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COVER PICTURE: This White Leghorn-Indian Game cross-bred chicken makes a study in camouflage as it perches on the fingers of Jill Daly at the Poultry Section of the Department's Animal Husbandry Research Farm at Rocklea.

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Grain Sorghum Tops Off Bullocks In Dry Spring

By J. A. ONLEY, Cattle Husbandry Branch

The intensification and diversification of agricultural production creates new problems and also new opportunities. This article tells how one producer dealt with the problem of lack of regrowth in winter crop when he needed it for topping-off young bullocks. Home-produced grain sorghum was crushed and fed to bullocks when it became obvious that the existing crop would fatten no more cattle.

Mr Colin Clift, of Gilgulgul, has a property comprising 4,200 acres of brigalow-belah with some vine scrub country, situated about 27 miles north of Miles. It is very well developed, with 1,300 acres of cultivation. The remainder is good grazing country. During 1959, 550 acres were shut up for winter grain crops and 220 acres for grain sorghum.

The property carried 1,900 sheep, a breeding herd of 150 cows, plus calves and yearlings and 220 two-to-three-year-old steers for fattening.

Rainfall

The average rainfall for the area is 28½ in. The year 1959 was very dry during the winter and early spring as the following table shows:

TABLE 1

Rainfall					Points per Month
January	..	..	..	..	404
February	..	..	..	..	698
March	..	..	..	..	179
April	..	..	..	..	..
May	..	..	..	..	146
June	..	..	..	..	..
July	..	..	..	..	89
August	..	..	..	..	..
September	..	..	..	..	35
October	..	..	..	..	317

Outline of Programme

Last year, Mr. Clift was fattening 220 head of 2-3 year old steers. These consisted of 70 head bred on the property and 150 bought cattle. From March until early in July grazing consisted of fodder sorghums and grain sorghum stubble, and then grazing oats was available to carry on the crop fattening programme.

During this period the cattle fattened well. One hundred and five head were sold for an average net return of £49 14s. 3d. per head.

By mid-August, due to the continuing dry season, the oats had cut out except for a very short pick, and all cattle in a marketable condition had been sold.

Mr. Clift had on hand 520 bags of grain sorghum. At that time this would have returned about £8 a ton net if sold as grain.

Encouraged by reports of the successful use of grain sorghum in cattle fattening trials, Mr. Clift considered that this grain could have a use in bridging the gap in feed supplies until good rains brought relief. He contacted the Cattle Husbandry Branch of the Department of Agriculture and Stock, and it was decided to feed the grain in the paddock. The idea was to make use of what grazing was available and keep expenditure at a minimum.

His alternatives to this at the time were either to sell his remaining steers at a lower rate or else turn them out where they would have lost much of the weight they had gained during the past months.

Feeding Troughs

Portable feeding troughs were constructed from materials on hand. These consisted of spare sheets of heavy flat iron $\frac{1}{8}$ in. thick, 4 ft. wide and 9 ft. long; second class hardwood 6 in. x 1 in. boards and iron posts.

One iron sheet was placed on the ground. Six iron posts, one at each end and one midway along each side, were driven in. The sides of the trough were 12 in. high and consisted of two 6 in. x 1 in. boards. These were fixed by the use of 2 in. x 2 in. x $\frac{1}{4}$ in. angle iron corners. The sides of the trough rested on the iron floor and were held in position by wiring to the iron posts. To prevent cattle walking in the troughs, a batten was attached to the posts 3 ft. 6 in. above ground level.

Troughs were placed in shady positions near watering points. They could be readily dismantled and carried to different positions as required. Although they were not of very firm construction, the damage done to them by rubbing and so on was negligible.

Method of Feeding

A small grinder driven by the farm lighting engine was used to grind the sorghum. Approximately 35 bags could be handled in one day.

The grain was put out every day, and cattle had free access to as much as they wanted. Only two animals showed symptoms of over-eating. These were taken out for a few days and later returned with no ill effects.

Under this system the average consumption of grain per head per day was 13.8 lb. Apart from standing dry grass of little value, the only feed available was a very limited green pick from the oats, which cut out altogether in September, and later a short shoot of fodder sorghum. Cattle under similar conditions, but without the grain supplement, were losing weight at this time.

As can be seen from the rainfall figures for the year, virtually no effective rain was received from the end of May until October. The 89 points received in July came in a number of light showers and was not a good crop rain. By the middle of August the oats were eaten well down, and regrowth was very slow. From the point of view of normal grazing it was finished, but, with the cattle getting a grain supplement, this paddock continued to provide a short green pick for another month.

The feeding of grain under these conditions greatly lengthened the productive life of the grazing crop. This is an important advantage as, when paddock-feeding grain, it is very necessary to have sufficient palatable roughage available in a comparatively small area. If the roughage is not palatable or only sparsely distributed, cattle will expend too much energy in looking for their roughage requirements. Under such conditions good liveweight gains could not be expected.

Cattle should be brought on to grain gradually, preferably using hay or silage until they become accustomed to the grain feeding. Afterwards, provided there is some roughage available and the grain supply is maintained, the risk involved in this type of feeding is apparently not so high as sometimes believed. Digestive and physiological disturbances could cause trouble if there were insufficient roughage available or if cattle gorged themselves when troughs were refilled after being empty for some time.

Liveweight Gain and Performance

During the grain feeding period a representative 40 head were weighed to measure actual liveweight performance. The results were:

Liveweight (lb.)	Liveweight (lb.)	Gain	Gain per Day (lb.)
19-8-59	2-10-59		
880	942	62	1.41

After 2-10-59 most of the tagged cattle had been sold. On appearance, the remainder continued to put on weight and by the end of the period almost all were in sale condition. The exceptions to this were a few rangy types and some dairy steers which were obviously poor "doers."



Plate 1. The Last of the Turnoff.

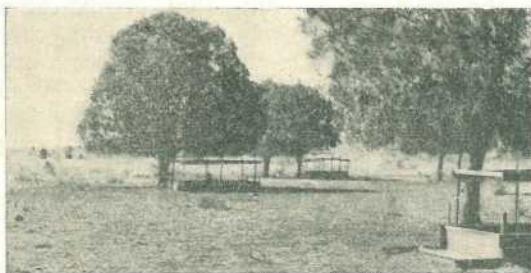


Plate 2. Troughs Were Placed in Shady Spots in the Grazing Paddock.



Plate 3. Feed Troughs Were Simple, Quickly Made and the Materials Can Be Used Again.

This 115 head was the "tail" portion of a mob of 220, and contained a proportion of dairy type steers. All the best "doers" had been sold by the time feeding commenced. Those not finished at the end of the feeding period were the really poor types which do not fatten well under any circumstances.

A liveweight gain of 1.41 lb. per day under the circumstances is reasonable. Better results would be expected if the quicker fattening types were being fed.

During the feeding period, 67 head were sold as fats for an average net return of £51 6s. 7d. per head.

The Financial Side

With an average liveweight of about 900 lb. in August, these cattle would have brought around £40 per head if sold, giving a total return of £4,600 for the 115 head. By feeding and selling them as fats the net return was:

67 head sold returned £3,439.

48 head held at the end of October for later markets could be valued at £48 per head. This gives a total return of £5,743 for 115 head.

This is a gross profit of £1,143 or almost £10 a head. From this must be deducted the value of the grain, cost of grinding, labour and so on, as follows:—

	£	s.	d.
520 bags grain sorghum	333	0	0
Labour in grinding	45	0	0
Cost in running grinder	7	10	0
Total	385	10	0

Depreciation on the troughing material would be quite small as all the components are still equally usable.

With regard to the actual feeding out, no extra labour was employed, but more efficient use was made of labour available. Only a small amount of time was needed to drive to the troughs and empty out the feed.

The net return of extra income over expenditure allowing for sorghum used was therefore:

£1,142 less £385 10s. = £757 10s.

Even with a very generous allowance for depreciation on material used and any sundry labour costs the net profit is still well over £700 for the 10 weeks' feeding period.

Although the crop-grass and grain sections of the ration are complementary it is reasonable to assume that the grain contributed 70-80 per cent. of the diet. On this basis the grain returned about £500 (£1 per bag) more as stock-feed than it would have realised on the grain market at the time when the stock feeding commenced.

What Was The Finding?

A number of important and interesting points came to notice during this feeding period. The value of grain sorghum, which gives heavy yields of good stock feed, is emphasised.

A very attractive financial return was gained for grain used in this manner. This method of fodder conservation fits in very well on properties which can grow grain and also fatten cattle. It very effectively bridges the gap caused by temporary crop shortages.

By feeding grain sorghum to cattle in the paddock, the effective life of a grazing crop was lengthened considerably during a vital period when lack of rainfall was inhibiting growth.

Care should be taken in getting the cattle accustomed to grain feeding. Horses, particularly, should not be allowed access to the grain troughs.

Troughs need not be elaborate but for preference should be portable.

From the point of view of property management, the use of grain sorghum in this way permitted adherence to a fattening programme despite unfavourable weather conditions. This was done with very little labour or capital cost.

The important aspect is that the grain feeding made possible the turn-off of cattle on a rising market. About half of the difference of £10 a head between the value of the stock in August and their value in October is accounted for by an increase in the price of meat. Thus only about one half of the difference in gross values at the two points of time was due to an increased weight of meat.

Although some allowance has to be made for the fact that the best of the draft had been turned off prior to grain feeding it should be pointed out that the efficiency of utilisation of the grain sorghum was comparatively low. In this case, 13.8 lb. of grain were required to produce a gain of 1.41 lb. of liveweight. Thus nearly 10 lb. of grain were required for 1 lb. of liveweight gain. Under feedlot conditions and when using a ration of 2 parts grain to 1 part lucerne hay, 1 lb. of liveweight gain has been obtained from about 6 lb. grain and 3 lb. lucerne hay.

In Mr. Clift's project the feed which the steers were able to obtain by grazing probably contributed no net energy to the animals. In other words, the nutritional value of the grazing was cancelled by the extra expenditure of energy by the animal in collecting it. Nevertheless, under the circumstances, this material was needed to avoid digestive upsets.



Weed Taints in Dairy Produce

As we enter the winter months, the appearance of weeds in crops and pastures spells trouble for the Queensland dairy farmer. Each year large quantities of milk and cream become tainted with chemicals carried over into the udder from the feed consumed by cows.

To give you some idea of the seriousness of these flavours, of the 31 per cent. of choice grade butter which was down graded for defects during the 1955-58 period 50 per cent. of this amount was because of weed flavours.

To tackle this problem successfully it is necessary firstly to know which weeds are the culprits. Some offenders are Bitter Cress, Pepper Cress,

Slender Celery, Turnip Weed, Turkey Berry and Fishweed. Ask your local Agricultural Officer to assist you in identification if you are in doubt.

What can be done about this problem? Firstly, give some thought to segregating morning and evening creams when supplying them to the factory. Then seek advice on the suitability of the wide range of weedicides as many of the tainting weeds are susceptible to these sprays. Finally try to keep one area of the farm free of weeds and direct the herd to this area a few hours prior to milking.

While these steps may not completely eliminate the problem they will at least minimise its effect.

—W. D. MITCHELL, Dairy Technologist.

10 Points On Mulesing

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

Resistance by the sheep blowfly to some chlorinated hydrocarbon preparations has been verified in some Queensland sheep areas. This has focussed attention on the usefulness of the Mules operation as a basic measure when considered in relation to other methods of fly control.

The Mules operation has the advantage of being a method of prevention, in that it helps to remove the breeding ground of the blowfly. Insecticides do not remove the breeding ground; they kill the maggot, or fly and maggot, when it has been attracted to a favourable breeding ground.

Once performed on a sheep, the Mules operation forms a lifetime means of protection, whereas insecticides have only a protection value lasting a few weeks.

The Mules operation remains, in spite of growing resistance of fly to some insecticides, a basic step in a co-ordinated plan for fly control.

Plate 1 shows the result of a well performed Mules operation of the type that is demonstrated to sheep owners by field officers of the Sheep and Wool Branch. You can see how the operator has been able to do an effective job by observing the following points:

(1) Making sure that the sheep to be operated on have been recently crutched, or are within a week or two of being off shears. In the case of crutched sheep the wool should be removed at crutching time well above the base of the tail. Shortness of wool is very important with Mulesing. With any longer than two weeks' growth, the wool proves a great hindrance, blunting the shears rapidly, and making a day's Mulesing an ordeal instead of a simple task. Overlong wool also causes delayed healing.

Some operators prefer to carry out the Mules operation immediately off shears, or following crutching. Others find that they are able to achieve more satisfactory Mulesing cuts on sheep that have had a few days opportunity to "fill out" following shearing. Immediate off-shears operation has the advantage of obviating a second muster. Alternatively, allowing a few days to lapse after shearing permits operation on well rounded buttocks instead of hollow dehydrated skin and muscle presentation which can result from a long period of yarding during shearing. It also allows shearing wounds to heal. Sheep are probably in better condition and heart to recover from Mulesing if spelled after shearing than if subjected to both shearing and Mulesing during one yarding period. To avoid long-wool blunting of shears perhaps a maximum of 10 days would be the longest period that should be allowed after shearing.



Plate 1
A Well Mulesed Sheep.

(2) By commencing the cut correctly without picking up the skin. It should start from a "V" at the point A (see Plate 1) at the side of the base of the tail. To achieve this start, a good method is to press down firmly with the thumb of the left hand on the right shear blade and the first two fingers of the left hand on the left shear blade with the shears slightly open at the tip, then make the first incision.

It is very essential, however, to avoid picking up the skin with the fingers until the first "V" incision has been made. If it is picked up with the fingers the result is likely to be a rounded pocket that will tend to encourage blowflies to enter to deposit eggs. If made without picking up the skin with the fingers the resultant "V" heals easily, and forms no inducement for blowflies seeking cover.

(3) Making sure that the greatest width of skin removed is opposite the vulva (marked B in Plate 1). Plenty of width here is desirable to ensure full stretch on healing. It is this stretch that determines the extent of bare area remaining when the wounds have completely healed.

(4) Ensuring that the cut has moved well in towards the vulva so that when the full cuts have been made on both sides they are only separated from one another by a distance of about two fingers' width in the region of the vulva.

(5) Finishing the cut in a narrowing inverted "V" at the point C, well down the leg from the vulva, and towards the inside of the thigh. The "V" cuts at start and finish assist rapid healing, and avoid pockets that could encourage fly strike.

(6) Making provision for the two areas of skin removed to leave neat symmetrical wounds of equal size. Without this evenness following stretching and healing, the vulva may be permanently distorted sideways, resulting in sideways emission of urine during micturition. This could soil wool and induce fly strike.

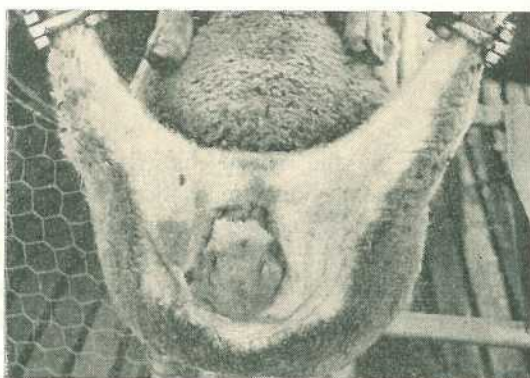


Plate 2
Ewe Weaner in Cradle, Recently Crutched, and Ready for Mulesing.



Plate 3
Immediately After Modified Mules Operation and Tail-Strip Cut.



Plate 4
Taken Later in the Day of Operation.



Plate 7
Taken a Fortnight After the Operation.



Plate 5
Taken One Day After the Operation.

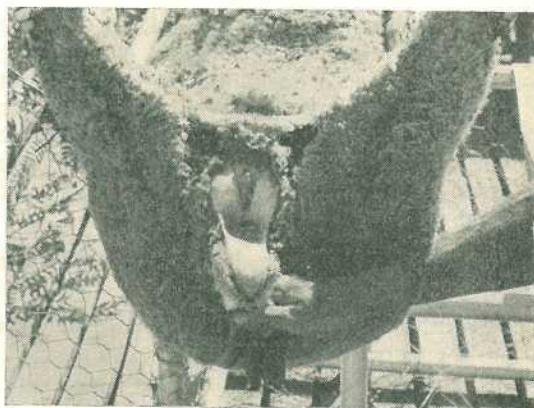


Plate 8
Taken Three Weeks After the Operation.
Note the spread of the bare area.



Plate 6
Taken One Week After the Operation.



Plate 9
4-tooth Ewe, One Year After the Modified Mules
Operation was Performed.

(7) Using sharp shears, as is apparent from the neat crescent cut formed by the gliding of the shears over the pin bone to completion at C in one smooth sliding movement. To achieve this the shears must be very sharp, and the blades kept well down on the sheep's rump during all parts of the cutting movement. Practice perfects this skill, and one may need to do hundreds of sheep before this craftsmanlike cut becomes second nature. But anybody can achieve it with sufficient practice and application.

(8) Taking care that the wounds are shallow, and do not go through the selvedge, so that there is little blood in evidence. This also results from using sharp shears and keeping the blades flat and tightly pressed against the sheep during all the sliding movement.

(9) Being careful that the tail cut is well carried out, starting from a "V" well up at the base of the tail, and expanding to the full width of the tail on completion. A follow through movement is required at the termination of the tail cut, to leave an even well-rounded finish at the end of the tail. Here also, as in the side cuts, the end result is quite symmetrical.

(10) Avoiding the common faults in Mulesing which are:

(a) Cutting into the bare area which surrounds the vulva.

(b) Cuts too wide apart, below the bare area.

(c) Cuts uneven.

(d) Cuts not commencing and finishing sharply with a point.

(e) Ragged edge cuts.

(f) Cuts not properly sited to achieve optimum stretching.

(g) Commencement of cuts not level.

By the use of the Mules operation, much needless suffering of sheep from blowfly strike is avoided.

From a well-performed, evenly balanced Mules operation as shown in Plate 1, the extent of stretch achieved on healing should give very satisfactory fly control. Plates 4 to 9 show how rapidly healing takes place following the Mules operation.

[Acknowledgement for photographs is made to Mr. G. LeGros, Adviser in Sheep and Wool, Blackall, and for provision of sheep and facilities for Mulesing to Mr. T. Hunter, "Evora," Yalleroi.]



Agricultural, Dairying, and Pastoral Statistics, 1959-60

Forms to be used for the annual collection of Agricultural, Dairying and Pastoral Statistics have now been distributed to primary producers throughout the State.

Great importance is attached to knowing the facts of the country's production at the earliest possible date after the close of the period to which the figures relate, and the achievement of this objective depends on producers promptly fulfilling their obligations.

Primary producers of all kinds (graziers, farmers, dairy farmers, orchardists, commercial

flower-growers and nurserymen) who occupy holdings of one acre or more, and all commercial poultry-farmers and commercial beekeepers are required to make returns. Any such producer who does not receive a form (A.P. 23) from the collector by the end of March should obtain one from the nearest Police Station and return it promptly, duly filled in, to the police collector.

Individual returns are treated as strictly confidential and are used only for the preparation of statistical aggregates.



Plate 1 Harvesting Soybeans with an Autoheader

Growing Soybeans In Queensland

By J. A. KERR, Plant Breeder

The Queensland Department of Agriculture and Stock has been working for 25 years on the selection and testing of soybeans in the South Burnett district. This article is a result of such work and contains advice for farmers on the growing of the crop in Queensland.

Soybeans could be a profitable crop in many parts of Queensland. The years of selection and testing leave no doubt that they are favoured by climatic conditions in the South Burnett and are suited to large areas of the soils.

They may be grown as a cash grain crop, or for green fodder, hay or green manure. While they draw heavily on the soil for mineral nutrients, they may gather nitrogen from the atmosphere and can accordingly become a valuable component in systems of crop rotation.

But what about markets?

That is the problem at present. The value of soybeans for human consumption, livestock rations and industrial purposes probably exceeds that of any other crop suited to Queensland conditions. The market in Australia has yet to be developed but the gradual increase in industrial utilization of soybeans warrants renewed and greater attention than the crop has received in the past. A few meals, pastes and sauces are produced at present. Sufficient soybean flour is produced to supply present bakers' requirements.

Lack of demand combines with competition from imported soybeans to retard development

of Australian production. The generally higher quality of the local product has permitted the local industry to develop to its present level.

Soybeans are by no means a new crop in agriculture. Cultivation of the soybean was recorded in China as far back as 2,838 B.C. and the frequent references to this crop from that period place it among the world's important crops. There is a reference to the introduction of soybeans to France in 1740. In 1790, the first soybeans were planted in the Royal Botanic Gardens in Kew. The first attempt, however, to produce soybeans as a crop in Europe was delayed until Friedrich Hoyerlandt published detailed results of his investigations in 1875. Climatic conditions limited successful production in Europe to a minor portion of that continent.

Soybean culture developed in U.S.A. several years later and from less than 50,000 acres in the early years of this century, the average now exceeds 23,000,000 acres with a total crop yield in excess of 450,000,000 bushels.

Soybean Plant

The cultivated soybean is an upright, branching summer-growing annual legume. The numerous varieties vary considerably in maturity, plant type, and colour and size of seed. The trifoliate leaves, stems and pods are densely covered with golden to grey coloured hairs, while the small purple or white flowers are borne in the axils of the leaves. The seed pods usually contain two or three seeds which may vary in colour (according to variety) from cream and yellow, to various shades of green, brown and black. Seed of some varieties will include blends or mottling of these colours.

The soybean plant will provide fodder in the form of green feed or hay, but the principal value of the crop is in the seed. The high oil and protein content of the seed create the demand from the standpoint of industrial processing.

Oil and protein content vary according to variety and growing conditions. Oil content may vary from 15 to 19 per cent. and protein content from 38 to 48 per cent. Low oil content is usually associated with high protein content and vice versa.

Varieties

Generally, the climatic limitations of soybeans are similar to those of maize. It has been noted, however, that any one soybean variety is usually adapted to only a short range of latitude. Varieties successful in the South Burnett (latitudes 26 deg. to 28 deg. S.) are those usually obtained from the U.S.A. latitudes 30 deg. to 36 deg. N., although a range of material grown from Canada to the southern border of U.S.A. has been tested in field trials.

About 150 varieties of soybeans from U.S.A. and South Africa have been tested in the South Burnett during the past 25 years. Less than 10 per cent. of these have proved to be suitable for commercial production in that district.

Initial observations were made with the object of selecting varieties suited for (1) commercial seed requirements and (2) green manurial or fodder purposes. Varieties selected for the production of seed require several important agronomic characteristics in addition to the trade requirements such as oil content, protein content and satisfactory iodine number of oil. Furthermore, high yielding ability of seed-producing varieties must be associated with a plant habit suited to direct harvesting by combine harvesters. Resistance to serious seed shattering is also essential.

An erect habit at maturity is desirable to facilitate harvesting and it may be advantageous to select varieties with an overall height of at least 18 in. The location of the seed pods on the plant is important. A major problem of direct harvesting is overcome if the seed pods have a minimum clearance of 4 in. from ground level.

The most promising varieties for commercial seed production include Nanda, Yelnando, Clemson-non-shatter and Pelican. Recently introduced varieties and progenies developed in Queensland are now under investigation and in the near future may replace some of the varieties recommended at present.

Nanda.—Average height of 26 in.; maturity approximately 160 days, semi-erect to erect in habit with the crop borne in a range from 4 in. to 26 in. above ground level; shattering normally light to medium though occasionally heavy; seed

fairly large, ellipsoid and slightly flattened, and coloured straw yellow with a light brown to brown hilum.

Yelnando.—Average height 30 in.; maturity approximately 165 days; erect in habit with a cropping range from 7 to 30 in.; shattering very light; seed medium size and straw yellow in colour with a brown hilum.

Clemson-non-shatter.—Average height 22 in.; maturity approximately 165 days; erect in habit with a cropping range from 2½ to 22 in.; seed is medium-sized flattened ellipsoid; colour, straw yellow with light to dark brown hilum; shattering, light to medium; a high yielding variety presenting problems for direct harvesting.

Pelican.—Average height 36 in.; maturity approximately 165 days; erect in habit with a cropping range from 6 to 36 in.; seed small, straw coloured with a brown hilum; shattering generally light.

Varieties selected for green manurial or fodder purposes include Avoyelles, Ootootan and Gatan.

Avoyelles.—Semi-erect, free-branching habit maturing in approximately 166 days; shattering light to medium; seed, medium size; black in colour with a black hilum.

Ootootan.—Dense vining habit up to 42 in. in diameter and height up to 18 in.; maturity approximately 170 days; shattering, medium; seed small, irregular shape; black in colour with a black hilum.

Gatan.—Similar to Ootootan though the vining branches are slightly finer and maturity a few days later; seed medium size, and brown in colour with a brown hilum.

Rotation

The value of a planned system of crop rotation is accepted by most farmers but practised by few. The soybean (a legume) can obtain most of its nitrogen requirements from the air by way of root nodule bacteria. Combine harvesting for grain returns the crop residue to the soil with consequent benefit to soil structure. Soil on which soybeans have been grown is generally loose and friable. This is not so pronounced when other crops are grown.

Soybeans, maize (or grain sorghum), Rhodes or other suitable grass, with additions in accordance with the individual farmer's requirements would provide a beneficial crop sequence on many farms. Cereals can follow soybeans with benefit and the soil requires little preparation before planting the cereal. The cereals may be planted either as a cash crop or alternatively for soil renovation. The cover thus provided will reinforce the loose soil against damage from early summer storms.

The full value of soybeans in the rotation will depend on the return of the plant residue to the soil. If the crop is used for hay the benefit to the soil is reduced accordingly.

Soils and Fertilizers

Fertile loams produce the best yields but satisfactory yields can be obtained from a large range of soils from friable clay loams to sandy loams. Heavy clay soils and soils of low fertility should, if possible, be avoided. Though soybeans are more acid-tolerant than many other legumes, both very acid and alkaline soils are unsuitable. Soybeans are more tolerant to wet conditions than navy beans, maize or sorghum and peanuts.

It may be necessary to apply lime to many soils which have been in cultivation for long periods.

Where soybeans are being grown for the first time in a particular field, the seed should, before planting, be treated with a culture of the specific nitrogen-fixing bacteria responsible for the formation of the nodules.

Phosphate-deficient soils will require an application of superphosphate, and as soybeans use a comparatively large amount of potash, applications of potash may also be necessary.

Care should be taken to avoid placing the fertilizer in contact with the seed.

Cultivation

Successful production of soybeans will depend, as with most other crops, on careful preparation of the land before planting.

Cultivation should be designed to produce a medium-fine, compact seedbed. The absorption and retention of moisture in the subsoil is

essential. If adequate moisture is not stored in the soil before planting, the crop will have to depend on rainfall during its growing period. If this is insufficient, crop height and yield will be reduced.

The problem of soil erosion should also be considered and cultivation implements selected to ensure a protective surface stubble.

It is important to control weeds immediately before and after the soybean seedlings have emerged. It is essential that, weather permitting, one or two crops of weeds be destroyed before planting. The possibility of controlling weeds by chemical weedicides is being investigated and recommendations will be issued as they become available.

Time of Planting

Length of day has a marked influence on the development and yield of soybeans.

Other factors to be considered include the normal period of suitable planting rains and the maturity period of the selected soybean variety.

Varieties recommended at present are generally fairly late maturing—up to 165 days, though the number of days to maturity will be reduced by late planting. The period to maturity of mid-December planted crops will be about 10 days less than the same variety planted in mid-November. A corresponding or even greater percentage reduction in yield may also be expected.

In the South Burnett the recommended planting period is from mid-November to mid-December though planting may commence as early as October. If early-maturing varieties are to be planted, the time of planting may be delayed but planting should be completed by the end of December.

Planting

Under favourable soil and moisture conditions, high yields are possible at row spacings of 7 or 14 in. However, drilling at not less than 21 in. is recommended for the seasonal conditions normally experienced in southern Queensland. The 21-in. spacing should be adopted only if the tractor and cultivating equipment can be operated at that spacing.

A minimum of 25 lb. to the acre of medium-sized seed is required when the crop is planted for inter-row cultivation. Where soil moisture is adequate the planting rate could be increased to at least 35 lb. to the acre.

Depth of Planting

Planting rates of soybeans for hay are high. Up to 90 lb. of seed may be required for dense stands. The amount of seed required for 24-in. row spacings will be about 40 lb. and will vary up or down according to seed size.

Hay Stands

The seed should not be planted deep. On heavy soils care should be taken to limit the depth of planting to not more than 2 in. On lighter or sandy soils the depth should not exceed 3 in. The practice, frequently adopted with maize, of planting deep enough to ensure germination when soil moisture is marginal will frequently be disastrous with soybeans. This is particularly the case when heavy rain precedes emergence of the seedling.

Where the soil is inclined to pack, the wheels of the planting equipment should not run over the covered seed.

If the crop is to be planted on sloping land which has not been protected by contour banks, planting on the contour is recommended to reduce crop and soil losses from soil erosion.

The seed may be planted by means of combines or maize planters.

Crop Cultivation

A light harrowing just before emergence will be of value if a crust develops on the soil. Cultivation after germination should be designed to destroy all weed growth. Early morning cultivation or cultivation after rain should be avoided to reduce plant injury. At least one cultivation, but rarely more than two, will be required. Limit hilling to the minimum. Excessive hilling will create a harvesting problem. Sweeps should be used for all late cultivations.

Damage by Hares and Wallabies

The soybean plant is very palatable and will attract hares and wallabies. Areas up to 4 or 5 acres may require netting, but damage in larger

areas is rarely an economic problem. Serious damage usually occurs within the first few weeks after emergence.

Harvesting

The leaves usually fall as the crop matures, leaving a plant framework with exposed ripening pods. The crop should be inspected regularly from this stage on and harvesting commenced without delay when the seeds have matured. Shattering of seed may then be avoided and high quality seed can be harvested.

Combine harvesters satisfactorily harvest the varieties recommended. Adjustment to the threshing mechanism should be made to avoid excessive cracking or splitting of the seed. This will involve reduced drum speeds and open or other variations to the concave.

To facilitate preparation of the land for following crops and to obtain the greatest value from the trash, a straw spreader should be used on the combines.

Yields

Yields will vary according to soil and season. Thirty-six bushels to the acre have been harvested from commercial stands in the South Burnett, but the average will probably be between 15 to 18 bus. to the acre. Yields from irrigated areas will normally exceed yields from rain-grown crops by up to 50 per cent.

Storage of Seed

The germination of soybean seed is affected in storage by both temperature and moisture content. American research has indicated that cool dry conditions are essential and the seed should contain not more than 10 per cent. moisture. Even at this moisture content there is usually an appreciable drop in germination percentage after twelve months. Local experience in storage of seed has been similar.

Soybean Hay

No attempt has been made to produce soybean hay in commercial quantities in Queensland. However, soybean hay is produced in large quantities in the eastern states of U.S.A. The crop is also planted in combination with sudan grass for fodder purposes.

The recommended time to harvest for hay varies from flowering to almost mature seed. A general recommendation is to harvest when the seed is half developed. Don't delay if the leaves are beginning to yellow.

If the crop is to be used for green manure, plough in when the seed is formed but before the leaves drop.

Green Fodder or Ensilage

Soybeans alone or in combination with sudan grass have been used successfully for grazing in the South Burnett. Maize and soybeans, or sweet sorghum and soybeans, also form a satisfactory combination for ensilage.

Crop Prospects

Soybeans have been produced in commercial quantities in Queensland for the past 10 years and there are indications that the acreage planted will be expanded considerably during the next few years.

The development of soybean production to major importance in the cropping programme in Queensland is dependent on new markets in Australia. The only large outlet will probably be in the form of stock foods and oil for industrial purposes. This market will involve reduced gross returns per acre to the grower.

The standard of quality for this market may be less exacting, however, and it is probable that returns could be on a par with maize. Improved production methods, and higher yielding varieties, could therefore encourage large-scale production.

Interest in the stock food and oil market has already been shown by some milling companies.



Hybrid Maize Varieties

Southern Downs Yields Show Big Increases

By A. G. MARTIN, Agriculture Branch

Many southern Darling Downs farmers are now growing the midseason hybrid maize varieties Q790, Q724 and DS303 with spectacular yield increases of up to 100 per cent. over other varieties.

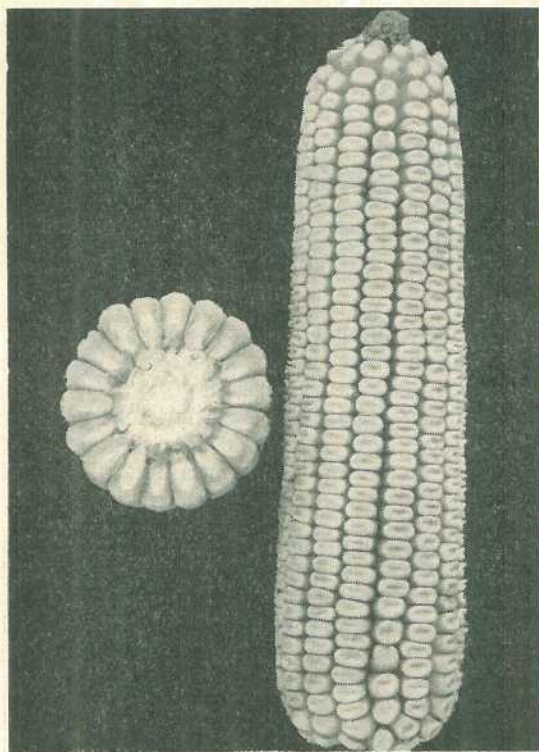


Plate 1

Hybrid Q790. A heavy yielding midseason variety which usually produces two well-filled medium ears with an excellent husk covering. The large uniform grain is a bright yellow colour. Suitable for planting up until mid-December.

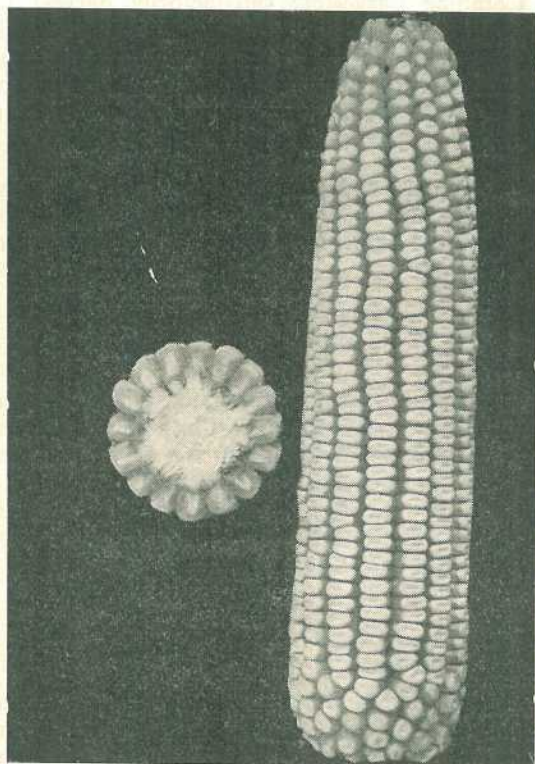


Plate 2

Hybrid Q724. A midseason variety producing high yields of medium to large dark-yellow grain. Suitable for planting up until mid-December.

The hybrids are grown on about 10,000 acres in this district, mostly for grain production. They are seen both on mixed farms and grain farms. Although they are fairly widely distri-

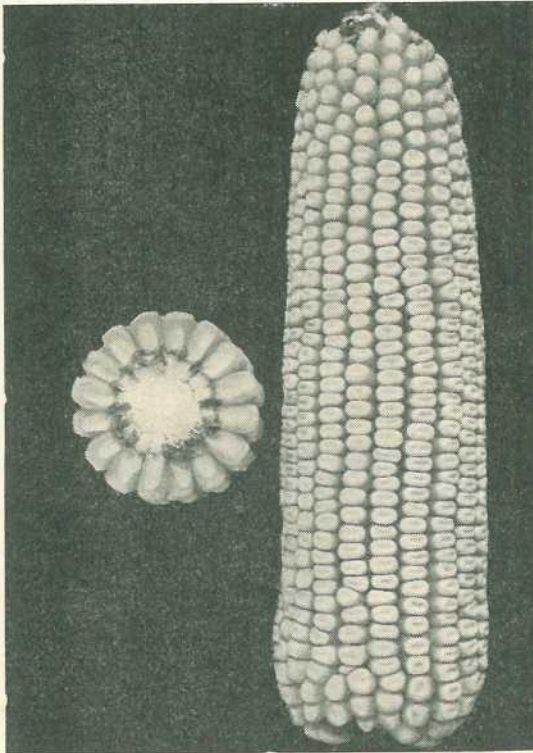


Plate 3

Hybrid DS303. A mid-late variety which is yielding very well on the southern Downs. It has better field qualities than most of the other locally-grown DS hybrids. The ears are medium-sized and the grain is a light-yellow colour. Suitable for planting until the end of November.

buted throughout the district, the bulk of them are grown in the better rainfall areas around Killarney, on the eastern Darling Downs, in the Freestone Valley and in the Clifton-Nobby area.

Owing to climatic conditions, the main planting is carried out fairly late in the season—usually during the November-December period. The practice of planting into stubble in late December and early January is quite common.

This follows the harvesting of barley and wheat crops.

During past years, quick maturing DS varieties have been widely grown on the southern Downs. Such varieties as DS28 and DS99 had proved very popular with some farmers.

Hybrids Well Tested

For several years, the Department of Agriculture and Stock has been intensively testing under field conditions all promising hybrid maize varieties together with popular local varieties to compare their yields and respective field qualities. These trials have been conducted in the Clifton, Freestone and Killarney areas under all extremes of seasonal conditions.

Of the available varieties, Q790, Q724 and DS303 have consistently outyielded all other midseason and quick-maturing varieties. The two Queensland midseason varieties, Q790 and Q724, mature slightly earlier than DS303, but all three share the ability to outyield the early variety DS28 which has been included in these trials as a standard.

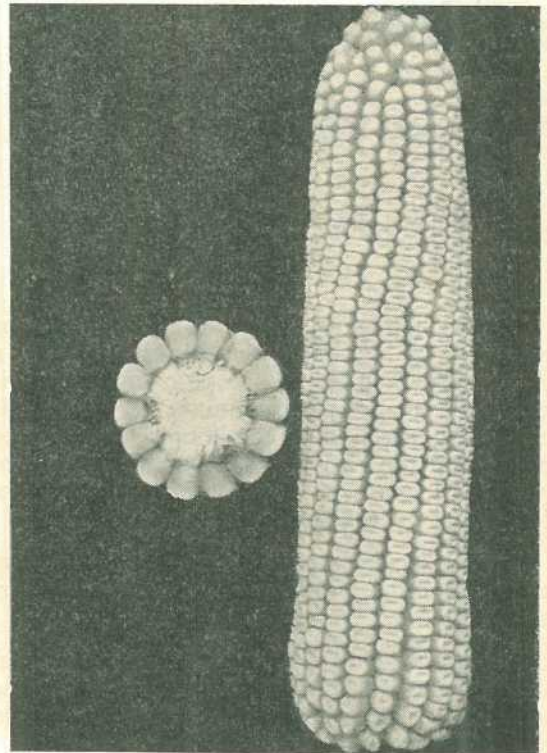


Plate 4

Hybrid Q739. A mid-early variety ideally suited for late planting. The well-filled ears carry a medium-yellow grain.

The popularity of some varieties in the past has been based on early maturity. The district has one of the shortest frost-free periods of all the major agricultural areas in Queensland. Now there is at present a definite demand for fast-maturing varieties for late planting, and Q739 is the best variety available to fill this role at the present time.

In this district, trials are also being conducted by the maize breeding section of the Queensland Agricultural College, Lawes. Last year, 22 early

hybrids were compared with DS28. Of these, 20 outyielded DS28 and most matured equally as fast.

The varieties selected from this group, after further testing, should play a major role in future maize growing on the Darling Downs, as present indications reveal that they possess the high-yielding capacity of the midseason varieties coupled with quick maturity—a combination not possessed by any varieties grown here to date.



This Drug Is Not For Layers

By B. W. MOFFATT, Poultry Adviser.

Nicarbazin is now being widely used for the prevention of coccidiosis in chickens. It is a very efficient drug for this purpose and while it is being used there is little chance of coccidiosis occurring under normal conditions. It is fed to pullets until the birds are within a few weeks of laying but it must not be given after this because of its effect on egg quality.

Plate 1 depicts this effect. The yolk shows extreme mottling. This is common where nicarbazin is fed.

The degree of mottling can vary greatly, but in many cases it would be severe enough to cause the egg to be downgraded. A consumer would certainly discard the egg as "bad."

Discolouring of the white has also been noted in some of these eggs. Some eggs have shown a cloudy white, while others show an amber discolouration.

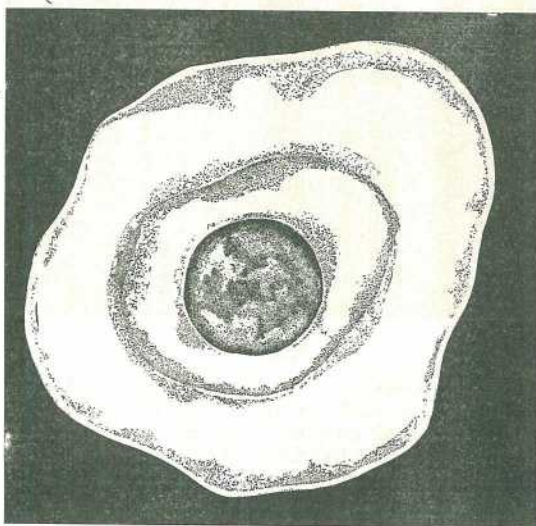


Plate 1: Mottling of Egg Yolk Caused by Nicarbazin, Which Is Used for the Prevention of Coccidiosis in Chickens.

Nicarbazin also tends to prevent the deposition of pigment in the shell of an egg so the eggs from Australorps can be white. This is a minor consideration, but it may act as a warning or a diagnostic point.

Because egg quality is so important if sales promotion programmes are to succeed, care should be taken with this drug. Be sure that layers are not fed a mash meant for chickens. Ensure also that pullets are changed on to a laying ration before laying commences. These little points may save your eggs from being downgraded.

Cleaning Milking Machines in Queensland

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

To produce milk or cream of good quality, it is necessary to wash the milking machines and other dairy equipment immediately after each milking. Firstly, rinse with luke-warm water, then wash with a detergent, and finally rinse in boiling water. When one or other of these three steps is inadequate, two problems follow:

- (a) The milk or cream produced develops an unpleasant flavour and aroma;
- (b) The working life of the equipment, particularly the rubber parts, is considerably reduced.

Hard Water Problem

In Queensland, highly mineralised ("hard") waters from bores, wells or streams are frequently used for cleaning dairy equipment. This presents a difficulty, because many widely accepted dairy cleaning combinations are not suited for use with these hard waters.

For example, cleaning combinations containing carbonates react with the minerals in hard water and produce finely divided, heavy precipitates such as the carbonates of calcium and magnesium, which are difficult to rinse from equipment.

Moreover, that portion of the cleaner which has reacted with the water has no further detergent power.

This reduces the power of the solution, or increases cleaning costs (as abnormally large amounts of "cleaner" are required to maintain cleaning strength).

The hard water problem has been studied from three angles:

- (a) Softening the hard water before use;
- (b) Developing a cleaning routine which will permit the use of untreated hard water;
- (c) Conserving alternative supplies of water chemically suitable for cleaning dairy equipment.

It has been amply demonstrated that the residual "hardness" after "softening" is enough to build up milkstone on milking machines and other equipment.

In addition, the composition of hard water varies considerably from time to time. This further complicates the treatment problem.

Softening also adds to both labour and capital costs.

Many chemicals and combinations of chemicals have been investigated, and a satisfactory cleaning routine has now been developed which

- (a) Reduces the very hard water problem;
- (b) Permits dairy utensils to be kept in a satisfactory state of cleanliness;
- (c) Reduces cleaning costs until they approach those of dairies with "soft" water supplies.

Large volumes of rain water run to waste from the roofs of the many buildings on the farm. This soft water can be diverted to large reinforced concrete tanks, which can be built with moulds similar to those used for silo construction.

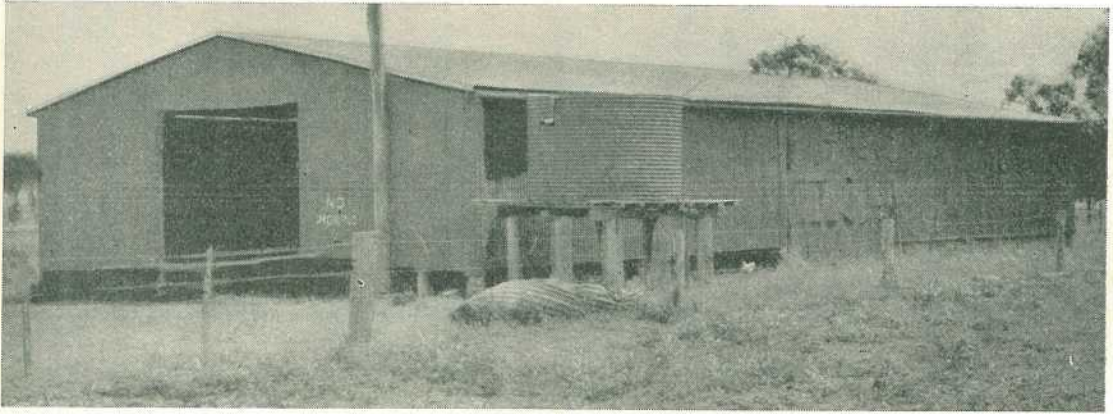


Plate 1

Run-off from the Roof of a Large Farm Building Provides Suitable Water for Cleaning Dairy Equipment.

Provided the concrete is suitably treated, this water will remain soft and suitable for use. It can be either gravitated or pumped to the dairy, where a small centrifugal pump driven by the milking machine engine will elevate it to an overhead tank to facilitate its use.

Highly polished surfaces are desirable. They are more easily and more completely cleaned than are unpolished, roughened or pitted surfaces.

Slight tarnish or corrosion greatly increases the tendency for "stone" to build up. Scratched or abraded surfaces build up deposits even more rapidly.

For example, glass pipelines in milking machines have an excellent surface for cleaning and are easily kept bright and clean, whereas corroded metal downdrops or releaser parts will rapidly build up deposits.

It is also most important that rubber parts have a "mirror finish". As soon as the rubber becomes rough, porous or spongy it readily builds up deposits. Rough, porous or ragged surface (or subsurface) finishes are not suitable for dairy equipment.

So, in order to keep equipment clean, it is necessary to discard any equipment that does not have a highly polished smooth, mirror-like finish, whether or not it is glass, metal, rubber or plastic.

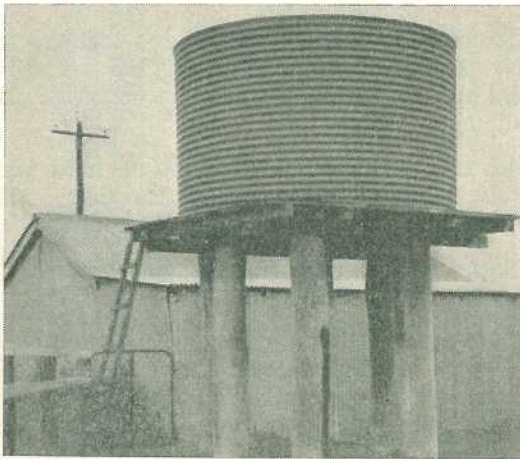


Plate 2

Water Collected at Other Farm Buildings Can Be Gravitated or Pumped to an Elevated Tank for Use at the Dairy.

A Suitable Cleaner

The cleaning solution must effectively and economically remove residues of milk proteins, fats, and so on from glass, metal, rubber or plastic surfaces. It is usual for the proteins to be partly dissolved and partly dispersed. The fats are usually emulsified.

Highly Polished Equipment

It is uneconomic to clean equipment in poor mechanical condition.

It is most important that the cleaning solution, together with the dissolved, dispersed and emulsified milk solids (and the precipitates from hard water) will drain freely from the equipment. No scum should remain. Subsequent rinsing is essential to ensure that no solids from the cleaner, the milk, or the water remain on the equipment.

Looking more closely at the characteristics of a suitable cleaner, we find:

Wetting Power: Various chemicals have the power of making a greasy surface as readily "wetted" as is a "non-greasy" surface. Several companies sell "wetting agents" and it is an advantage to include one of them in dairy cleaners as they increase their wetting and penetrating powers.

Causticity: The "causticity" of the chemicals used in dairy cleaners varies considerably. It is a measure of their power to dissolve milk proteins.

Emulsification: Suitable cleaning solutions break the fat films into small globules. These are removed, in suspension, in the cleaning solution.

Deflocculation: It is important that these finely dispersed globules, and other dispersed "soil", are prevented from re-aggregating to form scums which adhere to the surface of the equipment as the cleaning solution drains away. Such scums are difficult to remove.

Suspension: It is equally important to keep in suspension the insoluble "soil" collected by the cleaning solution. Unless this is done, it settles onto the equipment and is difficult to remove.

Rinsibility: If the cleaning solution is not "free-rinsing", traces remain on the equipment after cleaning. When the equipment dries, a film of powder remains on it. Although at first easily wiped off, it rapidly builds up and with the aid of milk solids develops into a hard, difficult-to-remove deposit. Insufficient final rinse water creates a similar problem.

Corrosive Action: If the cleaning solution corrodes the surface the effective work life of the equipment is reduced, the surface of the equipment becomes more difficult to clean and sterilize and traces of the metal removed during corrosion can accelerate chemical changes which reduce

the palatability of milk and milk products. Several chemicals can be added in cleaning solutions to guard against corrosion.

Strength of Solution: It is desirable that the strength of the cleaning solution be maintained during use.

Bactericidal Power: Some chemicals used in cleaning solutions have a bactericidal or germ-killing power, but the chief bactericidal actions depend upon the temperature of the cleaning solution during use, the duration of its contact with the equipment, and the physical removal of bacteria from the equipment during cleaning.

Foaming: Excessive foaming is undesirable because of the difficulty of removing foam by rinsing. Therefore, do not use too much "cleaner" in the solution. Do not incorporate excessive amounts of "wetting agent" in the cleaning mixture.

Useability: The farmer must immerse his hands in cleaning solutions to brush those utensils which are not rinse cleaned. It is important, therefore, that the cleaning solution does not adversely affect the farmer's hands.



Plate 3

A Large, Bricked-In Copper, with a Lid, Can Provide an Adequate Supply of Boiling Water at the Dairy.

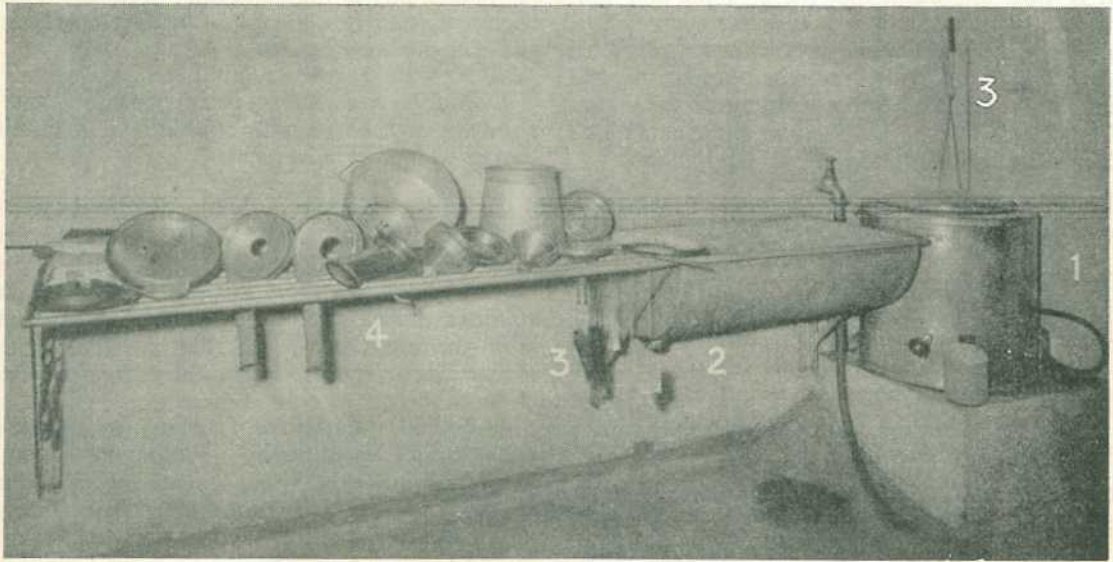


Plate 4

- (1) Electric water heating unit with a booster switch to provide water at a temperature of not less than 200 deg. F.
- (2) Solidly constructed wash-up trough, large enough to hold a milk or cream can.
- (3) Adequate supply of suitable brushes.
- (4) Metal draining rack in a position not exposed to dust.

Abrasion: It is unwise to include abrasive agents in dairy cleaners. Smooth "mirror finish" surfaces clean readily, but roughened, scratched or abraded surfaces build up deposits and increase cleaning difficulties.

Cost: Assuming that mixing, packaging and merchandising costs for various mixtures are comparable, the cost to the farmer will be largely influenced by the relative costs and amounts of the various chemicals present in the cleaner. Therefore, before more expensive chemicals can be preferred to cheaper chemicals, the dearer chemicals must give a very much better field performance over a considerable period than does the cheaper mixture.

Toxicity: The only chemicals which can be used in cleaners are those which are non-toxic to humans in the traces normally found in milk flowing over cleaned utensils.

Cleaning Requisites

For efficient cleaning of milking machines and equipment the following requisites are necessary:

1. **Water Supply:** To clean a three-unit milking machine twice daily, using the routine recommended, would require at least 6,500 gal. of water a year. Unless an adequate alternative supply of soft water is available, it is desirable to erect a reinforced concrete tank large enough to hold sufficient run-off from the various farm buildings. This water, is, chemically, the most suitable water for cleaning, provided the concrete tank is treated in such a way as to prevent it making the water hard. This supply is supplemented by bore, well, river or dam water for washing the concrete floors of the shed and yards and for drinking water for the dairy herd. When such facilities are not available, hard water from bores, wells and rivers, must be relied upon. Even with

modern cleaners, such waters do not give a perfect cleaning, but the results are much better than with such cleaners as washing soda.

2. *Water heating devices:* For effective cleaning, it is necessary to have an adequate supply of boiling water from either a bricked-in-copper, with a lid (see Plate 3), or a water heating unit capable of delivering either water at not less than 200 deg. F. (Plate 4) or steam under pressure (Plate 5). These units may be either electrically heated, oil fired or wood fired.

3. *Wash-up Trough:* It is desirable that the wash-up trough should be large enough to take a milk can, and made so that the first compartment contains the cleaning solution, and the second compartment contains water at not less than 190 deg. F. (Plates 4 and 5).

4. *Brushware:* A supply of brushes designed for cleaning the various pieces of dairy equipment is essential. Good quality nylon-type fibre brushes are more suitable than are natural fibre brushes (Plates 4 and 5).

5. *Draining Rack:* After the equipment has been washed, it should be stored in such a manner that it drains easily, air can freely circulate through it, and it remains relatively free from dust. Plates 4 and 6 illustrate suitable pipe and chain wire drainage and storage racks.

Removal of Milkstone

Before satisfactory cleaning can be achieved, milkstone must be removed from the equipment. Where very hard waters cannot be avoided for cleaning, it has been found that, if cleaning is to remain economic, some build-up of stone will occur. It will, therefore, be necessary to use intermittently an acid cleaner to soften the stone.

The interval between acid treatments varies from a few days to several months, depending on the amount and nature of the hardness of the water and the chemical composition of the cleaner. Departure from the recommended cleaning routine frequently markedly accelerates the rate of build up of stone.

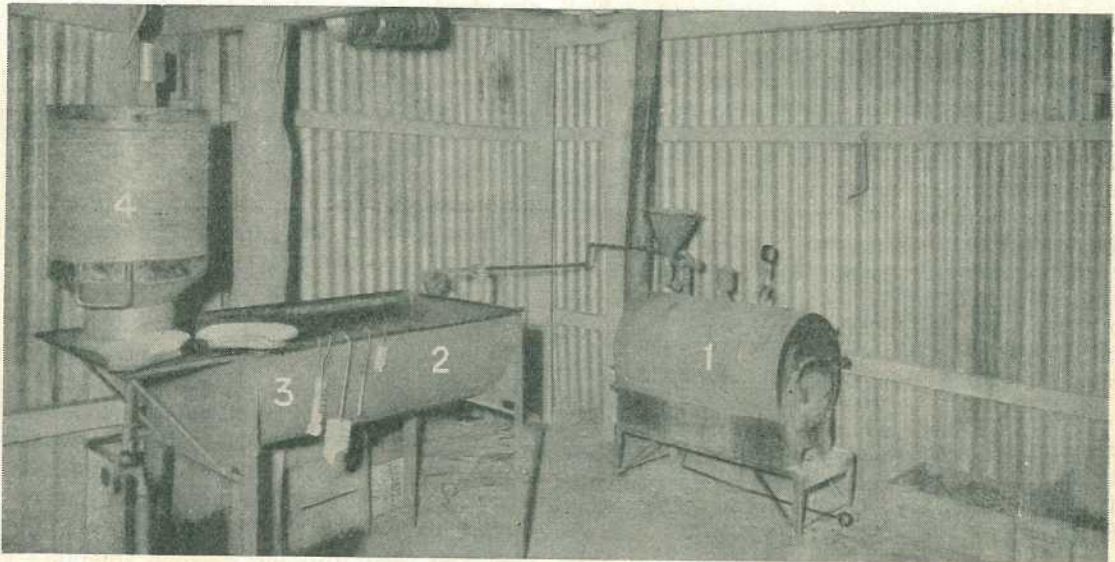


Plate 5

- (1) Water heating device capable of delivering water at not less than 200 deg. F. or steam under pressure.
- (2) Solidly constructed wash-up trough large enough to hold a milk or cream can.
- (3) Adequate supply of suitable brushes.
- (4) Can in position for steam sterilization after having been cleaned.



Plate 6

A Suitable Metal Storage Rack for Milk or Cream Cans in a Dust-Free Position in the Wash-Up Room at the Dairy.

The method of removing milkstone is as follows:

Step 1: Disconnect the long rubbers from the claws of the teat cups. Remove all the milk-line down-drops and long rubbers from the machine, except the milk down-drops for the unit furthest from the releaser. Turn off the milk taps. Connect all the milk down-drops and long rubbers in such a manner as to form a "hose" running from the end of the overhead milk-line towards the releaser. Then remove all the air-line down-drops and long rubbers. Plug the short airline rubbers, or turn off the airline taps. Connect the airline down-drops and long rubbers to the end of the milk-line "hose". Place the end rubber in a bucket under the releaser.

Step 2: Prepare an acid rinsing solution by adding 250 ml. (9 fluid ounces) of spirits of salts, to 2 gal. of water at not less than 190 deg. F.

Step 3: Start the plant and add the acid solution to the bucket under the releaser. Open the farthest milk tap and permit the solution to be drawn through the plant. Remove the outer releaser flap, and fill the releaser dome. (If

the hand is placed on the dome, the position of the hot solution can be accurately determined). Then replace the outer releaser flap and hold it down temporarily to fill the spit chamber of the releaser. Then release the outer flap and permit the releaser to discharge. While the acid is circulating, rotate each overhead milk pipe one-eighth of a turn each 30 sec. This is necessary as the overhead milk pipe is only partly filled by the acid solution. Five minutes' recirculation is ample—as the acid is usually "killed" within 5 minutes, and the temperature of the solution has also dropped considerably. Draw a milk-line brush through the milk-line each minute during recirculation.

Step 4: Prepare an alkaline rinsing solution by dissolving 2 level tablespoons of sodium metasilicate in 2 gal. of water at not less than 190 deg. F.

Step 5: Repeat all of step 3, using the alkaline solution.

Step 6: Dismantle the machine and brush the various parts. If the deposit does not easily brush out, repeat steps 2, 3, 4, 5 and 6 until the plant is clean. On bad plants, two treatments have been necessary.

The solution strength given is quite safe for general use in the method outlined, and stronger solutions are unnecessary. No deposit has yet been encountered which cannot be softened by this method. However, in no instance can the softened deposit be rinsed from the machine. Brushing is always necessary.

Step 7: To complete the clean-up, remove the various rubber rings flaps, and soak them and the claws, other metal fittings, and other utensils in hot acid solution for 5 minutes. Then soak them in hot sodium metasilicate solution (2 tablespoons in 2 gal.) for 5 minutes. Then brush them. Where the equipment is too large for soaking, its surface can be brushed—firstly with the acid solution, and then with the alkaline solution—until it is cleaned.

Step 8: Re-assemble the cleaned plant and rinse with water at not less than 190 deg. F., using 1 gal. per unit.

Warning

Exercise care in the storage and use of spirits of salts as it is corrosive and dangerous. Keep it away from children. Do not treat aluminium parts with spirits of salts. In case of accidents, wash copiously the affected parts with clean water; obtain medical attention if necessary.

Normal Cleaning Routine

Immediately Before Milking.—After the equipment has been assembled, it is rinsed with water at a temperature between 90 and 110 deg. F., which has been either treated with a chemical sterilant or has been previously boiled. If the copper is filled with water after use, the lid placed over it, and sufficient wood added to the fire to ensure that the water boils, a copper full of safe water will be available for pre-milking rinsing, although the fire will have given out between milkings.

It is unwise to use water of doubtful purity as a pre-milking rinse.

Immediately After Milking:

(a) Cleaning Without Recirculation:

Step 1: As soon as the last cow is finished in each bail, turn off the air and the milk taps. Then wash the outside of the cups, claws and long and short rubber tubes with detergent solution at 120 deg. F. Then rinse with water at a similar temperature. Then proceed immediately to step 2.

Step 2: Draw through each set of cups 1 gal. of water at 90 to 110 deg. F. It is important that the machines and utensils are rinsed as soon as milking ceases. A wet film of milk is relatively easy to remove by rinsing, but not when it is allowed to dry.

Rinse cleaning of the milking machine commences by drawing water into the unit nearest the releaser. The reason for this is the "backward surge" which is readily seen where glass lines are used.

During rinsing, raise the outer flap of the releaser until the releaser dome is almost full of water. Then replace the outer flap and hold it down momentarily to fill the releaser spit

chamber. Then release it and permit the releaser to work normally. Unless this is done the heat released during subsequent steps will "bake on" the film of milk on the releaser, thus increasing the difficulty of subsequent cleaning. Use clean water for rinsing the utensils to be hand-washed.

A torpedo brush is passed up and down the overhead milkline during step 2.

Step 3: Draw through each set of cups 1 gal. of the cleaning solution at 180 to 190 deg. F. As in step 2, flood the releaser during rinsing. Periodically raise the cups out of the cleaner during rinsing to permit air to enter and induce surging. The cleaning solution recommended is prepared by dissolving in each gallon of hot water, 1 level teaspoon of a mixture of 4 parts of sodium metasilicate and 1 part of "wetting agent." The cleaning solution is collected in the vat. The vat is brushed and the solution is then transferred to the first compartment of the wash up trough where it is used for washing the remaining previously rinsed dairy utensils, such as separator parts, cooler, buckets, strainers, cans, lids.

Step 4: Draw through each set of cups 1 gal. of water which enters the machines at a temperature of at least 190 deg. F. Do not flood the releaser during this step. After hand washing the remainder of the utensils, cover them in the second compartment of the wash-up trough with water at not less than 190 deg. F. The utensils can be removed with a metal hook (made from $\frac{3}{8}$ -in. round mild steel rod) and placed on the appropriate drainage and storage rack in a dust-free position.

Step 5: Remove and dismantle the releaser and vacuum tank. Place them on a storage rack. Open the various flaps, plugs, and taps of the milking machine. Disconnect the long air and milk rubbers from the corresponding metal down-drops. Hang the rubberware in such a position that it drains completely in a dust-free position where the rubber is not exposed to direct sunlight.

(b) Cleaning With Recirculation:

Before commencing recirculation cleaning, it is essential to thoroughly clean both the airline and the milkline of the milking machine. Adaptors are required to transfer the recircu-

lating solutions from the airline to the milkline. It is also usual to install a tap in the airline to facilitate the entry of the cleaning solutions.

Milking machines can be kept clean either with or without recirculation, provided a correct method is used. However, when "short cuts" are taken, unsatisfactory results are obtained, whether or not recirculation is used.

The following is a suitable method for recirculation cleaning:

Step 1: As soon as the last cow finishes in each bail, turn off the air and milk taps. Then wash the outside of the cups, claws and long and short rubber tubes with detergent solution. Then rinse with water.

Step 2: Set up the plant for recirculation cleaning. The method of setting up varies from model to model and from make to make. Follow the fitters' instructions.

Step 3: Draw water at 110 deg. F. into the airline of the plant and permit it to run to waste until it is clear. **Do not recirculate this first rinse.** Flood the releaser towards the end of this rinse. If air is admitted to the machine while the releaser is flooded it causes violent agitation which increases the effectiveness of this rinse. The spit chamber is then flooded, and finally the water is discharged. The amount of water varies with the layout of the machine (usually $\frac{3}{4}$ to 1 gal. is required for each set of cups).

Step 4: The cleaning solution (1 level teaspoon of mixture of 4 parts sodium metasilicate and 1 part of wetting agent per gallon of water) at not less than 190 deg. F. is placed in a bucket or other container under the releaser. The cleaning solution is then drawn into the airline through a piece of rubber tube and a specially installed tap. This solution is recirculated for 5 min. The cleaning solution passes down the airline to the claws where it is transferred to the milkline. It then passes along the milkline to the releaser, where it is discharged. Towards the end of recirculation, flood the releaser and admit air to facilitate cleaning. Then flood the spit chamber. Finally discharge the cleaning solution.

Step 5: Draw hot water (at not less than 190 deg. F.) into the airline. **Do not recirculate this rinse.** Do not flood the releaser.

Step 6: Empty the vacuum tank. Dismantle and open the machine to permit it to drain and dry as for normal cleaning.

The remainder of the utensils are cleaned in the same manner as for the normal rinse cleaning procedure.

A Recommended Cleaner

A mixture suitable for cleaning milking machines and farm dairy utensils can be prepared by mixing 4 parts of sodium metasilicate with 1 part of "wetting agent", and using 1 level teaspoon of mixture to each gallon of hot water. The mixing may be done before use, as is the case with some prepared detergents, or the chemicals may be added separately to the bucket of hot water used for cleaning.

Some other mixtures will give comparable results, but at increased cost.

The recommended mixture will considerably reduce, but not avoid, stone formation with excessively hard water supplies. (Such waters also form stone with the more expensive mixtures). Where it is necessary to use very hard water, it will also be necessary to periodically remove the stone formed on the dairy equipment. Spirits of salts is recommended to soften the stone so that it can be easily brushed out of the equipment.

The use of other mixtures is not forbidden. The object is to obtain clean equipment. How this is done is a matter for the dairyman. The methods outlined give an economic way of achieving satisfactory results. There are also other ways, but those investigated were either more expensive or less effective.

Under Queensland conditions, wherever the water used for cleaning is hard, it is suggested that consideration be given to the erection of treated, reinforced, concrete tanks to collect the roof run-off from farm buildings. These correctly treated tanks provide a supply of water which is, chemically, more suitable for use in dairy equipment cleaning than is the hard water from many wells, bores or streams.

Jubilee Celebrations At Animal Research Institute

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

On December 2, 1959, in the presence of a representative gathering drawn from organizations and firms connected with the livestock industries, the University, C.S.I.R.O. and Government departments, the Hon. G. F. R. Nicklin, Premier of Queensland, unveiled a plaque set in the wall of the entrance hall at the Department's Animal Research Institute, Yeerongpilly. The plaque commemorates the 50th anniversary of the establishment of a stock experiment station at Yeerongpilly.

The Premier referred to the importance of the livestock industries to the economy of Queensland. For the past several years they have averaged £140,000,000 worth of production or 54 per cent. of the total rural production of Queensland.

The original stock experiment station had been brought into being largely because of the challenge of cattle ticks and tick fever to the successful raising of stock. From that beginning, the Institute had built up an imposing record of service and achievement which was well known not only throughout Australia but also overseas.

It was most essential that all possible attention be given to ways and means of combating those hindrances to the health of animals that still cause serious losses, the Premier said.

Work on Tick Fever

The Hon. O. O. Madsen, Minister for Agriculture and Stock, who proposed a vote of thanks to the Premier, made reference to the research work on tick fever currently in progress at the

Institute. Although a method of immunisation against the infection had been worked out many years ago, it was not completely satisfactory, he said. An important new programme of research on the problem was now under way and there were indications that the whole procedure of immunisation might soon be put on a sounder basis. This was calculated to be of immense value to the cattle industry of Queensland.

Pests and diseases were with us continuously, the Minister said. Periods of feed shortage occurred every year and drought was ever ready to strike. Without an institute such as Yeerongpilly, gradually eliminating or reducing the many hazards and at least keeping abreast of the scourges besetting the livestock industries, their plight would indeed be a sorry one.

Diagnosis of Disease

The Director-General of the Department, Dr. W. A. T. Summerville, spoke on the organization of the Institute and the many different services provided by the three branches, Pathology under the direction of Mr. L. G. Newton, Biochemistry under Dr. J. M. Harvey, and Husbandry Research under Mr. J. W. Ryley.

Although called the Animal Research Institute, and research is indeed an important function of the Institute, the greater part of the time of the staff is taken up in the routine diagnosis of disease conditions, he said.

The Department has about 150 stock and slaughtering inspectors in the field, not to mention some 20 veterinary officers. From these



Plate 1

Director of the Pathology Branch of the Institute, Mr. L. G. Newton, Shows a Specimen to the Premier of Queensland, Hon. G. F. R. Nicklin, and the Minister for Agriculture and Stock, Hon. O. O. Madsen, at the Jubilee Celebrations Held at the Department's Animal Research Institute at Yeerongpilly.

["*Courier-Mail*" photograph.]

men and upwards of 40 veterinary practitioners, comes a never ending stream of specimens to the Institute. No less than 5,168 separate batches of specimens were examined in the year 1958-59.

The value of the diagnostic service provided to the livestock industries by the Institute is almost beyond price. There can be few more disturbing happenings on farm or station than the loss of valuable livestock from causes unknown—unknown that is, to the farmer or grazier; but the knowledge that there is a field diagnostic service available to him with the full resources of the Institute behind it, must surely be a great comfort.

The Institute is proud of its role in this regard and happy to acknowledge that if needs be, diagnostic work in general must take priority over research. Actually much of the research carried out springs directly from problems encountered in the diagnostic area so that the two are really very closely related. The research work carried out at the Institute is essentially applied research and the results obtained, of immediate benefit to the livestock industries.

History of the Institute

The following material is drawn directly from a booklet specially prepared for the 50th anniversary celebrations:

In 1888 a deputation of stockowners approached the then Colonial Secretary, the Hon. B. B. Moreton, to press for the establishment of a laboratory to study diseases and other problems of both animals and plants. Some three years later the Queensland Graziers and Stock Breeders' Association urged the formation of a laboratory.

In 1893, the Executive Council approved the establishment of a Stock Institute for Queensland and appointed Mr. Charles Joseph Pound, F.R.M.S., Director. The Minute of the Colonial Secretary establishing the Stock Institute, stated as its object ". . . the discovery by means of experimental research of the nature and origin of diseases in stock and the means of their prevention".

The first Stock Institute was located in rented premises in Turbot Street near North Quay, Brisbane. The volume of work rapidly increased and in 1899 a new building in College Road, Brisbane, was occupied. In 1900 control of the Institute was transferred to the Home Secretary's Department and its title changed to Bacteriological Institute. The Department of Agriculture and Stock resumed control of the Institute in 1907.

In 1909 the need for sufficient space to accommodate large animals for experimental purposes became urgent; 56 acres of land at Yeerongpilly

were then acquired and the Stock Experiment Station established. Mr. (later Dr.) Sydney Dodd, M.R.C.V.S., was placed in charge with the title of Principal Veterinary Surgeon and Bacteriologist. In relation to this the Annual Report of the Queensland Department of Agriculture and Stock 1909-10 states—

“Queensland may congratulate itself upon being the first State to possess a thoroughly equipped Station to deal with the epizootic diseases in stock, and research work in connection therewith.”

With the resignation of Mr. Dodd on March 31, 1910, Mr. C. J. Pound was transferred from the Bacteriological Institute and took charge with the title of Government Bacteriologist. Mr. A. H. Cory, M.R.C.V.S., was made responsible for the supervising of veterinary work at the Station.

Following Mr. Pound's retirement on August 1, 1932, Mr. James Arthur Rudd, L.V.Sc., was appointed to take charge of the Station on June 22, 1933. At this time its designation was changed to Animal Health Station. Mr. Rudd retired on August 29, 1941. Dr. John Legg, B.Sc., D.V.Sc., M.R.C.V.S., then became Director (later Director of Research), a position which he held until his retirement on February 11, 1957, except for a period from May 1945 to June 1947 when Dr. F. H. S. Roberts, D.Sc., was Acting Director.

The laboratory built in 1909 was vacated in July 1945, and the former premises of the University of Queensland Veterinary School, located in the same area, were occupied.

In the period 1951-53 the Biochemical and Toxicological Sections of the Agricultural Chemist's Laboratory were transferred from the Head Office of the Department to the Animal Health Station. However, they continued as part of the Division of Plant Industry. In 1956 these two sections were combined to become the Biochemical Branch of the Division of Animal Industry.

In 1952, to meet the increasing need for research into animal husbandry, 360 acres of land were purchased at Rocklea (approximately 2 miles from the Yeerongpilly site). This was followed by the establishment of a Husbandry Research Section of the Station with Mr. A. K. Sutherland, B.V.Sc., M.S., Chief Husbandry Officer in charge. In the following year the name Animal Health Station was changed to Animal Research Institute to correspond with the wider functions discharged.

Subsequent to Dr. Legg's retirement in 1957, the Biochemical Branch was included in the Animal Research Institute which then comprised three Branches—Pathology, Husbandry Research and Biochemical, with a common administration section.

In addition to headquarters at the Institute, the Pathology Branch has a regional laboratory located at Oonoonba, Townsville. This laboratory was opened on April 25, 1914, under the control of Mr. G. Tucker, M.R.C.V.S. It is now known as the Oonoonba Animal Health Station and provides a service for those areas of the State from Mackay northwards.



FARM SAFETY

Familiarity can breed contempt, but when you are dealing with bulls you should be careful at all times.

Accidents, some of them fatal, happen every year because stockmen and farmers fail to treat their bulls with respect.

Keep your eye on the bull!

Take A Look At Yellowberry!

By S. L. EVERIST, Government Botanist

Here is a description of Yellowberry (Rubus ellipticus) which recently was declared noxious throughout the State under the Stock Routes and Rural Lands Protection Acts:

Yellowberry is a coarse bramble with a habit of forming dense thickets. There are two kinds of stems, primary canes and flowering canes. The primary canes are stout, growing upright at first, then bending over at heights varying from 3 to 8 ft. and dropping down to the ground again, where they take root and form new crowns from which more primary canes arise.

The primary canes are densely covered with stiff, bristle-like hairs, reddish or brownish in colour and, in addition, have scattered hooked prickles.

The flowering canes are short and slender and come out from the forks of leaves along the primary canes. They also have bristly hairs and scattered prickles.

The leaves consist of three leaflets, the side two with short stalks and the end one with a longer stalk; those on the primary canes are 2 to 4 in. long and 1 to 2½ in. wide; those on the flowering canes are generally smaller.

Each leaflet is dark glossy green on the upper surface and paler underneath. The veins are prominent—sunken on the upper surface, raised on the lower. The leaflets are elliptic in outline, rounded at both ends, the edges finely and sharply serrated.

The flowers, borne in groups at or near the ends of the short flowering canes, have 5 white petals: the fruits resemble blackberries in size, shape and texture but are pale yellow in colour.

Distribution

A native of southern Asia, Yellowberry was first reported to be growing wild in Queensland near Eumundi in 1912. It spread slowly on to other parts of the Blackall Range and is now plentiful there. In recent years it has begun to spread rapidly on the range itself and the lower slopes towards Nambour and Palmwoods. Isolated patches have also been reported as far north as Maryborough and as far south as Pimpama.

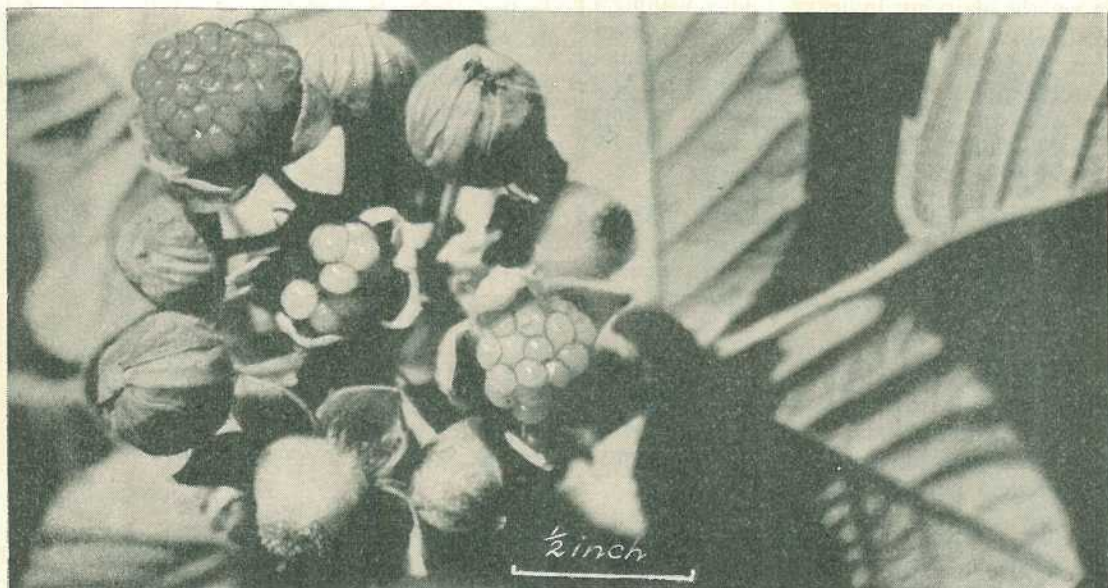
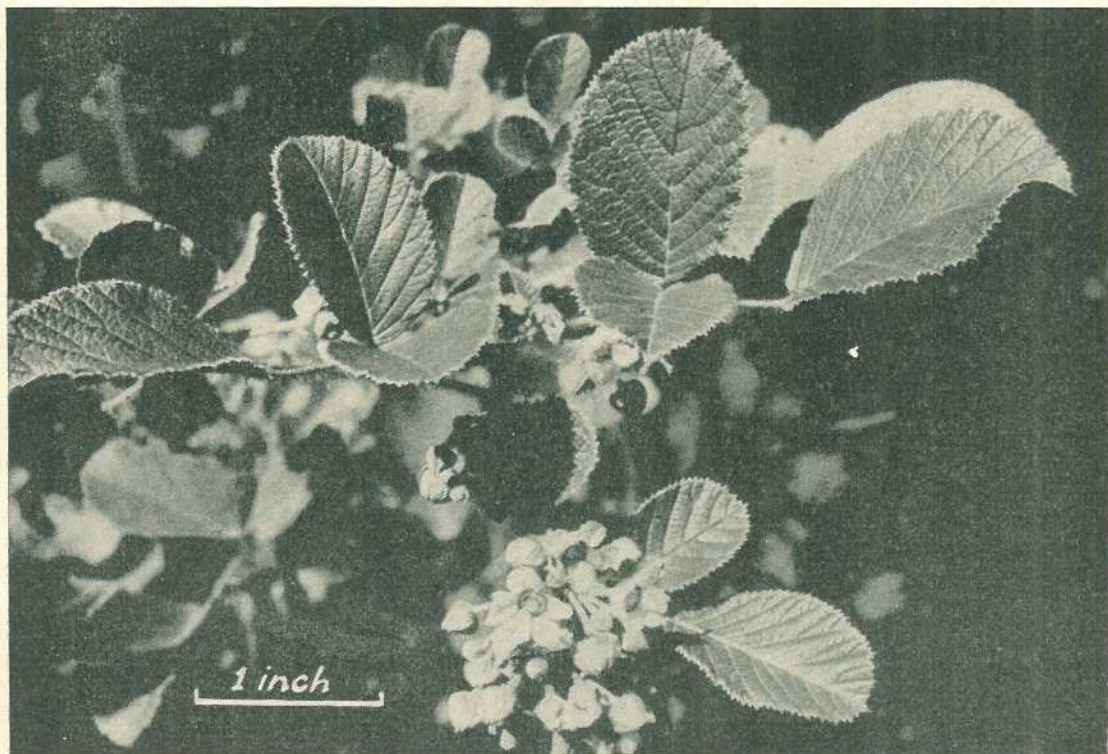
If the plant is allowed to spread it could become a serious pest on much of the good dairying country of the coastal belt. The fruit is edible and is spread by birds.

Control

Despite its fearsome appearance, Yellowberry is one of the easiest brambles to kill with hormones. It can be killed with 2,4,5-T or mixtures of 2,4-D and 2,4,5-T, provided the spraying is thorough.

If you use a 40 per cent. 2,4,5-T, mix 1½ fluid oz. to 3 gal. of water (1:400) and spray the bushes until they are wet. If you use a mixture of 2,4-D and 2,4,5-T, double the amount of hormone.

Most of the sprayed plants will die and the few survivors can be sprayed again later. Do not burn the sprayed plants for at least 6 months after treatment. Spraying should be followed up with grass planting when the bushes are dead.



TOP: Flowering Cane of the Yellowberry (*Rubus ellipticus*). BOTTOM: Cluster of Yellowberry Fruits.

Herd Recording In 1958-59

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

During the 1958-59 herd recording year, 43,412 cows from 1,259 herds completed recorded lactations under the Group Herd Recording Scheme, for a record average production of 402 gal. of milk and 170 lb. of fat.

Following the 1957-58 drought, most of the dairying districts received fair rains. Although the rainfall was below average it was well distributed. As a result of the improved conditions it was expected that the membership of herd recording groups would increase. However, the low price ruling for dairy produce overseas in August and September, 1958, had a depressing effect on the dairying industry. This waning of interest, allied with the increase in herd recording fees in October, 1958, curtailed the number of farmers practising herd recording. In order to reduce costs, several groups below strength were amalgamated. The number of groups fell from 78 to 72 during the year.

The average production of 4,022 lb. milk and 170 lb. fat is the highest recorded in this State. The previous highest was in 1955-56, when the average production was 3,563 lb. milk and 155 lb. fat.

The higher production this year can be attributed partially to the seasonal conditions, but it is also considered that herd owners have made use of herd recording information to improve their farm and herd management.

The high prices ruling for cow meat for the American trade has provided a profitable outlet for culled cows. Recording farmers have been able to dispose of their lower producing animals at a remunerative price.

Of course, all dairymen have been at liberty to sell culled cows on this market, but farmers who have not been recording have relied on personal observation to select their culls. Thus, it is quite possible that they may have unwittingly sold some of their higher yielding cows and retained the lower producing animals.

One point to remember is that although culling may increase the average production per cow it may not increase the overall production from the farm. This situation could arise if the property is understocked and cows are obtaining ample feed. When replacement stock are introduced their productive ability must exceed that of the culled animals. Culling is only successful if associated with good farm management.

The total completed lactation and average yield per cow for each year since 1948 are given in Table 1.

TABLE 1

Year	Herds	Lactations	Average Production per Cow		
			Milk (lb.)	Test (%)	Butterfat (lb.)
1948-49 ..	507	17,216	3,289	4.3	144
1949-50 ..	715	22,392	3,523	4.3	152
1950-51 ..	814	26,798	3,312	4.4	146
1951-52* ..	818	23,123	2,657	4.2	112
1952-53 ..	1,073	34,304	3,467	4.3	150
1953-54 ..	1,202	41,378	3,143	4.3	134
1954-55 ..	1,266	45,734	3,486	4.3	150
1955-56 ..	1,412	54,352	3,563	4.3	155
1956-57* ..	1,466	59,711	3,508	4.2	149
1957-58* ..	1,217	43,726	3,449	4.1	143
1958-59 ..	1,259	43,412	4,022	4.2	170

* Drought year.

Table 2 shows the number of cows, according to age groups, which completed recorded lactation periods of 300 days or less, and their average production.

TABLE 2

Age Group	Cows	Average Production per Lactation		
		Milk (lb.)	Test (%)	Butterfat (lb.)
2-year-old ..	6,122	3,340	4.3	145
3-year-old ..	4,760	3,689	4.3	159
4-year-old ..	4,305	4,081	4.3	175
Mature ..	19,247	4,342	4.2	182
Unknown age ..	8,978	3,950	4.2	164
Total ..	43,412	4,022	4.2	170

A total of 8,978 cows, or 20.7 per cent., are shown as being of unknown age. This is the same percentage as in the previous year. It is very disappointing to find that the age of one cow in every five is not known. This deficiency reduces the effectiveness of the production records for survey purposes.

Length of Lactation

The average length of lactation was 243 days or approximately eight months. This is a big improvement compared with previous years. Although the 1957-58 average was 247 days, it had previously varied from 203 to 230 days. As there is a correlation between production and length of lactation, dairymen should strive for a milking period of 10 months. If this is not attainable immediately, a minimum of nine months should be the initial aim.

The average length of lactation each year since 1948 is shown in Table 3.

TABLE 3

Year	Length of Lactation (Days)
1948-49	220
1949-50	223
1950-51	203
1951-52	209
1952-53	210
1953-54	211
1954-55	224
1955-56	229
1956-57	230
1957-58	247
1958-59	243

The average length of lactation for each of the areas in the State is shown in Table 4.

TABLE 4

District	Length of Lactation (Days)
Atherton Tableland	256
Mackay	252
South-Eastern Queensland	246
Eastern Downs	243
Western Downs	233
Central Burnett	249
Dawson-Callide	240
South Burnett	239
Port Curtis	234
Upper Burnett	239

Production in Each Group

The average production for each Herd Recording Group is shown in Table 5.

TABLE 5
GROUP HERD RECORDING FOR 1958-59

District/Group	Herds	Cows	Average Length Lactation (Days)	Average Milk (lb.)	Average Test (%)	Average B/Fat (lb.) 1958-59	Average B/Fat (lb.) 1957-58
<i>Atherton Tableland</i>	54	1,815	256	3,963	4.1	160.6	168.3
Malanda No. 1	9	399	256	4,625	4.1	190.2	199.8
Malanda No. 2	16	420	257	3,740	3.8	141.9	149.8
Malanda No. 3	12	411	259	3,980	4.0	157.5	174.5
Millaa Millaa	17	585	254	3,668	4.3	156.1	155.8
<i>Mackay</i>	19	551	252	3,052	4.4	133.2	137.9
<i>Port Curtis</i>	55	1,512	234	2,916	4.5	131.0	119.3
Mount Larcom	19	598	223	2,714	4.3	117.7	100.5
Rockhampton	15	437	243	3,109	4.6	143.9	136.7
Bundaberg No. 1	11	197	245	3,275	4.5	147.8	129.3
Bundaberg No. 2	10	280	234	2,793	4.6	127.6	130.1
<i>Dawson Callide</i>	52	2,391	240	3,504	4.3	152.3	117.4
Biloela No. 1	17	958	250	3,660	4.6	166.6	118.6
Biloela No. 2	18	760	243	3,617	4.2	153.6	138.9
Wowan	17	673	223	3,154	4.1	130.4	102.5
<i>Upper Burnett</i>	35	1,542	239	3,797	4.7	176.6	124.5
Monto No. 1	15	744	235	3,579	4.6	163.5	118.2
Monto No. 2	20	798	243	4,001	4.7	188.7	129.3

GROUP HERD RECORDING FOR 1958-59—continued

District/Group	Herds	Cows	Average Length Lactation (Days)	Average Milk (lb.)	Average Test (%)	Average B/Fat (lb.) 1958-59	Average B/Fat (lb.) 1957-58
<i>Central Burnett</i>	34	1,114	249	3,866	4.4	169.5	141.1
Biggenden	17	562	248	3,955	4.4	174.4	162.0
Mundubbera	17	552	251	3,775	4.4	164.5	124.0
<i>South Burnett</i>	217	8,073	239	4,159	4.1	170.0	137.3
Durong-Wonda	17	936	241	4,465	3.9	176.3	156.4
Kilkivan	18	668	235	3,345	4.4	146.5	109.6
Kingaroy	23	719	240	5,031	3.9	195.7	141.5
Kumbia-Ironpot	18	792	239	4,404	3.8	165.9	140.7
Murgon	19	803	244	4,225	4.2	178.6	137.6
Nanango No. 1	20	759	238	3,838	4.3	163.6	130.0
Nanango No. 2	21	818	234	4,416	4.1	179.4	147.4
Nanango No. 3	20	702	246	4,531	3.9	178.0	159.7
Proston	22	753	230	3,528	4.4	154.0	135.4
Tansey	17	424	250	3,299	4.5	150.0	116.3
Wooroolin-Tingoora	22	699	235	4,145	4.1	168.9	129.3
<i>South-East Queensland</i>	505	17,827	246	3,827	4.3	164.4	138.8
Beaudesert No. 1	12	633	249	4,540	3.8	170.6	153.9
Beaudesert No. 2	9	441	236	4,079	3.8	156.4	125.4
Beechmont-Currumbin	20	819	244	3,422	4.3	147.1	132.8
Beenleigh	16	608	255	4,112	4.0	162.7	129.0
Boonah	29	890	248	4,469	4.3	190.7	163.9
Brisbane No. 1	28	577	263	4,910	3.9	189.4	153.5
Brisbane No. 2	20	811	248	3,966	3.8	150.7	134.9
Cedar Pocket	17	528	242	3,259	4.8	156.2	140.3
Cooroy	16	790	242	3,445	4.6	159.5	136.0
Esk No. 1	18	823	236	3,969	4.1	163.0	169.2
Esk No. 3	15	493	232	3,839	4.3	163.7	161.9
Gatton	19	464	223	3,739	3.9	145.8	124.5
Gympie No. 1	18	593	230	3,093	4.7	148.8	116.3
Gympie No. 2	15	789	238	3,343	4.9	150.4	140.5
Ipswich No. 1	16	307	256	3,999	4.2	169.6	130.6
Ipswich No. 2	19	523	253	4,476	4.1	183.6	138.2
Ipswich No. 3	18	519	242	4,513	3.9	176.8	154.3
Kenilworth	20	780	248	3,832	4.4	167.9	153.3
Kilcoy	24	1,233	244	3,329	4.5	148.4	129.2
Laidley	14	307	225	3,190	4.3	138.4	104.8
Lowood	16	468	250	4,201	4.2	178.1	137.6
Maleny No. 1	15	479	256	3,371	4.9	164.3	127.4
Maleny No. 2	15	428	263	3,540	4.8	170.7	138.9
Maleny No. 3	9	404	276	4,985	4.4	219.3	159.2
Maryborough	18	402	243	3,384	4.3	147.0	115.9
Merrimac-Mudgeeraba	14	660	254	4,362	4.1	177.2	144.7
Nambour	22	758	252	3,313	4.5	148.1	116.9
Pomona	16	615	251	3,661	4.8	174.8	135.5
Wolvi	17	685	236	3,377	4.7	160.1	125.2
<i>Eastern Downs</i>	207	5,505	243	4,983	4.1	206.1	173.0
Allora No. 1	15	332	239	4,723	4.1	191.7	160.9
Allora No. 2	18	386	259	5,595	4.1	227.8	194.2
Crow's Nest	25	673	240	4,110	4.3	176.0	139.2
Goombungee	18	602	241	4,461	4.3	191.8	164.6
Oakey	21	757	245	4,904	4.2	205.1	170.2
Pittsworth No. 1	21	565	241	5,436	4.1	220.6	195.2
Pittsworth No. 2	10	268	249	5,143	4.3	222.9	192.5
Toowoomba No. 1	25	582	244	5,464	4.1	224.2	191.4
Toowoomba No. 2	25	661	231	4,919	3.9	191.0	159.0
Warwick No. 1	16	407	244	5,322	4.1	218.7	174.1
Warwick No. 2	13	272	249	5,514	4.2	233.3	189.2
<i>Western Downs</i>	81	3,082	233	4,404	4.1	179.8	143.6
Chinchilla	15	518	242	4,657	4.1	192.9	142.2
Chinchilla-Wandoan	15	412	234	4,639	4.2	194.4	154.3
Dalby No. 1	17	469	238	4,598	4.0	184.3	149.5
Dalby No. 2	19	853	227	4,448	4.0	177.7	.. .
Jandowae	15	830	230	3,974	4.1	164.2	145.5
<i>Queensland Figures</i>	1,259	43,412	243	4,022	4.2	170.0	142.5

The groups are listed according to districts and the average production of each district is shown also.

It is interesting to note that the average yield per cow increased in all districts except in the North. On the Atherton Tableland the production decreased from 168 to 161 lb. fat and from 138 to 131 lb. at Mackay. This drop was due to the effect of winter dysentery, followed by an excessively wet season during the first six months of 1959.

Butterfat Ranges of Cows

The number of cows whose yields came within the various butterfat ranges is shown in Table 6.

TABLE 6

Range of Butterfat	Number of Cows	Percentage of Cows
Under 100 lb.	5,998	13.8
100-149 lb.	11,703	27.0
150-199 lb.	12,892	29.7
200-249 lb.	7,796	18.0
250-299 lb.	3,312	7.6
300-349 lb.	1,136	2.6
350-399 lb.	419	1.0
400 lb. and over	156	0.4

The percentage of cows which gave less than 100 lb. fat for a completed lactation decreased from 24.1 per cent. last year to 13.8 this year.

This percentage is still too high. It means that one cow in every seven produced below 100 lb. fat.

The number of cows which yielded over 200 lb. fat increased from 15.5 to 29.6 per cent. or almost one cow out of every three.

Under Queensland conditions it is considered that 200 lb. fat should not be beyond the capacity of the average cow.

Production Ranges

Herds were grouped according to their butterfat production and the groupings for ranges of 50 lb. of butterfat are listed in Table 7.

TABLE 7

Butterfat Production Range	Number of Herds	Percentage of Herds
Under 100 lb.	98	7.7
100-149 lb.	393	31.2
150-199 lb.	477	37.9
200-249 lb.	200	15.9
250-299 lb.	66	5.2
Over 300 lb.	25	2.0

The percentage of herds averaging less than 100 lb. fat decreased from 18.2 to 7.7 per cent. However, it is still noted that 40 per cent. of the herds or two out of every five averaged under 150 lb. fat.; 23 per cent. averaged over 200 lb. fat compared with 11 per cent. of the previous year.

TABLE 8
HIGHEST HERDS 1958-59

Highest Herds	Group	Breed	Cows	Milk	Test	Fat	Days
11-20 cows							
L. G. Weier	Allora 1	AIS	13	10,209	3.5	358.4	274
A. Ruge and Sons	Biggenden	G	19	7,604	4.5	344.4	297
A. and D. Krautz	Toowoomba 2	AIS	11	8,495	4.0	341.2	278
21-50 cows—							
J. H. Fletcher	Warwick 1	AIS	26	9,406	4.0	373.5	285
R. J. Knowles	Nanango 3	AIS	26	7,998	4.5	356.6	298
W. and E. Adlem	Kingaroy	Mixed	37	8,343	3.9	328.7	276
51-100 cows—							
J. McInnes	Durong-Wondai	AIS	78	8,841	3.9	342.0	279
W. Diill and Son	Boonah	AIS	55	8,309	3.7	308.2	279
E. and K. Rogers	Pittsworth 2	J	67	5,599	5.0	277.1	273
101 and over—							
G. E. Loader	Monto 1	J	104	4,560	5.2	237.4	250
P. F. H. O'Brien	Jandowae	J	164	3,655	4.9	178.2	246
Haselwood Bros.	Jandowae	AIS	122	4,555	3.7	170.0	233

Highest Producing Herds

The highest producing herds are listed in Table 8 in sections according to the number of cows which completed recorded lactations during the year.

These results show what can be achieved by careful planning and intelligent use of information provided by herd recording.

The highest average production was obtained by Mr. J. H. Fletcher whose herd of 26 cows averaged 9,406 lb. milk and 374 lb. fat. The average length of lactation was 285 days.

Mr. Fletcher commenced recording in 1955 and the average production for the herd since then has increased from 253 lb. of butterfat in 1955-56 to 374 lb. of butterfat in 1958-59. Complete details of the progress of herd recording in this herd are available in another article in this Journal.



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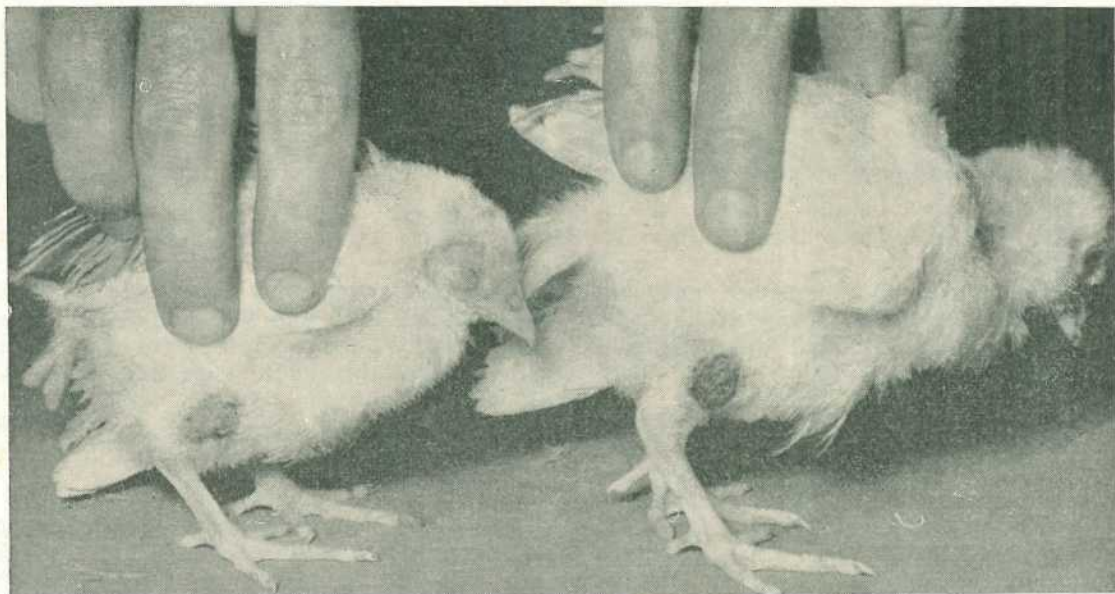


Plate 1

Wrong Vaccine Used on Day-Old Chicks

By P. D. RANBY, Veterinary Officer

The two chickens in Plate 1 are from a flock of 4 weeks old cockerels that have suffered a severe setback. Note the area of proud flesh on the leg of each bird, just above the hock joint. This area is where the chickens had been vaccinated.

The owner had vaccinated the 250 cross-bred chickens when they were one day old, using fowl pox vaccine. The follicle method had been employed. His mistake was that he had used the wrong vaccine.

He should have used pigeon pox instead of fowl pox vaccine.

Although fowl pox vaccine is suitable for older chickens (6 to 12 weeks), standard vaccine is too severe for baby chickens. Pigeon pox vaccine is safe to use at any age but the immunity is not so strong.

The owner reported that the first ill-effects occurred 2 to 3 weeks after vaccination. This would coincide with the expected time for the systemic (or general) reaction for fowl pox

vaccine. After vaccination with fowl pox vaccine (follicle method), the local reaction is seen by the sixth day as swelling of the feather follicles, each follicle being "capped" with a scab. Normally, the follicle swellings subside between the second and third week after vaccination and the scab material is shed.

However, in the flock in question, the whole vaccinating area became swollen and the swelling persisted well after the usual time.

In the two to three weeks following the first signs of sickness, 80 chickens died. This represents a death-rate of 40 per cent.! The survivors gradually recovered but at 12 weeks of age some of the birds still required culling.

This outbreak emphasises the care needed in vaccinating baby chickens against fowl pox. For details of fowl pox vaccination, see an earlier article entitled "Protect Chickens and Poults Against Fowl Pox". (December, 1959, issue of this journal.) This article will later be available in pamphlet form.

Pigs Graze Irrigated Clover

By J. B. AITKEN, Pig Branch

Pigs on a property at Moura now enjoy high quality grazing throughout the year, no matter how dry the weather. A small area of irrigated clover has made this possible.

The property, on the edge of the Dawson River irrigation area, is owned by Messrs. L. and J. Shelton. During the past year they have been grazing 100 sows and their progeny on irrigated clover, with very little trouble from photosensitisation.

Officers of the Department of Agriculture and Stock first outlined a plan for the pastures. In June 1958 an area of 5 acres was sown with 4 lb. Ladino clover and 1 lb. ryegrass seed an acre. The area was divided into three paddocks.

Within four months, pigs were grazing on these pastures.

The clover has gradually suppressed the ryegrass, and it has now been decided to sow clover only in future plantings for pig pastures.

Since the pasture was established, it has regularly carried about 50 head of sheep, in addition to the pigs. During the dry weather last October, 80 porker-sized pigs grazed the pastures.

Self-Feeders

The pigs use the grazing run in a paddock of native forest grasses adjoining the irrigated area. In this paddock are shelters, self-feeders, and automatic waterers. The pigs have free access to whatever clover paddock is to be grazed by them. No shade is provided in the pasture paddocks.

Sheep are turned onto the paddock before it is opened to the pigs. Pigs apparently graze the pasture more evenly than the sheep, so they are used to graze each paddock to a close even sward before it is watered.

The first time pigs were turned onto the clover, the crop was lush and tall, and some damage was done where the pigs rooted and tore up small areas. Since then, nose rings have been used on the pigs and the pastures were fed off at an earlier stage of growth. Since these two practices were established there has been little damage to the pastures.

Watering is done every two weeks in summer, and every three weeks in winter. At watering time a paddock is closed to stock, given the amount of water considered necessary, and kept closed until it is ready for grazing, when stock are again given access to it.

White-skinned pigs grazing on pastures with a high percentage of clover are likely to show symptoms of photosensitisation. To date very little of this trouble has been experienced even though the pigs are all white-skinned.

The small area of irrigated grazing has proved of considerable value to the owners. It has been the source of a regular supply of vitamin A to the growing pigs, and has saved an appreciable amount of protein meal and grain. These pastures are rated so highly that it is intended to sow an additional 9 acres, so that the dry sows may also have the benefits of high quality grazing.

Not every pig farmer is able to provide irrigated grazing to this extent, but many are using irrigation for small areas of green feed. Today, when more pigs are being dry fed than previously, the value of an adequate supply of high quality green feed to provide vitamin A for health is enhanced.

This venture underlines what many farmers are discovering—that we are only beginning to realise the true value of a small irrigated area of green feed, whether it be grazed or cut and hand-fed.

Spraying Weeds In Pineapples

By R. C. CANNON, Senior Horticulturist

Here are ways to use chemical weedicides to control weeds in pineapples:

Chemical weedicides control weeds in pineapples more cheaply and more easily than hand chipping and are now used extensively. Pre-emergence spraying to kill weeds as they germinate is far more effective than trying to destroy them after they have become established.



Plate 1

A Weed-Free Crop of Pineapples at Montville Just Before Harvest.

Since 1949, Queensland pineapple growers have been using PCP (sodium pentachlorophenate) to keep their plantations free of weeds. A number of other weedicides have been tested and, of these, monuron (parachlorophenyl dimethylurea), formerly known as CMU, has proved superior to PCP in some respects. When they are properly used, both will control seedling weeds and many grasses without any injury to pineapples.

However, neither of them has any value against grasses such as couch or kikuyu, which spread by means of runners. Either TCA (sodium salt of trichloroacetic acid) or dalapon (sodium salt of dichloropropionic acid) may be used to kill these types of grass, but only at the end of a crop cycle. They cannot be used in growing pineapples because of the risk of plant injury.

Pre-Emergence Control Best

There may be a certain amount of satisfaction in seeing a lot of dead weeds after you have sprayed, but experience has proved that pre-emergence spraying is more effective and more economical than post-emergence spraying. There are three good reasons why this is so:

- (1) It is obviously better to destroy weeds before they have had a chance to compete with the pineapples for plant foods, moisture and sunlight.
- (2) Pre-emergence sprays have a lasting effect, whereas spraying of large, established weeds does little or nothing to prevent another batch of weeds from coming up soon afterwards.
- (3) Both PCP and monuron kill seedling weeds and grasses more easily in their very early stages of growth.

Successful control of weeds depends on spraying before they have germinated, or just as the first weeds appear above-ground. The initial application for pineapples would automatically be made as soon as possible after planting and, preferably, after rain. This should keep the plantation free from weeds for 3 to 6 months, depending on the time of the year and the particular weedicide used. The second or any subsequent application should be made as soon as a few weeds start to appear. Weed control programmes often break down through failure to carry out follow-up operations at the right time.

If weeds do happen to get away from you, a contact spray may be necessary, but no time should be lost in destroying them while they are comparatively small. A mass of large, dead weeds forming a blanket over the surface of the ground will interfere with the penetration of the pre-emergence spray, which should be applied as soon as possible.

PCP Pre-Emergence Sprays

Sodium pentachlorophenate, used for PCP pre-emergence sprays, is available commercially as a powder (70 per cent. active ingredient), a paste (about 60 per cent. active ingredient) and a solution (50 per cent. active ingredient). These three forms are equally effective provided the sprays contain equal amounts of the active ingredient.

Sodium pentachlorophenate powder is very irritating to the nose and throat and all forms of PCP may be harmful if inhaled in quantity or absorbed through the skin. They should be handled with care.

Several deaths have occurred in Queensland through failure to take adequate safety precautions.

The PCP powder dissolves rather slowly in water and it is necessary to see that it is all properly dissolved before spraying. To avoid delays during spraying operations, it will be found convenient to make up in advance a stock solution containing 1 lb. PCP in 4 gal. water, to be diluted as required; the same applies to the paste. The solution can, of course, be quickly diluted with water for spraying.

For pre-emergence weed control, apply 10 lb. of the active ingredient to the acre in at least 200 gal. of water. The amount of water may be increased with advantage. There is no need to add a spreading agent to the solution, nor is agitation of the spray necessary, but $\frac{1}{2}$ gal. of an oil emulsion may be added to the spray to reduce its irritating properties.

To be effective, PCP has to reach the zone where weed seeds are germinating ($\frac{1}{2}$ to 1 in. below the surface) and the best results are obtained when the soil is moist at the time of spraying or when rain falls immediately afterwards. If applied under very dry conditions or on a very sandy soil, PCP often gives poor weed control.

There is no need to take precautions against walking over the sprayed surface of the soil.

Monuron Pre-Emergence Sprays

Monuron is available commercially as a dispersible powder containing 80 per cent. active ingredient. It mixes readily with water but settles very quickly, and constant, vigorous agitation in the vat is necessary. It is relatively harmless to humans and no special precautions are necessary in handling it.

For pre-emergence weed control, 4 lb. of active ingredient in at least 200 gal. water are required to treat 1 acre. The amount of water may be increased without increasing the amount of active ingredient.

Like PCP, monuron must also reach the zone of weed seed germination and requires a moist soil to be effective. Unlike PCP, however, it may be applied to a dry soil even though it remains

inactive until rain falls and raises the soil moisture. Monuron is absorbed through the root system of the plant, and young weeds which have already appeared above-ground die off in a few days.

Monuron remains effective in the soil for a longer period and kills young grasses rather more effectively than PCP.

PCP-Oil Contact Sprays

The addition of certain oils, such as diesel oil and creosote, greatly enhances the toxicity of PCP to established weeds. For high volume spraying, the oils must be in a form miscible with water, and emulsifiable diesel oils and emulsifiable creosote are available commercially for this purpose.

Combination sprays of this kind, containing 3 lb. of PCP and 1 gal. of an oil emulsion per 100 gal., give practically complete control of broad-leaved weeds. Grasses are more tolerant and sprays with even much higher concentrations of the ingredients are not entirely satisfactory for controlling them. Though frequently not killed

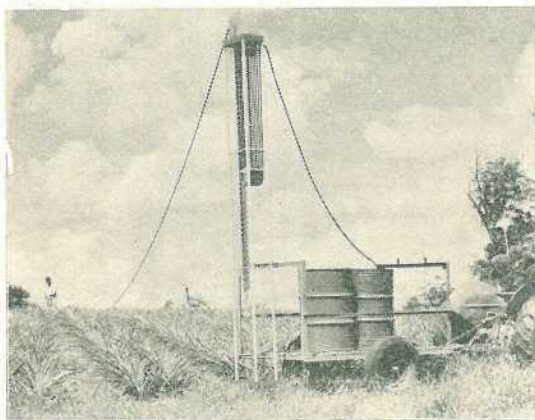


Plate 2

Modern Methods of Weed Spraying in Pineapples at Woombye. Retractable spray hose used for applying weedicides in pineapples.

outright, grasses are severely checked thereby giving the grower a respite during which they can be removed by chipping. Diesel oil is quite satisfactory in the PCP sprays used to destroy broad-leaved weeds, but creosote is slightly superior when grasses are troublesome.

The best and cheapest way of preparing PCP-oil contact sprays is to use sodium pentachlorophenate and an emulsifiable oil. The oil is first emulsified in a small quantity of water and then added to the bulk of the water containing the requisite amount of PCP in solution. Commercial preparations containing pentachlorophenol (NOT sodium pentachlorophenate) dissolved directly in the emulsifiable oil are available and in common use. They are less economical, though easier to use, and are of less value for pre-emergence weed control than similar sprays containing PCP as sodium pentachlorophenate.

In applying a contact spray, it is essential to completely wet the foliage of the weeds. The quantity of spray required will, therefore, depend on the number and size of the weeds present.

TCA and Dalapon for Special Grasses

As mentioned, both TCA and dalapon are injurious to pineapples. However, they may at times have to be used to eradicate couch or kikuyu grass from pineapple plantations. Where a small patch of either grass is present in a young plantation, it may be expedient to sacrifice a few pineapple plants to stop it spreading. Normally, however, these weedicides should be used only during the inter-cycle period and a strenuous effort made to complete weed eradication some time before replanting.

TCA and dalapon give the best results if applied when the grasses are actively growing but several weeks may elapse before their effects are apparent. For a complete kill, up to 100 lb. of TCA or 40 lb. dalapon an acre are required. Land treated with dalapon may be replanted to pineapples within 6 to 8 weeks; after TCA treatment, replanting should be deferred for several months.

Pre-Emergence Spraying

The main point to be remembered in applying pre-emergence weedicides is that the material has to reach and enter the soil. It is not necessary to use high pressure equipment—a watering-can would be good enough if it were not so slow and laborious. When sprays are applied at high pressure, giving a very fine spray, much of the solution may blow away and not settle on the soil to be treated.

In farm practice, a pressure of 30 lb. per sq. in. is adequate and results in comparatively little wastage.

As already mentioned, a moist soil is preferred for weedicide spraying, and growers should take full advantage of weather conditions in timing their weed sprays. When re-spraying an area, it may pay to put the weedicide on a little earlier than is absolutely necessary if good rain has fallen and there is no immediate prospect of further rain.

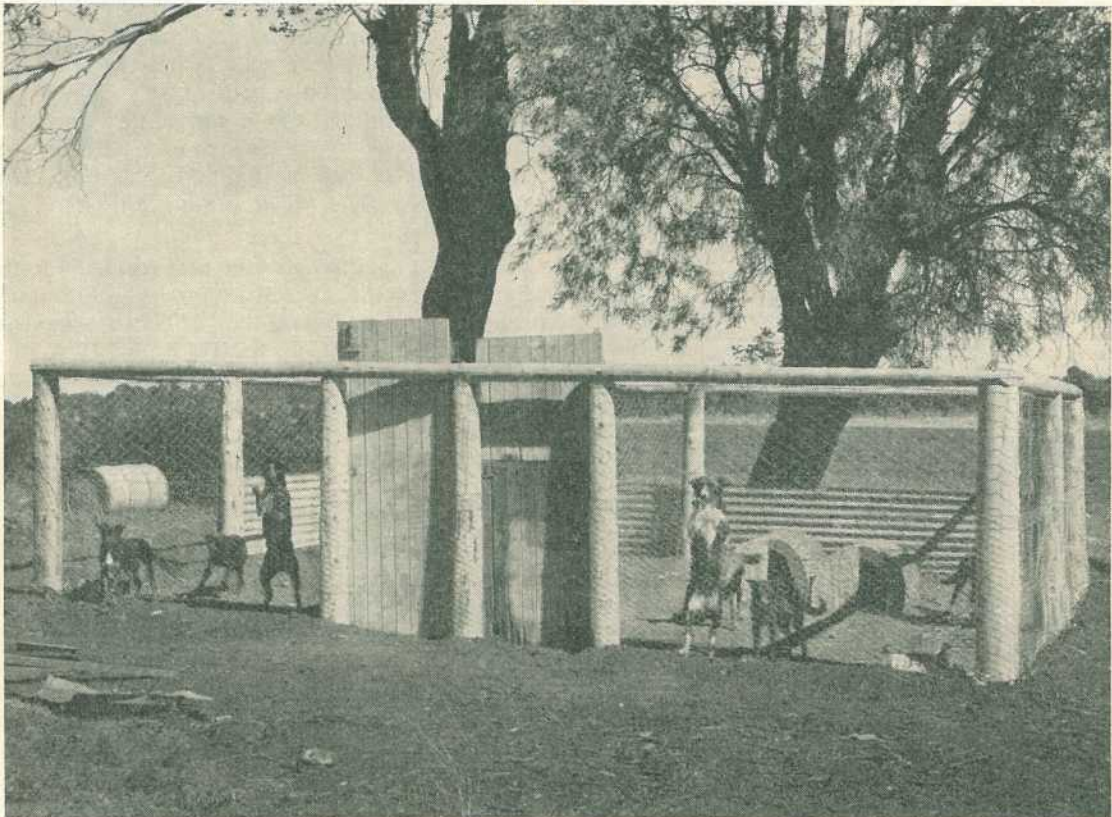
The only precaution necessary in spraying pineapples with PCP is to direct the spray so as to avoid wetting the tender growing tissues at the bases of the leaves or in the hearts of the plant. However, it is usually safe to spray over the top of newly-planted pineapples, provided the spray is applied within a week or so of planting and before active growth commences. This gives a good coverage of the soil close to the plants.

Pre-emergence weed control in pineapples has proved highly successful in Queensland over the past 10 years and few, if any, growers would consider reverting to the chipping hoe. However, individual failures do occur. They can almost invariably be traced to one or other of the following causes:

- (1) Spray pressure too high, or nozzle too fine.
- (2) Soil too dry.
- (3) Weedicide not completely dissolved (in the case of PCP) or insufficiently agitated (in the case of monuron).

These are faults in procedure and can be easily rectified once the cause of failure is recognised.

In The Dog House



Dog Pens At North Bindango, Roma.

Stock and Station

Nitrite Poisoning Kills Quickly.—Nitrite poisoning will kill cattle, sheep and pigs very quickly. Once symptoms appear, you'll need to identify the condition immediately to have a chance of saving affected animals.

The clearest sign of nitrite poisoning is that the blood of an affected animal turns a chocolate colour. Look at the colour of the small blood vessels underneath the eyelids and around the eyeballs. These will be quite brown. Other symptoms in cattle and sheep are rapid breathing and twitching muscles. The inside of the mouth turns bluish. Pigs usually vomit, and squeal as though in pain.

Nitrite poisoning can be treated by injecting a weak solution of methylene blue into the bloodstream. But because of the skill needed to give the correct dose, treatment is best carried out by a veterinary surgeon or stock inspector.

—K. M. GRANT,

Assistant Director of Veterinary Services.

Control of Sheep Body Louse.—Many sheepmen, particularly those with small properties having rather limited improvements, have come to rely on strip jetting of sheep to control body louse. By jetting the sheep in strips along back and sides they hope to eradicate louse infestation altogether or at least reduce it to very low levels. Such technique is frequently carried out with small jetting plants, or even with knapsack sprays. Although on the face of it, the method appears economical because of the saving in expenditure on plant such as power sprays, plunge sprays, or portable spray dips, research investigation has demonstrated clearly that this form of louse control with some insecticides is unsatisfactory. Controlled experiments by the Pathology Branch of the Division of Animal Industry showed that jetting along the back with organic phosphate insecticides will not control lice infestation. The treated areas are lice free, but there is a rapid increase in lice population in the untreated areas, and the sheep reverts to the previous typical appearance of lice infestation.

—R. B. YOUNG,

Senior Adviser, Sheep and Wool Branch.

Using Gouge Dehorner on Calves.—The Agriculture Department recommends gouge or cup dehorner for dehorning calves from 3 to 9 months old. Used properly, the calf is completely polled, and the operation is simple and nearly painless.

Many dairy farmers will have calves at the right age for dehorning now and through the summer and autumn months.

To use gouge dehorner, place the instrument over the horn base and aim to remove about $\frac{1}{4}$ in. of skin along with the horn. With the dehorner in position and the calf restrained, remove the horn by quickly snapping the handles to the closed position. Stubs or scurs are usually caused by lifting the dehorner at the time of cutting. Avoid these by pressing the dehorner to the calf's head as the horn is about to be cut.

—W. F. MAWSON,

Senior Cattle Husbandry Adviser.

Poison Plants Are Sly Killers.—Each year, more stock in Queensland are killed by poison plants than most farmers and graziers realise. Large numbers of animals are affected only occasionally, and usually only an odd beast dies now and then for no apparent reason. Over the whole State, this constant wastage adds up to a heavy toll in 12 months.

It's often very difficult to confirm a suspicion that plant poisoning has caused an animal's death. This is because most poison plants produce no definite symptoms.

Most paddocks contain plants capable of causing death if eaten in sufficiently large quantities. If you suspect plant poisoning, send specimens of the suspicious plants with your other specimens to the Animal Research Institute, Yeerongpilly. Knowing the plants growing in your paddocks will help the Botanist in his examination of the stomach contents of freshly dead beasts.

—B. PARKINSON,

Divisional Veterinary Officer.

Profitable Pigs.—Very young pigs need far more protection from cold and wind than market pigs or breeders. In winter the litters that are kept warm and comfortable are the ones that will be profitable to you later on.

Litters which are farrowed in cold pens are often chilled at birth, and seldom recover. Many of these chilled pigs die within the first few days; the remainder may survive up to porker or baconer weights. These survivors are seldom economic owing to the extra time and feed required.

For successful litter rearing you need a warm dry shed, free from draughts. Now is the time to check all your pig sheds. Make sure they

won't be a source of loss through slow growth and disease in your pigs this winter.

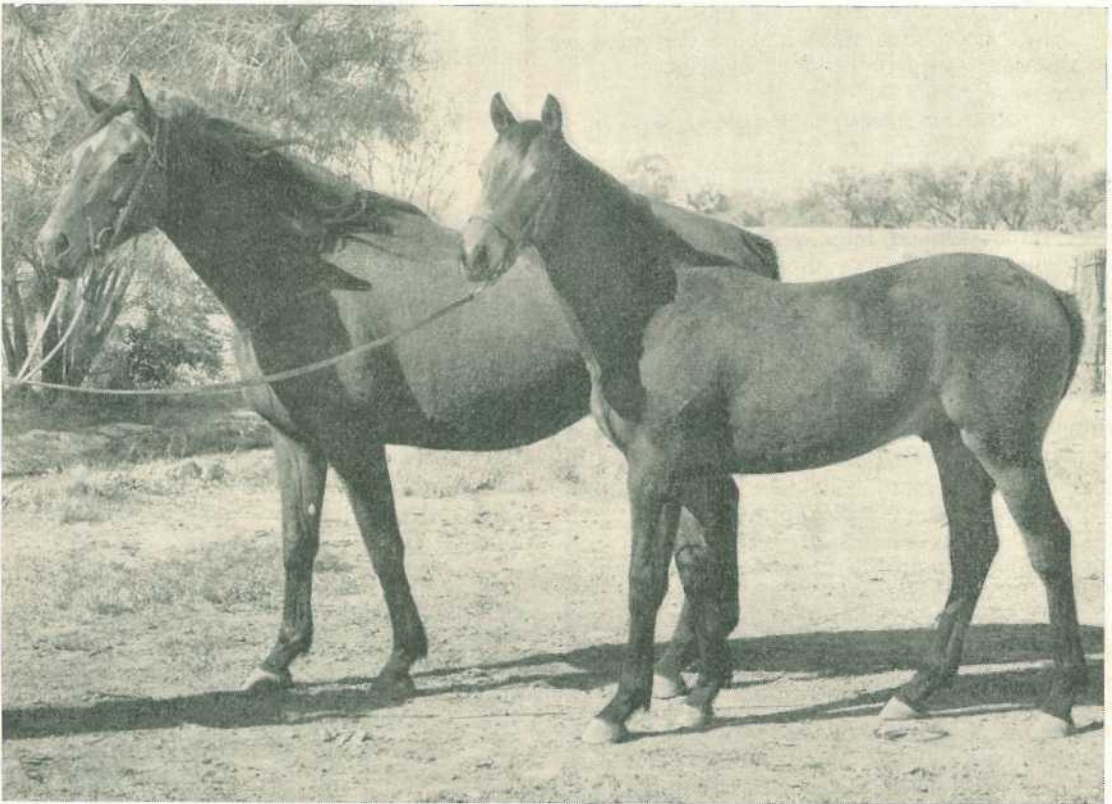
Check floors, walls, and roof. The floor must be warm, dry and free from draughts. Walls and roof should be capable of keeping out wind and rain.

Grade your sheds, and put your youngest pigs in the warmest ones, ending up with the oldest stock in the poorer sheds. The alternative is to make all sheds warm for winter, and have specially fitted sheds for litter rearing. Money spent on this work would be a wise and profitable investment.

—T. ABEL, Senior Adviser, Pig Branch.



A Family Likeness



Blood Mare and Foal at Whynot, Quilpie.

Transmission Of Disease From Animals To Man

By C. G. LUDFORD, Bacteriologist

Besides stockowners, the whole public benefits from the work carried out by veterinary microbiological laboratories on diseases of animals.

Everybody knows that certain human diseases are spread from one infected person to another, for example a child with mumps is kept isolated not only so that he may be nursed to recovery but that he may not spread the disease to his friends.

The disease mumps is said to be host specific: it spreads only from human to human, and there is no fear of the little patient's pet puppy having mumps too. Conversely a child cannot catch mumps from a puppy or any other animal.

However, there are some diseases that are able to spread from animals to man. These are known as zoonoses, the word being coined from the Greek *zoon*, an animal and *nosos*, sickness. An example is psittacosis or parrot disease, where man is infected from sick or infected parrots.

It is important that the veterinary microbiology laboratory be able to recognise such diseases in animals and to help accumulate knowledge of the areas where they occur. Not until then can eradication of the disease be successful.

This brings the veterinary laboratory into the field of public health.

Australia is fortunate in escaping many severe diseases of animals that occur in other parts of the world, particularly in such continents as Africa where there is a large wild animal population to act as a reservoir of infection. The constant watch of the quarantine authorities is responsible for these diseases being kept out.

Even so, a surprising number of diseases occur here that under suitable circumstances may infect man.

Spread by Four Ways

The third article of this series explained how infectious diseases may be spread in four different ways. The first is by direct contact with an infected animal, the second by contact with the microorganism in the external environment, the third by introduction of the microorganism into the animal and the fourth by transmission by an insect vector (or carrier).

Although a disease is not necessarily restricted to a single means of spread, one pathway is usually the major method and only occasional infections arise via alternative ways. Therefore, it is convenient to classify the zoonoses according to this same scheme:

1. *Diseases spread to man by direct contact with infected animals.*—It was observed that this pathway is exceptional in the transmission of infection between animals, other than in the venereal diseases. However, certain sections of human populations such as stockowners, employees of slaughter yards and veterinarians may be in direct contact with animals and so are exposed to infection.

On the other hand, inhabitants of cities are not usually in contact with animals and are not infected in this way. An example is brucellosis, a disease nearly restricted to people handling animals.

It is interesting to note that when a case does occur in an urban dweller, his infection may often be traced to a recent farm holiday.

Other diseases spread to man by direct contact are shown in the first part of Table 1. Some of these such as erysipelas, listeriosis, and melioidosis are very rare in man and so there has not been much opportunity to study the ways in which man is infected. Vibriosis is included in this group although it is not fully understood how man becomes infected. The infection has been known for many years in cattle, but only recently has it been suspected in man. In this group, ringworm is the only disease likely to infect any member of the population, as the cat may pass infection to man.

2A. *Diseases spread to man by external contact with the pathogen.*—One important disease, leptospirosis, is transmitted in this way, and there are two others, anthrax and Q fever, that are of minor importance.

Leptospirosis is very widespread in Queensland among cattle and pigs. Two factors make this disease readily transmissible to man. Firstly, infected animals excrete the causative organisms in the urine, and secondly, the organisms may pass through intact skin to infect man. As they may live at least for some days in surface water, it can be seen that persons who are splashed with contaminated urine or water may become infected. Of course, the disease may be passed to stock in the same way.

Leptospirosis also occurs in North Queensland in rats and in some small native animals. Infected animals may contaminate small streams and sur-

face water with their urine, and so spread the disease to man.

Anthrax and Q fever may infect handlers of hides and skins that contain the organisms. Anthrax has also been known to occur in man following the use of toilet goods such as new shaving brushes made from bristle infected with the resistant spores of the organism. Now all such material must be sterilized in steam before it is made into articles for human use.

2B. *Diseases spread to man by introduction of the pathogen into the body.*—A number of diseases may be spread in this way as well as by direct contact with the infected animal. In recent years there has been a lot of attention drawn to salmonellosis in both domestic and wild animals. Losses of animals have been of great economic importance, and in addition, the animals have formed a vast reservoir for infection of man. Salmonellosis, or food poisoning, or gastroenteritis as it is commonly known, may spread from person to person as well as from animal to person. However, outbreaks occur from eating of infected foods such as eggs, meat—in types of sausages that are inadequately cooked—and sometimes milk.

Under conditions of bad hygiene, rats or mice may contaminate stored food that is later eaten without being cooked.

Salmonellosis is also a disease that may travel in the reverse to what has already been described, from man to animals. Human carriers of the disease in addition to spreading infection to other persons may initiate an outbreak in livestock.

Rats and mice may also be infected from excreta of persons with salmonellosis and then play their part in infecting other persons.

Several milk-borne diseases fall into this group, but are less important now than formerly as nearly all city milk is pasteurised to destroy pathogenic bacteria. Brucellosis, Q fever, bovine-type tuberculosis and possibly vibriosis are examples.

Bovine-type tuberculosis may infect lymph glands of children and should be distinguished from the more common human type or pulmonary tuberculosis, which is transmitted from man to man and rarely from animals to man.

The organisms of two diseases in this group may infect man through inhalation of infected dust. Q fever occurs in sheep, cattle and goats, although it does not seem to produce visible symptoms in affected animals. The organisms may be excreted by parturient animals in enormous numbers along with the placenta or after-birth. If such material is allowed to remain in a paddock the organisms readily become mixed with dust and so may be re-deposited onto the fleece or coat of other animals. Persons handling these animals may breathe infected dust and so contract the disease.

Psittacosis may infect man by inhalation of faecal dust from affected birds, as already mentioned.

Tetanus, the remaining member of this group, is only indirectly transmitted by animals. The organism is a normal inhabitant in the intestinal tract of animals, and enters the soil in faecal droppings. Man is usually infected by the presence of the organism on objects causing puncture wounds. Tetanus is commoner in Queensland than in other Australian States, probably because the climate is more favourable to going barefooted.

3. *The transmission of disease from animals to man by an insect vector.*—Australia is fortunate that few diseases are transmitted in this way. In other parts of the world the number is much greater. Q fever, in addition to the routes of infection already described, may pass to man through the bite of an infected scrub tick (*Ixodes holocyclus*). The ticks are described as vectors or carriers, and become infected when biting another animal. In Queensland this is usually the bandicoot, or possibly other small native marsupials.

Queensland tick typhus is a mild disease also transmitted by tick bite and again small native animals provide a reservoir of infection.

During 1951 an outbreak of human disease occurred in the Murray River region of New South Wales and Victoria and was subsequently called Murray Valley encephalitis. It was characterised by inflammation of the brain of the sick persons, frequently resulting in death or permanent disability.

Investigation showed the disease was caused by a virus and was transmitted by certain mosquitoes.

Fortunately there have been no further outbreaks but workers have found that the disease was introduced by migrating water birds. Although affected birds were not sick, they carried the virus in their bloodstream; mosquitoes biting them became infected and were capable of carrying the disease to other birds, or to man. Domestic fowls could also be infected and presumably play a part in the transmission of the virus.

TABLE I
SOME DISEASES OF ANIMALS TRANSMISSIBLE TO MAN

—	Disease	Animal
Group 1 ..	scabby mouth erysipelas listeriosis brucellosis ? vibriosis ringworm melioidosis anthrax Q fever	sheep pigs, sheep sheep cattle, pigs cattle cattle, cats, dogs sheep, pigs, goats most animals sheep, cattle, goats
Group 2A ..	anthrax leptospirosis Q fever	most animals cattle, pigs, rats, native animals sheep
Group 2B ..	tetanus psittacosis tuberculosis brucellosis vibriosis Q fever salmonellosis	birds cattle cattle cattle cattle most animals and birds
Group 3 ..	Q fever Queensland tick typhus Murray Valley encephalitis	native animals native animals birds

Prevention

Animal quarantine regulations play an important part in the control of the zoonoses. Diseases not occurring in Australia may be kept out by prohibiting or restricting the import of certain animals. For example, rabies, a disease passing from dog to man, is prevented from entering Australia by banning importation of dogs from areas where the disease occurs.

Where disease is already established in Australia, there are several ways to limit infection in animals and to prevent infection of man. The disease may be controlled or limited in its animal host, animal products may be

sterilized before human use, and man may be immunised to minimise the risk of his infection.

The most obvious approach is elimination of the disease in susceptible animals. As an extreme measure, affected animals may be slaughtered, a procedure that has no counterpart in human medicine. A good example is the success in some countries of the test and slaughter programme for the elimination of bovine tuberculosis. A notable decline in the number of reactions has occurred and control of the disease by this means is possible, much sooner than pulmonary tuberculosis can be eliminated in man.

On the other hand, eradication of a disease with a reservoir of infection in wild animals or birds is much more difficult. Here, control of vectors passing the disease to man must be attempted and if possible persons at risk may be immunised.

Immunisation is also very important in the prevention of tetanus in man. It is done by injections of toxoid and gives immunity for several years. Such immunisation should be distinguished from the temporary protection lasting

only a few weeks given by an injection of anti-serum. Tetanus antiserum is only used following a puncture wound in a person who has not been immunised with toxoid.

In certain diseases where infection in animals may be difficult to detect, man may be effectively protected by breaking a link in the chain of circumstances leading to his contact with the organism. For example, the pasteurisation of egg products destroys bacteria of the genus *Salmonella* that may be present. However, such methods of control should only be temporary measures, for the pool of infection still remains in the host animal, where it continues to cause economic losses.

With disease control, one most important factor is the co-operation of animal owners, for without this, no programme can be effective. The prevention and control of all animal diseases is first and foremost of greatest benefit to the stock-owner, not only for public health reasons but for his own financial gain.

(Concluded)

Junior Farmers at Gatton



Junior Farmers Visiting the Queensland Agricultural High School and College at Lawes Have a Close Look at Pasture Grasses and Clovers from the College's Irrigated Pastures.

Removing Honeycombs From The Hive

By C. ROFF, Adviser in Apiculture

Apiarists have a choice of three methods commonly used for removing honeycombs from the beehive.

These methods are described:

Shake and Brush

Honeycombs ready for extraction may be removed from the colony by a slight upward movement of the frame, followed by a quick reversal and downward shake to dislodge most of the bees; the remaining bees then are brushed off with a specially designed bee-brush. Frames free of bees are placed in empty supers on a barrow, and when sufficient have been removed are taken to the honeyhouse for extraction.

Carbolic Acid Gas

An efficient method using carbolic acid for removal of complete supers containing 8 or 9 honeycombs has been adopted by Queensland commercial apiarists to avoid separate handling of each frame. In this method the cover of the

hive is replaced by an "acid board" impregnated with carbolic acid. Heat from the colony and the sun volatilises the acid and the resultant vapour forces bees to leave the super immediately beneath the acid board.

Acid boards are made from flat galvanised iron painted black to improve solar heat absorption and are cut to fit light wooden rims the size of the tops of hives. Absorbent material such as light towelling is fastened on the underside for impregnation with liquid carbolic acid. The towelling is stretched and tacked to the wooden frames, so as to allow for a space of $\frac{3}{4}$ in. above the top bars of the honeycombs. As most fabrics sag, strands of case wire or wire-netting may be used to support the towelling. The completed acid boards must fit snugly on the tops of the hives.

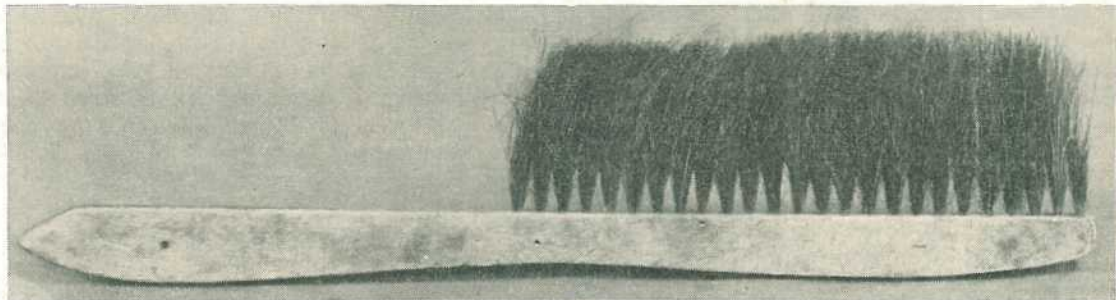


Plate 1
Bee Brush.

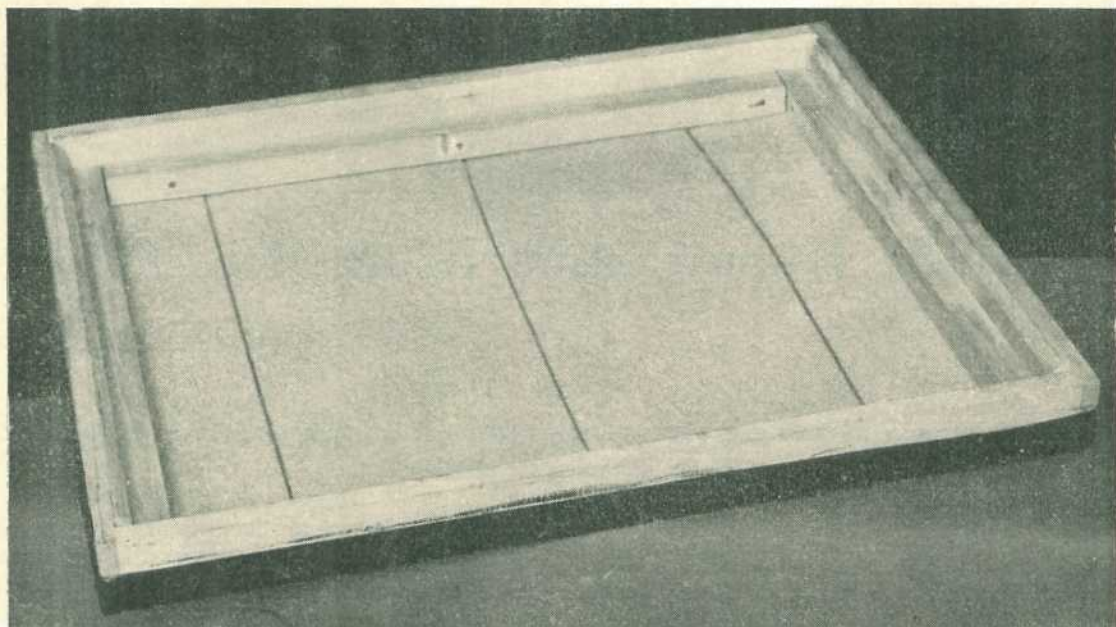


Plate 2

Carbolitic Acid Board.

Liquid carbolitic acid is prepared by dissolving carbolitic acid crystals (phenol, B.P. standard) in four parts by volume of water. Gentle heating on a waterbath will hasten solution. *Remember carbolitic acid must be handled carefully as it is strongly corrosive and severely burns human skin. Remedial measures are methylated spirits applied immediately, or thorough washing with soap and water.*

The acid boards are prepared for use by shaking liquid carbolitic acid onto the towelling from a bottle fitted with a household laundry clothes sprinkler. The towelling must be wetted thoroughly but the acid must not drip onto the honeycombs as tainting will occur. Tainting has not been caused by carbolitic acid as a vapour.

When ready for use, acid boards are placed with the cloth side down over hives from which the covers have been removed. Under summer conditions, the bees leave the honey supers immediately beneath in about 5 min., after which the top super can be removed and the acid board placed over the next super of the colony or onto

another hive. In summer during cool weather or when the sun is clouded, acid boards work slowly but effectively; in winter, however, unless warm weather prevails, this method is unsatisfactory.

The number of acid boards in use at any one time depends on the rapidity with which the bees are repelled; in large apiaries 5 to 10 boards may be found satisfactory. The number used should be sufficient to allow the operator to take away honey supers in a steady flow. The boards, however, should not be left in position too long as the bees may then leave the hives and crowd the entrances. Under such circumstances, or if the bees fly in abnormal numbers, the boards must be removed immediately. Once disturbed flight is excessive, bees of different colonies unite in the air, queenbees leave the hives and are lost, and drifting becomes general.

Bees do not move readily from brood combs, and the use of queen excluders to keep the brood-nest in the bottom super, facilitates the removal of honeycombs with carbolitic acid.

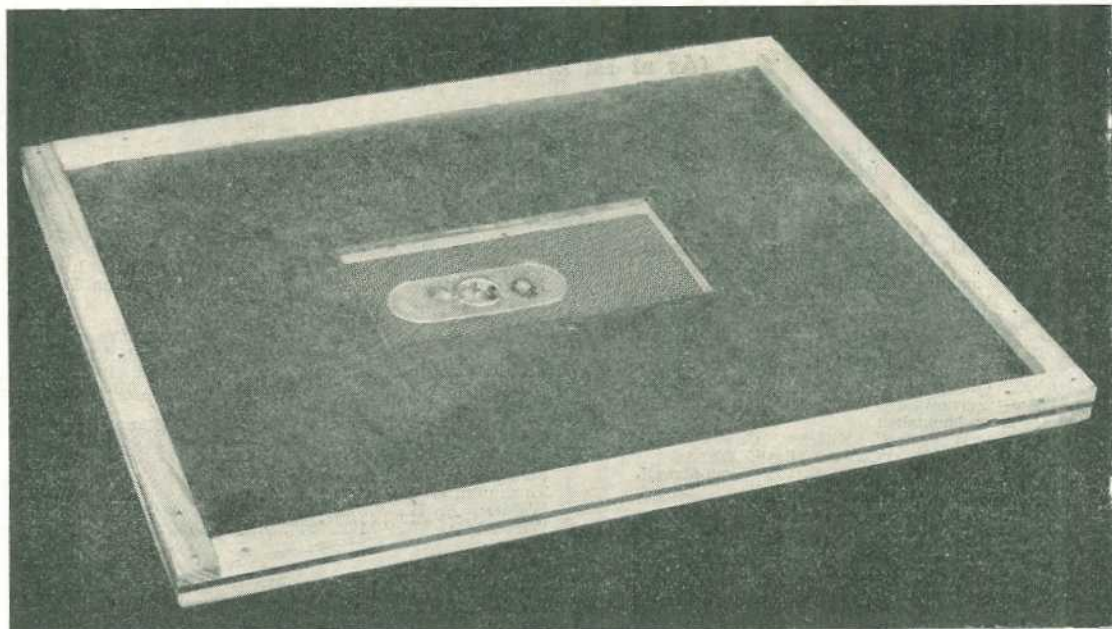


Plate 3

Clearer Board.

Clearer Board

Clearer boards exclude bees from honey supers and when a board is used in each hive, mass removal of honeycombs can be effected quickly.

The usual practice is to make clearer boards from water-resistant woodply or hardboard cut to the size of the tops of hives. A bee escape set in wire gauze is located in the centre of each board and narrow external wood rims are fitted. The escapes allow bees to move downwards, but prevent return.

During mid-afternoon, clearer boards are placed in the colonies between the brood-nests and supers. The following morning most of the bees are below the clearer boards and the supers can be removed. Occasionally it may be necessary to shake a few remaining bees from the honeycombs.

During hot weather the boards must not be left in place for longer than necessary as the absence of bees in the supers disrupts normal controlled hive temperatures resulting in the collapse and melting of honeycombs.

Keep Milk Free From Sediment

Beat the dust problem and you've taken a big step towards keeping your dairy produce free from sediment. Sediment is often a serious defect in milk and sometimes leads to its rejection at the factory. The sediment usually found in milk consists of dust and cow hairs. You can keep down the dust nuisance by providing concrete holding yards and races. Manure should be removed after each milking and

heaped at least 150 ft. from the milking shed. A 30 ft. stock-free area should be enclosed around the milk room. Washing the udder before milking removes dirt and loose hairs that might otherwise be drawn into the milk. Use of cotton wool filter wads in the milk strainer will remove much of the sediment. But by then it may have introduced bacteria into the milk. It's safer to keep the sediment out.

—L. T. FOSSEY, Dairy Officer.

Tuberculosis-Free Cattle Herds

(As at 1st March, 1960)

Aberdeen Angus

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

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

A.I.S.

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

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

Ayrshire

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

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

Friesian

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

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

Guernsey

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

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

Jersey

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

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

Poll Hereford

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

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

Poll Shorthorn

Leonard, W. & Sons, Welltown, Goondiwindi

Dealing With Seasonal Decline In Milk On Atherton Tableland

By LORNA G. LIGHTBODY,
Dairy Technologist, and
A. J. W. MURRAY,
Senior Dairy Adviser

The seasonal decline in milk composition and production on the Atherton Tableland is due to the low nutritional level of pastures in the dry period of the year. Additional fodder must be provided at this period. The results obtained with two commercial herds show how the problem can be solved successfully.

IT has been frequently pointed out that there is a characteristic seasonal decline in milk composition in dairying districts of Queensland, coinciding with a fall in the nutritive value of pastures. On the Atherton Tableland, the period when pastures are at their poorest is during the months of September, October, and November. The condition of pastures in the dry season becomes steadily worse until the summer rains begin in December or January.

During this dry season, the bulk milk supply from many farms contains less than the legal minimum of 3.3 per cent. fat. The fact that the factories on the Tableland introduced the policy of penalising suppliers whose milk did not conform to this standard brought the problem before the farmers. In addition, milk production at this time is low, and factories find it hard to get sufficient supplies for market needs.

Results from Five Farms

To get some detailed figures of these trends, sampling of milk from five selected farms in the Malanda district has been carried out regularly. The results obtained have been considered in relation to grazing and feeding practices on the farms.

The samples taken were from a mixture of the night's and morning's milk supply from each farm. Thus a sample of the 24-hour production from each herd was obtained. These samples were tested in the Dairy Research Laboratory for fat and solids-not-fat percentages.

The farmers taking part in the survey have co-operated by providing detailed information of pastures grazed, the condition of pastures, supplementary feeding, and the number of cows being milked. All the herds sampled were of A.I.S. cows.



Plate 1

First Year Guinea Grass on New Scrub Burn, Malanda Area. A man is wearing that hat.

Feeding Practices

The feeding practices on these five commercial dairy farms will be discussed. Three of these farms rely on natural grasses only, although on one farm, pastures have been improved by fertilizer treatment. The other two farms have small areas of irrigated pastures, and have used other supplementary feeding during the dry season.

Farm A has pastures consisting mainly of molasses grass with a smaller area of paspalum. A few acres along the creek flat are irrigated during the dry season. These pastures comprise guinea, green panic and elephant grasses, with a small area of para grass. The green panic and guinea grass pastures are grown in association with *glycine javanica* and centro legumes.

A glycine seed multiplication plot is established to provide supplies of this legume seed for sowing with improved pastures under irrigation.

The total acreage under irrigation is 6 acres. The irrigated pasture on this farm was top-dressed with sulphate of ammonia at the beginning of September and irrigation commenced from this time. The first grazing of these areas was at the beginning of October.

The irrigated pastures are strip-grazed, using an electric fence. About $\frac{1}{3}$ acre is grazed each night by the herd of approximately 30 cows. Irrigated pastures were found to be really effective for only 3 months with the one application of sulphate of ammonia.

A small area of oats and field pea was strip-grazed in July and August. In this case the herd was confined to $\frac{1}{2}$ acre each night. At the first grazing, the cows scarcely touched the field pea, but at later grazings the pea was eaten to the ground.

In 1958, before the irrigated pastures were used, maize offal was bought and fed to the herd. This purchased fodder was relatively expensive, and the same result could be obtained by having silage available to supply some additional feeding in the winter before irrigated pastures are used.

Farm B has pastures mainly of paspalum but some paddocks contain molasses grass, kikuyu, green panic and guinea. Paddocks which were noticed by the farmer to be particularly good contained mixtures of kikuyu, molasses grass and green panic. A small area of approximately 10 acres on this farm is also put under irrigation during the dry season, and these paddocks contained green panic and sweet sudan.

On this farm, the irrigated pasture has been grazed from August to December, but only for one or two hours each day. The areas have been strip-grazed.

As additional feeding from August to December, herd B received hammermill corn at the rate of 2 lb. a cow a day. This corn was grown on the farm and no fodder was bought.

Farm C is in an area where soil and climatic conditions are similar to those on farms A and B. The herd on this farm is grazed on natural pastures only. These comprise mainly paspalum and narrow-leafed carpet grass (*axonopus affinis*). On the river flats, there are small amounts of clover and para grass.

No supplementary feeding was given to the cows, with the exception of a short period from the third week in November. At this time, lucerne hay, which had been railed to the Tableland from the south was fed for four weeks. The consumption rate was 4½ lb. a cow a day. For two weeks at the end of November, maize meal was fed at the rate of 3 lb. a cow a day.

Farms D and E are situated in an area where rainfall is higher than in the case of the three previous farms. The pastures on farm D are mainly kikuyu and some paspalum and sour grass (*paspalum conjugatum*). In addition, two paddocks contain about 50 per cent. molasses grass.

The paddocks used mainly for the milking cows have been top-dressed regularly throughout the past two years with superphosphate, muriate of potash and lime.

Farm E has pastures composed mainly of paspalum and kikuyu mixtures with some sour grass and narrow-leafed carpet grass.

During the months of August to November, a small area of elephant grass was cut and fed to the cows after chaffing.

In the middle of November, lucerne hay similar to that fed on Farm C was bought. This additional fodder was used until the end of December.

Milk Composition

The monthly averages of fat tests on all samples taken during the year March, 1958, to February, 1959, were recorded. For purposes of comparison the average results of tests on samples of pasteurised milk from Malanda factory were also taken. These results are the averages of tests on about 24 samples monthly and therefore give an indication of the average fat percentage of milk supplies throughout the district.

It was shown that the fat percentage of the bulk milk is about 4.0 or higher till June, but after this time the level falls gradually to 3.6 in October to December. In January the test rises again to 3.9.

A similar trend is seen in the results from individual farms. However, in the case of herds C, D and E, the fat percentages are lower in the latter part of the year. Several results from these herds were below the legal standard of 3.3, and the average fat percentages for herd C in November, and herd E in November and December were below this standard.

The results for herds A and B remained above the standard for the whole year. Before the introduction of better feeding practices, mainly achieved by the use of irrigation on improved pasture species, considerable difficulty was experienced regularly in maintaining the fat percentage of bulk milk from herd A above the legal minimum in the dry period.

The results of the solids-not-fat tests were recorded. As in the case of the fat percentages, the average results of tests each month on pasteurised milk were included. The solids-not-fat content of the milk is dependent upon the protein uptake. It therefore gives a good indication of the nutritional value of the feed. There is also a definite seasonal trend in the results

of the solids-not-fat tests on samples from all five farms and the general factory supplies. During the first few months, the results from all farms were high. However, the average solids-not-fat percentage for the months of September, October and November was 8.4. This shows the generally low standard of nutrition of the cows of the district during this period. It is obvious that on many farms cows were receiving even much below maintenance rations. The results for herds C, D and E were particularly low for several months, all being below the legal standard of 8.5. On the other hand, the results for farms A and B remained at a satisfactory level at all times and there was little variation between the level of solids-not-fat in the March-May period and September-November period.

Although it may be claimed that the dry season was particularly severe in 1958, the solids-not-fat percentages in the preceding years were similarly very low. This problem of providing adequate nutrition for cows in this period is therefore an annual one. Every year, grazing

from non-irrigated pastures must be supplemented in some way so that milk composition is maintained at a satisfactory level. The farmer has to find the most convenient and most economical way to provide this additional fodder.

Milk Production

In addition to the marked effect on milk composition, the decline in the nutritional value of pastures has a very marked effect on production.

All farms which were included in this survey are primarily milk suppliers. The amounts of milk produced on the occasion of each test were recorded and from these figures the average production for each cow calculated.

Production figures for herds A and B are high throughout the 12 months. These good averages in October and November for herd B were obtained in spite of a severe outbreak of winter dysentery at the beginning of October.



Plate 2

Ideal Molasses—Kikuyu Pasture Near Millaa Millaa. Mixed pastures respond better to seasonal conditions.

In the results from farm A, small boosts in production were noticed whenever green forage crops such as fresh sweet sudan, green panic and legume, oats and field pea, or green para grass, was available during the preceding two days. There were marked daily fluctuations in production depending on the grazing, and generally there was good agreement between the figures obtained and the farmer's assessment of the quality of the pasture.

In the case of farm B, there appeared to be significant rises in production when certain good paddocks were grazed. It was also significant that there was a drop in production whenever paspalum grazing only was available to this herd.

The production from herds C and E declined steadily from July to November. The sudden increase in production in December was due largely to the provision of high quality lucerne hay and some other additional feeding. This lucerne hay was obtained from the south because of the extremely dry conditions and sold to the farmers at a relatively cheap figure because of freight rebates. In most seasons such a supply of cheaper fodder is not available. The rise in production when adequate feed was provided was spectacular and emphasises the loss in production from these herds because of the poor quality of feed available in September, October and November.

On farm D, considerable effort has been expended in applying top-dressing to pastures. However, the natural pastures only have been utilized and the results show that milk composition and production have still declined in the dry season. The production trends are related solely to rainfall for the area.

On farm E, a small quantity of elephant grass grown on the farm has been chaffed and fed to the cows in the dry months. However, this small amount of additional fodder was not sufficient to compensate for the poor quality of the pastures at this time.

Nutritional Deficiency

Summing up the results the problem is one of a general nutritional deficiency rather than of a low fat percentage which could be due to an unbalanced ration. Extra feeding is essential for part of the year, and the farmer has to consider the most economical way of providing this fodder.

Milk of satisfactory legal composition must be supplied. However, results show that when the cows are adequately fed so that milk of good compositional quality is produced, the amount of milk production during the dry season is maintained at a higher level. In this way the farmer benefits by better returns from the factory.

This period of generally low milk production coincides with the period of greatest milk sales for the year in this area of the State. The expansion of markets depends on the availability of more milk at this time. The farmer who feeds adequately, and keeps production up has the additional benefit of being able to sell all milk produced.

He thus gets better returns for the amount produced than at other periods of the year when portion of the production would have to be sold as cream.

With greater emphasis now being placed on milk production, the level of butterfat in the milk is not of such importance, provided it is always above the minimum legal standard. There has been a gradual change-over to breeds giving greater gallonage and lower fat level. Consequently, with such breeds of cows, the fat percentage will fall below standard more easily.

In all milk-producing areas of the State, the trend is towards the use of dairy refrigerators and the supply of night's and morning's milk. This will counteract a low fat percentage in morning's milk due to uneven milking intervals.

Good Feed In Dry Seasons

The seasonal decline in milk composition and production can be overcome if good feed is available to the herd in the dry season. It is not necessary to resort to heavy and costly supplementary feeding.

The advantage of irrigated pasture cannot be stressed too much. A relatively small area of fresh green pasture of good quality can maintain milk composition and production at satisfactory levels. Stands of lucerne, sweet sudan, green panic and guinea grass have been used successfully under irrigation.

The nutritional value of pasture grasses is improved when they are grown in association with legumes.



Plate 3

Sweet Sudan Irrigated Pasture. Maximum benefit is obtained by strip-grazing.

Strip-grazing allows the best use of the pasture available.

It is necessary to start irrigating early enough to maintain pasture growth. Maximum benefit from irrigation cannot be obtained when watering is commenced during advanced stages of drought.

Home-grown fodder conserved is the cheapest fodder other than pastures, and fodder can be conserved conveniently as silage. Even if irrigated pasture is available, some additional source of extra feed is needed when pastures start to decline before the irrigated pasture is grazed.

Silage can fill this need.

Additional feeding should be provided as soon as pastures start to deteriorate. Cows fed before losing condition will maintain a good level of production and will respond immediately to natural pastures when fresh grass comes again.

It is wise management to provide additional feed for cows before calving. Cows calving in good condition will respond with higher production of better composition milk.

The availability of a variety of different pastures or fodder crops provides good grazing over a greater period. Pastures which are frequently composed mainly of one species cannot provide adequate nutrition for the whole year.

Although natural pastures can be improved by top-dressing, this treatment of paddocks alone will not overcome the seasonal decline in milk composition. Additional feeding must also be provided.

The farmer who feeds his herd so as to maintain milk composition will benefit by increased milk production, which can be sold for the liquid milk trade during the period of shortage of supplies.

Orchard and Garden

Downy Mildew of Pumpkin and Marrow.—The unusually moist weather conditions which were experienced last spring led to a greater than usual incidence of downy mildew disease in the south-eastern districts of Queensland. Pumpkin and marrow growers should take the warning that extra precautions to cope with the disease may have to be taken.

Powdery mildew is the usual trouble with these crops for which sulphur dust is used. However, if downy mildew is present, then a zineb dust should also be applied regularly.

Downy mildew causes the older leaves to wither and die. If it is present, a close examination of the undersides of the leaves will reveal small water-soaked spots about $\frac{1}{8}$ in. across, perhaps with a brownish centre. In severe cases these spots may be less than $\frac{1}{8}$ in. apart, and are therefore very numerous. It is a trouble of which few growers seem to be aware.

—J. C. JOHNSON, *Plant Pathologist.*

Tomato Seedlings for Transplanting.—Success of a tomato crop is influenced greatly by the quality of the seedlings the grower transplants. Seedlings must be able to withstand the shock of transplanting and start making new growth after the shortest possible delay.

Raising these vigorous seedlings calls for special care and attention. The seedbed should be in a warm, open position. Shade causes uneven germination and irregular growth.

The soil should be worked deeply to improve its internal drainage and to get a uniform tilth on the surface. Without a fine, even tilth, at the surface, it's difficult to sow the seed at a uniform

depth. Poor growth of the young plants can often be traced to an insufficient supply of phosphate. To avoid trouble, apply a handful of superphosphate to each square yard of the seedbed.

—K. FISHER-WEBSTER,
Senior Horticulture Adviser.

Marketing Summer Carrots.—During the last 20 years or so, we have witnessed an increased demand for carrots as a summer salad vegetable. Grated raw carrot served in combination salads is a popular choice for summer meals.

However, carrots marketed for this purpose, whether bunched, bagged or crated, should measure up to high standards as regards visual appeal and texture. Many growers are experienced enough to overcome production hazards but fail to realise the importance of marketing their produce in such a way that it appeals to prospective buyers. These growers are encouraged to wash and dry the carrots, grade them to relatively even size, and reject all specimens which are misshapen or show symptoms of nematode infestations or other ugly blemishes. Too many growers market carrots of mixed sizes and odd shapes. These do not appeal to the salad buyer and should be rejected during grading.

There are two grade standards for carrots: No. 1 and No. 2. Only the best quality should be included in the No. 1 grade, and they should be not less than 4 in. in length and $1\frac{1}{2}$ in. in diameter. No. 2 grade may include those which are smaller and less attractive. The minimum size for these is 3 in. in length and 1 in. in diameter. Bags should be clearly marked to indicate the grade in each instance.

—C. M. APPS, *Market Inspector.*

Grafted Passion Vines.—The development of grafted passion vines has given a big boost to passionfruit plantings on farms and in home gardens.

These vines are grafted onto a variety of rootstocks which are resistant to the serious disease, Fusarium wilt. They are, however, just as susceptible as seedling plants to other serious pests and diseases.

Officers of the Department of Agriculture and Stock report that many inquiries have been received from farmers and gardeners about damage caused by fruit fly, woodiness virus and brown spot.

Many people apparently expect their grafted vines to be resistant to all major pests and diseases. This is not the case, and suitable precautions must still be taken to avoid losses.

Annual pruning is necessary. Regular spraying with a zineb or copper fungicide must be carried out during the warmer months to control brown spot. Regular spraying with 0.2 per cent. DDT will combat fruit fly when this pest is active. Pests such as red scale and mites must also be controlled by spraying when necessary.

It is essential to plant grafted passion vines to avoid Fusarium wilt. It is just as important to carry out routine pest and disease control practices to ensure a good, healthy crop.

Fertilizer Injury to Bean Seed.—Big areas of beans will be planted from February to June in Queensland coastal districts from the border right up to Cairns.

The bean crop is important and the plant has its troubles in the way of diseases, pests and climatic upsets. Enough hazards without adding fertilizer injury to the list. What is this injury? Usually, it's known as fertilizer "burn" and is caused by fertilizer coming into contact with the seed. The actual burn or injury results when fertilizer salt concentrations near the roots withdraw water from the plants. Symptoms range from partial or total loss of leaves to loss of the whole plant.

Poor germination, inferior seed, and other causes are sometimes blamed for patchy stands with numerous misses. Often, however, they are due purely to faulty fertilizer placement and resultant burn.

And the remedy is simple and in your own hands.

When the seed is sown, there should be a protective layer of soil—about 2 in.—above the fertilizer band in the drill. First open up the drill to 7 or 8 in., place the fertilizer then cover this with 2 in. of soil, and you are ready to sow.

A mechanical planter will place the fertilizer and sow the seed in one operation. Make sure, however, that depth adjustments are adequate, and that fertilizer and seeds run freely.

—D. DOWLES, *Adviser in Horticulture.*



Flower Colour

Some gardeners imagine that flower colour is influenced by fertilization or by climatic factors, but actually their effects are generally small. Flowers produced in full sun may appear slightly bleached or faded in comparison with those grown under light shade. Flowers produced at cool temperatures are often deeper coloured than when the temperature is higher. Likewise, foliage on evergreens growing in full sun is lighter in colour than when growing in partial shade.

However, hydrangeas, in which the colour of the flower is variable, depend to a considerable degree upon the soil reaction. In the presence of lime with ample amounts of nitrogen and phosphorus the flowers are a clear pink. Under more acid conditions the flowers range from mauve to blue due to the presence of more available aluminium. It is thus possible to vary the flower colour at will by the use of soil alkalising or acidifying materials.



Winners in the 1960 Wool Awards. At left are brilliant red wool swimming togs, modelled with an outsize beach bag; at right, the two special award winning entries.

New Process Makes Wool Non-Shrinkable

From Eleanor Knox, Australian Wool Bureau

A new process which guarantees total non-shrinkage of knitted woollen garments in normal washing looks set fair to bring a big expansion in the use of wool as opposed to synthetic fibres.

For with it, wool has taken over command in the last stronghold of the market previously the exclusive corner of synthetics—completely safe washability with no shrinkage and no loss of texture smoothness unconditionally guaranteed.

This new process is a feather in Australia's cap, for it has been developed by two Australian firms, with co-operation from a Swiss chemical firm.

The lengthy process which makes knitted garments for men, women and boys completely wash-safe has nine phases which have been evolved and perfected during 18 months' of intensive research which has cost one firm alone some £50,000.

Briefly, the process which brings to the consumer a knitted garment which may be tossed in the washing machine with impunity is as follows:

One—The wool yarn is knitted into lengths.

Two—It is put through a drying machine developed by one of the firms to take all the moisture content out of the fabric.

Three—It is passed into refrigerating chambers to bring back into it a controlled moisture content which can have a variation tolerance of .05 per cent. only.

Four—It goes into autoclaves and has a dry chlorination gas put right through it.

Five—It passes into a liquid bath which removes all chlorination and all impurities which might be in the fabric.

Six—It goes through a bath which contains a special softening agent which is exclusive to the process.

Seven—It is moved to a hydro extractor which extracts loose moisture.

Eight—The fabric goes to drying machines.

Nine—It goes through a controlled press which produces a relaxed fabric non-stretchable in any direction.

Now, and at last, the fabric is ready for making up into the garments which are not only tossable into a washing machine, but have a softer and silkier texture than those which have not been shrink-proofed by this new and revolutionary process.

And garments which will retail in most instances at a lower cost than their synthetic rivals.

Which looks like making wool a winner all the way at long last.

For now, with this new process, it not only has all the washing qualities and non-shrink qualities of its synthetic sister, AND a lower retail pricing, but still has all its own peculiar attributes that no synthetic, however good, can acquire. . . its warmth, its breathing qualities, and its longer wearing qualities.

It is hard to assess accurately the longer wearing quality of wool as opposed to synthetics, but it is estimated that it must be at least 10 times greater now that this new Australian process has been evolved which permits perfect washing of woollens with no change in size or texture.

This estimate is based on the fact that, with constant wearing, a synthetic garment calls for washing 10 times as often as a pure woollen one.



Flowers In Winter

At this time of year we become almost squirrel-like in our endeavours to provide for the less abundant seasons, preserving fruit and vegetables, and making jams and sauces. Nonetheless we think of flowers and decorations.

One of the simplest and effective ways of preserving flowers is with borax. Flat flowers and those of open face variety preserve very well, that is zinnias, daisies, and so on.

Choose a strong cardboard box and cover the bottom with about an inch of borax. Place the blooms face down into the box and sprinkle borax round and between the petals until they are well covered. Leave for three weeks.

You could leave them until ready to use, but as the borax can be used many times the preserved blooms can now be transferred to another box until required.

When removing them, be careful not to break them as the petals become quite brittle. Surplus borax can be removed with a light brushing with a small paint brush. A more workable stem can be fixed with green pipe cleaners or florists' wire.

Another method of preserving is pressing between newspapers. Use flat, moisture-loving leaves and ferns. Spread out between newspapers and then press under heavy books or under a carpet. After a few weeks they will be quite dried and preserved and their colour retained.

More About Bookkeeping

by J. PARK, State Organiser, Junior Farmers

The "expenditure" side of the cash book will be written up from the cheque butts, and the total should agree with total debits shown in the bank statement. Note these examples taken from the "expenditure" side of the cash book.

Date	Particulars	Cheque No.	Date Approved	Amount	Total
1960				£ s. d.	£ s. d.
Feb. 2	Head office : 10 membership fees	596	1-2-60	2 10 0	
Feb. 3	B. Jones : Catering for dance	597	1-2-60	3 0 0	
Feb. 3	Hall committee : Hall hire	598	1-2-60	1 0 0	

Note that only the last three numbers of the cheque are used.

In the "date approved" column, the date of the meeting at which each payment is approved is inserted. Make certain that each payment is approved by a properly constituted meeting of the club, and that the names of the mover and the seconder of such approval are written in the minutes of the meeting.

A receipt must be obtained for every payment made.

At the end of the financial year when the "amounts" column is ruled off, make sure that bank charges, for example, exchange, cheque book, and so on, are also written up in the cash book.

Note carefully the way in which the cash book is "ruled off" at the end of the financial year. To obtain the surplus or deficit for the year, the amount shown in the "total" column on the "expenditure" side is carried across to the "receipts" side and deducted from the total shown in the "banked" column.

CASH BOOK

RECEIPTS

EXPENDITURE

Date	Particulars	Receipt No.	Amount	Banked	Date	Particulars	Cheque No.	Date Approv.	Amount	Total
1960			£ s. d.	£ s. d.	1960			1960	£ s. d.	£ s. d.
Feb. 5	Membership Fee— W. Brown	042	5 0		Feb. 2	Head Office—Fees ..	596	1-2-60	2 10 0	
Feb. 6	Donation— S. Smith and Son ..	043	2 2 0		Feb. 3	B. Jones	597	1-2-60	3 0 0	
Feb. 7	Gross Proceeds— Annual Dance ..	044	15 4 6		Feb. 3	Hall Committee— Hire of Hall ..	598	1-2-60	1 0 0	
Mar. 3	Membership Fee ..		5 0	17 11 6		Cheque Book ..			5 0	
	Bank Interest ..			2 6		Exchange			1 6	
Mar. 31	Total Receipts ..			17 19 0						6 16 0
	Deduct Expenditure ..			6 16 6						
	Surplus for year ending 31st March, 1960 ..			£11 2 6						

The "net receipts" figure of £11 2s. 6d. should be "agreed" with the bank balance as at that date in the following manner:—

"RECONCILIATION"

Cash Book Balance	£ s. d.
Deduct cash not yet Banked	11 2 6
	5 0
	<u>10 17 6</u>
Add cheques drawn but not yet presented at Bank No. 598	1 0 0
Bank Balance as per Bank Statement	<u>11 17 6</u>

When the books have been ruled off as shown, the treasurer will prepare a statement or report for submission to the annual meeting.

RECEIPTS.

Membership fees	£ s. d.
Donations	0 10 0
Gross Proceeds of dances	2 2 0
Interest	15 4 6
	0 2 6
	<u>£17 19 0</u>

EXPENDITURE.

Head Office—Membership fees ..	s. d.	£ s. d.
Dance Expenses—Catering £3, Hall Hire £1		2 10 0
Bank charges— Cheque book		4 0 0
Exchange		5 0
		1 6
		0 6 6
Net receipts for year		<u>11 2 6</u>
		<u>£17 19 0</u>

Each item of income and outgo has been grouped under certain broad headings, such as "membership fees," "donations," "dance expenses."

At the foot of the treasurer's statement there should be a certificate signed by the club auditor reading—

"I certify that I have examined the books and vouchers of the Junior Farmers' Club and found them properly kept and the above statement is a true extract therefrom.

Signed:

Hon. Auditor."

A similar statement (without the auditor's certificate), covering the preceding month, should be prepared and presented by the treasurer at each regular monthly meeting.

In addition to the statement of receipts and expenditure presented to the annual meeting, the treasurer should prepare a balance sheet for presentation to this meeting on the following lines:—

BALANCE SHEET

(As at 31st March, 1960)

LIABILITIES					ASSETS									
					£	s.	d.							
					£	s.	d.							
Sundry Creditors—								Cash at Bank (as shown by cash book) ..	11	2	6			
(C.W.A. Hire of meeting Hall not yet paid)					1	0	0	Club Library (at cost)	2	0	0			
Total liabilities					1	0	0	Subscriptions due (but not yet paid by members	1	0	0			
Surplus					13	2	6							
					£14	2	6					£14	2	6



Use Electric Mowers With Care

Accidents with electric lawnmowers should never happen. Yet they sometimes do, and investigations have shown that they are usually due to work or repairs done by an amateur electrician, or lack of care.

When using an electric lawnmower it is essential to use it so that there is no chance of its cutting the lead. Should this happen, however, then commonsense dictates turning off the power and pulling out the plug before touching the mower.

If this is not done, then the user is likely to receive an electric shock from any damp or metal part of the mower, which would become "live" after the breaking of the lead.

For the same reason the power should always be turned off and the plug removed before carrying out any inspection of the machine after a sudden stoppage.

The flexible lead should never be coiled around the shoulder, but allowed to trail on the grass, and the mower should be used only from a power outlet which is effectively earthed. A check by an electrician or the local supply authority will dispel any doubts on this point.

It is as dangerous to use a damaged or perished lead, or one with an improvised joint, as it is to use a mower connected to a lamp-holder or two-pin power outlet, which would not be earthed.

Safest kind of lead is the three-core, sheathed, flexible type, in good condition and preferably in one length. For extension leads only the approved type of cord extension socket and plug, fitted by a certificated electrician, should be used.

—State Electricity Commission.

Brucellosis-Tested Swine Herds

(As at 1st March, 1960)

Berkshire

Clarke, E. J., Mt. Alford, via Boonah
Cochrane, S., "Stanroy", Felton
Cook, F. R. J., Middle Creek, Pomona
Crawley, R. A., Rockthorpe, Linthorpe
Edwards, C. E., "Spring Valley" Stud, Kingaroy
Farm Home For Boys, Westbrook
Fletcher, A. C., "Myola" Stud, Jimbour
French, A., "Wilson Park", Pittsworth
H. M. State Farm, Numinbah
H. M. State Farm, "Palen" Stud, Palen Creek
Handley, J. L., "Meadow Vale", Lockyer
James, I. M. (Mrs.), "Kenmore" Stud, Cambooya
Kimber, E. R., Block 11, Mundubbera
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View" Stud, Yandina
Ludwig & Sons, A. R., "Beau View" Stud, Beaudesert

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

Large White

Assenbruck, C., Mundubbera
Barron Bros., "Chiltern Hill", Cooyar
Bell & Son, E. J., "Dorne", Chinchilla
Butcher, Dr. B. J. & Parnwell, A. J., Plunkett, via Tamborine
Clark, L. D., Greens Creek, Gympie
Duncan, C. P., "Hillview", Flagstone Creek
Fowler, S., "Kenstan", Pittsworth
Franke, H. J., "Delvue" Stud, Cawdor
Garwin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield
Gibbons, A. E. H., Mt. Glorious
Gibson, H., "Thistleton" Stud, Maleny
H. M. State Farm, Numinbah
Hall, M., "Milena" Stud, D'Aguilar
Heading, J. A., "Highfields", Murgon
Horton, C. J., "Mannum Brae" Stud, Mannum, Kingaroy
Hutton, G., "Grajea" Stud, Cabarlah
Jensen, S., Rosevale, via Rosewood
Jones, K. B., "Cefn" Stud, Clifton
Kahler, J. & S., East Nanang
Kanowski, A., "Exton", Pechey
Kennard, R. B., "Collar" Stud, Warwick
Larsen, H. L., "Oakway" Stud, Kingaroy

Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View", Yandina
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood
Mack, A. J., Mundubbera
Neilsen, L. R., "Sunny Hill", Ascot, via Greenmount
Neilsen, A. R., Ascot, via Greenmount
Palmer, V. P. & Son, "Remlap", Greenmont
Pampling, G., Watch Box Rd., Goomeri
Postie, R., "Yaralla" Stud, Pittsworth
Powell, R. S., "Kybong", Gympie
Q.A.H.S. & College, Lawes
Radel, V. V., Coalstoun Lakes
Radel, R. M., Coalstoun Lakes
Regional Experimental Station, Biloela
Robinson, O. R. & O. J., "Linvale", Argoon, Biloela
Skyring, G. I., "Bellwood" Stud, via Goomeri
Stanton, H. R., "Tansey" Stud, via Goomeri
Stewart, L., Mulgowie, via Laidley
Stumer, K. F., French's Creek, Boonah
Wharton, C. A., "Central Burnett" Stud, Gayndah
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah
Zahnaw, W., Rosevale, via Rosewood

Tamworth

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

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

Wessex Saddleback

Ashwell, J., "Green Hill", Felton South
Cooper, G. J., Neungua
Douglas, W., "Greylight" Stud, Goombungee
Dunlop, J. B., "Kunawyn", Acacia Rd., Kuraby
Kruger & Sons, "Greyhurst" Stud, Goombungee

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

Large Black

Pointon, E., Goomburra

Landrace

Grayson, D. G., Killarney
Neilsen, L. R., "Sunny Hill", Ascot, via Greenmount
Neilsen, A. R., Ascot, via Greenmount
Orange, L. P., "Hillview", Flagstone Creek