard broom and a shovel to clear dirt and dung from the crush and draining pen before, during, and after dipping.

Stir Dip Thoroughly

The particles of silt and their passenger crystals of dip preparation must be brought back into the dipping

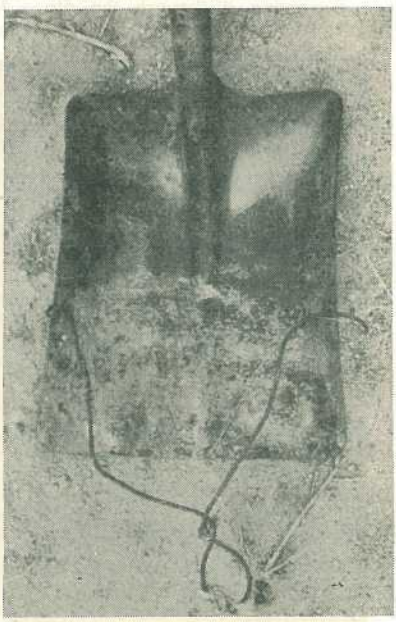


Plate 3.

Square-Nosed Shovel Used to Remove Silt from Plunge End of the Dip.

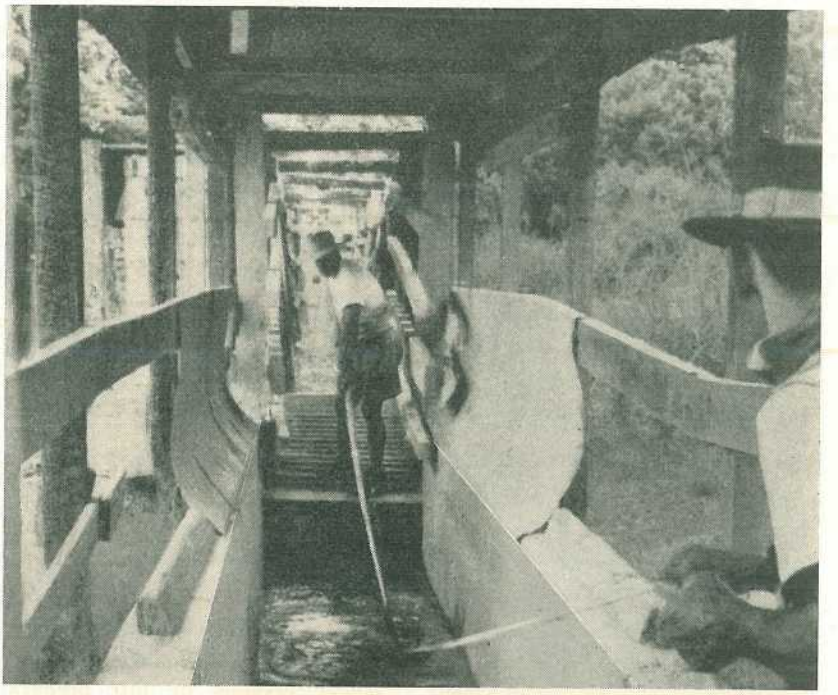


Plate 4.

The First Step in Stirring the Dip. Removing silt from the plunge end and dispersing it through the dip. Note rope used to haul the shovel along floor of dip.

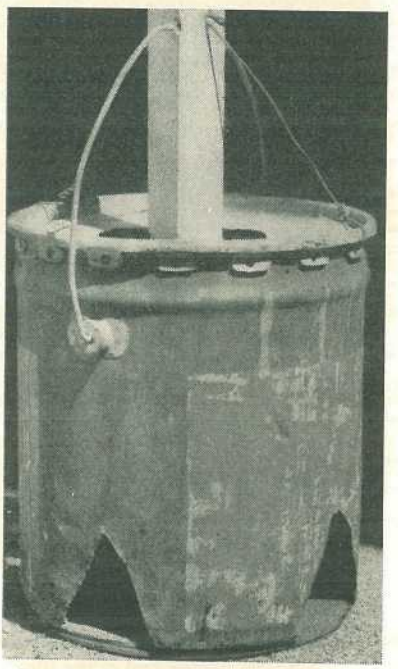


Plate 5.

Dip Stirrer Made from 4-Gal. Drum. Wire handle passed through stick acts as a guy.

fluid for effective dipping. Three steps are necessary to do this job properly:

1. Dislodge silt at plunge end with tool such as square-nosed shovel on long handle shown in Plate 3—(This process is fully described in the advisory leaflet mentioned).

2. Disperse the dislodged silt through the dip and then stir thoroughly with a hand-stirrer. An empty drum with a central hole in the lid and three or four holes cut around the side near the bottom, firmly fixed to a long piece of timber, as shown in Plate 5, makes a good stirrer. If sufficient labour is available to work two or three of these stirrers in the dip at the same time a great surging effect is created.

3. Dip about 20 to 40 cattle as additional stirrers (run these back to mob and dip again).

Failure to stir the dip thoroughly before use can result in the concentration of the active ingredient in the dipping fluid being too low to kill

ticks. An ineffective dipping of this nature is so much valuable time, labour and money wasted.

Remove Heavy Mud and Hair

During the 10 min. period immediately after a good dipping, while the effective ingredient is still suspended, the floor of the dip may be dredged by shovel or a tin on a stick to remove the heavier mud. The particles of the dip preparation discarded with these dredgings are too large to be effective at dipping. Furthermore, the chance inclusion of some of these large particles in a sample taken for analysis can give a false picture of the strength of the dip.

Hair may also be scooped from the surface of the dip—but this operation should *not* take place until the froth, which does contain useful material has subsided.

How Dip is Lost

We have seen that some active material can be lost (from the tick-killing point of view) by being trapped in silt on the bottom of the dip, especially when this is allowed to pack into a solid mass. The tickicide can also be lost in the hair and dung, which accumulates in the sump between the draining pen and the dip. This can be overcome by dispensing with the sump altogether and allowing the fluid from the draining pen to run back directly to the dip. Loss from these sources can be minimized by good dip management.

Cattle normally take away a quantity of active ingredient in their coats. This is called "stripping" and is mainly responsible for what is known as the "residual effect" of a dip preparation. Some tickicides lose strength by chemical breakdown in the dip. These sources of loss are beyond the dip-owner's control.

Keep Track of the Strength

Dangling a narrow-necked bottle on a string to obtain a sample for analysis was probably good enough with an arsenic dip—anyway, the local stock inspector could always test your sample in a couple of minutes. But with modern tickicides this method is not nearly good enough. Hair and scum in the neck of a narrow-mouthed bottle can filter out a quantity of active ingredient so that the sample ultimately obtained is not truly representative of the vat fluid.

Furthermore, although chemists are working toward that end, a quick dip-side test has not yet been perfected and analysis of modern dip preparations demands the skilful attention of a trained technician in a well-equipped laboratory.

Sampling Tool

Realising that lack of a suitable sampling tool was an obstacle to efficient sampling of dips, the Depart-

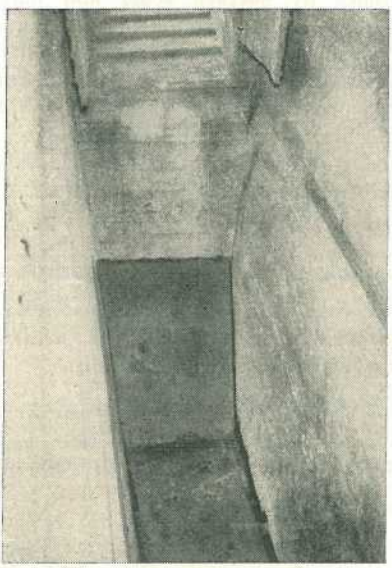


Plate 6.

The Corner at the Foot of the Plunge-In Wall Filled with Concrete to Minimise Deposition of Silt at this Point.

ment has developed the simple instrument depicted in Plates 1 and 2. This can be made by any handyman for a few shillings. It consists of an ordinary 1½ lb. jam tin fixed to a length of 2 in. x 1 in. timber, and a 3/16 in. metal rod, threaded at one end, running through two brackets on the "stick." Permanently fixed to the end of the metal rod is a jar lid of the type found on the common wide-mouthed 2 lb. honey jar.

To obtain a sample of dipping fluid, a jar of this type is placed in the tin and the lid on the rod lightly screwed on to it. *A thin smear of petroleum jelly on the inside of the lid assists its action.*

The tool is then plunged into the dip to a depth of about 3 ft. and about 3 ft. from the plunge end of the vat; the lid unscrewed by a twist or two of the rod and replaced on the jar after it has filled.

By this means a representative sample is obtained free from interference by surface scum and hair. Upon removal from the dip, the jar is fitted with another lid, which should contain a well-fitting rubber or other waterproof seal to prevent loss of fluid in transit. Any such loss will render an analysis of the remaining fluid worthless.

To obtain and despatch samples

1. Take sample *immediately* dipping is finished, preferably while the last beast is walking out of the dip.

2. Label carefully, showing your name and address, the proper proprietary name of the dip preparation in use, its formulation (liquid, paste etc.) and rate of dilution.

3. Complete a copy of an application form for analysis of dipping fluid (Form 225, available from your local stock inspector or from the Department's Head Office) giving clear answers to all questions. The analyst requires this information to enable him to identify quickly the material he is to deal with; to properly interpret his results and advise you accordingly. If anything, err on the side of giving *too much information* rather than too little.

4. Despatch your sample, in the jar in which it was collected, to the Biochemist, Animal Research Institute, Yeerongpilly. No fee is charged for analyses of dipping fluids (or water for use in dips) but freight on samples should be prepaid.

"Topping-Up" the Dip

"Topping-up" the dip means more expense. A sample carelessly taken may give a test well below the true level of the dip with the result that money spent on the addition of dipping concentrate in such a case would be largely wasted. Remember, good sampling saves money.

In "topping-up", as in charging a dip, remember also to stick closely to the manufacturer's instructions concerning preparation and mixing of the material. It is a good practice to add fresh material to the dip just prior to dipping cattle as this usually ensures a good mix. A fresh sample for analysis should be taken after this dipping to serve as a check on the effectiveness of the "topping-up" process.

Guard Against These Ailments In Your Horses

By R. MILLAR, Veterinary Officer.

The overall well-being of horses, like all other animals, is dependent firstly on their condition. It may seem odd to say that an adequate diet is essential, but there is no doubt that, in many cases, deficiencies in the diet are often attributed to more mysterious things, such as parasites and the like.

Veterinary scientists are often asked to perform some feat that will make up for improper or inadequate feeding. Naturally, this cannot be done. But what can be done is to ensure that an animal is healthy and able to make the best use of a proper and sufficient diet.

There are times in the lives of horses, as with other animals, when a satisfactory diet is an absolute essential. Two important stages are during pregnancy in mares, and at weaning and immediately after in foals. In spite of this, it is common practice to say, "Oh! She's in foal, turn her out," or to turn out the foals after weaning into the paddock there to stay until they are wanted.

Having established that sufficient food has been available, there are many ailments and diseases that can occur to interfere with horses' condition.

Teeth.

Naturally, if the teeth are in bad condition, the grasping and chewing of food is upset. This is the first link in the digestive chain, and is thus of primary importance. The action of grinding food by the molar teeth is from side to side. The opposing faces of the upper and lower grinders are inclined in opposite directions. Thus, the outside edge of the upper molars and the inside edge of the lower molars tend to get sharp. These sharp irregularities injure the tongue and the inside of the cheek and stop proper chewing.

Often the food forms into balls inside the cheek. These small balls will often fall out in the manger or in the paddock in bad cases.

The sharp edges of these teeth can be rasped off, and special tooth rasps are available for this purpose.

In older horses, teeth must be inspected regularly and treated if necessary. Your veterinary surgeon will assist you in this matter.

Colic.

This term is used to describe a number of conditions characterised by abdominal pain in the horse. It may be caused by things as different as indigestion and parasites. Generally, however, changes in feed, lush feed, dry feed, poor quality feed give rise to indigestion and colic. Abstinence from water and a sudden fill after a feed will often bring about colic.

Symptoms include abdominal pain, varying from acute pain with rolling and sweating to dull persistent pain going on for weeks. Generally, the more acute the type, the better the chance of recovery. There may be

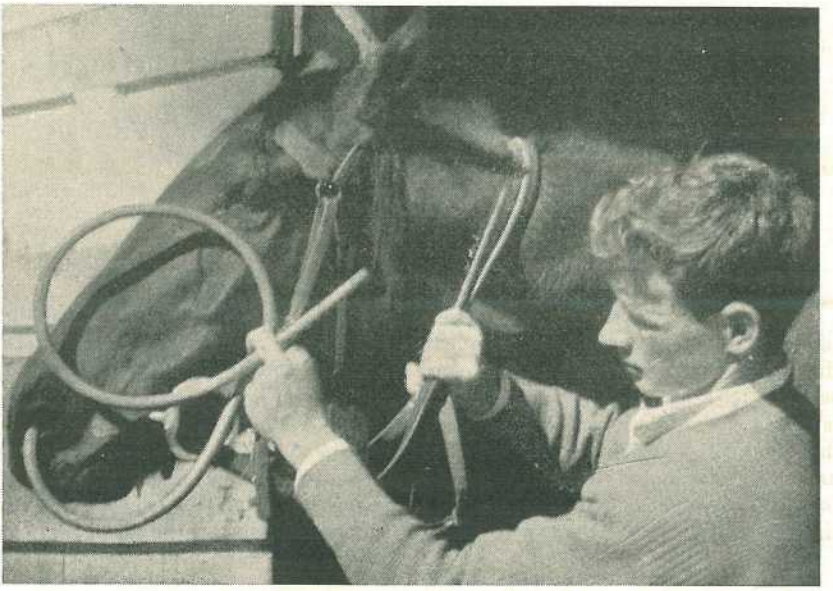


Plate 1.

Stomach Tube for Drenching, Showing Tube in Position in Nostril.

constipation or diarrhoea, the action of the bowels varying according to the cause.

Treatment.—Many home remedies have been acclaimed according to their result. Turpentine, linseed oil, liquid paraffin and many others have been successfully used by horse owners.

Today, veterinary surgeons have anaesthetics and "tranquilisers" and a wide variety of drugs that make the modern treatment more effective and much easier.

Parasites.

There are several parasites that affect horses. Again, one must stress the importance of good feeding in relation to the balance between the condition or health of the animal and the number of worms present. It has been established that animals on poor feed and in low condition tend to become more favourable hosts to parasites. This does not imply that adequate feeding will lessen the number of parasites in horses, but if the horses are well fed, the ravages of the parasites are less. Foals which are well fed will show less loss of condition than those on poor feed and with an equal parasitic infestation.

The response of horses to parasitic treatment will be much better if they are well fed, both before and after treatment. Generally, treatment alone is insufficient unless nursing is equally thorough.

The three most common parasites of horses are, (*a*) red worms, (*b*) large round worms and, (*c*) bots. In any parasitic life-cycle, there is a most favourable time to attack. Thus it might be as well to stress this time in respect to these three parasites.

(*a*) *The Red Worm.*—These are of the greatest economic importance. The adult red worm lays eggs which

pass out in the droppings. Here they undergo rapid development and become infective. They are then picked up by the new host during grazing. Having been swallowed, they undergo development in the bowel, then they pass through the bowel wall. Here they get into the blood stream and migrate throughout the organs of the body, eventually returning to the lumen of the bowel as adult males and females to start the cycle over again. They are blood suckers and, if present in sufficient numbers, will cause severe anaemia. In addition, they cause considerable damage during their migration through the animal's body.

Thus, the only time to treat these is when they are in the adult stage in the bowel. Drugs cannot reach them at any other time. Rotational grazing of paddocks will help as will the harrowing of pastures to break up dung pads. Drenching is most effective in the autumn or early winter, as the worm eggs are picked up during the summer months.

(*b*) *The Large Round Worm.*—It is often inferred that large round worms are not important, but experience shows that in foals they are. The life history is the same in general as the red worm. Here again, the only time to attack this parasite with success is during the adult stage in the bowel. Foals must be treated before they are weaned and again as yearlings.

(*c*) *Bots.*—Bot flies lay their eggs round the muzzle, under the jowl, or on the legs of horses. The eggs hatch into larvae which bore through the skin and reach the circulation and subsequently settle in the stomach. Here they attach themselves to the wall. Again, the only satisfactory time to treat is when the bots are in the stomach.

Various suggestions have been made as to methods of destroying the eggs on the hair but up to now, none has been satisfactory. As soon as the bot fly ceases to be active in early winter, all horses should be drenched.

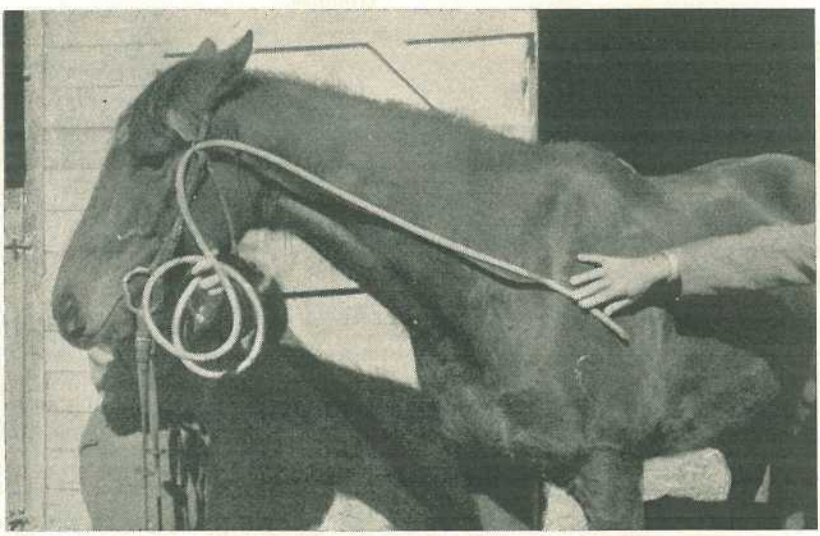


Plate 2.

Stomach Tube, Indicating Course Taken Down Food Pipe to Stomach.

The symptoms of parasitic infestation in horses and foals vary, but poorness, diarrhoea, pot-belly and general unthriftiness are most common. Circulatory symptoms and peritonitis, colic and death often occur in the later stages. Treatment must be specific for each—there is no "blanket" treatment for them all.

The red worm is treated with phenothiazine, the large round worm with piperazine and carbon bisulphide is the drug most effective against bots.

There is little doubt that the stomach tube is the safest and most effective method of administering these drugs. Carbon bisulphide is irritant and, unless given by the nasal tube, needs handling with care.

The stomach tube can be used to give a large quantity of fluid, which is an advantage, and also all drugs can be given at once. This should be done by a veterinary surgeon, as the passage of the nasal tube can be both dangerous and fatal in unskilled hands. Any treatment for parasites must be supplemented by good feeding.

Strangles.

Strangles is an infectious disease of horses caused by the organism known as *Streptococcus*. This will spread through a mob with amazing thoroughness and rapidity. It is often advisable to isolate new purchases, especially if they come from a sale-yard or public auction.

Symptoms—The horse goes off its feed and becomes dull, and often difficulty in swallowing is noticed. It runs a high temperature and its nasal and eye membranes become reddened. Often a cough starts, a sore throat is noted, and a thick discharge appears from one or both nostrils. The glands under the jaw or below the ears swell up and eventually burst. Similar swollen glands may appear at the back of the sheath and around the anus.

Treatment.—Isolate all healthy animals, and as soon as these show any rise in temperature they must be put with the infected. Disinfect all in-contact materials, clothing, water utensils, feeders, brushes and so on. It is claimed that penicillin and other antibiotics are useful—they are in the initial stages, and heavy doses every 24 hours may help. The disease tends to run its course, however, but pneumonia and other secondary affections may be lessened with treatment.

It seems that many horse owners are not aware that there is quite a good vaccine available against strangles. Recent purchases or horses from public sales, should be isolated and vaccinated. Vaccination has little curative value; it has a preventative value and this should be used before symptoms occur. It is felt that vaccination should be practised more widely as it either prevents the development of the disease entirely, or renders it much less severe. Its use will also prevent minor respiratory troubles.

Strangles is a good deal more serious than is realised and long convalescence and good nursing are essential. Often, starting horses working too soon after an attack is followed by further changes in the heart and lungs. These "post strangles" complications may often be fatal.

Tetanus

This has always been an important disease of horses. The germ is frequently carried in the intestines of normal horses and passed out in the dung without causing any trouble. The poison must reach the nervous system to cause symptoms. The infection in tetanus is almost always associated with a wound, although some cases have occurred where no wound is visible.

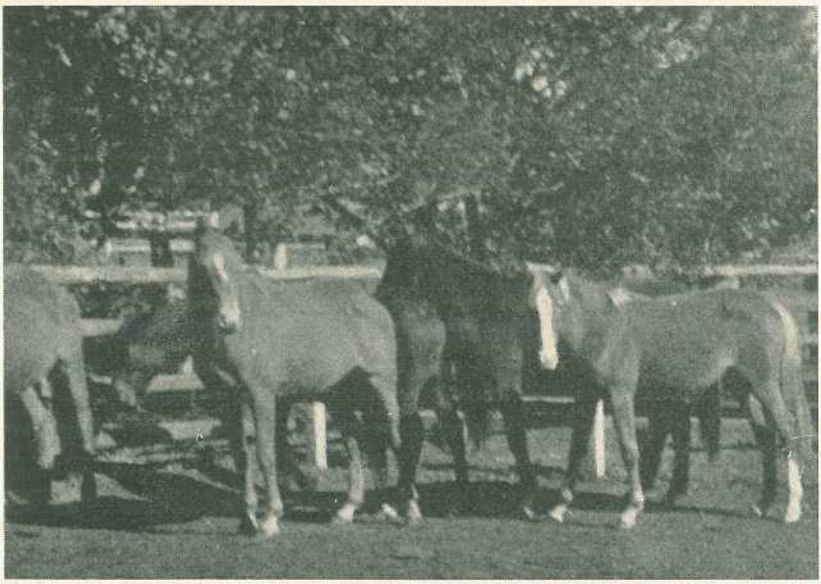


Plate 3.

Young Horses in Shady Yards.

Symptoms of tetanus may appear from 4 to 20 days after infection of the wound has occurred. The organisms like to get buried and out of the air before they develop, thus the healing wound is generally the cause and seldom the fresh wound.

Symptoms.—These are well known to most horsemen. After the wound has started to heal, the horse goes stiff, as with laminitis. A peculiar "proppy" gait and stiffening of all the muscles occur. These symptoms are precipitated by fright or movement, and the animal will then go into a complete spasm all over. If the spasm persists, profuse sweating will start.

The diagnostic symptoms are that the third eyelid slips over the eye when the chin of the horse is gently raised away from the ground, and when the head is lowered it slowly retracts to its normal position. In advanced cases it remains protruded. The tail has a peculiar position and often tends to stick out like a pump handle. This is due to a spasm of the back and loin muscles. As the disease progresses the nostrils become dilated, the limbs stiff and the abdomen drawn up. The animal tends to go into a perpetual state of spasm and goes down. The distress is obvious, sweating is profuse and destruction is inevitable.

The characteristics of the disease are shown by all animals alike—sheep, pigs, cattle and man. So, if you have seen tetanus in one species, you can imagine what it is like in the rest.

Prevention.—Tetanus can be prevented by inoculation. Many of you have had your children immunised against this disease—if you have not, you should. The same applies to horses in any breeding or racing establishment. The initial vaccination is carried out with tetanus toxoid. A "booster" injection should be given 12 months later and for greatest protection this should be repeated every three years. This gives a high degree

of protection from tetanus. Three weeks or a month before any operation, such as castration, toxoid should be given. The time factor is important, as the animal has to develop its own resistance. Giving the injection the day before may be of no use. In such a case, antitetanic serum should be used for immediate short-term protection as well.

Treatment.—In the initial stage of symptoms, tetanus anti-toxin can be used, but the result of this is very variable; generally, it is of no avail. If it is to be of any use, it must be used early and in maximum quantities. Anti-serum is also useful for short-term protection of non-immunised animals suffering penetrating wounds which are likely to become infected. The successful treatment of tetanus is best handled by a veterinary surgeon. Not only is he familiar with the procedure but he has narcotics and other drugs available that are essential to the successful treatment of this disease. Prevention of tetanus in all animals and man is the ideal method. Treatment should not be necessary today.

Lameness.

Today, the motorist expects to have the puncture mended and the spare wheel put in the boot an hour later. The same is expected of horses that go lame. You are expected to put the matter right at once, so that the horse can go again tomorrow. But it must be remembered that any sudden cause of lameness, a nail in the foot, or blow on the tendons, will cause an immediate change from soundness to lameness. It must also be remembered that the reversal of this process is not so sudden and may even be prolonged over weeks or months.

Recovery, even with adequate and proper treatment, is only a natural process which can be helped or impeded by man's interference. The natural process of recovery may be accelerated by heat or cold, with or without rest and exercise, as well as the application and use of many remedies. So, in dealing with lameness, one is forced to state the old maxim, "No foot, no horse."

There seems so little knowledge available to people today on the importance of horses' feet, yet this is the vital matter, for neglect will soon bring about lameness of one sort or another.

So often, one sees horses turned out and literally forgotten. When this happens, it is not unusual to find deformed feet, split hoofs and all the rest.

Now it must be remembered that the hoofs grow in the same way as finger nails. Everybody knows that unless these are cut, they grow at an alarming rate. The manicuring of horses' feet is equally important. They must be kept even and rasped down every few weeks. Not only is this important to give the horse an even, level foot on which to walk, but it also stops splitting up the wall. An uneven sole and wall will alter the mechanics of walking, upset the distribution of weight into the foot and leg. Splits in the wall allow dirt to work in to the tissue and abscesses in the foot will result.

Often people think turning out horses with shoes on absolves them from taking any further interest in their feet. Over-grown feet will extend over the edge of the shoes. The shoes become loose and the clenches then tear off the edge of the wall, so that when you want to put on a shoe, there is no wall left to nail through. The loose shoes wrench off and the horse stands on the toe-clip. This will give rise to abscess formation. In the worst cases the toe clip can injure the bone or ligaments in the sole of the foot above the frog.

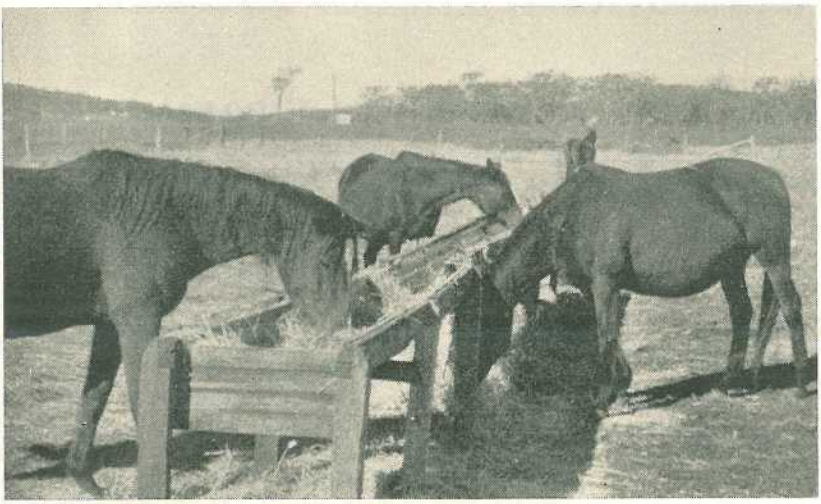


Plate 4.
Feeding Brood Mares.

Horses turned out with shoes on, require to have those shoes removed and their hoofs rasped back every month or so, according to growth of hoof. This is essential so that when the animal is needed it has a well-shaped foot which can be shod for work.

The maladies higher up the legs from which horses suffer often have their origin in neglected feet. On the other hand, there are many strains and bone enlargements that come from work. Often these complaints are the result of hereditary factors. There is no doubt that they tend to follow certain families and certain breeding lines.

The fact remains that both heredity and neglect bring on many types of lameness. The diagnosis of lamenes is often not difficult but the assessing of the future of the animals is more difficult.

The object of these observations is to bring before horse-owners a few of the common conditions affecting horses. It must be appreciated that, as with all animals, prevention is the first and most economic way of defeating any ailment.

Planting Irrigated Pasture

Failure of a planting of irrigated pasture is often due solely to skimpy land preparation. Cultivate the land well, particularly after rain, to destroy germinating weeds. Weedy seedbeds mean thin stands and unthrifty growth of pasture.

Delay planting for week if the land is not in good tilth. A week's work on land preparation will more than compensate for a week's delay in planting. Land which has been graded in preparation for border irrigation should be given a light corrective grading to smooth out small irregularities before planting.

A well-graded field is easier to water and makes more effective use of the irrigation water.

—A. NAGLE, Irrigationist.

Save Your Sows From Agalactia

By T. ABELL,
Senior Adviser, Pig Branch.

Agalactia—little or no milk in brood sows—is increasingly a cause of loss under present day intensive pig farming conditions.

SOWS which develop agalactia usually lose their litters unless some measures are taken to help the piglets. Any survivors make a slow start in life and are seldom profitable to rear.

These notes will help farmers to recognise the symptoms of agalactia early, so that prompt and appropriate treatment may be arranged. What is more important is that farmers will learn something of the causes, and the preventive measures required. This will help to eliminate many agalactia cases which occur at present because of insufficient information in the hands of pig raisers.

Agalactia in pigs is a condition found only in sows which have recently farrowed. It is most aptly described as a complicated series of disorders arising from many different causes, all with a common symptom—little or no milk.

As a sow's lactation is upset easily, and the litter depends entirely on her during the first few days of life, sows should be protected from agalactia. Once it appears, the piglets will lose weight and strength until the sow recovers.

Normal Lactation

A normal lactation is governed by a number of hormones whose influence starts early in pregnancy. Hormones prevent the occurrence of heat periods during pregnancy, and start a slow building up of the udder tissues. This udder development is not obvious externally for many weeks, but internally the milk secreting tissues get ready for their work long before farrowing. The final development to start lactation is rapid, and left until very late in the pregnancy of normal sows. In fact, one type of agalactia is due to too late development of the udder tissues.

A healthy sow will have milk in her teats whilst she is farrowing, and it is common for piglets to suckle while others are being born. After about a day, the litter develops a mealtime teamwork routine which they maintain until weaned. With their snouts, they nuzzle and push at the sow's udder. This vigorous massage stimulates the sow's glandular reactions controlling "let-down" of milk. After a minute or two of active massaging the litter is suddenly quiet, busily drinking for a short time. The stimulation brings a pituitary hormone into the udder, and this causes the cells to contract and squeeze milk into the teats.

This process occurs at every feeding time, but during the periods between "let-down," milk cannot be squeezed from the teats. This means that the

piglets only drink when they cause the normal contented sow to release milk following udder stimulation.

In agalactia cases, some milk can usually be squeezed from the teats during farrowing, but soon after, milk flow ceases. The udder generally becomes hard, and there is no "let-down," no matter how the piglets massage it. One indication of a sow with agalactia is a restless litter, with every pig hollow and hungry.

Causes of Agalactia

Agalactia may be caused by:

1. Glandular troubles
2. Disease
3. Faulty management

Glandular Troubles include lack of development of udder tissue, and failure of the hormone system to stimulate milk secretion or "let-down."

An extra grouping could be added to cover hereditary factors such as poor milking strains, and those cases with no obvious symptoms.

This list of causes shows clearly why one treatment will not cover all cases, and why indiscriminate use of hormone treatment so often fails.

Disease.—Sows which farrow whilst suffering from a systemic disease and develop agalactia do so because the whole body system, including the milk secreting cells, is not functioning normally. Such sows have agalactia simply because *there is no milk to squeeze out.*

With mastitis, the milk-producing cells are blocked, and agalactia occurs because *milk cannot be squeezed out.* Mastitis is often allied with some other complaint, and so milk secretion is also limited. Both conditions then have to be treated to restore lactation.

Shock due to the strain of an unduly prolonged or difficult farrowing, and dietary deficiencies, for example, calcium, may also cause agalactia.

Faulty Management.—Under this heading are many of the causes which the farmer can control, such as wet, cold floors and bedding; cold draughty pens; impaction; lack of exercise; faulty feeding; insufficient water; sows too fat; premature farrowings due to injury, and so on.

Symptoms of Agalactia

There is a good deal of variation in the symptoms shown by agalactia cases, due to the different origins. The symptoms listed here do not always appear, but a combination of several is just as likely to occur. These symptoms are useful in determining the cause of, and the appropriate treatment for, each agalactia case. Therefore, it is important to note accurately any abnormalities, as under the following headings, which accompany lack of milk.

Lack of Appetite.—The first sign a farmer is likely to note is refusal of food. Normal sows usually eat within a few hours of farrowing, but a sow with agalactia isn't much interested in food.

Temperature.—The sow's temperature is usually normal, but it may be from 103.5 deg. F. to 105 deg. F. or even higher in some cases.

Udder.—The udder may be soft after farrowing or it may be congested, reddened, painful, and hard, particularly if mastitis develops concurrently. A sow with acute mastitis will often lie on her belly and push aside the piglets trying to suckle.

Discharge.—A brownish or yellowish discharge from the vagina may occur. This usually indicates a pig or membranes retained, or an infection of the uterus (metritis).

Staggering.—Sows may wobble or sway when walking, and even find it difficult to rise. These symptoms of affected movement may appear at any time from farrowing up to 3 weeks later. They are generally due to impaction and/or milk fever (calcium deficiency).

Other symptoms occur. The general effect of agalactia is to make the sow either irritable or torpid.

Treatment

The sooner appropriate treatment is given the quicker the milk supply will be back to normal, and the smaller the setback suffered by the litter. Therefore, as soon as you suspect agalactia get in touch with a veterinary surgeon, an advisory officer of the Department's Pig Section or an Inspector of Stock. Each case of agalactia must be treated according to the cause. Home treatment with drugs normally kept on the farm may do much harm if the wrong treatment is chosen.

When the need for treatment arises, it should be regarded as a warning to check management practices. Don't forget the litter while the sow is sick. Let them suck the sow, as they may get a little milk, and their massaging of the udder assists in clearing congestion. However, there is a risk of the sow overlying or savaging piglets trying to feed at painful udders. In these cases it is advisable to keep the piglets in a warm box, and put them to the sow (while observed) for a short time every few hours.

If they are weak, give each piglet a teaspoonful or two of a saturated solution of glucose dissolved in clean, boiled water at feeding time until they recover, or have been transferred to artificial feeding.

Sows usually recover quickly with proper treatment, taking three or four days. If recovery is delayed it will be necessary to feed the litter artificially.

Preventive Measures.

Scientific knowledge of agalactia is at present limited, so we must depend on management practices long regarded as useful in preventing agalactia. They are not cures, but aids to ensure normal farrowings. These practices start at mating, and not just before the sow farrows.

Records.—By keeping breeding records you know when each sow is due to farrow and can arrange feeding and management with a definite date in mind. The sow can be penned alone two weeks before farrowing, safe from bullying and injury, and given any individual attention required.

Exercise.—Sows are natural foragers and the exercise thus obtained keeps the in-pig sow fit. Half an hour in a grazing paddock daily for penned sows helps to prevent impaction, and maintains activity.

Feeding.—Rations after mating must supply the essentials to restore the sow's condition and allow the unborn litter to develop. It is important that she be given enough protein, minerals and vitamins to prevent exhaustion of her own body reserves. By controlling the amount of food, you will also avoid making her overfat; sows in good breeding condition are less likely to develop agalactia than very fat sows.

Sudden change in the diet before farrowing can be harmful. The better plan is to start when the sow is penned, and gradually reduce or change the feeding if necessary. By adding a handful of bran at this stage, and providing soft green feed, impaction will be unlikely.

At Farrowing.—Try to provide a clean, dry shed, free from draughts, and warm in winter. Cold or wet floors will cause trouble.

Healthy sows seldom experience trouble when farrowing, so resist the temptation to interfere unless necessary.

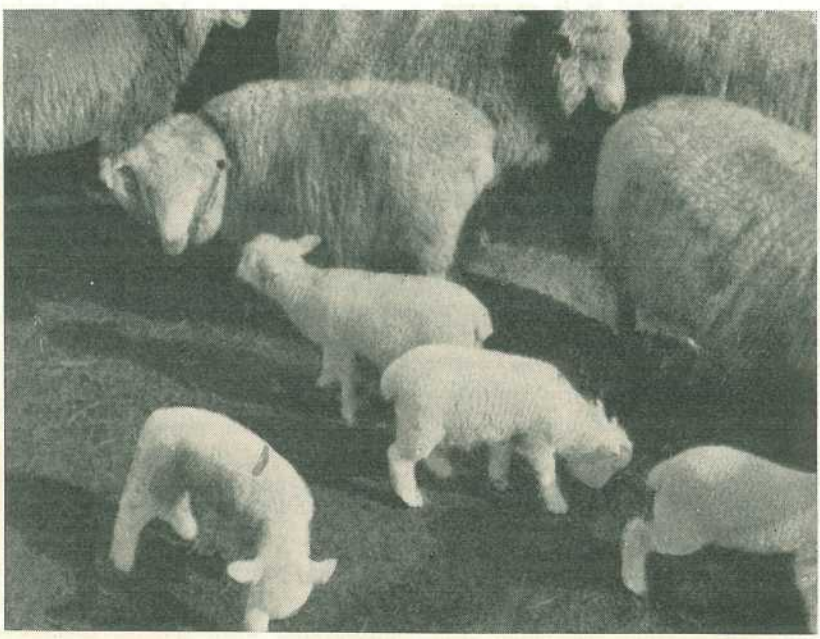
A normal farrowing may take up to eight hours. If a farrowing sow strains for an hour or more without results, or has not passed the afterbirth an hour or two after the last pig's arrival, it is advisable to provide skilled assistance. These farrowing difficulties often lead to agalactia unless prompt action is taken.

Inexperienced meddling is very likely to lead to infection in the sow's breeding organs, followed by agalactia. It also makes successful treatment more difficult.

After Farrowing.—The general rule is to feed sows lightly the day they farrow, and then build up to full rations as quickly as possible without upsetting either the sow or litter. The bran is generally continued for a few days after farrowing, as neglected sows often become impacted during this period. Ample clean drinking water is essential during lactation.

Modern farming demands a high standard of performance from stock. Sows which break down under the strain of meeting these conditions may again develop agalactia at a later farrowing.

When agalactia occurs it will rob you of profits, and caring for both sow and litter will make extra demands on your time. However, a planned system of sow management, together with a little "stock sense", will go a long way towards eliminating agalactia, with the expenditure of very little extra time daily during the year.



Corriedale Ewes and Lambs by Dorset Horn at Theodore Experiment Station.

The Egg and I.Q.*

By B. W. MOFFATT,
Poultry Adviser.

** Internal Quality*

High temperature and low humidity are the egg's worst enemies, for, as temperatures rise, egg quality falls rapidly. There are a number of other causes of loss also and these must all receive the farmers' constant attention in an effort to improve the over-all quality of eggs. This will mean more money in his pocket !

From the structure of the egg (Plate 1) it can be seen how deterioration occurs and why it is so rapid. The shell is made up of nearly pure calcium carbonate. It is dotted with a number of minute pores provided by nature to allow oxygen to diffuse into, and carbon dioxide to diffuse out from, the developing chick. These pores also allow water to evaporate from the egg.

Beneath the shell are two shell membranes enclosing the contents of the egg. They are the inner and outer shell membranes. The outer shell membrane adheres closely to the shell. When the egg is laid it has a temperature of about 107 deg. Fahrenheit, but it immediately begins to cool. This cooling causes the contraction or shrinking of the egg contents and results in the formation of the air cell at the large end of the egg due to the inner shell membrane moving away from the outer shell membrane.

This air cell then gradually increases in size, and is used as a guide in determining the egg's age.

The white, or albumen, consists of four layers but these are often difficult to define in the broken out egg. These layers of albumen consists of two thin layers, a thick layer and the chalaziferous layer which holds the yolk in suspension. The chalazae can usually be seen in the broken out egg as two twisted, whitish cords of thick albumen attached to the yolk.

In the fresh egg (Plate 2), the proportion of thick albumen to thin is high. Because of this, the fresh egg does not spread far when broken out and a wide layer of thick white is seen surrounding the yolk. The yolk stands well up in the thick albumen and is nicely rounded on top.

The yolk is enclosed by a membrane called the vitelline membrane. This membrane is surrounded by the chalaziferous layer of albumen and the chalazae keep the yolk suspended in the middle of the egg.

As Time Goes By

You may now appreciate what happens as the egg ages. The formation of the air cell occurs immediately after laying and increases in size as water evaporates from the egg. High temperatures and low humidity speed up this process. A few days in summer can give the egg a stale appearance when candled because of the large air cell.

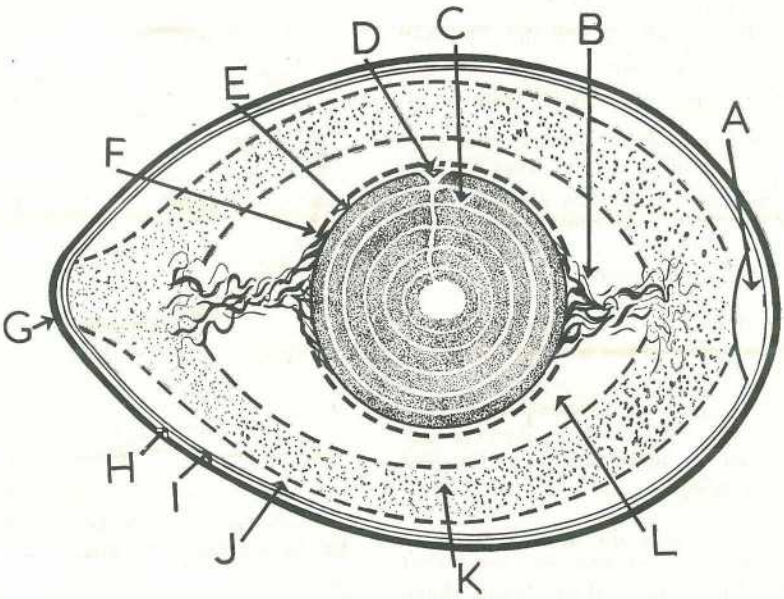


Plate 1.

The Structure of the Egg as Seen in Cross Section.—A.=Air Cell. B.=Chalazae. C.=Yolk. D.=Germinal Disc. E.=Vitelline Membrane. F.=Chalaziferous Layer. G.=Shell. H.=Shell Membrane (Outer). I.=Shell Membrane (Inner). J.=Thin White (Outer). K.=Thick White. L.=Thin White (Inner).

This will lead to the egg being down-graded, and so bringing a lower return to the producer.

In addition to the evaporation of water from the egg, some water inside passes from the white to the yolk. This leads to a breakdown of the thick to thin white and an increase in size of the yolk. As the yolk increases in volume, the vitelline membrane is weakened, thus giving the stale egg its characteristic flattened appearance (Plate 3). When broken out, there is little or no thick white and the egg spreads over a wide area.

A stale egg, when candled, besides showing the enlarged air cell, will also show a dark yolk shadow. In the fresh egg, the thick white prevents the yolk showing as a dark shadow and the yolk is barely visible.

There is no Cure

It is of no avail looking for a cure, for the changes in quality which take place within the egg are irreversible. Quality is not difficult to maintain provided due attention is paid to those factors which affect quality, namely—time, temperature, and humidity.

Time.—The time taken for the egg to reach the table from the nest is of the utmost importance, particularly in summer time. The farmer can play his part by marketing his eggs at least twice a week. The storekeeper and the consumer can assist also by purchasing eggs more frequently.

Temperature.—Heat-affected eggs are the most common cause of down-grading in summer. Heat increases the evaporation of water from the egg and increases the rate of breakdown

of thick to thin white. Eggs kept for three weeks at 60 deg. F. will be in just as good condition as eggs kept for one week at 80 deg. F.

The essentials in solving this part of the problem are to remove eggs quickly from the nests, allow them to cool rapidly, pre-cool them before packing and then hold them at cool temperatures before marketing.

Eggs should, therefore, be collected at least three times a day, preferably more often, in wire baskets. These allow a greater circulation of air round the eggs than do buckets and tins and so allow the eggs to cool more rapidly.

As egg cases do not allow rapid cooling, eggs should be pre-cooled before packing. Most farms have no facilities for cooling and so eggs are often packed when still warm. Cases also are not stored in cool rooms before marketing. But the solution to this problem is not so difficult as many people imagine. Refrigerated rooms at a temperature of 55–65 deg. F. would be ideal for the purpose of cooling eggs. However, a cheaper method of cooling is available in the form of charcoal coolers (Plate 4). These are often referred to as evaporative coolers because they use water evaporation to keep the contents cool. Under our summer conditions, these coolers could be expected to reduce the temperature to the 60–70 deg. range, which would be a vast improvement on existing holding conditions.

Under the heading of temperature, broodiness and hot nests should also be mentioned. Broody birds sitting on eggs in the nest keep the eggs close to body temperature and deterioration of quality is rapid. Broody birds should be removed from the nest immediately they are noticed and placed in a broody coop. Nests, particularly those with iron roofs,

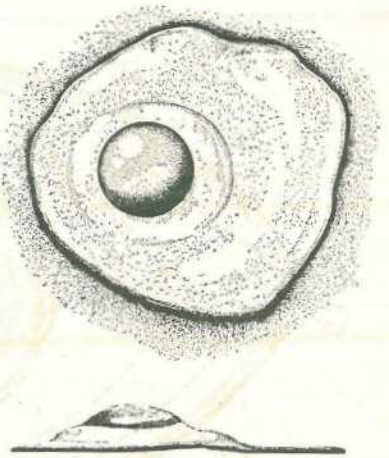


Plate 2.

A Fresh Egg When Broken Out Will Not Spread Far in the Pan. Note the high proportion of thick to thin white. The yolk is rounded on top and stands well up in the thick white. Compare with the stale egg in Plate 3.

in the front of sheds are usually excessively hot. Consideration should be given when constructing nests to see that they are well ventilated and not likely to be too hot in summer time. The painting of iron roofs with a silver paint will reduce the inside temperature of the shed.

Humidity.—Humidity is often sacrificed for coolness. This is noticed when eggs are kept under a house, where the breeze will cool them. It should be realised that this breeze will also dry them out and give them that second grade appearance on candling.

When the atmosphere is dry (that is, low humidity) the egg will naturally lose water more rapidly. By increasing humidity, the rate of evaporation is lowered. Therefore the ideal is a cool, humid atmosphere such as in a charcoal cooler. If refrigeration is used, humidity can still be a problem, for there is a drying-out effect. Humidity should be kept to 80–85 per cent. Above this

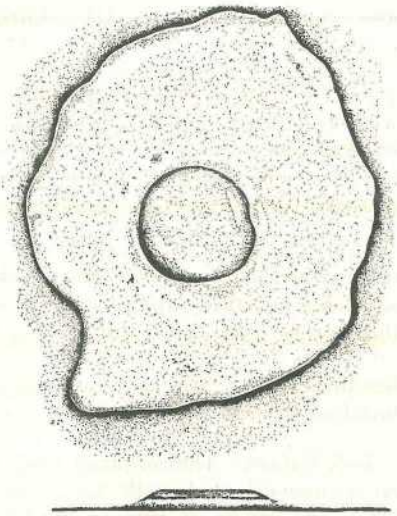


Plate 3.

The Stale Egg When Broken Out Spreads over the Pan as the Thick White has Broken Down to Thin White. The vitelline membrane has weakened and so the yolk shows this flattened appearance.

percentage, mould growth on eggs is likely to be a problem but if marketing is done twice weekly then no damage should result.

Through low humidity and loss of water from the egg, the farmer can lose money when his eggs fail to meet the weight standards. This will only occur where weights are borderline but it can mean the difference between first grade hen and first grade small hen, a difference of at least 6d. a doz.

Use of Coolers on the Farm

In some parts of the U.S.A., wholesalers will only buy eggs that have been kept in coolers on the farm before marketing. This practice shows the emphasis placed on farm cooling of eggs.

Charcoal coolers would not be so effective as a properly constructed cooling room equipped with refrigeration and a humidifier, but they would at least guarantee reasonable egg holding conditions. Their big selling point is the low cost of installation, and their cost of running is negligible.

The charcoal cooler consists of a small room, preferably with a cement floor, the walls and roof being made of charcoal which is held in place by wire netting or slats.

The room need only be large enough to hold half the week's egg supply in cases, in addition to a day's collection held in baskets. An insulated door is very desirable. Water is allowed to drip onto the charcoal, or in many cases the charcoal is thoroughly wet each day. The charcoal provides a large evaporative surface for water, which takes heat from its surroundings to evaporate. This reduces the inner temperature of the cooler, at the same time maintaining a high humidity. In southern Queensland, the maximum temperature inside a charcoal cooler is not likely to be above 72 deg. F. and the humidity would be 80–85 per cent.

Eggs collected in baskets should be immediately placed in the cooler and allowed to cool before packing. When packed ready for market, the cases are then stored in the cooler. With the lower temperatures obtained in refrigerators, moisture is likely to condense on eggs when they are taken from storage, causing "sweating." However, the temperature of charcoal coolers is not low enough to cause "sweating" when the eggs are taken from the cooler. Sweating is undesirable, as moisture assists moulds and bacteria to penetrate the pores of the egg shell with ease. Dirty marks can also be left on eggs if they are handled in this condition.

Other Common Egg Faults

Beside the processes of deterioration already described, a number of other faults can be responsible for eggs being down-graded. These egg faults

represent a definite loss to the farmer and in many instances can be easily corrected. An important point often overlooked is the bad effect that such eggs have on sales if they reach the consumer.

Egg Size.—Egg size depends largely on the breeding of the bird. Farmers should choose a strain that they know will give a high percentage of first grade eggs. It should be realised, however, that the production of oversize eggs such as those averaging 2½ oz. would not be very profitable because of the extra feed required to produce the weight of eggs. Breeders should aim at producing birds that will lay eggs averaging 24–26 oz. to the dozen.

Thin shells.—Whilst the thickness of shell is an inherited trait, it also depends largely on the feeding practices. The ration should contain calcium and phosphorus, manganese and vitamin D_3 in correct proportions. It is also desirable to feed good quality shellgrit or limestone grit at all times. Thin shelled eggs will lead to a high percentage of cracked and broken eggs during handling and transport to and from market.

Porous Shells.—When porous shell occurs, the shell appears mottled. The egg loses moisture rapidly because of the porous shell and will thus not retain its first grade quality for any length of time. The fault lies in the breeding of the bird.

Yolk Colour.—The consumer prefers an orange-coloured yolk to a pale one. The colour of yolk is due to a pigment contained in green feed, yellow maize and lucerne. Good yolk colour can be obtained by feeding lucerne meal and maize meal in the mash if green feed is not used.

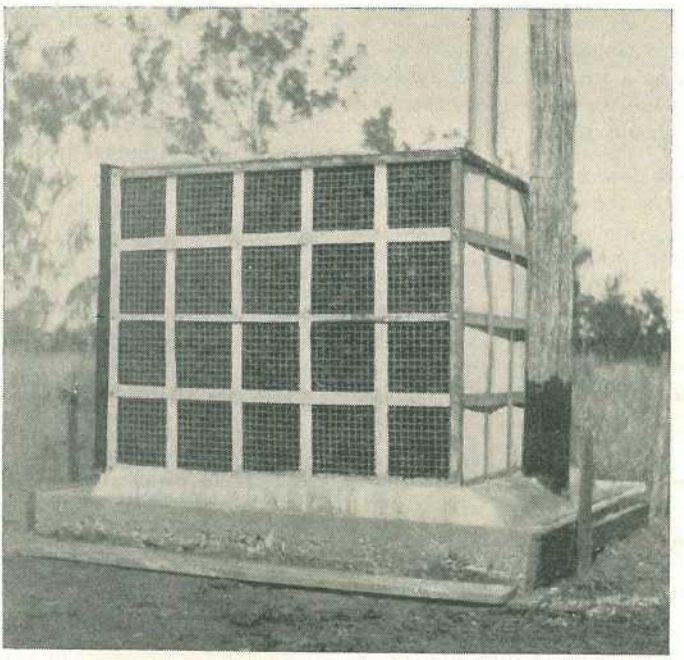


Plate 4.

Side and Back View of a Charcoal Cooler. This type of cooler would be a cheap and effective means of cooling eggs on the farm.

Plate 5.

All Eggs Handled by the South Queensland Egg Marketing Board are Candled by This Method to Detect Internal Faults.

Individual birds vary in their ability to transfer pigment to the yolk.

"Blood" and "Meat" Spots.—Eggs are frequently found that contain a clot of blood or blood dispersed through the white. There is still doubt as to whether "meat" spots are actually tissue or degenerated clots of blood. These faults are easily detected by candling. The blood usually originates from the rupture of a blood vessel at the time the yolk is ovulated from the ovary. It has been established that this is an heritable condition so the answer lies in breeding. However, it is difficult to detect birds laying such eggs in a breeding flock.

Fertile Eggs.—Quite frequently, eggs have to be down-graded because on candling they are found to contain a developing chicken embryo. These eggs are inedible. Cockerels should not be run with pullets except when eggs are required for hatching. Fertile eggs not set for hatching should be kept below 68 deg. F. to prevent development commencing. In summer time, Queensland temperatures are sufficiently high to start the incubation process.

Dirty Eggs.—Dirt or stains on the shell detract from the appearance of the egg and so it has to be down-graded. It is well known that dirty eggs will not keep so long as clean eggs, for dirt is teeming with bacteria and moulds, which if they gain entry through the shell soon affect interior quality.

The aim should be to produce clean eggs rather than to clean dirty eggs. The washing of eggs should be avoided at all cost. It removes the "bloom" from the shell and allows bacteria and moulds to gain an easy entry. Most cases of black rots in eggs can be traced to washing dirty eggs. Dry cleaning with steel wool is to be preferred or where necessary the egg can be wiped with a clean, damp cloth. It cannot be over emphasised here that the cloth must be clean or this practice would be no better than washing.

The cleaning of eggs is time-consuming. This is an extra point in favour of the production of "nest clean" eggs. It is not difficult to produce clean eggs if attention is paid to the cleanliness of sheds, nests and yards. Dirty floors and yards can lead to soiled eggs, the birds carrying dirt to the nests on their feet. The type of nest, the material used in nests and the number of nests per shed are all important factors. At least one nest to every five birds should be allowed. There should always be a good depth of clean, dry litter in the nest. Pine sawdust or shavings or a mixture of these make good nesting material. Hardwood sawdust and shavings should be avoided because they are likely to

Plate 6.

Eggs Being Packed in Cartons after Candling at the South Queensland Egg Marketing Board.

stain the eggs. The frequent collection of eggs from the nest reduces the number of broken ones, and so aids in the production of clean eggs.

Semi-intensive yards in wet weather can be a problem. This can often be overcome by filling in wet areas with ashes. If this is not entirely successful it may be desirable to make birds walk over clean floors or a wire netting ramp to get to the nests. This will remove most of the dirt from their feet.

Black Rots.—Black rot is a condition brought about by an organism entering the egg and causing complete putrefaction. The egg when candled is completely black. Unfortunately these eggs often appear to be of first quality when candled but can be bad within a few days. Practically all instances of black rot can be traced to the washing of dirty eggs.

Amber Whites.—The condition known as amber whites is characterised by a reddish brown discolouration of the white usually only noticed after eggs have been in cold storage for some time. On one occasion in Queensland this trouble was traced to the feeding of cottonseed meal. It can also be caused by feeding green feed containing plants belonging to the same family as cotton (*Malvaceae*).

Shell Ridges.—Many eggs are seen that are abnormal with regard to shell formation. One of these common faults is that of a ridge round the middle of the egg. Unfortunately the farmer can do little about these eggs as they are caused by an abnormal condition of the hen's oviduct at the time of laying.

Tremulous and Loose Air Cells.—Jarring or rough handling of eggs can result in rupture of the inner

shell membrane with a resultant abnormal air cell. In extreme instances, the air cell may float freely in the egg or a number of air bubbles may be formed. It is obvious that eggs should be handled carefully.

Olive Yolks.—In some eggs when candled the yolk shows a greenish discolouration. This is referred to as an olive yolk. Certain types of green feed are thought to be responsible for this condition. Plants of the family *Malvaceae* and shepherd's purse (*Capsella bursa-pastoris*) have at times been considered the cause.

The Egg and You

The hen gives you the egg nicely wrapped and in a first grade condition. It is your job to see that the consumer gets this egg in good condition. This can be aided by careful management of the flock and hygienic handling practices. Breeders can help by culling those birds which do not lay first grade eggs.

Above all, a method of cooling eggs quickly and keeping them cool is needed to prevent them becoming heat-affected and stale. Charcoal coolers offer a cheap and effective method of achieving this. The use of such coolers will result in better returns to the farmer through better grading of eggs and a more stable market because the housewife will buy eggs with confidence.

Putting a Check on Bloat

WHILE there is no certain method of preventing bloat, there are several management practices which help to reduce its severity and occurrence. You may be able to use one or more of these.

Bloat is most likely to occur in stock grazing pastures which contain over 50 per cent. clover or lucerne. Efforts to keep a balance between the grass and clover in a pasture are thus worthwhile but for short periods of the year it may be difficult to do this.

Hungry and empty stock are liable to bloat. The moral is—don't turn hungry stock into pastures likely to produce bloat. Give then some other feed beforehand.

Intensive grazing of small areas is also thought to reduce the likelihood of bloat. This can be done by means of strip-grazing, using an electric fence to keep the stock on a small area.

Mowing of the pasture half a day or so before grazing is another helpful practice. The cut material wilts before it is eaten and is then less likely to cause bloat.

The provision of some coarse hay, such as sudan grass or oaten hay, in a hay rack in or near the pasture being grazed, is useful.

Lately, promising results have resulted from spraying melted tallow plus a detergent on to pastures. Tallow is used at the rate of about 2 oz. for each cow.

See the Department of Agriculture and Stock if you want more details on this subject.

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

Stock and Station

THE Agriculture Department wants to obtain more identical twin calves for use in nutrition and management studies at its research stations. In research, identical twins save the use of large numbers of unrelated animals. They have the same inheritance and, if managed and fed in the same way, they should, in theory, respond similarly. In studying certain characters, the response of identical twins is very efficient. It has been found, for example, that in studying growth rate, one pair of identical twins is as reliable as two groups of 13 ordinary calves.

The Department is offering £8 to £12 a calf, according to age, for healthy identical twins up to three months old. Farmers who wish to sell or donate twin calves they believe to be identical should consult the officers at their nearest Agriculture Department office.

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

HOLLOW concrete floors are recommended for pig sheds. A great deal of sickness, which slows down growth, occurs among pigs every year because they are housed on cold, wet floors. Neither wooden nor solid concrete floors are the complete answer.

It has been shown conclusively that the hollow concrete floor greatly reduces losses caused in the first place by cold, damp floors. This floor is drier than all others and warmer, even without bedding. It's cheap to construct and is ideal for sow-and-litter and weaner pens. The easiest way to build a hollow concrete floor is to use empty bottles. Place them flat on a prepared site about one-inch apart. Fill the spaces between the bottles with concrete; then pour a layer of concrete, not more than three-quarters of an inch thick, over them.

—T. ABELL.
Senior Adviser in Pig Raising.

THE Poultry Section of the Department is at present making a colour film on egg quality. This film will be used to demonstrate to farmers how heat can cause their eggs to become stale very quickly. In the making of this film some stale eggs were required to be photographed. To provide these stale eggs, one dozen fresh eggs were put aside at room temperature for two weeks. At the end of this two week period, these eggs were broken out for photographing, and they were found to be very stale. There was little thick white remaining and so they spread over a wide area. The yolks were very flattened and broke easily. They were just the type of egg a housewife would complain about if she broke one into the frying pan, and yet they were only two weeks old.

There is much to be learnt from this little story. Many eggs could be two weeks old before they reach the housewife, if eggs are marketed only once a week. It also shows that cool storage facilities are necessary on farms for storing eggs prior to marketing especially in hot weather. Eggs are a perishable commodity and should be treated as such.

—B. W. MOFFATT,
Poultry Adviser.

FOWL ticks, found particularly in the drier inland areas, are common common on farms where small flocks of poultry are kept. The ticks not only worry the fowls, but can transmit fowl tick fever to the birds.

Fowl ticks can be controlled or even eradicated by the correct use of a 1 to 2 per cent. DDT spray in the fowlhouse. A strong jet is essential to penetrate cracks and crevices in the timber. Avoid using tar-oils as they not only fail to penetrate effectively, but prevent other sprays from doing so. Any rubbish and nearby trees should be removed. About four sprayings at fortnightly intervals are required to eradicate the ticks.

Immature ticks on the fowls can be killed by dusting any flea powder containing DDT, BHC, or derris onto the birds. One per cent. DDT in liquid form can also be used.

—P. D. RANBY,
Veterinary Officer.

Timely Tips for June

WHEN June comes along the calving season will start in the next month or two. Remember that calving will most certainly bring trouble to an odd cow. Watch the herd, and especially the heifers closely for difficulty in calving and retained membranes or breeding bag infection after calving.

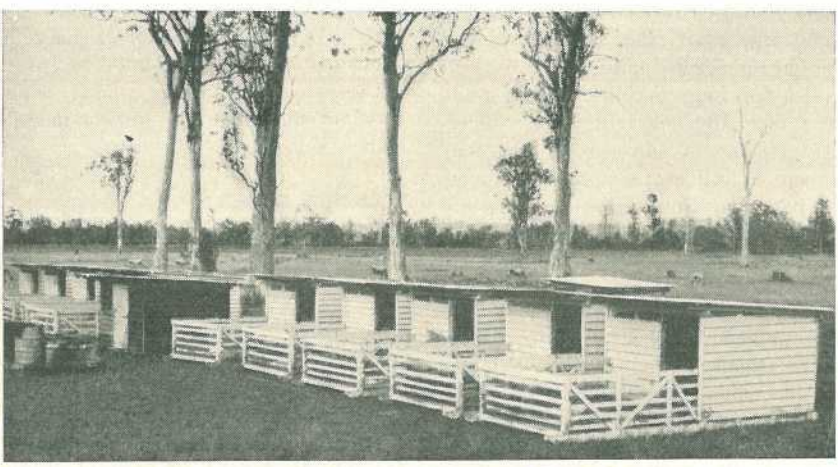
Skilled veterinary treatment early in any of these conditions certainly is worthwhile, not only in saving the cow but in keeping her in production for the most profitable part of her lactation.

You'll probably have litters of pigs coming along to coincide with the expected flush of milk. Did you know that the most serious losses in young pigs occur between birth and weaning? The Department has some sound ideas on cutting down these losses. Talk them over with your nearest pig husbandry officer.

Sow's milk is not very rich in iron. Consequently anaemia is common in baby pigs. This is one of the causes of loss that can be easily rectified.

Once the possibility of June rains is past the clean, cool weather which follows is a good time to dehorn. There aren't many flies about then either. Dehorning is a good thing. Ask any farmer who has done his herd. Like a lot of other things though, it has to be done well to give best results.

Talk over the technique of dehorning with your nearest veterinary officer, and do it soon!



A C.E.S.G. grazing demonstration is in progress on Mr. I. Gulliford's Kilcoy farm, where these portable pig pens are shown. The sheds are concentrated while the pigs are being hand-fed, but they can be moved readily into grazing paddocks when required.

Windbreaks To Protect Your Crops

Contributed by the Horticulture Branch.

MOST of the cultivated crops grown in Queensland are susceptible to wind damage. The plant may be damaged by simple physical impact and/or the high or low temperature of the air at the time. If the "blow" occurs at a critical stage in the development of the crop, as, for example, when the fruit is setting or when it is nearing maturity, losses can be serious.

The more destructive winds in Queensland are:

(*a*) *Westerlies.*—In winter, these winds are very cold, and in summer they may be very hot and dry. Sometimes they blow at almost gale force. They can be a major problem to fruit and vegetable growers, particularly in southern and central Queensland.

(*b*) *South-easterlies.*—These are the trade winds of the coastal plains. They are generally mild and moist and persist for long periods, but in some areas near the coast they are sufficiently strong to cause root and leaf damage in tall crops such as bananas and papaws. Southerlies blow mainly during the March-November period.

(*c*) *Cyclonic winds* of variable direction, often of gale force and accompanied by heavy rain. They occur usually during the summer months when the ground has been soaked by rain and the root anchorage of cultivated crops is least stable. Crops in the path of these cyclones are often a total loss.

Wind protection is a necessity in almost all horticultural areas, but the measures to be taken on any particular property depend a great deal on the topography of the land, its aspect and the cropping programme. Windbreaks, therefore, play an important part in farm planning and though they may immobilise a certain amount of cultivable land, this is a small insurance premium to pay for safeguarding the rest of the property. In any case, well-laid-out windbreaks substantially improve the appearance of a farm.

Windbreaks are of various types:

(1) Blocks of natural timber may be left standing when the land is cleared.

(2) Suitable tree species may be planted closely in strips two or three tiers deep.

(3) The cultivated crop may be protected by closely planted strips of tall-growing herbaceous plants which may or may not be of commercial value themselves.

STANDING TIMBER

Where standing timber is retained, the windbreaks should be at least two chains wide in the case of rain forest and one chain wide in the case of open hardwood forest. Windbreaks of this kind are very apt to die out owing to the long-term effect of exposure and sometimes fire. They should, where possible, be fenced off from stock and bordered by ½-chain firebreaks which

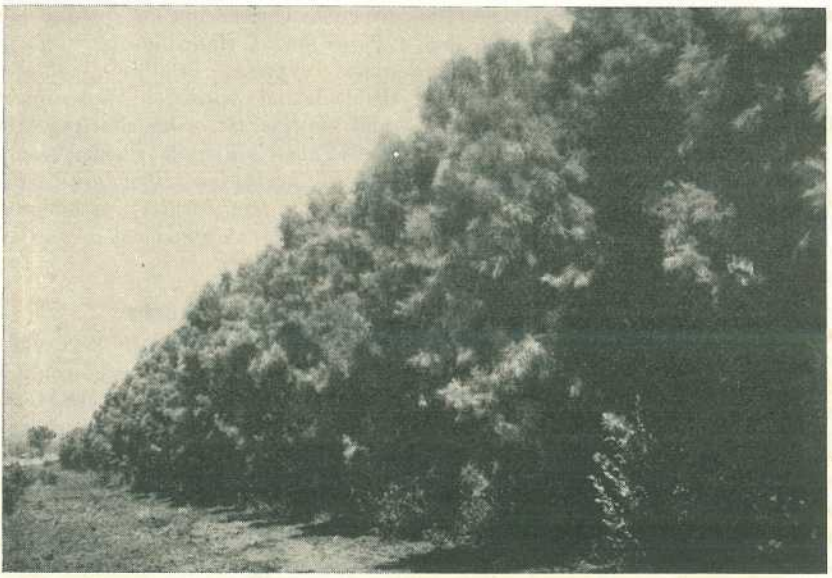


Plate 1.

Athel Tree Windbreak in the Lockyer Valley from the Sheltered Side. The trees were close-planted in three rows, the outer rows being lopped to give an upward sweep to the westerly winds.

can be cultivated each year in early summer when the fire hazard approaches its peak.

TREE WINDBREAKS

Tree windbreaks may be planted to supplement or take the place of natural timber. They consist of narrow strips of quick-growing trees planted about at right angles to the more destructive winds. The protection given to any particular area depends on the density of the stand and the height of the trees; the denser the stand the more effective the protection, and the higher the stand, the greater the area protected on the lee side.

Complete protection usually extends for a distance equivalent to twice the height of the trees, but partial protection often extends much farther.

Tree windbreaks may comprise one or more species. Normally if a single species is used, it must have a dense base or be amenable to lopping which promotes the development of lateral growth near the ground. It is more usual, however, to plant the trees in two or three parallel rows with a spacing of 6–8 ft. between the plants in the row and also between the rows themselves. The outer tree row can then be lopped and the inner row allowed to develop naturally.

As far as possible, windbreaks should follow a natural line of demarcation between adjacent paddocks or cultivated areas and form a barrier in the direct path of destructive winds. If the obvious position for the windbreak is across a slope, gaps should be left in the stand to prevent any

banking-up of cold air which might increase the risk of frost damage to the cultivated crop. Alternatively, the windbreak may be planted at an angle to the slope to permit the lateral flow of air on the upper side.

Where more than one species of tree is planted, each occupies an adjacent row in the windbreak, the taller facing the cultivated area and the smaller, usually more densely foliaged, species on the outside. When established, the canopy has an upward sweep on its outer edge, which is an advantage during periods of high winds.

Many trees are planted early in the wet season so that they will be well established before the following winter and thus be capable of withstanding stress conditions during the spring and early summer months. However, some pines do better in southern Queensland when planted in autumn.

Young trees should be protected from stock, weeded regularly for at least 12 months, and irrigated when necessary for at least two years after planting.

The more common windbreak trees grown in Queensland are loblolly pine (*Pinus taeda*), slash pine (*P. elliottii*), white cypress (*Callitris glauca*), Bribie Island cypress (*C. rhomboidea*), sand cypress (*C. columellaris*), Athel tree (*Tamarix aphylla*), lemon-scented gum (*Eucalyptus citriodora*), blue gum (*E. tereticornis*), tallow-wood (*E. microcorys*) and flooded gum (*E. grandis*).

TEMPORARY WINDBREAKS

Tree windbreaks occupy a considerable amount of land and only a limited number can be established conveniently on any property. They seldom provide all the wind protection required and it is customary, therefore, in some market garden districts to "box in" areas of low-growing annual crops with tall herbaceous perennial plants, such as sugar cane (usually cow cane) and some varieties of bananas (usually Lady Fingers or Ducasses). Cow cane breaks consist of two rows spaced 3 ft. apart; banana breaks are planted in two rows 4 ft. apart with 4 ft. between plants in the row.

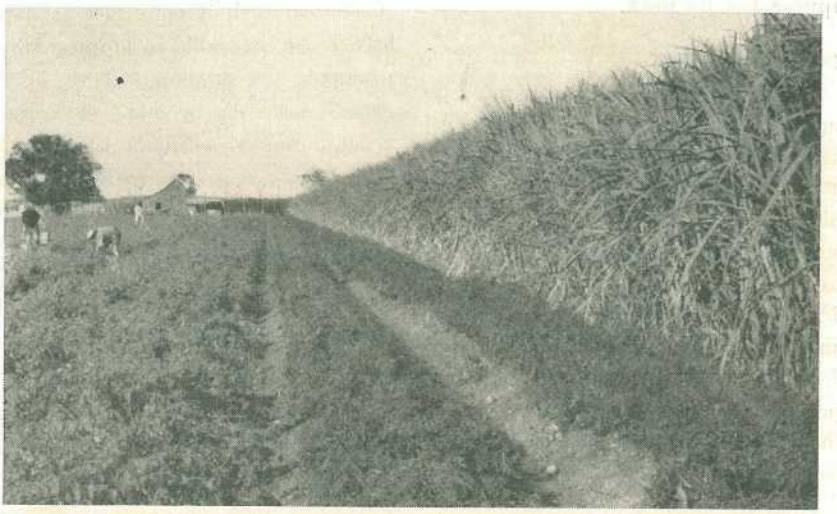


Plate 2.

Cow Cane Windbreak Protecting a Crop of Tomatoes. In market gardening areas near the coast, this type of windbreak is very popular.

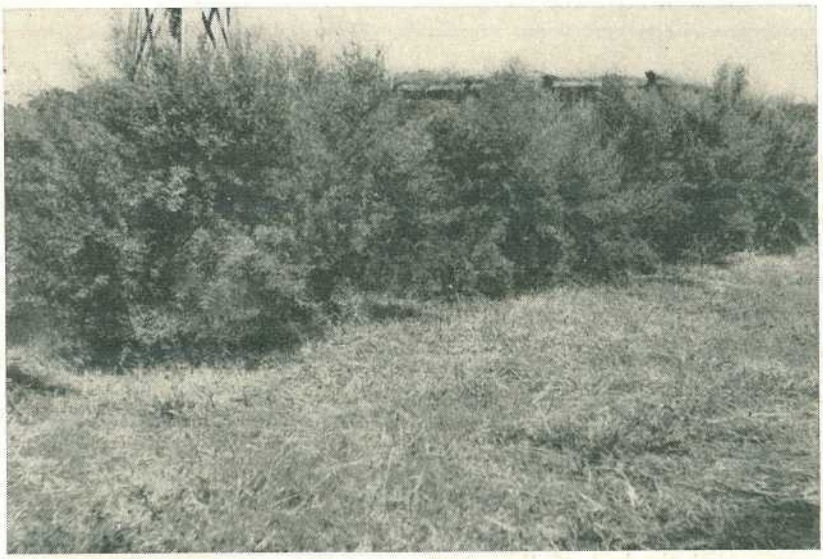


Plate 3.

Lemon-Scented Tea-Tree. A hardy shrub planted at the Redlands Experiment Station to protect the nursery.

The "box" break is seldom complete; usually only two sides of the cropping area from which the more destructive winds are expected, are established. Several such breaks may be planted on the one property and each can be renewed as required.

In upland or inland areas where tall, frost-susceptible perennial plants such as cow cane and banana cannot be grown, hardy shrubs may take their place. The more common species are privet, olive, tecoma and lemon-scented tea-tree.

Fertilizing Small Crops

Small crops need lots of plant foods; to keep them well-nourished you need to apply suitable fertilizers.

Recommended practice is first to apply a basal dressing of fertilizer 6 or 7 in. underneath—before planting—where the roots can get it as the plants grow.

This is the really important fertilizer application—it normally comprises about 75 per cent. of the crop's total requirements.

Trying to compensate for lack of basal fertilizer by applying very heavy side dressings is dangerous. When a complete fertilizer is applied to the surface soil, the phosphoric acid and potash seldom move downwards more than a couple of inches. The plants can utilise these foods when the roots approach the surface —but the trouble is: if the fertilizer is applied heavily, it may burn the roots and set back the plants.

A crop's total fertilizer requirements may be 15 cwt. to the acre or more. Imagine the dangerous concentration of salts if all this fertilizer is applied in heavy side dressings.

Later side dressing need only be light to feed the surface roots.

—*D. DOWDLES,*
Adviser in Horticulture.

Orchard and Garden

A NEW strawberry variety named Majestic is being tested by Agriculture Department officers at the Redlands Experiment Station. The variety was bred by Mr. E. Mazarz, of Palmwoods, about four years ago.

Mr. Mazarz considered that a strawberry yielding more and firmer fruit than the standard Phenomenal variety was required by the industry. He crossed Phenomenal with Mitchell's Seedling, a local type, and was able to raise a few crossbred seedlings. Some of these were unusually vigorous, and the best of them have been propagated for some years. The fruit is larger, firmer and a darker red than that of the Phenomenal. It promises to be a first-class berry for the fresh fruit trade and suitable for processing as well.

The trials at Redlands are aimed at assessing the vigour and disease resistance of the plant, and the flavour, colour and evenness of ripening of the fruit.

—*K. KING,*
Senior Adviser in Horticulture.

MANGO plants are very easy to raise from seed if the proper technique is adopted, but the wrong methods will result in many failures.

The seed should have the outer fibrous husk removed, which is most simply done by cutting round the convex edge with secateurs and peeling it off. A parchment-like envelope under the husk should also be removed. The seed can then be examined for soundness—those showing weevil infestation should be discarded.

The seed should be germinated in a fairly coarse sharp sand. If only a few plants are to be grown, this can be placed in containers such as cleaned-out gallon paint tins with drainage holes in the bottom. Two or three seeds can be placed in each tin. The seeds should be stood on the concave edge and pressed into the sand until only about one third of the seed is left exposed. Now cover the whole top of the tin with a layer of dead leaves or woodwool and set it in a partially shaded situation. Water every day to keep the sand moist. Germination will commence in 8 to 14 days.

—*S. E. STEPHENS,*
Horticulturist.

ARE you planning to plant pineapple suckers next autumn and spring? If so, it will be worth your while to see that your plants maintain their growth and vigour until planted. Don't make the mistake of letting the plantation go without fertilizer or attention after harvesting your crop.

Suckers which are starved in the field or overgrown with grass don't make good planting material. Certainly, they will grow. But it takes time and money to make weak plants into healthy ones. There is considerably more profit in growing a quicker, better crop by planting strong, healthy plants to begin with. This principle, of course, applies to other crops too.

The vigour of suckers in an old pineapple plantation can be maintained by supplying sulphate of ammonia. For the cost of a few bags of this fertilizer several thousand good, strong suckers can be secured from the old plants.

It is advisable to keep the plantation reasonably free of weeds. Otherwise, the competition may weaken the pineapple plants.

Plant your suckers while still fresh, soon after removal from the plants. But first give them time for the base to dry out to prevent base rot. This practice is generally called "curing". The best way is to lay them out on top of the rows after pulling. One or two days in the hot sun will "cure" them. Unnecessary delay in planting will result in leaf withering and consequent loss of plant vigour.

When planting, avoid cutting the leaves. Trimming may make the plants easier to handle, but it definitely gives them a severe setback.

Pineapple plants will live a long time out of the ground and will grow even after harsh treatment. Even so, for the best returns, you need to plant the best plants and see that they don't get unnecessary checks.

—*L. J. MISSINGHAM,*
Adviser in Horticulture.

The Farm Family

Hints on Hacksaws

By C. G. WRAGGE,
Agricultural Engineer,
Adapted from an article
in "Practical Power Farming."

The hacksaw is a tool to be found in any farm workshop. In spite of this, it is a tool that appears to be the least understood and the most abused. When hand hacksaw blades break frequently, or their teeth become blunted quickly, it is usually because the wrong blade has been chosen or it is being used incorrectly.

When replacement blades are to be purchased, the man at the shop counter will probably ask you whether you require a 10 in. or a 12 in. blade. Perhaps the reason for this is that he has become accustomed to the customer's frequent reply "Oh! any old blade will do". There is, of course, the possibility that he is no wiser than you are on the type of blades best suited to your particular requirements.

For any job, the correct blade should be chosen according to the material and pitch of the teeth. This will ensure long life, faster cutting and lower blade costs.

The salesman is perfectly correct in asking you the length of blade required because they are obtainable in the two lengths. This nominal length is the distance between the pin holes used for holding the blade in the saw frame.

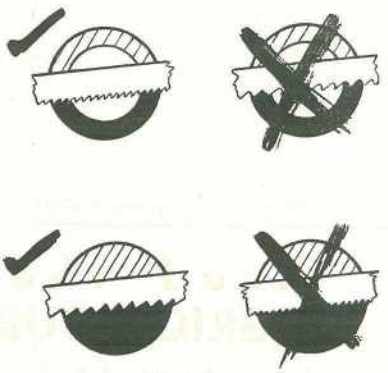


Plate 1.

Top: Use a Fine Tooth Hacksaw when Cutting a Tube, So That at Least Two Teeth of the Blade Make Contact With Each Cutting Area. Coarse teeth straddle the work and may strip. Bottom: Use a coarse tooth hacksaw blade for cutting thick sections because they leave ample chip clearance and allow smooth, easy operation. Fine teeth may clog.

Blade Types

Blade types are as follow:—

(1) TUNGSTEN STEEL, (hard all over).—This type of blade is suitable for general sawing work of fairly soft metals. It will not stand up to abuse, but in the hands of a skilled user will do good work. It is low in price.

(2) TUNGSTEN STEEL, (spring temper).—A fully hardened blade on the tooth edge but with the rest of the blade spring-tempered for elas-

ticity. This blade will revert to its original shape after bending. It withstands a considerable amount of rough treatment and is recommended for use by those unskilled in the art of using a hacksaw.

(3) TUNGSTEN STEEL, (soft back).—This type of blade is hardened on the teeth edge only but has a completely soft back which permits the blade to be bent and twisted and is useful for sawing in awkward positions.

(4) HIGH SPEED STEEL (all hard).—This type of blade is the most expensive and has displaced the tungsten steel type in most engineering shops. Although relatively high in first cost, it is nevertheless an economical proposition in the hands of a skilled user because of its long life and ability to cut almost any material while at the same time maintaining tooth sharpness.

Tooth Pitch

Correct tooth pitch is governed by the hardness of the material to be cut and its shape.

For thick sections it is advisable to use a coarse tooth which will provide chip clearance. The use of a fine tooth is liable to cause clogging.

The fine pitch tooth is recommended for thin sections such as tubing and sheeting which would tend to strip off coarse teeth.

Tooth pitches and the type of work they are best suited for are as follow:

14 teeth per inch (t.p.i.): For cutting stock over 1 in. wide. For soft material of thick section so as to give a maximum chip clearance.

18 t.p.i.: A general purpose blade for use when one blade is to be used for many different jobs.

24 t.p.i.: Pipe sections between 1/16 in. and ¼ in. thick; small structural sections and small diameter rods.

32 t.p.i.: For material up to 1/16 in. thick such as thin-walled tubing, sheet metal and thin plastics.

The general rule when selecting a blade tooth pitch is to be sure that at least two teeth will be in contact with the work at any blade position.

Correct Use

To get the best performance out of a blade it must be of the correct type for the job and it must be used correctly.

The blade must be mounted in a rigid frame and the mounting pins must be in good order. The teeth of the blade should point forward, away from the handle. Tooth direction of a fine-toothed blade can be checked by running the thumb nail lightly over the teeth in both directions.

When using the hacksaw, the blade should be pushed firmly at a slight angle on the forward stroke as illustrated, so that the teeth are made to bite the metal. The pressure is relaxed on the return or backward stroke. It is important that the teeth should not be allowed to slide over the metal without cutting, as this will burr over the tips and blunt them.

The maximum sawing speed should be 60 strokes per minute. This speed can be reduced to 40 strokes per minute when sawing thick sections. At slow speeds, a much heavier pressure can be applied on the forward stroke.

The Good Chairman Is Fair And Impartial

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

THE chairman must act fairly and impartially at all times and make certain that all have an equal chance of voicing their opinions as long as they observe the rules of debate. The chairman will no doubt have his own views on the matter under discussion, and he may express them, but he must not use his position to exert an undue influence over the members.

If the chairman wants to take part in a debate on a controversial matter, and to speak at length and with force on the subject, he should ask another member (the deputy club leader, if present) to take the chair. Having left or vacated the chair, he becomes an ordinary member of the meeting, and as such is subject to the ruling of, and must obey, the acting chairman.

Closing the debate

The chairman closes the debate when all members wishing to do so have spoken, or when he feels that the matter has been discussed long enough for the meeting to come to a reasonable decision.

Strictly speaking, each member is permitted to speak only once on any motion; the permission of the chairman must be sought before a second speech is permitted.

The mover of the motion, or the proposer, is permitted the "right of reply", and once this right has been exercised, the debate is closed, and the motion is put to the vote. In speaking a second time, the mover must not introduce any new matter or arguments, but must keep to the same line he adopted when moving the resolution.

The seconder of a resolution may, with the chairman's consent, merely second the motion formally, and reserve until later in the debate his right to speak. He may also second a motion "pro forma", and decline to speak for the motion. The chairman may give warning towards the end of a long debate that he proposes to close it in a few minutes' time. A debate can also be closed by the meeting passing a properly moved and seconded motion "that the question be now put" or "that the debate be closed and a vote taken".

If any member thinks that one of the rules of debate or procedure is being broken, he can rise to his feet and say "Mr. Chairman, a point of order———." The speaker must resume his seat, and the chairman must consider the objection raised.

The chairman's ruling as to whether the point of order is taken or not is final, and cannot be discussed.

Amendments

An amendment is a resolution to add words to or subtract words from a motion already being discussed. Thus if the motion is "That a field day be conducted," and if there are

members present who want to make certain that it is held during May, then an amendment might be proposed "that the words—in May this year—be added."

This amendment, or any other amendment, when it has been properly moved and seconded, must be put to the vote first, before the original motion, and those who are still in favour of the original must vote against the amendment.

If the amendment is carried, it becomes the motion, and as the motion it is open for further debate and further amendment if necessary.

An amendment must not be a direct negative to the motion. The chairman should not accept more than one amendment to a motion at a time. A member may indicate that he does not approve of the present amendment by foreshadowing another. By doing so, he will indicate the substance of his proposed alteration, and members can vote on the amendment before the meeting in the light of these proposals.

It should be remembered that voting on an amendment means making a choice between the resolution and the amendment. Whichever one wins must be voted on again, and the choice then is between the resolution (new or old) or doing nothing.

Sometimes the mover and seconder of a motion, or amendment, may wish to withdraw it before it has been voted on, having had their minds changed, perhaps, by some new thought introduced during the debate, or by some thing said by the chairman. A request from these two has to meet with the approval of the whole meeting before a withdrawal is permitted.

Voting

When a resolution (motion) is "put to the meeting" (voted upon) after full discussion has been allowed, the chairman must make sure that all understand the choice that is before them. If there is any possibility of confusion he should insist that the motion be read slowly and clearly. He can then say "You have all heard the resolution which has been moved and seconded. Will those in favour please vote? . . . those against? . . ."

Voting on such a motion is by show of hands, and it is the duty of the chairman to announce the result by saying "The motion is carried" or "The motion is defeated." The result is *unanimous* when everyone entitled to vote does so, and all the same way.

A resolution is carried by a *majority* when some members vote for it and a smaller number against it.

A member may *abstain from voting* if he so desires, and may ask the secretary to record the fact. The number voting on each side should be recorded in the minutes when the matter is of some importance, or when the number is almost equal.

The chairman has the same right as any other member to a vote, but he should think twice before he exercises that right, let him be sure that all the relevant facts for and against the matter have been clearly presented, and that the issues at stake are understood, then he can sit back and let voting take its course. Should the chairman vote and the result be a tie, he may make a second vote if he wants to.

This second vote is called the chairman's *casting vote*. (Not all constitutions permit the chairman to have a casting vote). Should the result of voting be a tie, and the chairman decide not to use his casting vote, the status quo remains and the matter must be laid aside, and cannot be dealt with again at that meeting. It is a wise chairman who declines to use his casting vote on some resolution which is controversial, or on some issue which will change the "old" order of things.

Hints for Club Members

YOU will now have had a chance to find out how your club programme for the year is going. Have a frank discussion about it in the club, and make any necessary alterations. A programme, to be effective, must be elastic and allow of changes being made. Make this check on the programme a quarterly one.

The club's show exhibit will be exercising the minds of many members now. A few thoughts from outside the club might help. The exhibit should aim to emphasise one main idea. Present only striking material that will catch and hold attention and perhaps cause the viewers to think. Don't "fill up" the exhibit with masses of vegetables, fruit, grains and placards; the result may be confusing rather than enlightening. It is better to use fewer, attractive and well-spaced items than overcrowd your precious space.

Queensland Bush Book Club

The Queensland Bush Book Club will supply literature to anyone living beyond the reach of a town library.

For a subscription of 3s. 6d. a year, members may receive parcels consisting of 10 books, mainly fiction, and some magazines and illustrated papers.

Parcels will be consigned to a member free of cost to the nearest railway station but the member will make his or her own arrangements for delivery from and to that station.

Each parcel contains about three months' reading, but will be exchanged to meet all reasonable requirements of members. Owing to method of distribution of parcels, choice of particular books by members is impracticable.

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