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DARLING DOWNS WHEATLANDS FROM GOWRIE MOUNTAIN

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Summer Maize And Winter Pasture Under Irrigation

By C. A. SCHRODER, Regional Experiment Stations Branch

Subterranean clover has been developed as a useful irrigated pasture for the autumn and winter period in the Lockyer Valley. The use of the same land in summer for production of maize, also irrigated, is discussed in this article.

Benefits from the farming plan that combines this growing of summer maize and winter pasture under irrigation are listed briefly as follows:

(1) Both crops grow in their proper seasons. In this respect they combine well and give good use of the climatic conditions. There is an overlap period in February-May when the two crops are growing in conjunction.

(2) The combination suits the stock farmer who has irrigation. It provides very nutritious grazing at low cost over a period when natural feed is normally absent. It also provides a good crop of maize for silage or grain. The maize occupies the land at a time when it would otherwise be unproductive and it does not appreciably reduce the annual grazing return from the pasture.

(3) The pasture phase improves the soil structure and fertility to the benefit of the maize.

(4) Land preparation for the maize, and the weed control practised during its early growth, remove the competition of summer volunteer species and provide a good bed for clover regeneration. The maize gives beneficial shade to the clover seedlings.

(5) There is economy of irrigation water. Permanent irrigated pastures based on white clover require approximately 30-36 in. of irrigation a year in the Lockyer Valley for maximum production. Indications are that approximately 15 to 16 in. of irrigation should be sufficient in most years for the full needs of one acre of Yarloop subterranean clover plus maize. The annual yield per acre from maize for silage plus Yarloop is of approximately the same order as that from well managed permanent irrigated pasture.

Irrigation of winter pasture affords good use in Queensland of "harvested" water (this is normally harvested in January-March) before the heat of summer when water losses and water usage are high.

The Lockyer Valley

The Lockyer Valley of South Eastern Queensland is today well known as one of the most fertile

agricultural areas in Australia. However because of climatic vagaries success in farming is very largely dependent on the use of supplementary irrigation. **Average production under rainfall conditions is of a very low order.**

The annual rainfall is approximately 29 in. Just over 20 in. of this amount fall during the six-month period October-March.

The summer rains, however, are so erratic that failure of summer crops and shortage of good pasture during summer months are frequent occurrences. For example, maize crops grown on rainfall frequently return very poor yields due to moisture stress at some stage; although isolated yields occasionally exceed 100 bus. of grain per acre, the average return is around the low figure of 20 bus. In a similar way, because of frequent periods of moisture stress, rain-grown summer pastures are often low in quantity, quality or both; and animals dependent on them give satisfactory production only in short intermittent bursts.

A further disability is that, as a result of the rainfall being summer dominant, very little natural pasture growth occurs during April to October. Through this period, animal production either ceases or goes on at a very low level unless steps are taken to provide suitable feeding supplements.

The Soils and Irrigation

Lockyer Valley soils are highly fertile.

Good supplies of irrigation water are available, especially in autumn, winter and spring.

The application of irrigation to supplement rainfall enables farmers to maintain high yields from crops and pastures.

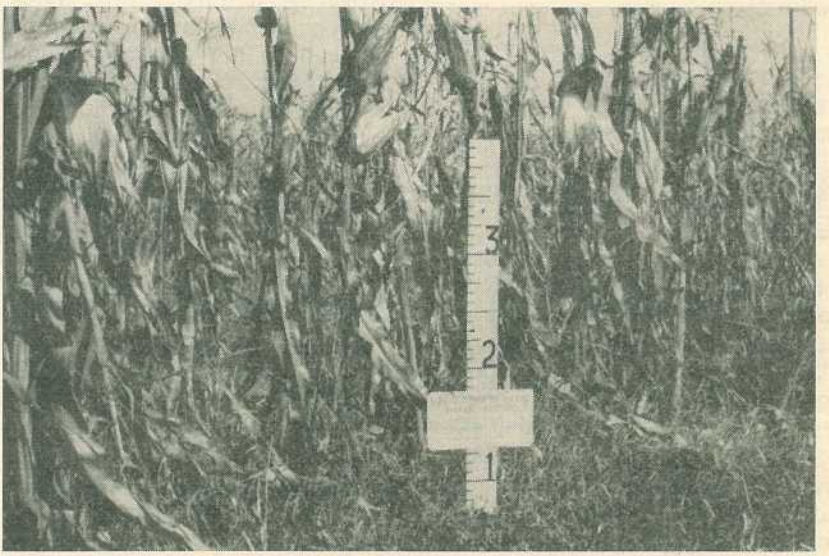


Plate 1

The 1957-58 Maize Crop Ready for Harvest on 14th May, 1958. Some maize has been pushed aside for the photo. Note the self-regenerated pasture present.

Subterranean Clover

Early strains of subterranean clover, particularly Yarloop, give good performance in the Lockyer Valley at the Gatton Regional Experiment Station when irrigation is provided to supplement rainfall.

Vigorous pasture stands occur every year from natural regeneration. Fast growth rates are recorded regularly (Yarloop makes considerably faster winter growth than does white clover) and pasture from this source normally provides five good grazings every season between early May and mid-October.

An area of Yarloop grazed one or two hours each day provides a very satisfactory source of protein in a period when it is urgently needed. Grazed in this manner, it does much to assist in maintaining a good level of production in the dairy herd during the vulnerable period of May to October.

The average seasonal irrigation requirement of such a pasture is approximately 12 in.

The Clover Area in Summer

After seeding in late October-early November, the subclover dies off and provides no further grazing until the stand re-establishes and reaches grazing condition in the following May.

Feed provided during summer in the area down to sub. is chiefly confined to the growth of volunteer species such as crowsfoot and woolly-topped Rhodes grasses, wild millet and other summer growing weeds. **The amount of feed produced is small and the quality is low.** A small return can be obtained by including a very light seeding of lucerne with the clover.

Therefore the summer period, which is actually the season of

Plate 2

A Close-Up View of the Pasture Shown in Plate 1.

Plate 3

The Same Pasture Being Grazed for the Second Time in the Season.
Taken 20-6-58.

natural growth in the Lockyer, is largely wasted in an area set aside for subterranean clover alone.

The rainfall, long days and warmth of summer add practically nothing to the farmer's income.

Experimental Results So Far

At the Gatton Regional Experiment Station an attempt is being made to obtain a good return from the land during summer, and in doing this to utilize the benefits of the rain and the warm conditions with the backing of irrigation in times of moisture stress.

An experiment is in progress to examine the possibility of producing a crop of summer maize in the subterranean clover area without appreciably reducing the normal seasonal winter grazing return from the clover.

The overall annual irrigation requirement is being kept in mind.

The trial was commenced in 1957 and encouraging results are being obtained. These are outlined briefly:

First Year (1957-58)—Maize

Following the seeding down and drying off of a Yarloop subterranean pasture (originally planted 3-7-56) in November 1957, half of the area was chisel ploughed and tine cultivated. A crop of hybrid maize for grain production was drilled in on 6-1-58. To allow better light conditions for the anticipated clover seedlings, the rather wide row spacing of 6 ft. was used for the maize. Plant spacings within the rows were reduced to give near normal population.

In the absence of rainfall, which had delayed the planting of the maize from December, a spray irrigation of 2 in. was applied for germination. Subsequent rainfall was satisfactory and no further irrigation was required during the life of the crop.

Maize Yield.—The maize was harvested for grain on 14-5-58 and yielded 53 bus. per acre. Though not high, this was approximately double the Queensland average.

First Year—Clover

Regeneration and subsequent re-establishment of the clover among the growing maize crop exceeded expectations.

Cultivation for weed control in the maize provided a good clean seed bed for the clover. Very good germination occurred during February. The growing maize provided the clover seedlings with beneficial shading from the summer sun, while the wide rows afforded sufficient light for them to develop rapidly into sturdy, fast-growing plants. As the days became shorter and the light intensity decreased during autumn, the clover benefited by the maturing and the thinning of the maize cover.

At the date the maize was harvested for grain, there was a dense sward of clover ready for grazing.

Stock were introduced for the first seasonal grazing of the clover immediately the maize was harvested.

The stand of clover growing among the maize was practically equal in every way to that in the half of the area which had been given normal summer treatment and not planted to maize. This near-equality lasted throughout the season during which five good grazings were obtained by the end of October.

Clover Yields.—The total yields of green pasture for the season were 22·94 tons to the acre in the area planted to maize and 23·51 tons to the acre in the area not planted to maize. Both yields were a little lower than average. This was largely the result of a very heavy overgrazing by sheep at the second

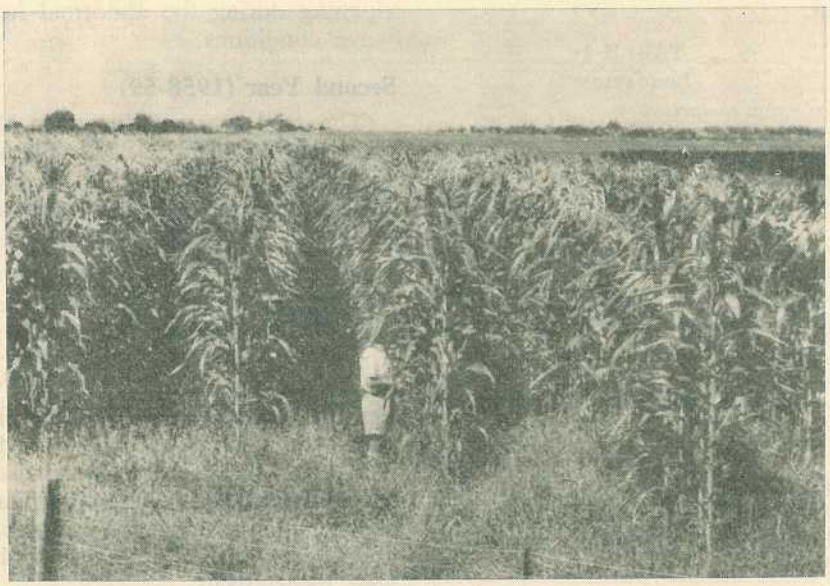


Plate 4

Six-foot Rows of Maize planted 22-12-58 After Ploughing the Area Shown in Plates 1, 2, and 3. This photo was taken 23-2-59.

Plate 5

Photo taken at time of Harvesting for Silage on 16-3-59.

period of grazing during 20–24-6-58 when every clover leaf was eaten off.

TABLE 1

IRRIGATION

Irrigation comprised :—

Maize		Pasture	
6–1–58	2·0 in.	21–5–58	2·7 in.
		11–7–58	2·3 in.
		28–7–58	1·8 in.
		1–9–58	2·5 in.
		17–10–58	2·5 in.
		29–10–58	3·4 in.
Totals	2·0 in.		15·2 in.

Combined total for both crops 17·2 in.

The clover required above average irrigation. The total of 15·2 in. was applied in six waterings. Record maximum temperatures for October were recorded in 1958 when a screen reading of 104·2 deg. F. was registered. Of the total irrigation applied, 5·9 in. were put on right at the end of the season during the last two weeks of October to ensure seed setting and ripening during the abnormal heat wave conditions.

Second Year (1958-59)

The trial was continued in the same area in 1958-59. Results for the season are available to the time the maize grain crop was harvested and yields determined.

In November 1958, the whole of the subterranean area discussed earlier was plowed 3-4 in. deep. Following discing and tining, hybrid maize was drilled in on 22-12-59. On this occasion two row widths were used, namely 4 ft. and 6 ft. The same plant spacing was used in each row width, the actual plant stands comprising approximately 15,000 and 10,000 plants to the acre respectively.

With irrigation available to prevent shortage of moisture from becoming a limiting factor in the

maize growth, it was decided to apply fertilizer with a view to increasing the maize yields. Fertilizer applications comprised—

16-1-59—Approximately 3½ cwt./acre of a mixture made up of 3 parts of a complete fertilizer mixture (10:8·25:7·5) to 1 part of sulphate of ammonia was introduced into the soil with the sodseeder.

4-2-59—2 cwt/acre sulphate of ammonia as a top dressing.

Maize Growth.—As a result of good early rains and fertilizer application, the maize made very fast early growth throughout January.

With irrigation applied as required, the maize maintained spectacular growth throughout the whole area, showing uniform, very dark green, tall stalks of large diameter and much superior to the previous year's crop.

The vigour is indicated by Plates 4 and 5 and by the yield figures given later.

Maize Yields.—Silage: On 16-3-59 half of the maize in each row width was harvested for silage with a maize binder. The actual green yields were—

	Tons per acre
From 4-ft. rows . .	21·7
From 6-ft. rows . .	15·3

When harvested for silage, the average measurements and weight per stalk in each row width were almost identical. The yields were proportionate to the number of plants per acre.

Grain.—The half of the crop not utilized for silage was allowed to mature for grain. Harvesting of this area was carried out on 3-6-59. After being harvested, the cobs were sun and air dried, the cobs were shelled and the grain weighed on 16-6-59 when the following grain yields were recorded:—

	Bush. per acre
4-ft. rows	151·5
6-ft. rows	117·1

There were practically no barren stalks. All cobs borne one per stalk were very large while quite a number of stalks carried two good cobs. The 6-ft. rows produced particularly large cobs and the grain yield per stalk was greater than in the 4-ft. rows.

The yield figures were particularly good, especially when there were some almost worthless crops (not irrigated) produced in the district on similar soils.

Clover.—The clover germinated among the growing maize in February.

Regeneration, development, and the early grazing return from the clover showed a good deal of variation in the different maize row widths and crop treatments.

With the maize stalks taller and leafier than in the previous season, more light was intercepted. The light interception was not great enough in the 6-ft. rows to seriously impede the clover development.

On the other hand, the shading in the 4-ft. rows was so heavy that the clover seedlings soon became spindly and made only slow growth. However, all plants remained alive.

In the maize area allotted for silage, the clover made an immediate response when the maize was removed on 16-3-59. While this response was quite marked in the 6-ft. row portion, it was outstanding in the 4-ft. portion. In the latter, the existing spindly, unthrifty

Plate 6

Close-Up View of Clover. Note the maize stubble from the silage harvest and the density of the Yarloop cover.

plants developed spectacularly; they quickly became sturdy and vigorous and by mid April had developed into a very satisfactory pasture. (See plate 6.)

In the maize area allotted for grain production the clover in the 6-ft. rows maintained quite good growth. In the 4-ft. maize rows, the poor spindly clover plants present when the maize was at silage stage remained alive but made practically no growth. As the maize crop matured, the thinning stand allowed an increasing amount of light to penetrate and the clover in both maize row widths responded.

The early condition of the pasture and the effect of the various maize treatments are indicated by the pasture yield determinations made when the stock were introduced for the first time of grazing on 1-5-59.

These yields were—

Maize Silage Area—

6-ft. rows, 4.72 tons per acre (green weight).

4-ft. rows, 3·18 tons per acre (green weight).

Maize Grain Area—

6-ft. rows, 2·86 tons per acre (green weight).

4-ft. rows, ·60 tons per acre (green weight).

These are discussed very briefly as follows:—

(*a*) Regeneration and early development of the clover were good in both row widths throughout the maize silage area. At this date the yield in the 6-ft. maize rows was slightly better than in the 4-ft. rows.

(*b*) Regeneration and early development of the clover in the maize grain area were not as good

as in the silage area. The stand in the 6-ft. rows must nevertheless be classed as very good and capable of giving a very good season's performance. In the 4-ft. rows, the clover yield was negligible; no early grazing was provided; however, the clover population and the condition of the individual plants were such that good grazing should be provided from approximately late July onwards.

A visual examination of the area at this time indicated—

(1) That the growth rate of the clover in both row widths in the maize silage area and in the 6-ft. row widths in the maize grain area could be expected to level out and that the total grazing for the season would show little if any reduction due to the crop of maize.

(2) That the total grazing for the season would be considerably reduced by the crop of maize for grain in the row width of 4 ft.

Pasture Regrowth after First Grazing

At the time of maize harvest on 3-6-59, the clover was almost ready for the second grazing. The condition of the pasture at this date verified the foregoing observations.

TABLE 2

IRRIGATION

Maize	Maize plus Regenerated Pasture
9–2–59 2·0 in.	4–3–59 2·0 in.
	18–3–59 2·0 in.
	10–4–59 2·0 in.
	5–5–59 1·7 in.

The combined use of irrigation total for both crops to the time of maize harvest on 3–6–59 was 9·7 in.

The rainfall for February was largely confined to 5·89 in. of storm rain during the sixteenth to the eighteenth of the month (4·88 in. on 18-2-59). March, April, May, and June registrations were well below normal every

Plate 7

Close-Up View of Yarloop Within 6-ft. Rows of Maize.

month (average 46 per cent. below). Under these conditions, four irrigations were applied between 3rd March and 5th April so that the maize could utilize the available nutrients and warm conditions.

Summing Up

In each of the first two seasons of the trial, successful maize crops were produced. With the application of fertilizer in the second year, very heavy yields of silage and grain were obtained in both row widths used.

The maize crops did not retard the date of the first grazing of the pasture nor seriously reduce total pasture production in any treatment other than where maize was grown for grain production in 4-ft. rows.

Irrigation requirements were low and economy of irrigation was effected. In 1958, the October maximum temperatures reached an all-time record yet the total irrigation applied for both crops in the year was only 17·2 in. Below normal rainfall was recorded in 1959 from mid-February to July. The total irrigation applied up to the time of harvest of the maize crop on 3-6-59 was only 9·7 in.

It is emphasized that availability of irrigation is essential. Good crops of maize are seldom obtained without irrigation being applied at some stage. Production of the types of pasture dealt with is dependent on supplementary irrigation. Their growth should not be attempted without it—any such attempt can be expected to result in failure.

Colonel Murray's Tribute

A tribute to the work of the technologists was paid by Colonel J. K. Murray in his centenary address to the Queensland branch of the Australian Institute of Agricultural Science in Brisbane. Referring to the Queensland Department of Agriculture and Stock, Colonel Murray said:

"The work of the Department of Agriculture and Stock has extended over the whole of Queensland and its hundreds of research and extension officers have contributed continuously and efficiently to the development of the agricultural industries. It would be impossible to assess the technological contributions, in all their diversity, made to rural production and its promise for the future, except to say that the present prosperity of the State would never have been reached without the Department's contributions in all the applied sciences related to agriculture and stock. Some slight measure of its achievement may lie in its introduction of some 70-odd crop plants and its programme of soil investigations, plant breeding, disease and pest control, and the orderly marketing of many of them."

Pasture and Crop

Hints on Growing Soybeans.— The soybean plant is an upright branching summer legume which has been used to provide green feed, green manure and hay, but its principal value is in the seed. It does best on friable loam soils, although satisfactory yields can be obtained from a wide range of soil types, varying from clay loams to sandy loams. Heavy clays and soils of low fertility should be avoided. Its climatic range is similar to that of maize, but particular attention needs to be paid to varieties suitable for different districts.

In the South Burnett, many varieties have been tried. Those proving most suitable for seed production are Nanda and Yelnando, and for green feed, or green manure, Gatan, Otootan, and Avoyelles. Nanda produces straw-coloured seed attractive to the trade, produces it sufficiently far above the ground to make harvesting easy, and normally shatters little. Occasionally, though, shattering may be severe. It grows to about 26 in. in height and matures in 160 days. Yelnando also produces an attractive seed high on the plant, shatters very little, averages 30 in. in height and matures in 165 days.

Shattering is a characteristic of all soybeans, and particular attention should be paid to time of harvest if losses are to be avoided.

Gatan and Otootan have a vining habit, grow up to 40 in. in diameter, reach a height of 18 in. and mature in 170 days. Avoyelles is semi-erect, free branching and matures in about 166 days. For silage, these varieties can be grown with Sudan grass or maize. Their seed is dark-coloured and not a product attractive to the human consumer, but it could be used for stock food.

So far as is known, no attempt has been made to make hay from soybeans in the South Burnett, and there has been limited experience with grazing. Interstate sources say that "soybeans do not come again after grazing," but possibly time of grazing and variety would have an effect on this. Yields up to 3 tons of hay and 12 tons of green stuff to the acre could be expected. They should be cut for hay when the pods are half formed.

In the South Burnett district, soybeans are sown for seed production at not less than 25 lb. to the acre in 36 in. rows. Narrower row spacing, down to 21 in., may be used if inter-row machinery is suitable. For green crops, up to 90 lb. of seed to the acre may be used for dense stands. The amount of seed required for 24 in. row spacing would be 40 lb., but varying with seed size.

Soybeans should not be planted too deep, not more than 2 in. on most soils and not more than 3 in. on sandy soils. A maize planter or combine is suitable for the job. More than one inter-row cultivation is seldom needed, and only limited hilling, to facilitate harvesting, is desirable.

The leaves fall off the plant as it matures, leaving the pods attached to the skeleton. Harvesting should commence before shattering occurs, using a header with reduced drum speed and open or other variations to the concave.

Yields vary with the season, but in the South Burnett have been up to 15 three bushel bags to the acre. The average would be about 6 bags.

New varieties and progenies developed in Queensland are at

present under investigation, and may soon replace some of the varieties now recommended.

Any farmer thinking of growing soybeans should ensure a market before planting extensive areas.

—D. R. EVANS,
Agriculture Branch.

Sweet Potatoes for Cash or Stock. Sweet Potatoes offer farmers either a ready cash return or good food for pigs and cows. The crop does well in most farming districts in Queensland. As more farmers recognise its merits, there's every reason to expect bigger plantings in the future.

Officers of Agriculture Branch advise that average yields from sweet potatoes are about six to eight tons an acre. Heavy crops running as high as 15 tons an acre are obtained occasionally under ideal conditions.

The most suitable soils for sweet potatoes are sandy loams and sandy clay loams. Even poor sandy soils will produce good crops if suitable fertilizer is applied. Red volcanic soils like those on the Atherton Tableland produce good crops. But avoid the heavy clay soils as these are completely unsuitable. So, too, are the rich alluvials, because these produce heavy vine growth but few tubers.

Excessive vine growth with few tubers occurs also when a fertilizer too rich in nitrogen is used. For most soils, use a 4: 12: 4 or similar fertilizer mixture at 4 to 5 cwt. an acre. On the poorer, sandy soils, however, it's better to use a 6: 14: 10 mixture at 5 to 6 cwt. an acre.

Varieties recommended by Agriculture Branch are Abundance for the table trade and White Maltese for pig and cow food.

Sweet potatoes should be planted as soon as the danger of frost has passed. Varieties differ in the time they take to grow, but usually the mature tubers can be harvested four to five months after planting. If late-maturing varieties are planted too late in the season, no tubers will develop until the following season.

Sweet potatoes are an easy crop to feed to stock. Harvesting of crops grown for pig food can be safely left to the pigs themselves. If sweet potatoes are grown for cow food, the tubers have to be ploughed out so that the animals can get at them. The cows will then pick up the tubers from the ploughed ground.

Check on Quality. The Standards Branch of the Agriculture Department controls the quality of many of the agricultural products used by the man on the land.

In particular, these items include stock foods, fertilizers, pest destroyers, and veterinary medicines. All of these items must be registered with the Standards Branch before being placed on the market in Queensland.

The reason for this requirement is to enable the Department to ascertain the quality and usefulness of the agricultural requirement by knowing the formula of each product, thus ensuring that inferior products are not offered for sale.

When registered, these agricultural requirements must be correctly labelled, showing, among other things, active constituents or chemical analysis and in the case of pest destroyers and veterinary medicines full directions for use.

When buying these products you would be wise to purchase recognised brands and particularly to avoid unlabelled or unbranded agricultural requirements.

—B. LINNETT,
Inspector, Standards Branch.

Centro-Molasses Pasture Finds Place In Cooroy District

By N. DOUGLAS,
Agriculture Branch Officer.

While the value of centro-molasses grass pastures is well recognised in north Queensland, little information is available to date regarding their potential in the south-eastern portion of the State. In the Cooroy district, however, this pasture has lately found a place in frost-free locations which are not dominated by sward grasses.

Centro is a perennial, twining legume which shows a marked tendency to climb. Once established, it does provide a dense ground cover. It has a high protein value, ranging from 15 to 23 per cent., according to stage of growth. A summer-growing plant, native to the tropics, it will stand occasional frosts if it has adequate plant cover. Centro

Plate 1

A Four-Year-Old Centro and Molasses Grass Pasture on the Property of Cooney Bros., Nambour, June 21, 1958. The area had been closed to allow bulk growth to be made and seeding to take place.

Plate 2

The Climbing Characteristic of Centro. If it has not the opportunity to climb, it will form a solid mat of vine over the ground surface. Note the seed pods.

particularly favours a northerly aspect in this district.

Molasses grass is a pioneer grass which will overgrow vigorous scrub weeds and yield good grazing if managed correctly.

While paspalum and kikuyu still remain the best dairying grasses we have at our disposal, there are areas where they can be established only with great difficulty. These areas are often dominated by blady grass, bracken fern and kangaroo grass. There are also old banana plantations or bean patches which require re-grassing. It is in such places that centro and molasses grass have demonstrated their ability to compete with and finally dominate the inevitable phase of coarse grass and weeds.

Local History

The first stand of centro and molasses grass was established during 1954 in an old banana patch in the nearby Nambour district. This land was so steep that it could not be cultivated even though the owners, Messrs. Cooney Bros., possessed a small crawler tractor. The seed mixture was planted by hand, a few seeds being placed in holes dug by a chipping hoe. After a slow start the first year, this pasture is now flourishing—as can be seen in accompanying photos. Following this small start, a considerable acreage has been planted throughout the district.

From a 5-acre area of centro and molasses grass established in the Mooloolah district, some 2,638

cow/hours were obtained during the first grazing. As this area becomes older, better grazing yields are expected. Before the establishment of the centro and molasses grass, the paddock was dominated by blady grass and neglected by the stock.

Another grazing trial, after a very poor start in the 1957 drought, has recorded 1,719 cow/hours of grazing from a 5-acre areas. The adjacent control paddock of 5 acres yielded 952 cow/hours of grazing.

Further Uses

Another role for molasses grass and centro is in the re-grassing of groundsel patches. A heavy stand of groundsel kills out all pasture growth. One method of tackling this problem is to brush the groundsel during the winter months, then burn in the following summer. After the burn, centro and molasses grass are planted in the ash. The re-growth groundsel is then sprayed as it comes away.

Planting

It is recommended that wherever possible, some sort of seedbed preparation should be carried out. A good stand may be expected after a scrub burn, but if the seed is thrown in the ash after a grass fire the result is generally disappointing.

The recommended planting mixture in the Cooroy district is 4 lb. of molasses grass and 6 lb. of centro seed to the acre. As centro is a legume, the seed should be treated with the correct inoculum prior to planting. Inoculum may be procured free of cost from the Department of Agriculture and Stock at Brisbane, Cooroy or Gympie.

Plate 3

A well-managed Centro and Molasses Grass Pasture, January 27, 1959. Before the establishment of this pasture, this land was dominated by blady grass and bracken fern.

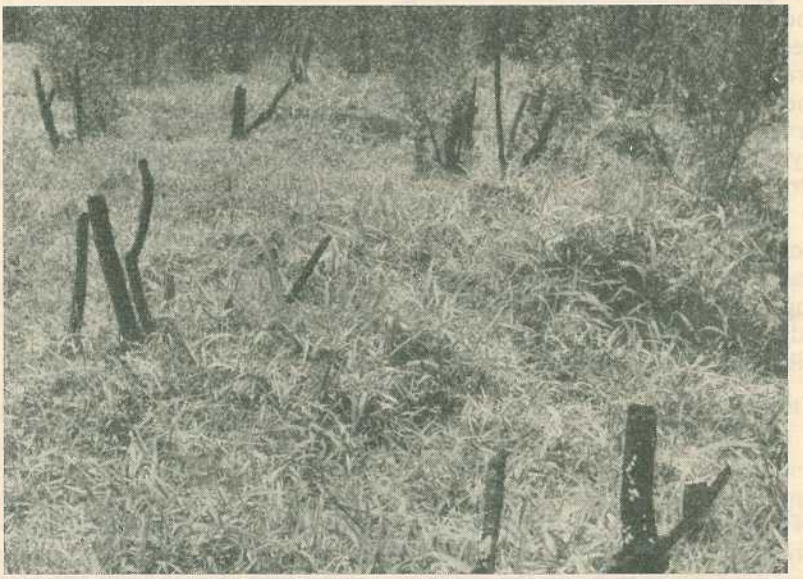


Plate 4

Molasses Grass Can be Used to Regrass Areas that were Dominated by Heavy Groundsel. The groundsel that comes away after the fire is sprayed with hormone.

Molasses grass seed is very small and tends to clump together, so the following planting procedure is suggested: After inoculating the centro seed, mix it and the molasses grass seed together with sawdust and then broadcast the resultant mixture. Usually one bag of sawdust will provide sufficient bulk for 2 acres.

If the area to be planted is carrying a heavy blady grass and/or bracken fern cover, it would be advantageous to crop the area with oats before planting the pasture mixture. The cropping period and the extra working will control the blady grass and bracken fern to a large extent. This is not possible on steep slopes. Planting may be carried out from September to February but most successful plantings are made in the December-January period depending on the season.

Management

If the area planted cannot be closed to stock at suitable times, there is little point in planting the mixture. Uncontrolled grazing will soon deplete the stand. Molasses grass has its crown above the soil surface, and if overgrazed, the crown will be damaged and the grass will die.

Centro is slow in establishing, so grazing should be restricted to the minimum during the year of establishment. All subsequent stocking should be for short periods of heavy grazing, allowing adequate time between grazings for the plants to recover. The pasture should never be grazed closer than 6 to 8 in.

The following is the suggested overall management of the pastures: Close the area from stock in late February and so allow it to make

bulky growth before seeding in May and June. This growth can be successfully grazed off in early spring after seed has matured. Good quality bulk feed is scarce at this period of the year so this deferred grazing will help to carry stock through the normally dry spring. The pastures may then be grazed intermittently until February when the cycle is repeated.

The reasons for this suggested cycle are twofold. First, it allows the centro and molasses grass to seed. This seed may be collected for further planting. Second, it gives the pasture a chance to dominate other weeds and grasses in the area.

Another important point to remember is that fire may kill out molasses grass, so do not burn the pasture.

Fertilizer

It is recommended that after the first good spring rains, the pasture be top-dressed with one bag of nitrogen-phosphate fertilizer to the acre. Make this an annual application. This fertilizer stimulates the pasture to more vigorous competitive growth and yield.

A summary of more important points to remember—

1. Plant in frost-free locations which are not dominated by a sward grass.

2. Controlled grazing is essential to the life of the pastures.

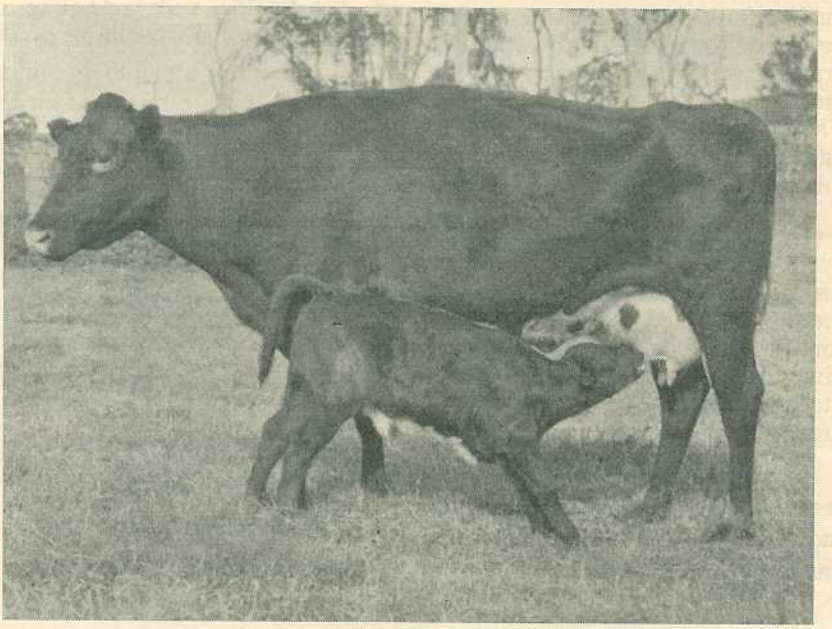
3. Allow pasture to make bulk growth and seed annually.

4. Graze lightly in first year.

5. Do not burn.

Toowoomba Farmers' Festival

This Cabin For a Farm Tractor Made from a 1930 Dodge Sedan Was Entered in the Toowoomba Farmers' Festival by Mr. M. Walsh, of Clifton.



Calves Must Have Colostrum

ONE of the corner-stones in building a dairy herd is rearing healthy calves. Healthy calves cost money to rear, but sick calves cost a lot more.

A calf is born with very small reserves of vitamin A and little resistance to the diseases that so often surround yards, sheds and paddocks. It is vital, therefore, to give the calf assistance in combating these diseases.

The calf must receive colostrum, either by sucking its mother or by bucket feeding.

Colostrum, a cow's first milk after calving, is particularly rich in vitamin A and antibodies which the newborn calf readily absorbs. These afford some protection. The vitamin A is contained in the highly coloured fat, and the antibodies in the globulin portion of the protein. Vitamin A and antibodies in a cow's milk return to normal a few days after calving.

Sometimes the mother dies before the calf has had its colostrum. Then the addition of an antibiotic to normal milk will act as a substitute. It will prevent or reduce the severity of that bacterial infection which sometimes occurs soon after birth, and which often occurs during the first two months of a calf's life.

—A. HUTCHINGS,
Senior Adviser in Cattle Husbandry.

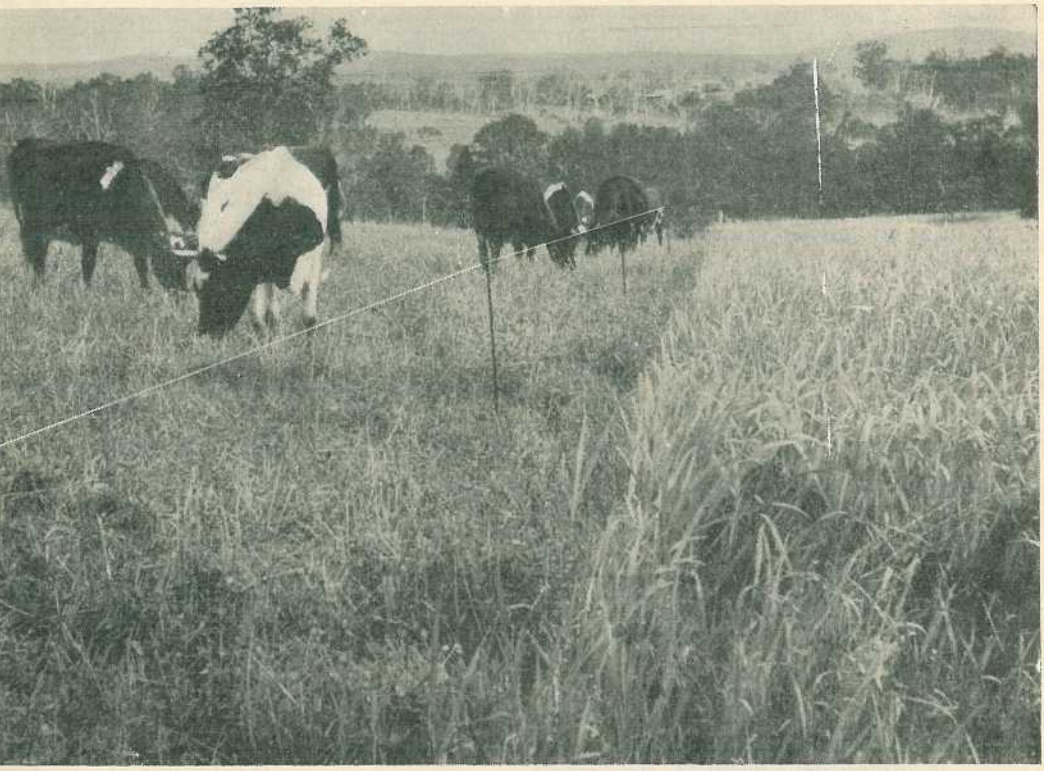


Plate 1: Controlled Grazing Has Many Advantages When There Is An Abundance of Succulent Feed.

Reducing the Risk of Bloat

By T. H. RUDDER, Cattle Husbandry Branch

A sure way of preventing bloat is not known at present, but a tallow spray on the pasture is the most effective and promising method so far devised.

Bloat is a common occurrence in herds where irrigated lucerne or clover-dominant pastures are fed. As irrigated pastures offer one of the best methods of raising the level of nutrition during the autumn to spring months, bloat is a serious problem.

The economic losses due to bloat are possibly higher than generally recognised. At present, it is impossible to estimate in terms of money the actual loss of farm income. However, when the following four factors are considered, it will be seen that this loss is considerable:

1. *Losses due to Death.* Untreated cases of bloat often lead to the death of animals.

2. *Reduced Milk Production.* It is generally accepted that good quality pasture is the most econ-

omical feed for dairy cows. For high production from pastures, the cow must have as much good quality pasture as she can eat.

In an endeavour to avoid fatal cases of bloat, it is a common practice to restrict grazing time on the irrigated pasture. As the rain-grown pastures are of poor quality during most of the April-October period, this practice limits the intake of good quality feed and thus limits production.

Where cases of bloat occur, the cow has to be removed for treatment. Thus grazing is further limited. In addition, the discomfort by the bloated animal has an adverse effect on production. Further, there is the likelihood of lower production due to recurring mild cases of bloat.

When considering the money invested in an irrigation plant and in establishing pastures, this aspect is very important. Being unable to graze the irrigated pasture to best advantage probably causes greater economic loss than do deaths.

3. *Labour Costs.* Considerable time has to be spent in supervising the grazing herd to observe cases of bloat, in addition to the time spent in treating actual cases.

4. *Cost of Drugs for Treating Bloated Cows.*—Depending on the method of treatment, drugs can easily cost up to 5s. for each case.

Due to the variation in the incidence and severity of bloat between cows within a herd from day to day, this disease is very difficult to control.

The April-May to September-November period is the most dangerous for bloating. During this period it is wise to be prepared for cases of bloat every day. Of course, there will be days when bloat will not occur but such days cannot be forecast.

The Danger Can Be Reduced

A sure way of totally preventing bloat is not known at present, but the use of a tallow spray on the pasture is the most effective and promising method so far devised.

The following techniques will greatly reduce the incidence and severity of bloat; the means adopted will be largely determined by the facilities available on the particular farm:

1. *Pasture Management.* Pasture management should aim at keeping the legume content of the pasture below 50 per cent. of the total bulk. Bloat incidence and severity is reduced if such a mixture can be maintained.

Due to climatic conditions, this is not always possible. However, good pasture management can shorten the "bloat-season".

2. *Feeding Hay or Silage.* Hungry animals bloat more readily than those fed hay or silage before grazing "bloaty" pasture. Access to a rack containing some coarse-stemmed hay is useful. The rack should be reasonably close to the grazing area.

3. *Using an Electric Fence for Strip Grazing.* By rationing the area available, the stock are forced to eat the more fibrous stalks as well as the succulent tips of the pasture legume. Also, cows are less likely to bloat if allowed a given area instead of a given time. This is because they eat quickly when on a short time limit. Any change in management should be made gradually if the stock have been accustomed to a time limit.

4. *Cutting and Wilting of the Pasture* for half a day prior to grazing have given good results in the control of bloat.

5. *Pasture Spraying.* Preliminary experiments have shown that spraying the pasture with 2 to 3 oz. of tallow for each cow a day will reduce the incidence and severity of bloat.

The cost of this preventive is 5s. to 7s. a cow a month. This is regarded as the most effective method of control to date.

Insufficient work has been done on this method in Queensland to indicate the best technique. However, the following materials and methods have given satisfactory results but should not be regarded necessarily as the final recommendation on the subject:

Recipe for 60 cows—

7-10 lb. tallow—free from hairs, hide, etc.
½ lb. detergent (Lissapol NX has been used).
4 gallons hot water at 180 deg. to 200 deg. F.
Add sufficient water to spray the required area.

Method. Place the tallow and detergent in a container and then mix with the hot water. Add this mixture to enough water to give the necessary cover over the area.

A small pump fitted to a tractor is suitable for spraying the material on the pasture. Using a boom spray pressure of 20–25 lb. to the sq. in. about 8 gall. of fluid to the acre is required. A hand-operated knapsack spray is effective on a small scale.

After the mixture is made up to the quantity required, agitation is needed. This is easily achieved by pumping the mixture through the pump and back into the container.

Time and labour are saved if a two days' grazing area is sprayed at one time. Unless heavy rain falls, the tallow will remain effective on the grass for at least two days. In any case, spraying should be done at least half a day before grazing.

Reports from other States indicate that a stock emulsion which may be stored for two weeks can be made if a stabilizing agent is used. The recipe to make sufficient for 60 to 80 cows is:

1½ oz. stabilizing agent (Cellofas B was used).
½ lb. detergent.
10 lb. melted tallow.

Method. Stir the stabilizing powder into half a gal. of hot water, then make up to one gal. with water.

Mix the detergent into the melted tallow, then slowly add mixture containing stabilizing powder.

Add 2 gal. of hot water and stir.

This makes the stock mixture.

One gal. of the stock emulsion is sufficient for 25 cows.

When using, stir the stock emulsion and add to the quantity of hot water required. If the requirement is for 50 cows over 1 acre, then 2 gal. of the stock would be added to about 6 gal. of hot water.

6. *Penicillin.* Preliminary trials based on overseas work indicate that penicillin may play a role in bloat control. A dose of 100,000 units of penicillin four to six hours before grazing of bloat-producing pasture promises to reduce the occurrence and severity of bloat for two or three days.

Where cows are fed an individual grain ration, this method could become an easy way of prevention. The cost involved would be about 5s. a cow monthly.

At this stage, this preventive should only be attempted under the guidance of a veterinary officer. The possibility of undesirable side-effects due to continued penicillin treatment has yet to be determined. There is also evidence that penicillin loses its effectiveness after treatment has continued for two to three weeks.

Tallow spraying combined with the management techniques offer the best protection at present under Queensland conditions. However, these methods should be approached with care and attention to detail.

It is stressed that these techniques are claimed to reduce the incidence and severity of bloat, not eliminate the danger. Observation for, and facilities to treat, cases of bloat should not be forgotten.

Advice on the treatment of bloat is contained in Advirsory Leaflet No. 53 entitled "Bloat in Dairy Cattle." This leaflet is available on request from the Department of Agriculture and Stock.

The Value Of Fodder Cane

Fodder cane is proving a profitable and practical way of conserving carbohydrate-rich fodder on many farms. It has been referred to as "The Poor Man's Silo." Good yields of up to 70 tons to the acre have been obtained on Queensland farms. The crop shown (variety Q50) on Mr. Roy Austin's farm at Logan Village was calculated to yield 50 tons to the acre. At this yield, the cost for land preparation, planting material and fertilizer was 10s. a ton.

Cream Cooler For Small Herd

By J. B. WILSON,
Dairy Officer

When cream is produced under clean conditions, cooling to 70 deg. F. and storing at that temperature provide conditions that help to ensure choice grade quality. These conditions have been fulfilled in an unusual type of cream cooler developed by a farmer in the Boonah district, and its

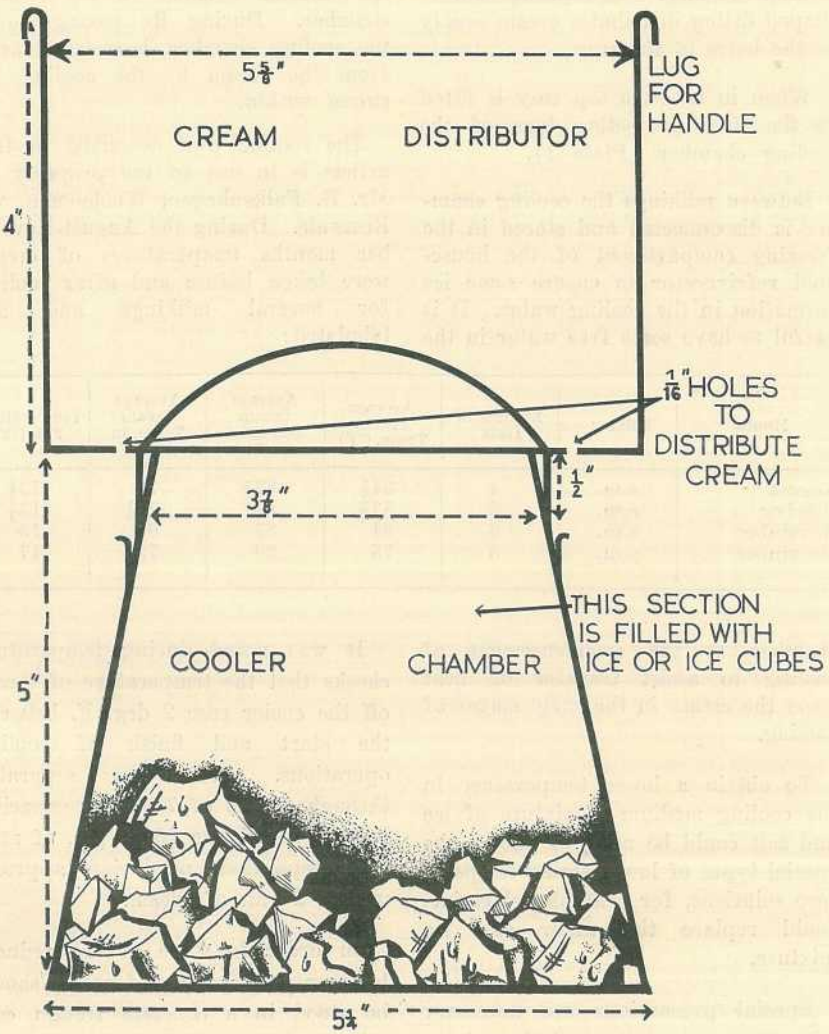


Plate 1

Cross Section of Distributor and Cooler Assembled.

success suggests that this unit has a place on the small-herd farm. With this unit, cream has been cooled from about 85 deg. F. to 70 deg. F. as it falls from the separator into the can.

The cooler consists of two sections: a distributor tray containing a ring of small holes, and a cooling chamber into which a mixture of ice and water is placed. The holes in the distributor tray must be so spaced as to ensure an even flow of cream over the cooling chamber. The separate saucer-shaped fitting distributes cream evenly to the holes in the tray.

When in use, the top tray is fitted to the two projecting lugs of the cooling chamber (Plate 1).

Between milkings the cooling chamber is disconnected and stored in the freezing compartment of the household refrigerator to ensure some ice formation in the cooling water. It is useful to have some free water in the chamber at the commencement of cooling to assist transfer of heat from the cream in the early stages of cooling.

To obtain a lower temperature in the cooling medium a mixture of ice and salt could be used, or one of the special types of low freezing temperature solutions, for example, glycerine, could replace the water and ice mixture.

Special precautions are necessary with these alternative solutions however, to prevent excessive corrosion with brine solutions and possible freezing of a layer of cream onto the surface when low temperature solutions are used for cooling.

A plan of this unit is illustrated in Plate 1. It can be constructed either of tinned metal or stainless steel. It is suited for attachment to the cream spout or, with altered dimensions, can be constructed to rest across the neck of the cream can. Cream enters the tray from the separator and falls in an even film through the holes onto the external surfaces of the cooling chamber. During its passage over the cooling chamber, heat is removed from the cream by the cooling ice stored within.

The cooling unit described in this article is in use on the property of Mr. R. Falkenhagen, Woolooman, via Rosevale. During the August-November months temperatures of cream were taken before and after cooling for several milkings and are tabulated:

Month	Milking	Number of Tests	Average Atmos. Temp. (°F)	Average Cream Temp. ex Separator	Average Cream Temp. in Can (°F)	Temperature Fall (°F)
August ..	a.m.	4	54½	83½	70	13½
October ..	a.m.	2	67½	87	73½	13½
November ..	a.m.	6	64	87	69	18
November ..	p.m.	6	75	89	72	17

It was noted during temperature checks that the temperature of cream off the cooler rose 2 deg. F. between the start and finish of cooling operations. Cream was separated through a unit of 75 g.p.h. capacity. During the checks 20–25 gal. of milk were separated, producing approximately 2 gal. of cream.

In order to store at the reduced temperature, the can of cream should be stood in a concrete trough containing water, and the exterior covered by towelling or a clean sack extending into the water.

Mr. E. B. RICE

100 Years of Queensland Dairying—III

Butter, Cheese, and Market Milk

By E. B. RICE, Director of Dairying

The early phases of the change-over from farm butter-making to factory production were discussed in the first part of this article, which dealt with the pioneering stage of the Queensland dairy industry between 1859 and 1900.

The earliest record shows that pasteurisation was adopted in Queensland in the dairy at Gatton Agricultural College in 1898-99. All the cream manufactured into butter at the dairy during that year was pasteurised and this treatment was

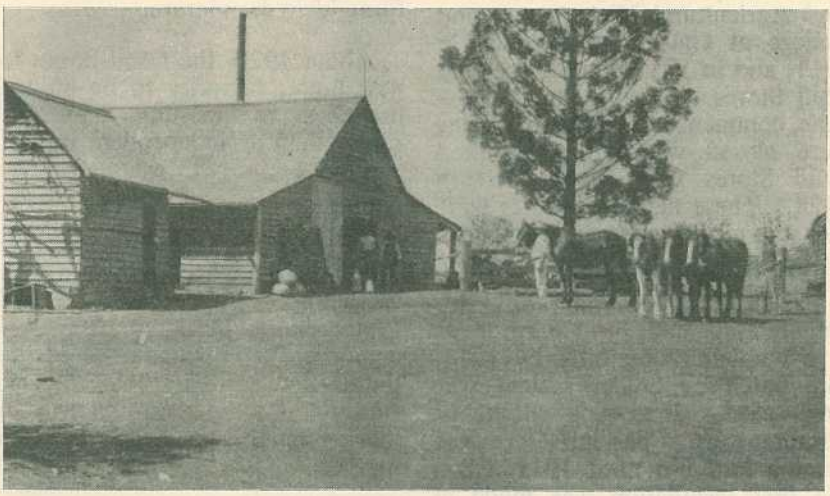


Plate 1

Purga Butter Factory, Which Operated From 1901 to 1914. The factory was situated nine miles from Ipswich and received cream from about a dozen suppliers. This photograph was kindly lent by Mr. M. H. Dick, of Purga.

continued thereafter. However, it is not recorded what type of pasteuriser was used.

The prevalence of a fishy flavour in our butter was mentioned in the early 1900's. It was not present in the butter immediately after manufacture but manifested itself in export butter by the time it reached England. The cause was baffling those connected with the butter industry in Australia and England, but was finally established in 1920 as the contamination of cream by traces of copper and iron. These traces came from the farm and factory dairy utensils and equipment.

In those early years, farmers' indiscriminate addition of preservatives to milk and cream was also a matter of concern. The quality of the cream reaching the factories was low; it was common for the cream to be so fermented as to ooze over the rim of the can.

Hamilton Cold Stores

The dairy factory at the Queensland Agricultural High School and College at Gatton was opened in 1911, and in 1912 the Government Cold Stores at Roma Street, Brisbane, commenced operations. They were closed when the Hamilton Cold Stores were constructed in 1924. These new cold stores were then the most modern and spacious in the Southern Hemisphere.

Pasteurisation of cream for butter manufacture had been introduced in a number of factories by 1914. The batch or holder system was first used, dome-type flash or instantaneous pasteurisers not coming into use until 1911, when the first installation was made at Warwick factory. Neutralisation of cream also began in this period.

In 1925, all butter factories had been equipped with pasteurisers. The export of choice or first grade butter was prohibited by Commonwealth Government legislation from August, 1924, unless it was made from pasteurised cream. This had the effect of compelling all factories to install pasteurisers for the treatment of all cream from that date.

Systems for deodorising cream used in butter manufacture were introduced in the mid 1920's, but the original systems have now been entirely displaced by modern vacuum pasteurisation techniques. The first vacreator was installed in Kingston factory in 1934 and the first Creamery Treatment Unit, in which a cream-steam counter flow principle is employed, was installed in Booval factory in 1955.

Wood taint and mould growth were common defects of Queensland butters in the 1920's; neither defect occurs now. The wood taint imparted by butter boxes made of Queensland hoop pine was overcome in 1930 by spraying the boxes of export butter with a casein-formaldehyde mixture.

About 1920, the trend began for new butter factories to be built as branches of existing companies rather than as independent units.

Organised Marketing

Organised co-operative marketing of butter was initiated in 1921 when a Queensland–New South Wales Butter Pool was formed to equalize the prices received for butter by each factory whether it sold on the more profitable local market or the lower-priced export market.

The Queensland Butter Marketing Board which now has statutory authority to control the marketing of butter sold intra-State, was constituted in February, 1925. It was

not until 1936 that the Board established its own patting factory in Brisbane and displaced private butter packing firms. However, the Board has continued to allow wholesalers to distribute butter to retail sellers.

In 1955, the Board moved to a new factory which is considered the most modernly constructed and equipped butter packing and blending factory in the world.

The Gympie factory of the Wide Bay Co-operative Dairy Association, which was rebuilt in 1925, then had the highest butter production of any factory in Australia. Its output in 1925-26 was 3,547,949 lb.

In the early history of Queensland dairying, milk and cream were conveyed from the farms to the separating depots and factories by horsedrawn vehicles. A report in 1925 referred to motor transport gradually superseding horse-drawn vehicles for conveying cream to butter factories and two rail motors for conveying cream were constructed by the Railway Department.

Equalization

In 1926, the Kangaroo brand was introduced for butter exported to Britain. The Paterson scheme also introduced then, was the forerunner of the voluntary Australia-wide equalization scheme which came into effect in 1934. The Paterson scheme provided for a levy to be imposed on all butter and cheese produced within Australia, and bonus payments on exports. Under the Equalization Scheme, the returns to manufacturers of butter and cheese are equalized, irrespective of whether the produce is sold on export markets or within Australia.

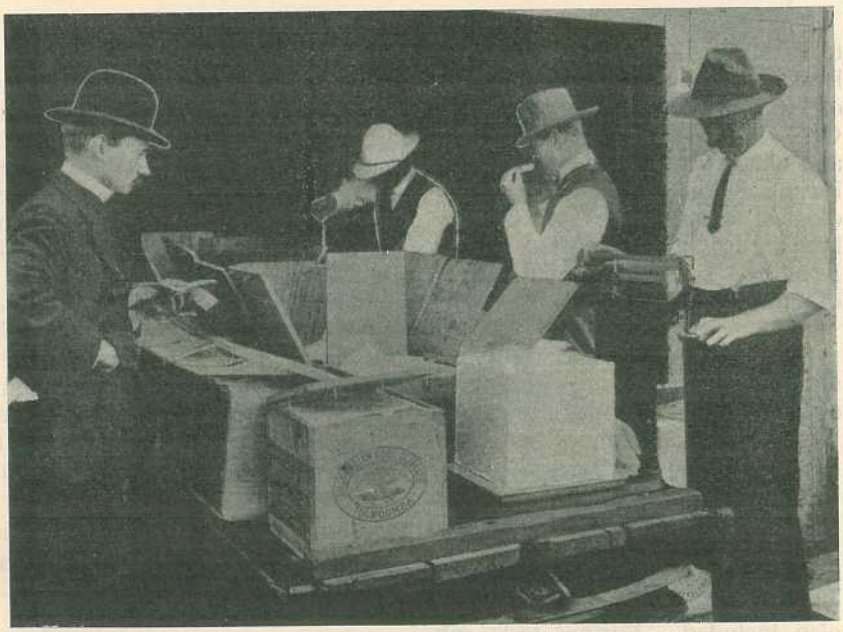


Plate 2

Grading Butter At Brisbane about 1907. On the left is Mr. G. S. THOMSON, Queensland's first butter expert. Two of the men with him are Mr. R. WINKS and Mr. J. WILSON.

Experiments in producing unpreservatised butter were commenced in 1924. All butter exported up to that time was preservatised with boric acid. In 1927, the British Ministry of Health prohibited the use of preservatives in butter and they have since then been forbidden under the provisions of the Dairy Produce Acts.

In 1926-27 the official quality gradings of Queensland butter were 35 per cent. choice, 42 per cent. first, 15 per cent. second and 8 per cent. third grade.

In the earlier years, most factories were constructed of wood, but a change to brick construction became evident between 1920 and 1930 and all factories have since then been required to be of brick or concrete.

Dairy Research

The nucleus of a scientific staff to specialize in dairy industry problems was the appointment in 1930 of a University graduate (Mr. O. St. J. Kent) to carry out chemical and bacteriological examinations. Results of the first detailed bacteriological examinations of Queensland butters were reported by Mr. Kent in the 1932 Annual Report of the Department.

A Dairy Research Laboratory was established in 1935. A scheme to assist factories to control the moisture and salt contents of butter was introduced by the Dairy Research Laboratory in 1937. This was called the Butter Standardization Scheme, which was changed in 1939 to the Butter Improvement Service whereby bacteriological tests were also included. Further tests subsequently embraced in the scheme were pH, microscopic examination for thoroughness of moisture incorporation and extraneous matter.

Differentials in prices of cream paid to suppliers of butter factories were introduced by a regulation under the Dairy Produce Acts in 1936. Choice grade cream was paid for at ½d. a lb. commercial butter over first grade and first grade was 1d. a lb above second grade. All previous regulations under the Acts were revoked in this year and new regulations, based on changes in the industry were substituted.

In 1939, a churn with a capacity of 100 boxes of butter was installed in Malanda factory. The first metal churn was installed in Laidley factory in 1942, but this type was unsuitable for Queensland conditions and was discarded after a couple of years. Suitable types have since been developed and there are now 22 metal churns in Queensland factories. The first installation was made at Kingston factory in 1956.

THE CHEESE INDUSTRY

At the National Agricultural and Industrial Association of Queensland exhibition in 1891, a special prize was awarded to Daly Brothers, Quinalow, for the best Queensland-made cheese. This certificate is now possessed by Mr. M. Daly, Woodford.

A co-operative cheese factory was opened at Pittsworth in 1896. The Pittsworth Co-operative Dairy Association soon became the highest cheese-producing company in the State, and retained this position until displaced in 1945-46 by the Downs Co-operative Association which built a large central cheese factory in Toowoomba.

The contrast between the scale of manufacture in cheese factories at the beginning of the century and present-day factories is reflected by

a reference in 1902 to the Pittsworth factory, then the largest in the State, receiving 1,200 gallons of milk daily.

In 1914, Queensland became the highest cheese-producing State and retained this position until 1935-36, when it was displaced by Victoria. Pasteurisation of milk in cheese factories began about 1914, but inability to import pasteurisers during the first world war hindered progress.

In 1942-43, Queensland again achieved the position of premier cheese-producing State. However, its ranking was short-lived as Victoria again overtook Queensland production in 1943-44 and has continued to be the leading State. South Australia now ranks second and Queensland third.

There were 94 cheese factories in 1920, the highest number ever in the State. Prior to this year, there was no uniformity of size of cheese produced for the export trade, but in that year a standard 80 lb. size was adopted by all factories for such cheese.

A Cheese Pool Act was proclaimed in 1921 to provide for the formation of a Cheese Board and equalization of returns to factories whether their cheese was sold locally or exported. But even in 1910, a Downs Co-operative Cheese Factories Association had been formed, mainly to deal with the high prices then charged for cheese crates and in 1913 a Queensland Cheese Manufacturers Association was formed, which in 1914 fixed prices for cheese sold locally.

A mammoth cheese, weighing 1½ tons, was made at Pittsworth factory in 1923 and sent to the Wembley Exhibition in London.

Plate 3

Dairy Cattle at Talgai West in 1912.

The need for refrigerated holding rooms at cheese factories and the fact that none was then in existence was mentioned in 1926. The first refrigerated cheese holding room was provided at the Malling factory in 1930. In 1958, 18 out of 24 factories had refrigerated storage rooms.

In 1930, only about half of the cheese produced in the State was made in factories which had milk pasteurisers installed. In 1958, all cheese factories, excepting two with small outputs, manufactured cheese from pasteurised milk.

Rehabilitation

The cheese industry in 1937 had reached a stage where factory buildings and equipment were generally in an unsatisfactory condition and cheese quality was poor. The industry and the government agreed that rehabilitating action was necessary. In attempting to meet competition for milk supplies from butter factories, cheese factories had for some years paid as high a price as possible for these supplies with the result that maintenance of factory buildings and equipment had been seriously neglected and cheese quality was causing much concern.

A scheme was implemented by the Department of Agriculture and Stock in 1938 whereby cheese manufacturers were required to make a gradual but effective improvement in rebuilding or renovating factories and installing more efficient equipment. At the same time, they were given more technical help from Departmental officers with a view to raising the general quality of Queensland cheese production.

A travelling dairy laboratory, with the author in charge, commenced operations among Downs cheese factories in 1938. This had for its purpose the giving of greater technical help in the industry's problems. The work at first was concentrated on carrying out tests for milk quality, advising farmers on quality milk production and introducing improved methods of control of starters in factories.

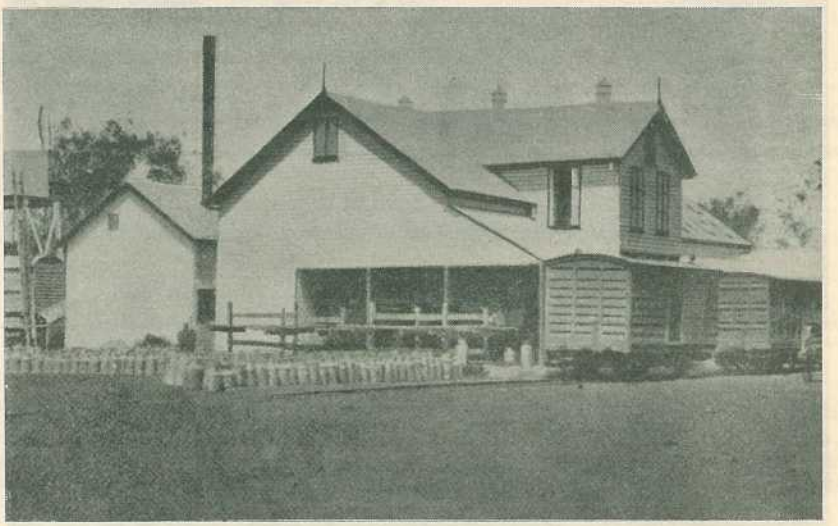


Plate 4

The South Burnett Co-operative Butter Factory at Murgon in 1914.

Quite a number of small cheese factories were closed during the early phase of the cheese industry rehabilitation scheme, the supplies being diverted to larger central factories. Up to this time, most cheese factory suppliers lived not more than two to three miles from their factory, but organized transport of milk supplies to cheese factories was then introduced by several associations in conjunction with this centralized manufacturing development.

Organized motor lorry pickup of milk supplies for cheese factories enabled milk supplies to be drawn from more distant farms and nowadays few suppliers convey their own milk to a cheese factory.

Although, since 1904, some grading of cheese had been carried out, it was not until 1940 that systematic grading of cheese for local sale and processing in Brisbane was instituted.

Expansion Scheme

About two years after the cheese rehabilitation scheme was commenced, a further development had a market effect on the cheese industry. In 1940, the British Government was concerned about the cold storage position for butter in the event of enemy bombing of British cold stores and requested the Australian Government to reduce butter exports but at the same time increase cheese exports. A scheme known as the Cheese Production Expansion Scheme was implemented.

Fifteen new cheese factories were established and 35 existing factories were enlarged and provided additional equipment to handle greater milk supplies. This scheme culminated in the State's record cheese production of 28,501,000 lb. in 1942-43; its monetary value exceeded £1,000,000 for the first time!

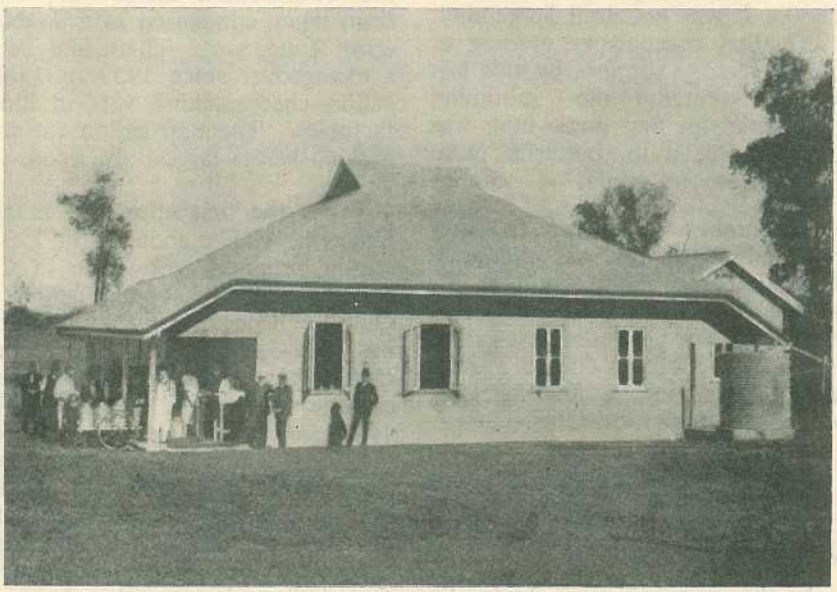


Plate 5

The New Dairy at Queensland Agricultural College, Gatton, in 1912.

Plate 6
Farmers Arriving With Milk at Cambooya Cheese Factory in 1919.

Cheese production then commenced to fall, due to a reversion of some suppliers to producing cream for butter manufacture.

The payment to suppliers of price differentials, according to the methylene blue test for milk quality, was introduced by two factories in 1940. It was not until September, 1957, that compulsory grading of cheese factory supplies by this test was instituted; the minimum differential for first grade milk was fixed at 2d. a lb. butterfat more than for second grade.

A number of cheese factories had commenced to wax cheese in 1939, but as waxing of cheese for export to Britain was prohibited during the war years, interest in this method of covering cheese lapsed, excepting among a few factories which had large local sales.

Whey separators were in use in three cheese factories in 1945, and thereafter were installed in all of the larger factories.

In the post-war years, hydraulic cheese presses, whey separators, water-seal lids for bulk starter cans, mechanical curd stirrers, automatic temperature and humidity control systems for cheese holding rooms, and *all-stainless steel* plate type pasteurisers, cheese vats and other equipment were features of progress in cheese factories. Whey powder was made by the roller process in the Toowoomba factory in 1949 from whey condensed in a double-effect condenser. There had been a changeover since 1939 to 1,000 gallon cheesemaking vats in most factories. The 650 gallon vat was previously the largest size used.

From the first efforts to rehabilitate the cheese industry in 1938, steady progress was made in the improvement of cheese quality. Only 36·8 per cent. was first grade in 1937-38, but in the record quality year of 1957-58, the percentage so classified was 88·2. In 1955, with the development of plastic-type film for the covering of cheese instead of the conventional cheese bandage, the Queensland industry commenced to package cheese for local sale in consumer-size, rindless cheese packs. Associated with this development, which has been quite rapid, a marked

improvement in the presentation of cheese on the local market has been a creditable achievement of the cheese industry. From January 1, 1959, all cheese exported to England was waxed. This action was taken voluntarily by the Australian cheese industry.

Since 1955, several cheese factories have diversified the types of cheese made. Among the varieties produced are Gouda, Edam, Taffel, Carraway seed, smoked and clove cheeses. Gruyere and Roman cheese have been made at the Malling factory for many years.

THE MARKET MILK INDUSTRY

From the inception of settlement in the State until the turn of the present century, all milk consumed in Brisbane was produced on nearby suburban dairy farms.

Early records indicate that in 1902, milk was first brought to Brisbane by rail from outlying areas such as Bald Hills and Strathpine and later from Rosewood, Lowood and Caboolture. This was brine cooled, stored in cans in cold rooms and distributed by retail vendors.

The retail distribution method was to place the milk in a can fitted with a tap. The vendor poured out the quantity purchased by the householder into a measure, placed this milk in another vessel and transferred the milk into a jug or billycan left by the consumer on his doorstep.

Bottled, chilled raw milk was distributed from two small establishments in Brisbane in 1912. Pasteurisation of milk for city consumers was first commenced in 1919 in a factory at North Quay in Brisbane owned by Brisbane Milk and Ice Co. and at a factory in Ipswich owned by Pommer Bros.

The railway strike in 1927 led to the abandonment of rail transport for bringing country milk supplies into Brisbane and since that year all country supplies have been sent to Brisbane by road transport. However, in the early stages the milk was simply conveyed in milk cans and mostly was not even chilled before commencing its journey.

In 1928, about 1,000 gallons (5 per cent.) of bottled pasteurised milk were sold daily in Brisbane,

Plate 7

The Southern Queensland Dairy Company's Butter Factory at Kingston, Which Was Established in 1906 and Rebuilt in 1932.

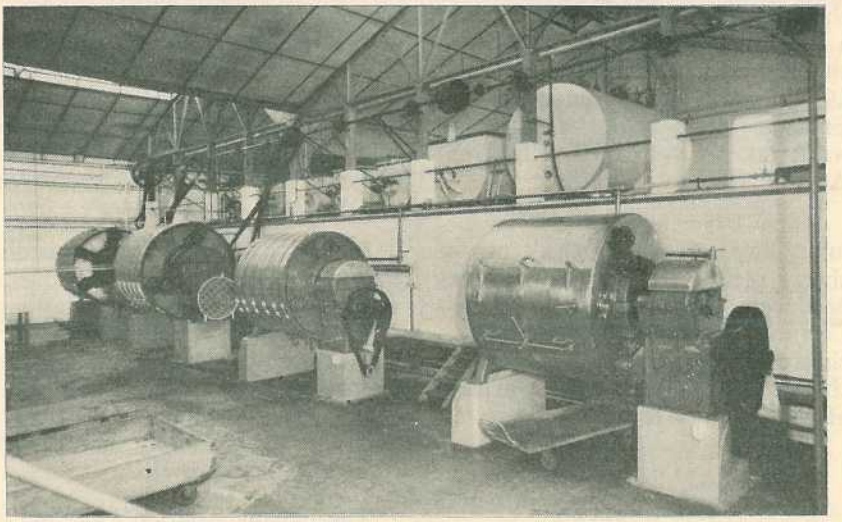


Plate 8

Kingston Butter Factory's Churn Room After Installation of Stainless Steel Churn in 1956.

3,000 gallons (17 per cent.) of pasteurised milk (unbottled), and 14,000 gallons (78 per cent.) of raw milk.

The market milk industry was in a chaotic condition during and just after the depression years of 1930's. This was due to cut-throat competition on the Brisbane market through supplies being brought into the city from additional country areas. A Milk Supply Act, which was passed in 1938, provided for the formation of the Brisbane Milk Board and the organised marketing of Brisbane milk supplies. It also provided for approval to be given for companies outside Brisbane to be given the exclusive right to supply pasteurised milk for a period of years within a defined area. This Act was repealed by the Milk Supply Act of 1952, which provided additional powers for the organised marketing of milk.

During 1938, about 4,000 gallons (20 per cent.) of milk were sold daily in Brisbane as bottled pasteurised milk, 6,000 gallons (30 per cent.) as heat-treated, unbottled milk, and 10,000 gallons (50 per cent.) as so-called "warm" milk (suburban producer-vended milk), or chilled milk (which was milk received from country centres, brine-cooled, but not pasteurised, on arrival in Brisbane).

A systematic laboratory control service as well as a programme of investigational work was commenced in the Dairy Research Branch in 1939.

In 1944-45 the quantities of milk distributed in Brisbane were 41 per cent. as bottled pasteurised milk, 38 per cent as pasteurised but not bottled (mainly shop and hotel trade) and 21 per cent. as chilled or warm milk.

Road Tankers

Another development was the receival of bulk supplies of milk cooled at country factories, placed

in insulated road milk tankers and conveyed to Brisbane milk factories for pasteurisation. This system commenced in 1947 and in 1958 supplies were received from 13 country factories, representing 62·4 per cent. of milk receivals by pasteurisation factories in Brisbane.

In 1952, a road milk tanker commenced to convey milk from Malanda to Townsville, a haul of 234 miles; some of this milk was then sent by railway a further 603 miles to Mt. Isa. A milk bottling plant was erected in that town in 1958.

The high-temperature, short time method of pasteurisation (162 deg. F. for 15 sec.) was approved under the Health Act in 1946. Before that year, the holder or batch system (145 deg. F. for 30 min.) was the only officially approved method of pasteurisation of market milk. By 1956, all Queensland milk pasteurisation factories were using the HT-ST method.

A further development in the market milk section of the industry was the railing of milk from Toowoomba to Charleville and Cunnamulla in 1955. It was bottled on arrival and then distributed to consumers. This was a step to enable an increased availability of milk in western Queensland towns, where winter shortages are common. In 1958, a service was provided by the Port Curtis Co-operative Dairy Association for towns on the Central Western railway. The milk was forwarded from Rockhampton in refrigerated railway waggons and placed in cold rooms in the towns before distribution.

In 1956-57, the quantity of bottled pasteurised milk sold in Brisbane averaged 42,600 gal. daily; warm milk had completely disappeared as a type of milk, but raw milk sales averaged 1,850 gal. daily; and the quantity of non-bottled pasteurised milk sold (mainly for cafes, hotels, etc.) averaged 4,500 gal. daily. Unpasteurised milk thus represented less than 4 per cent. of sales.

Pasteurisation of milk has been extended to most of the larger towns and their environs through the establishment of milk pasteurisation plants of which there were 15 in country centres in 1958. The first country town to be catered for by a pasteurised milk supply was Southport in 1937. The next country town in which a milk pasteurisation factory was established was Toowoomba, in 1940.

The school milk scheme, whereby each school child is given a one-third pint bottle of pasteurised milk, was commenced in 1952-53 and has been extended to all areas where bottled pasteurised milk is available.

[TO BE CONTINUED]

David Brown 900 D Tractor

The technical report on the David Brown 900 D tractor, made following a test by the Australian Tractor Testing Committee in January, is now available. Copies may be obtained free of charge on application to the Department of Agriculture and Stock, William Street, Brisbane.

Tuberculosis-Free Cattle Herds (As at 1st November, 1959)

Aberdeen Angus

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

A.I.S.

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

Ayrshire

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

Friesian

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

Guernsey

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

Jersey

Beckingham, C. Trout's Rd., Everton Park
Birt, W. C. M., Pine Hill Jersey Stud, Gundiah
Borchert, Mrs. I. L. M., "Willowbank" Jersey Stud, Kingaroy
Burrows, R. N., Wondai, Box 23
Bygrave, P. J. L., The Craigan Farm, Aspley
Carpenter, J. W., Flagstone Ck., Helidon
Conochie, W. S. & Sons, "Brookland", Sherwood Rd., Sherwood
Cramb, S. A., Bridge St., Wilsonton, via Toowoomba
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
Queensland Agricultural High School & College, Lawes
Ralph, G. H. "Ryecome", Ravensbourne
Scott, Est. J. A., "Kiaora", Manumbar Rd., Nanango
Semgreen, A. L., "Tecoma", Coolabunia
Seymour, B. T., "Upwell", Jersey Stud, Mulgeldie
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
McCamley, E. W. G., "Eulogie Park", Dululu
Maller, W., "Bore View", Pickanjinnie
Wilson & McDouall, Calliope Station, Calliope

Poll Shorthorn

Leonard, W. & Sons, Welltown, Goondiwindi

Bucket and Bail

Save Money on Cream Cans. Careful handling, right from the time they come brand new from the store, will prolong the useful life of milk and cream cans. Neglected or roughly treated they will quickly deteriorate and become unsuitable for carrying dairy produce.

From the time you start using them, the cans are exposed to attacks by acid milk and cream and by washing solutions. The action of these substances gradually destroys the thin layer of tin on the cans. The steel is then exposed and rusting will commence. Unchecked, rust will quickly eat right through a can, making the re-tinning more expensive.

Exposed steel in a can imparts a tallowy and oxidised flavour to milk and cream. This flavour cannot be removed during butter-making, and the cream has to be down-graded.

To prolong the life of cans here are some precautions:

1. Wash your cans thoroughly and sterilize them with boiling water or steam. Stand them upright until the steam has escaped and the can has dried; then turn them upside-down on a dust-free storage rack. If possible, always wash up in rain water.

2. Use cleansers at the correct strength, and use stiff bristle brushes. Never use steel wool or metal fabric, as these quickly cut off the tinning.

3. Rinse the cans with the chlorine solution (at the correct strength) only a few minutes before use. Never rinse with a chlorine solution after washing up.

4. Inspect the cream stirrer for sharp edges. Use the stirrer by plunging it up and down in the can; don't roll it around the sides of the can.

5. If cans are not being used for long periods, wipe them over with an oily rag and store in a clean, dry place. Wash thoroughly and air before use.

—N. E. FOWLER,
Dairy Officer.

Using Gouge Dehorners. Gouge or cup dehorners allow you to dehorn all the season's calves at the one time. This is their big advantage. Gouge dehorners can be used on calves from three to nine months old. This makes them especially suitable for use on beef breeding properties where frequent musters to treat calves soon after birth would not be possible.

The risk of infection developing after dehorning with the gouge type instrument is only slight. You can reduce this risk still further by working in clean surroundings and keeping the dehorners in an antiseptic solution when they're not actually in use. Tie a bucket of antiseptic solution to a fence rail so it won't get knocked over, and after you've dehorned each calf put your dehorners in it. Replace the solution frequently so it's always clean.

Before you start, make sure your dehorners are properly adjusted and sharp. Have your calves properly restrained, either in a branding cradle, a calf sword bail or securely held or tied.

To use gouge or cup dehorners, place the instrument over the base of the horn. Aim to remove about a quarter of an inch of skin around the horn base along with the horn. In practice, you'll find it necessary to cut as low as possible. With the dehorners in position and the calf restrained, remove the horn by snapping the handles to the closed position. If the job is done properly, the animal will be completely polled.

Stubs or scurs are the result of failure to remove the growing buds at the horn base. This is usually caused by lifting the dehorners at the time of cutting. Avoid this by keeping the dehorners pressed to the calf's head while you are snapping the handles into the closed position. If your dehorner is clean, there's no need to put any ointment or dressing on the wound.

From this start you'll learn by experience how to dehorn successfully. Observe the results and you'll soon know the right time and age to get the best results.

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

Save Money on Milking Buckets. Care in handling dairy buckets will lengthen their life and save the farmer the constant expense of having to replace them. All too often, comparatively new buckets lose large areas of tinning through rough handling, and then these areas are allowed to rust.

A rusty or badly scored bucket is unsatisfactory for handling dairy produce. Rusted surfaces are difficult to clean and may be a breeding ground for harmful bacteria. The rust may also cause the oxidation of the butterfat in the milk and cream. Both of these faults can cause the produce to be downgraded—a loss to the farmer.

Possibly the greatest cause of worn buckets is the practice of telescoping them after washing up. The steel bottom rims score the insides of the overlapping buckets and continuation of the practice causes large areas of steel to be exposed. This attempt to save space on the draining racket is not worth the cost of early retinning.

Tinning can also be damaged by using the buckets to hold the hot cleaning solution for the milking machine. Because they are in contact with the surface of the bucket for so long, these acid or alkali solutions will eventually remove the tinning. Choose your oldest bucket for this purpose and reserve it solely for holding cleaning solutions. If you have to store your buckets, smear them lightly but thoroughly with petroleum jelly.

—D. C. KEATING, Dairy Officer.

Plan Now For December

Mate cows now to ensure seasonal calving.

Repair roofs and tanks to catch all available rain-water for cleaning operations.

Destroy flies and breeding grounds and protect milk quality.

Check your breeding records. Call in your vet. if necessary.

Hormone Treatment For Fattening Steers

By D. N. SUTHERLAND,
Director of Cattle Husbandry.

Here are the results of tests on the use of hormones for fattening cattle in Queensland.

The treatment of feed-lot cattle with hormones in U.S.A. is now well-established. Producers are interested in the possibilities of the use of hormones for fattening in Queensland. Since there are differences in the type of feedstuff available here and also considering that the method of treatment would necessarily vary it has been necessary to gather as much information as possible under Queensland conditions.

During the past three years, observations have been made on about 600 head of steers or bullocks on 12 different properties. Growth rate performance on native pastures, improved pasture and crop have been observed. Properties on the Darling Downs, Burnett and Far North Queensland have been included in the investigations. In addition to weight gain performance, carcass measurements and observations have been made where possible.

The information which follows summarises work to date, and the recommendations are based on local experience:

Male cattle (steers or bullocks) only have been treated. Results with treatment of fattening heifers have been variable in other parts of the world. More information is required before recommendations can be made for this class of animal.

Breeding animals of either sex should not be treated.

Extreme care is necessary to ensure that no residue of the tablet is present in any edible meat. No variation from the recommended site for injection should ever be made.

What Are Hormones?

Hormones are chemical substances which occur naturally in the body of animals, where they regulate various activities. There are several different kinds, each with a separate function. The proportion of various types of hormone

occurring naturally in animals varies with the sex of the animal. Thus, reference is sometimes made to a "male" hormone or a "female" hormone.

The chemical compositions of some naturally occurring hormones have been established and these can now be manufactured by chemical means. Hexoestrol is the hormone which has been used most commonly in Queensland. It is a synthetic product similar to the natural "female" hormone called oestrogen.

Hexoestrol is made up commercially in tablet form—the common size at present contains 15 milligrams of hormone. The cost is about 6d. a tablet.

Methods of Use

Hormones can be either given in the feed daily or implanted under the skin. Mixing with the feed is practicable only under feed lot conditions. In Queensland, all observations to date have been made on grazing animals which have been treated by the implantation method.

Implantation is made by means of an implantor which consists of a hollow needle fitted to a plunger. The tablets are injected by depressing the plunger after the point of the needle has been inserted under the skin of the ear. Because of the possibility that some residue of the tablets will be present at slaughter, it is essential that the site of implantation be as far removed as possible from edible meat. *Thus implantation should be made only in the ear.*

Dose Rates

Observations have been made on dose rates ranging from 15 mgm. to 60 mgm. Where comparisons have been made, it would appear that no advantage is obtained from dose rates exceeding 30 mgm. However, where feed of high quality is abundant throughout, the dose rate above 30 mgm. may be justified. On the other hand, increasing dose rates leads to intensification of undesirable carcass characteristics.

The Effect of Treatment

Hormones cannot take the place of a foodstuff. They are not a foodstuff in any way. The effect of hexoestrol implantation on steers or bullocks is to alter the proportion of muscle (lean meat) and fat which is produced from its feed by the animal. The hormone directs more of the absorbed nutrients from the feed into the muscle at the expense of fat. When animals are in a fattening state and have access to plenty of feed of suitable quality it is unlikely that this change due to hormone treatment will be excessive.

On the other hand, if the feed supply suddenly fails, hormone treatment is likely to produce a carcass which lacks "finish." This has led, in some cases, to downgrading and actual economic loss.

Implantation of ordinary store cattle serves no useful purpose since such animals are unable to take advantage of the treatment. It will be appreciated that hormone treatment does not start the fattening process but is only useful when the fattening is proceeding.

Undesirable Side-Effects

Some undesirable side-effects on the behaviour of the animals and on carcass conformation are usually evident. It has not been demonstrated that these alone are of a serious economic nature.

Treated animals show a tendency to mount their mates, particularly when mustered or yarded. A slackening of the pelvic ligaments

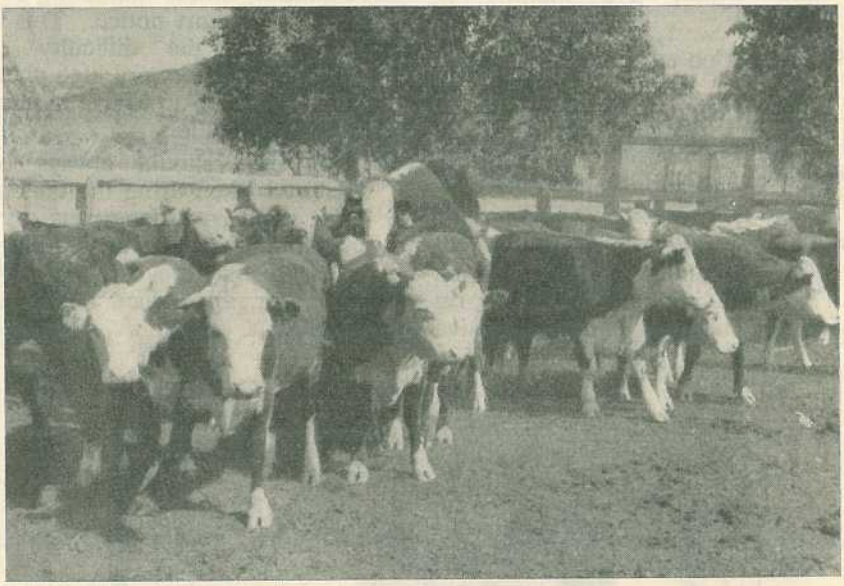


Plate 1

A Group of Steers Treated with Hexoestrol.

with consequent elevation of the tail head, sideways sloping of the rump and swayback are frequently seen. Excess development of the rudimentary teats and a thickening over the neck and shoulders have also been noted.

The Effect on Body Weight

Under appropriate conditions, hormone treated animals tend to gain weight at a faster rate. Taking the average of all observations, treated animals have shown an increased liveweight gain of 22 lb. a head. The range of increased weight of treated groups over untreated was from 4 lb. to 35 lb. The range in length of period of observation was from 56-169 days.

With a carcass price of £7 10s. for 100 lb., an extra 22 lb. liveweight is worth about £1.

It is thought that the increased gain stems partly from the fact that less feed is required to produce 1 lb. of meat than 1 lb. of fat. Since hormone treatment tends to favour meat production rather than fat, a greater weight of lean meat can be produced from a given amount of feed.

When the Gain Is Made

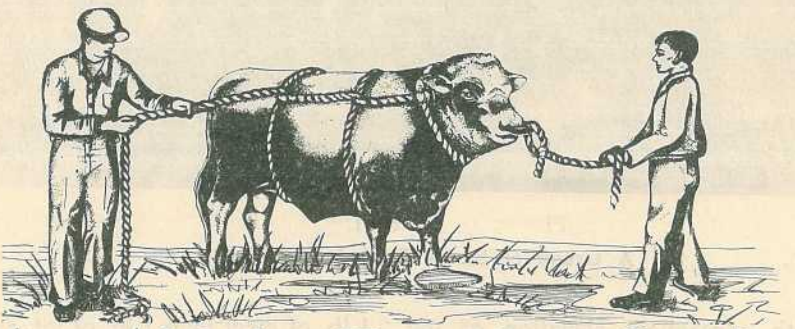
Implanted animals in suitable condition and on good quality feed tend to put on extra weight soon after implantation. This advantage appears to increase up to about 100 days and disappears at about 150 days. The best time for implantation is thus between three and four months before the expected date of turn-off.

To sum up—

- Hormones are not a foodstuff and will not promote fattening in animals.
- They should be used only on fattening steers or bullocks which are on plenty of good quality feed

and within five months of turnoff.

- There is no advantage in treating growing stock or backward stores. On no account should breeding stock be treated.
- Implant only in the ear of animals.
- There would appear to be risk of economic loss if using hormone implants on steers on native pasture under extensive conditions, unless marketing can be done at short notice. This is because of the difficulty of ensuring the necessary high plane of nutrition for up to five months after implantation.
- Great care should always be exercised when using the tablets. Treat them as a dangerous drug and store in such a way and place to ensure that they are not mistaken for any other medicinal material.



An Aid in Treating Cattle

How often have you put off a job because you weren't certain of how to tackle it? This is particularly the case in treating cattle, especially big animals. Moreover, complete restraint of the patient allows you to give thorough treatment.

Here is a method of casting or throwing cattle in preparation for branding, castrating, attention to feet, udders, head or many other parts of the body.

Firstly, tether the head by a halter or nose ring but allow sufficient slack rope for access to the head if tied to a fence. Now follow the diagram.

Tie one end of a strong 30 ft. rope around the neck of the beast with a non-slip knot. Take the rope over the withers and make a half-hitch around the body just behind the fore-legs. Then make another half-hitch around the body behind the ribs and immediately in front of the hip bones.

Standing at the rear and to one side of the animal, make a steady firm pull on the rope and the animal will sink to the ground without struggling or injury. The animal will go down on the side from which the rope is pulled.

The legs are next fastened in pairs, front to back above the fetlock. This is a precaution to protect the operator even where the front of the body is to be treated, for although the animal can't get up, it can kick.

Queensland Year Book, 1958

The 1958 issue of the Queensland Year Book is available in the main bookstores at the prices of 5s. for paper-covered copies and 7s. 6d. for stiff cloth-covered copies. Copies may also be obtained from the office of the Government Statistician.

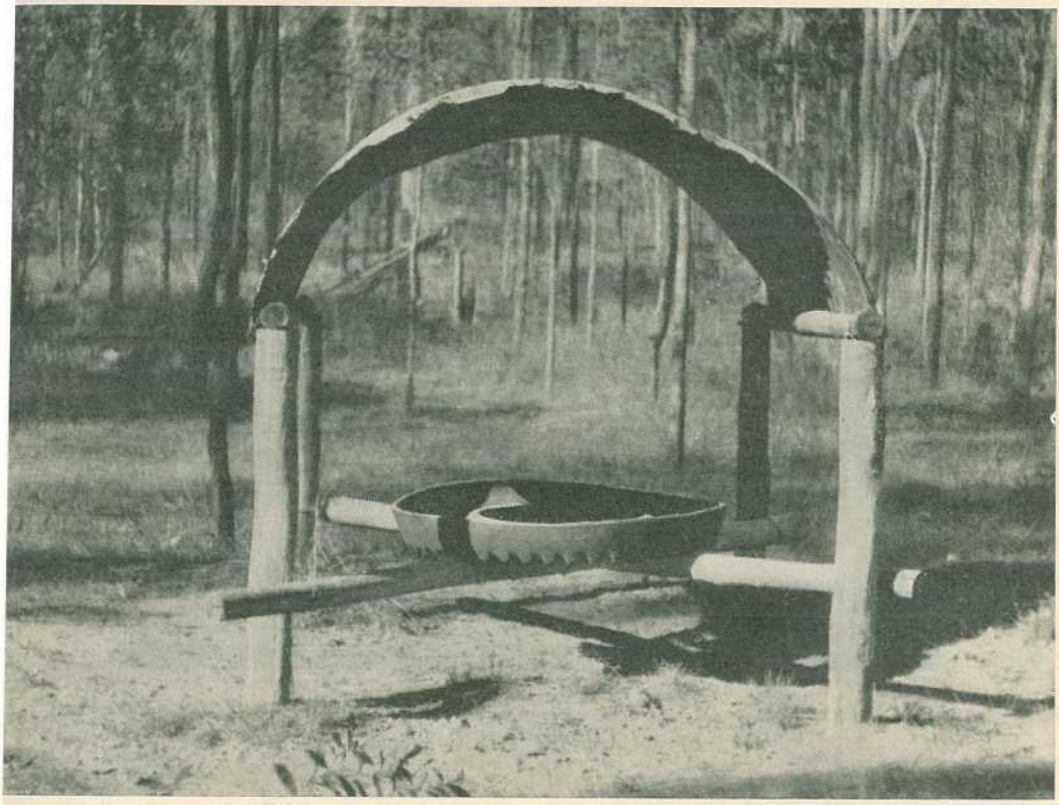


Plate 1: A General View of the Feeder.

A Cheap and Effective Lick Feeder

By P. C. DAVIDSON, Cattle Husbandry Branch

Mr. V. Smith, Melbadale, Dingo, has constructed a number of very effective lick feeders from materials that are available on most properties.

Phosphate deficiency of cattle is a problem encountered along extensive areas of coastal Queensland and northern inland districts. The feeding of bonemeal or boneflour is becoming a regular practice on many beef properties.

Where surface water is available to cattle for most of the year and no supplementary feeding is practised, the only practicable means of supplying a phosphate supplement to cattle is by licks.

A popular mixture consists of equal parts of boneflour (or bonemeal) and coarse salt. Parts are by weight. When stock are accustomed to such a mixture it can be changed to 75 per cent. bonemeal

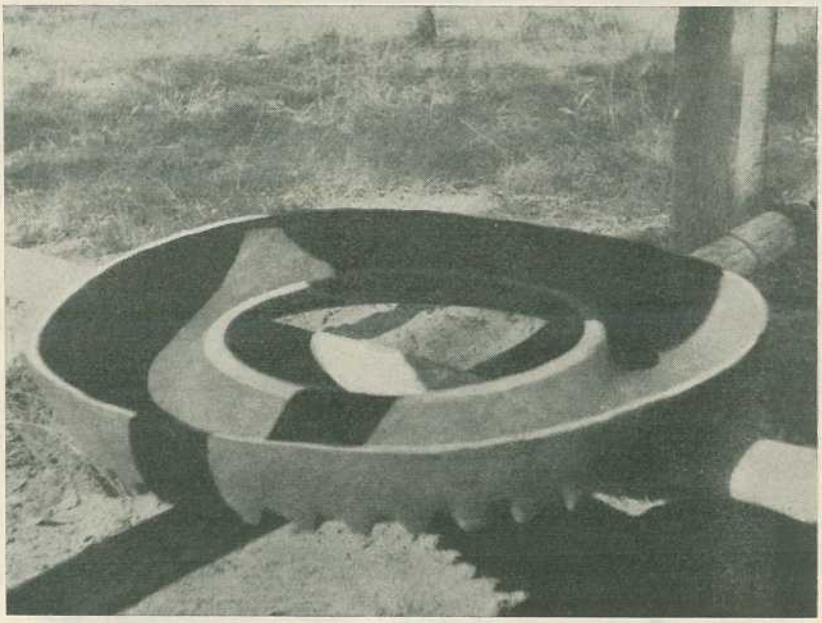


Plate 2
Close-Up of the Tyre Container.

and 25 per cent. salt if desired. The salt adds to the palatability of the mixture.

Covered lick feeding troughs are essential to prevent wastage caused by rain spoilage. Where uncovered troughs are used, it is necessary to discard most of the unused lick which has been dampened by rain.

This is all You Need

The materials required for the construction of Mr. Smith's type of feeder are usually plentiful and cheap. They consist of 8 poles of light bush timber, some number 8 wire, an old tractor tyre and half of a discarded 1,000-gallon tank.

The approximate dimensions are—

Distance between posts—6 ft. 6 in. to 7 ft.

Height from ground level to top rail —4 ft. 8 in.

Distance from ground level to bottom of tyre—1 ft. 7 in.

The tank should be flattened slightly for better coverage.

Construction

As can be seen from the illustration, the structure is very easy to make. The distances between posts and height of roof above ground level may be varied to suit but it is important that the bottom of the tyre be about 19 in. above ground level. At this height, cattle spill very little when eating. It is also sufficiently high to catch the tails of animals and so prevent dung and urine contamination in the feeder.

Advantages of this Type of Feeder

1. Construction is simple and quick, and apart from labour the cost is very low.

2. The lick is sheltered from the weather, thus cutting out wastage due to rain damage.

3. By the use of a circular trough such as this, more cattle are allowed to feed at one time. Boss cows can only control one quarter of the trough space at most. This leaves the remaining three-quarters for more timid cattle.

Position of Feeder

The feeder should be strategically placed in the paddock so that cattle will use it regularly. Since bonemeal and salt are heavy materials, motor transport of them is indicated. Thus, easy access by motor vehicle is desirable. Near watering places or cattle camps are ideal situations. If the feeder is in a convenient position it will be possible to check it regularly whilst inspecting watering facilities.

A few shillings may save you pounds

THE FIGHT AGAINST DISEASE—III.

How Infectious Diseases Are Spread

By G. C. SIMMONS,
Senior Bacteriologist.

One of the important sides to the study of infectious diseases is how they pass from one animal to another and produce ill health. This is discussed here:

Many of the ancient laws relating to hygiene were based on observations that outbreaks of disease may originate in one area and then spread throughout a community. Consequently, isolation and quarantine have long been a standby to prevent epidemics. Nevertheless, it was only after the germ theory of disease was discovered that people realised that some such customs were based on sound principles.

Microbiologists have divided pathogenic micro-organisms into six groups: viruses, rickettsia, pleuropneumonia organisms, bacteria, fungi and protozoa. Although representatives of each of these groups may have their own special means of transmission there are some factors basic to all of them. These will be considered later, but firstly the source and reservoir of pathogenic organisms (pathogens or germs) will be briefly discussed.

Outside the host, the pathogen may be a temporary or permanent inhabitant of the environment. The duration of its existence outside the body often determines the ease with which a disease is transmitted. If it can survive for long periods, there is more chance that it comes into contact with a suitable host. It must be realised also that some organisms do not need to infect an animal in order to survive, but will multiply in soil, water or vegetation if conditions are suitable.

With most diseases, the infected animal is the important reservoir, for such animals shed numerous micro-organisms into the surroundings. There are two types of disseminators, the *clinically affected* animal and the *healthy infected* animal or *carrier*. During the course of most diseases there is a period in which the pathogen is shed from the body or occurs in the body in such a position that insects such as mosquitos can take up the infection. On recovery, the pathogen is usually eliminated from the body, but a small percentage of animals may continue to harbour it and shed it intermittently or continuously into the surrounding atmosphere. These are *carriers*.

Other animals may become infected and show no ill-health but remain shedders of the infectious agent and also are called *carriers*. It is easy to realise then the importance of recognising such carriers in any herd or flock when eradication or control of a disease is attempted. In tick fevers of cattle, the carrier state is deliberately produced to

obtain immunity but such is an exceptional case.

Methods of Transmission

An animal may pick up an infection by three main methods:

(1) Contact with an infected animal.

(2) Contact with the infectious agent which is in the environment.

(3) Bites of insects.

For better consideration, method 2 is divided into Section 2a dealing with infection obtained by entry of the germ through the external surface of the animal; and 2b which considers infections where the pathogen enters the body through one of the external openings.

1. Contact with Infected Animal

Rarely is direct contact the method of transmission, necessitating as it does the physical contact between the donor and recipient of the micro-organism. There is a group of diseases where this method is important and these are the venereally transmitted diseases, such as bovine trichomoniasis. This type of transmission may depend on the host rather than the infecting agent. For example, bovine vibriosis is usually transmitted by service, but in ovine vibriosis caused by the same organism, venereal transmission is the exception. On occasions, stock such as cattle and sheep may be infected by bites from dogs carrying dangerous bacteria in their mouths.

2a. External Contact with Pathogen

External contact occurs when the pathogen is brought into contact with the external surface of the animal. Animals are constantly exposed to a wide variety of infections but have developed quite an efficient system of dealing with them before they can penetrate and set up the diseased state. Intact skin is impenetrable to all but a few pathogens. However, small scratches, cuts or abrasions of the skin may be all this is required to break down the skin barrier.

In many cases the host may be carrying the organism on its skin and infection occurs when the skin is altered by some influence either from outside or inside the body.

Examples of this method of transmission are contagious pustular dermatitis of sheep and the fungal disease ringworm, which occurs in several animal species. Infectious agents transmitted by this method are often quite resistant and are able to survive for long periods in or on the ground.

2b. Introduction of the Pathogen into the Animal

Introduction of the pathogen into the animal is by far the most common method of infection. The introduction may occur by direct penetration of the body such as by wounds or by entry of the respiratory, oral, intestinal, or genito-urinary tracts or teat canals. The pathogen may cause immediate sickness or may lie dormant for a considerable period as in the case of blackleg of cattle.

Diseases occurring as a result of respiratory tract infection naturally include those which manifest themselves in the form of pneumonia, bronchitis, coughing and sneezing.

Coughing, sneezing and even breathing expel numerous droplets of moisture into the atmosphere. These droplets may contain the infectious agent. The large droplets soon fall and thereby pollute water or feed. If they fall and dry out, scattering of the germs may occur by the dust being carried by the wind.

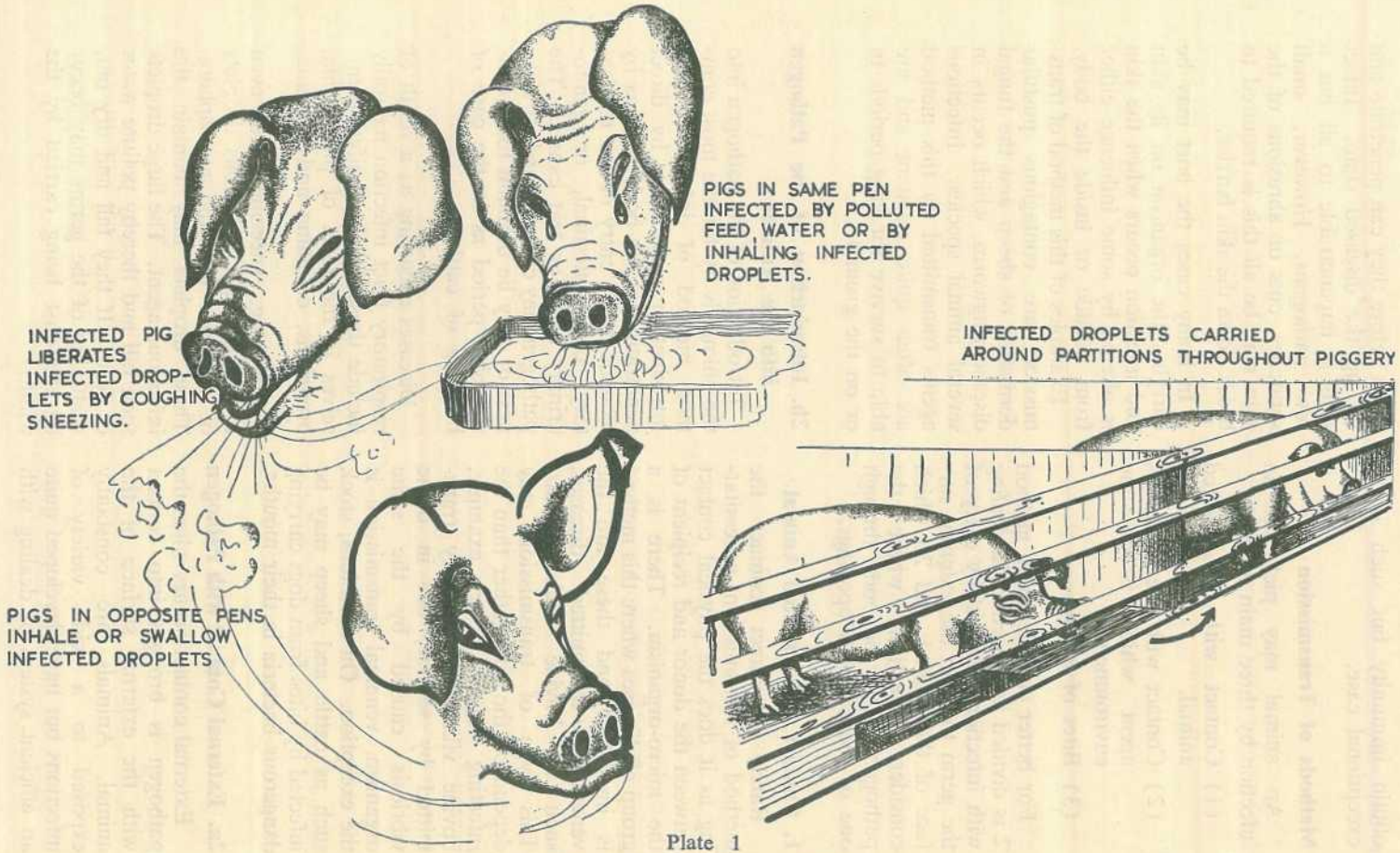


Plate 1

A Method of Transmission of Disease.

Small droplets are very light and have a large surface area in comparison with their volume. As a result, they remain in the air for considerable periods and also tend to dry out quickly in the air.

If the pathogen is not killed during the drying process, the air may be heavily contaminated with small infective particles. Infectious laryngo-tracheitis of fowls and virus pneumonia of pigs are examples where droplet infection is important.

Swallowing of infectious agents is a common method of transmission. In many animal species, the stomach contents are very acid and will destroy many pathogens that are swallowed. This is probably true when Brucella infected milk is consumed by man.

However, just as food factors are drawn from the intestine into the tissues so may pathogens which survive the stomach journey pass through the wall of the intestine and eventually lodge and grow in sites suited to their particular requirements.

Other organisms may not need to leave the intestine but merely multiply in it and so disrupt normal functions that disease is manifested. Bacteriological examination of tissues from such a case will often result in the isolation of the pathogen, such as Salmonella, from the intestinal contents and associated lymph nodes but not from other tissues such as liver and spleen.

Few diseases enter by the genito-urinary system unless by direct contact as described under 1. The period when offspring are being born or just after is dangerous as the uterus and genital tract of the dam is then in a very susceptible state, and chance contact with

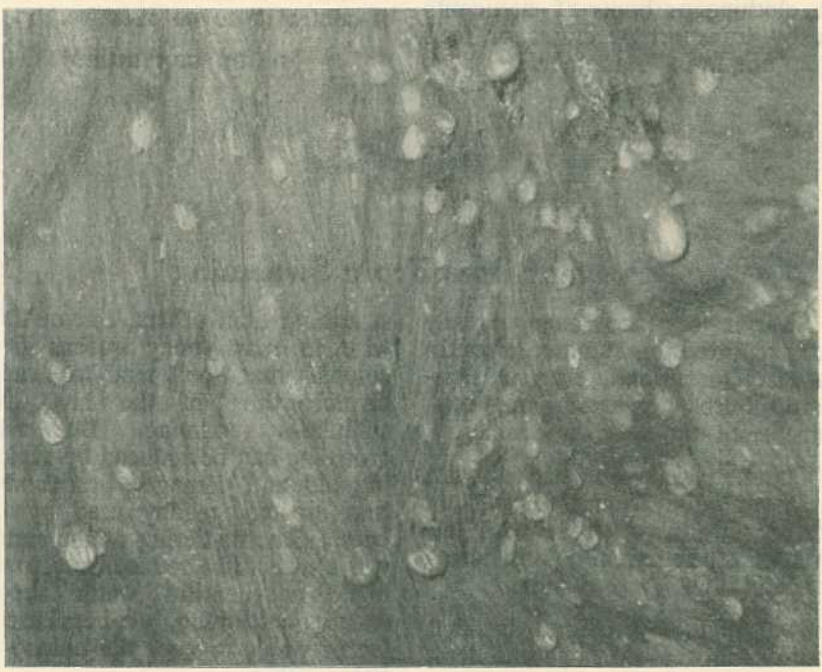


Plate 2

Cattle Ticks May Infect Cattle With Tick Fever Organisms.

pathogens in the environment may result in infection.

A man-made transmission of type 2a is that which occurs in mastitis. *Streptococcus agalactiae* is an organism which is only occassionally present outside the bovine udder. Experiments have shown that transmission of this disease is mainly by milkers' contaminated hands, milking machines and cloths used for washing udders.

The transport of infection from one place to another is obviously most important, particularly in this method of transmission and the ways in which this is done are many. Wind may transport micro-organisms or water may carry them along streams and drains. Pathogens are excreted in large numbers in excreta, urine and discharges from nose and mouth. Bedding, sheds, crates and soil can therefore become heavily contaminated. This material may then be transported on clothing or boots of attendants or by transport of crates or feed from one farm to another.

3. Vectors

Some diseases are transmitted by insects or other living agents which do not show any signs of ill-health as a result. In the case of fowl pox, the mosquito sucks infected blood from a fowl with fowl pox and transmits it to the next bird that it bites. The mosquito in this example acts merely as a mechanical carrier of the virus.

On the other hand, there are some mosquito-borne diseases in which the virus must develop within the insect before transmission is likely to take place. Some parasites have the ability to survive throughout the life cycle of the vector. This is so in tick fever of cattle.

Each micro-organism may have its own main method of transmission but most are capable of using several routes. A full understanding is therefore necessary of all means of transmission of a disease if control is to be effective.

[TO BE CONTINUED]

Prevent Bees From Swarming

Swarms of bees have already been reported this summer in south-eastern Queensland, even in Brisbane suburbs. Swarming may continue until the end of summer.

Commercial beekeepers look with disfavour on swarming. Departure of the swarm often reduces the strength of the parent colony during a nectar flow.

Swarming is a natural instinct, and for that reason it's very difficult to prevent. Some strains of bees have a greater tendency towards swarming than others, so you'd be wise to rear young queens from colonies that don't tend to swarm. Overcrowding in the hive also stimulates swarming. But overcrowding can be reduced by replacing old and damaged broodcombs that are not readily used by the bees. Careful tiering of the supers will also help to reduce overcrowding. A plentiful water supply reduces swarming, as bees use a lot of water to cool the colony in hot weather.

—C. ROFF, Adviser in Apiculture.

Stock and Station

Beat Tetanus with Good Hygiene. Improved hygiene around sheep yards and shearing sheds will do much to reduce the toll of tetanus. This widespread disease is responsible for deaths ranging from a few sheep to several hundred.

Tetanus usually occurs after routine sheep work. At shearing, crutching, lamb marking, mulesing, and on dipping heavily grass-infested sheep, the animals can pick up tetanus germs. These germs often live for years in the soil around shearing sheds, dips, and sheep and horse yards. Infection takes place through wounds, especially deep ones. When it has gained entrance, the tetanus germ produces a poison that affects the nervous system. It is generally fatal.

Tetanus is very difficult to cure, so it's better to prevent it. Before shearing and crutching, the board should be scrubbed with disinfectant and the counting out pens cleaned. Lamb marking and mulesing tools should be dipped regularly in a disinfectant solution during these operations.

If tetanus occurs after lamb marking and mulesing, be warned and next time mark the lambs in temporary yards well away from the infected area. In any case, temporary lamb marking yards are an advantage. Besides being removed from the heaviest sources of infection, they allow you to drop the lambs on to clean grass after the operations.

Sheep can be inoculated to give them immunity from tetanus, and for all sheep, especially valuable rams and show stock, this may be worthwhile. Two injections 12 months apart will ensure life long protection.

—A. T. BELL,
Director of Sheep Husbandry.

Cost of Treating Sheep For Lice. Before tackling the job of treating sheep for lice, it is well for a sheepman to discover whether putting the sheep through is going to cost him more than it should.

As a case in point, some sheepmen dipping sheep with a power spray or plunge dip use dieldrin at a concentration of 0·05 per cent. Others use only a strength of 0.0125 per cent. Using the higher concentration at ½ gallon of dip to a sheep would cost over 1½d. for a sheep. Using the lighter concentration at half a gallon to a sheep would cost well under ½d. a sheep. Actually dieldrin at 0·0125 per cent. is quite strong enough to eradicate lice in sheep not long off shears.

For the man using the higher concentration, it would cost £6 13s. 4d. for 1,000; for the other man, £1 13s. 4d., which is just £5 more on every 1,000 sheep. Quite a difference, isn't it?

If you need help in deciding strength and quantity of insecticides, contact your local Sheep and Wool Adviser to help you work out the most economical way of treating your sheep for lice.

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

Control Ticks in Spring. The cattle tick is a one host tick and you can gauge how prolific it is when you consider that a female will lay an average of 3,000 eggs when it drops from a beast. Now if you have a heavily infested animal dropping up to 200 ticks a day and you have 30 animals so infested, you will realise that those animals can infest your pastures at the rate of 18 million eggs a day.

The thing which helps to control tick population, one way or another, is the weather. Ticks like hot, humid and wet conditions, that is why they are so prolific in the summer months. On the other hand, cold conditions have an adverse effect on ticks and that is why we do not experience the same trouble from them in the winter months. Because of this adverse effect which cold has on tick propagation, it means that we enter the spring months of the year with a minimum of pasture infestation. So, if you control your ticks in the spring months of the year; that is, about September to December, dip them with an effective insecticide at least every three weeks, it means that you can take your cattle into the wet summer months of the year with minimum tick infestation abounding in the paddocks. This will lessen the number of dippings you will have to carry out in the wet months of the year when everything is against you and for the ticks.

—S. G. KNOTT,
Divisional Veterinary Officer

Feeding Beef Weaners. Beef weaners in Queensland need some extra feed during their first winter if they're to reach market weight at early age. The rate at which a calf grows during its first winter determines whether it can be marketed at two or three years.

Cattle that have native pasture as their only feed usually lose weight in the winter. Beef calves weaned onto blue grass or kangaroo grass lose weight and receive a setback.

They never catch up again, and this check can cause them to reach market a year late.

After May, the growth of calves on their mothers comes almost to a standstill. Cows suckling calves during the winter do not have a chance to regain body condition in preparation for the next calving.

Giving weaners supplementary feed in the winter will keep them growing. This practice also permits earlier weaning, which gives the breeders a chance to put on condition and have heavier calves.

Probably the simplest way of improving the feed for weaners is to reserve a special paddock for them. This may be the best paddock on the property, an area of improved pasture, a grazing crop or crop residue. If none of these can be arranged, a little conserved fodder is effective in preventing weight losses. Two to 3 lb. a head daily of good lucerne hay or three-quarters to 1 lb. of meal rich in protein are suitable materials. Cottonseed meal and peanut meal are well suited for this purpose. Meat-and-bone meal is also a satisfactory feed, but there may be some difficulty in getting the weaners to eat it. The feed should be taken to the cattle twice a week.

—D. N. SUTHERLAND,
Director of Cattle Husbandry.

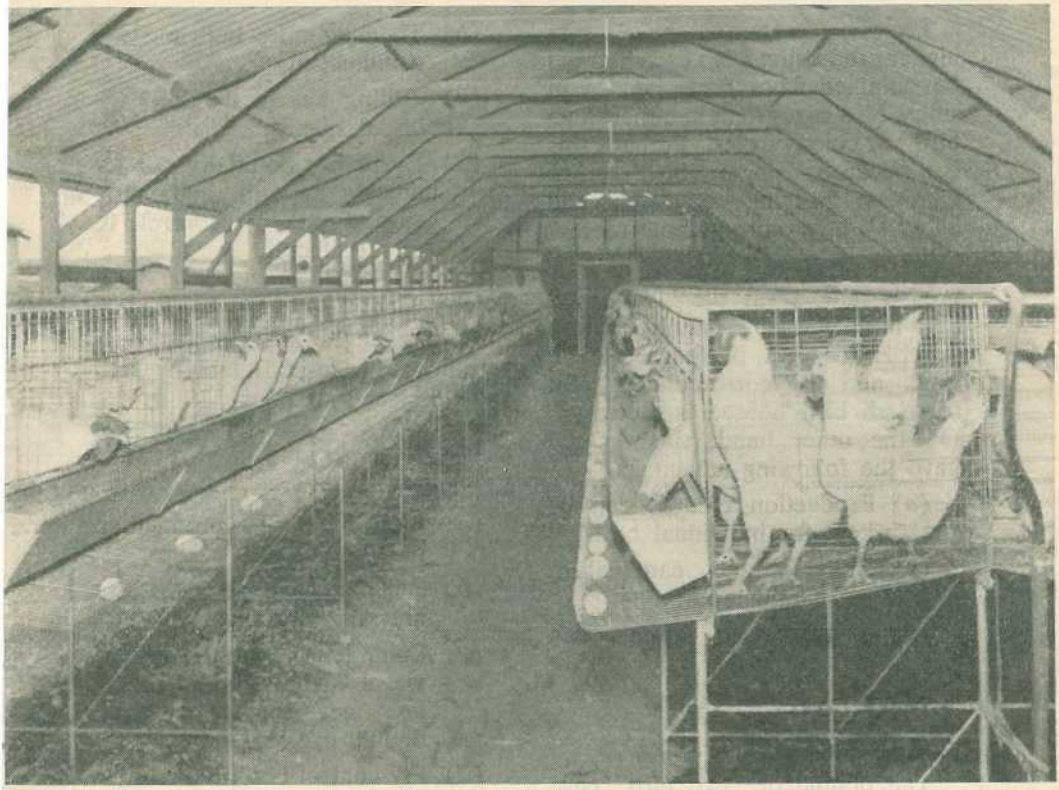


Plate 1: A Single Tier Cage System with Two Birds to a Cage.

Keeping Hens In Laying Cages

By R. V. BYRNES,
Poultry Section.

Some people believe that housing layers in cages is a cruel practice. This argument can be dismissed in one sentence. Birds wouldn't maintain the high rate of production common in cages if the system was cruel.

Several years ago there were virtually no commercial cage farmers in Queensland. About this time manufacturers began to see a future in producing cages for the poultry industry. Once the early "teething troubles" were rectified, cages became more popular.

It is doubtful whether cages will ever supersede the intensive system of poultry farming, but they will have their place in the industry.

Laying cages are manufactured in 6 ft. units to hold eight birds in single cages or 12 birds in "two bird" cages and prices are usually quoted for a unit rather than for a cage.

Single Bird Cages

This cage, designed to accommodate one bird, is 9 in. wide, 18 in. deep, 21 in. high at the front and 18 in. high at the back.

Experiments have shown that higher production from each hen can be obtained from birds housed in single bird cages than in either "two bird" or colony cages. Perhaps this is because single bird cages eliminate bullying completely and allow slightly more "elbow room."

At present, this type of cage is not so popular as the "two bird" cage in Queensland, mainly because fewer birds can be housed to a shed, and the corresponding cost for each bird housed is increased. On the other hand, single cages have the following advantages—

(*a*) Production records can be kept for individual birds,

(*b*) Bullying and cannibalism are eliminated,

(*c*) Inexperienced farmers can cull accurately,

(*d*) Fly control is easier.

Two Bird Cages

The double or "two bird" cage is 3 in. wider than the single bird cage, but otherwise the dimensions are the same. They are favoured in Queensland at the present time because of the comparatively lower cost for each bird housed, that is including housing and cages complete. On present prices, the approximate cost would be 22s. for each bird in "two bird" cages and 36s. for each bird in single bird cages. In addition, "two bird" cages save time in feeding and egg collecting, as there are more birds in a given length of cages than with singles and consequently the distance walked is reduced.

However, "two bird" cages do have the following disadvantages when compared with single bird cages—

(*a*) Accurate individual production records cannot be kept,

(*b*) There is more bullying and cannibalism,

(*c*) Culling has to be done by visual means,

(*d*) Droppings don't dry out so quickly as with single bird cages, and fly control is more difficult.

Colony Cages

Colony cages are simply large wire-floored cages, 6 ft. long by 3 ft. wide designed to house 20 to 25 layers. They are not popular because of the following disadvantages—

(*a*) Individual production records cannot be kept,

(*b*) Bullying and cannibalism are very prevalent,

(*c*) Culling has to be done by visual means and is much less accurate than with double cages,

(*d*) Fly control is a problem, as droppings do not form cones and take longer to dry out.

The only points in favour of colony cages when compared with other types of cages are the slightly lower housing cost and labour requirement for each bird.

System of Cage Layout

The system chosen will depend on the attitude of the farmer. If he wants to get the greatest number of birds under the one roof, he may choose the multi-tiered system. On the other hand, he may consider that ease of operation in egg collecting, feeding and dropping disposal, is more important than number of birds housed and for this reason may favour a stepped system or a single tier system.

Generally cage systems can be classified into three main types—

(*a*) Single Tier Systems.

(*b*) Californian Offset or Stepped Tier Systems.

(*c*) Multi-tiered Systems.

The Single Tier System. This system consists of a single row of cages on either side of one or more aisles running the length of the shed. There are several suggested systems for the layout of a single tier system. One method used widely in America is to have two single rows of cages in a shed one on each side of a central aisle. The main advantage with a shed of this type is the ease of cleaning out droppings as this can be done from outside the shed.

On the other hand, construction costs may be cheaper with a multi-aisle shed and this may influence the farmer's decision.

With the single tier system, fewer birds can be housed to a shed than with either of the other cage systems, but it has important advantages. Operations such as egg collecting and feeding are much simplified as egg trays and feed troughs are each on one level at a convenient height (see Plate 1).

This reduces the amount of stooping and reaching by the person collecting eggs or feeding, and amounts to a considerable saving of time in a large cage plant.

The job of removing litter from a single tier cage plant is easier as there is more room to work under the cages. With birds housed in a single tier system, there is less danger of their being too close to the roof and being affected by heat radiating from the roof in hot weather. This can be a problem with multi-tiered and offset systems.

Plate 2

Interior of a Two Aisle Cage Shed, Showing One Aisle and Four Rows of Offset Cages. Note the individual production cards tacked to lengths of pine board.

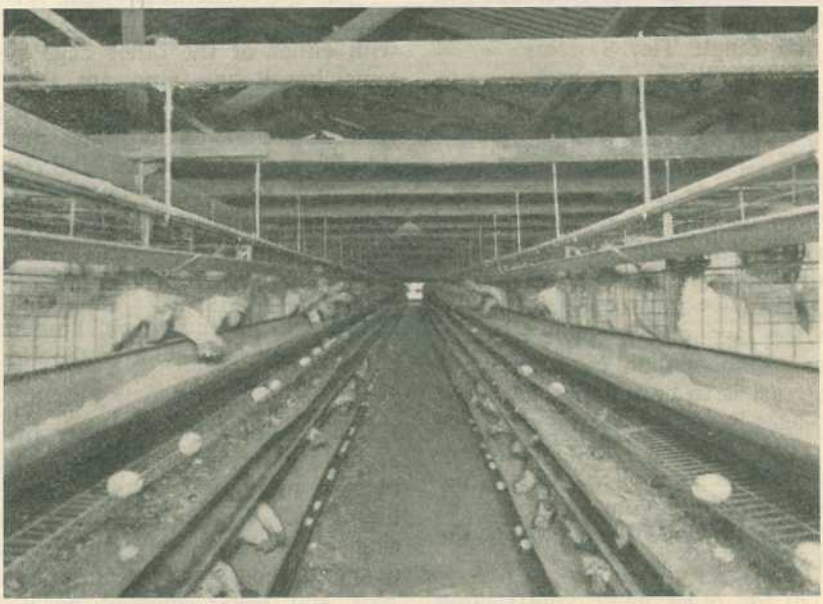


Plate 3

Four Rows of Multi-Tiered Cages on a Cage Farm at Mt. Cotton. In this instance, the cages are two tiers high.

It appears that single tier systems are gaining popularity in Queensland, as they have done in other countries, and they may well become the most popular system on cage farms within a short time.

Californian Offset or Stepped Tier System. This system consists of two rows of cages one offset above the other so that the front of the top row of cages is 4 in. behind the back of the lower cage. This allows droppings from the offset row of cages to fall clear of the lower row. This system is the most common one in use in Queensland at the present time, probably on account of the fact that more birds can be housed to a unit of shed area than with the single tier system while at the same time removal of droppings isn't the problem that it is with a multi-tiered system.

With two tiers of cages offset, neither can be placed at a convenient working height, hence a considerable amount of stooping and reaching is necessary during egg collecting and feeding. This will automatically increase the time required for these operations.

The usual layout is four offset rows of cages to a shed, two on either side of a central aisle. However, this can be varied, and with a wider shed, eight rows can be accommodated. Four offset rows are placed back to back in the centre of the shed with an aisle on either side and a further two offset rows on the outside of each aisle (see Plate 2).

Multi-tiered System. This system appeals to those farmers who consider that the number of birds housed to a shed is more important

than ease of operation. As the name implies, the multi-tiered system is simply one or more rows of cages placed on top of one another (see Plate 3). It is necessary to make provision for collection and removal of droppings from other than the bottom row of cages. Dropping trays and wide revolving belts fitted with scrapers are two methods used and both of these have their disadvantages; dropping trays are awkward to handle and time consuming in cleaning. Belts are costly and deteriorate rapidly due to the destructive action of the droppings. Both dropping trays and belts have to be cleaned frequently as there is little room for droppings to build up under the cages.

Birds are affected more by heat in multi-tiered systems than in single tier systems as ventilation is better in the latter and heat radiation from the roof affects the birds less.

Site

Before choosing a site, make sure that the local authority permits poultry farming in the area. In addition, certain building regulations may apply to your district so make sure that you are conversant with them before you site your sheds.

To allow for future expansion, the smallest area of land required for a cage farm would be five acres. When choosing the site, bear in mind that it should be well drained with as little slope as possible in the direction in which you intend siting the long axis of the sheds. For this reason, land with a gentle easterly slope would be ideally suitable for a cage farm, provided that the site is accessible by road. A site such as this would be well drained and would receive the most effective sunlight for drying of droppings. The easterly aspect might ensure some protection against prevailing westerly winds in winter.

It is desirable that the long axis of the sheds run north to south to get the greater drying effect from sunlight on droppings on *both* sides of the sheds.

Layers in cages are particularly susceptible to cold prevailing winds, so it is necessary to provide wind breaks. If clearing is necessary it is a good idea to leave a belt of standing timber on the windward side of the site.

Housing

The ideal cage shed should allow maximum ventilation in summer, should have sufficient overhang to prevent rain blowing in on droppings, should protect birds from cold winds in winter and should be economical to construct.

Single or multi-aisle gable roofed sheds fit these conditions fairly well provided that at least 3 ft. of roof overhang is allowed and provision is made to protect the birds from cold winds in winter. If the sides of the shed are left open, it will be necessary to provide a windbreak on the windward side.

The length of the shed will be limited by the amount of level ground available on which to build it. If you extend a shed down a slope, a series of stepped levels will be necessary and pressure leaks may result in the watering system. The cost of construction of stepped levels will be high and it will probably be higher still if the whole site has to be levelled by excavation and filling.

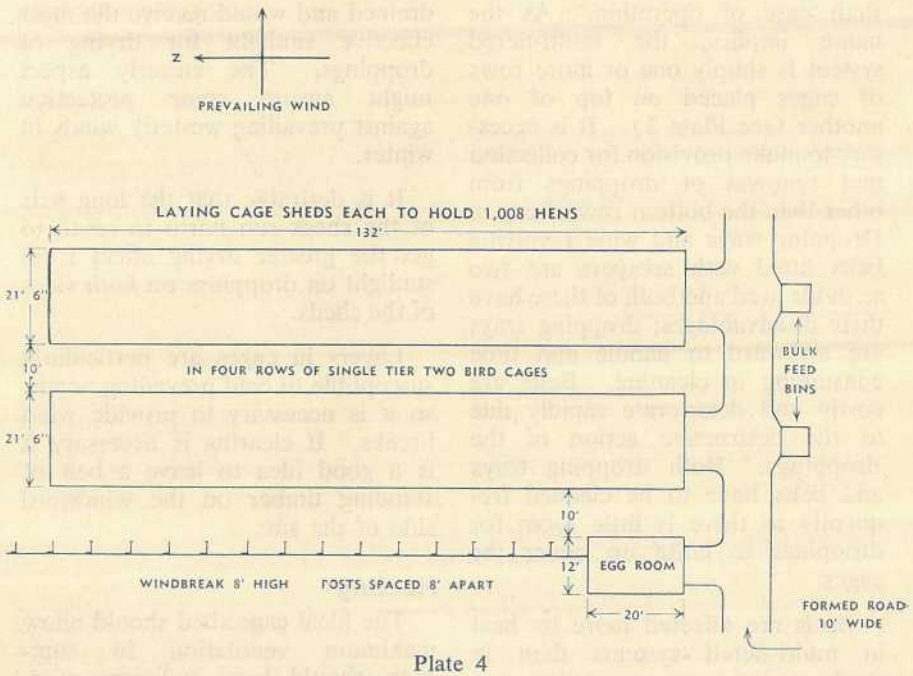


Plate 4

A Suggested 2,000 Bird Cage Farm Layout.

The width of shed will depend on the number of rows of cages which you intend to put in it and the system of layout that you intend to use. Take for example a two aisle cage shed to house four rows of single tier cages. Two rows of cages are placed back to back in the centre of the shed, and a single row on the outside of each aisle. Each cage will be 2 ft. 3 in. wide (including egg tray) therefore the cages alone will take up 9 ft. of shed width. Each aisle should be 3 ft. wide. This will take up a further 6ft., giving a total width of 15 ft. Allowing 3 ft. of roof overhang and 3 in. for studs on either side, the overall width between eaves will be 21 ft. 6 in. Floors may be cemented and should be formed to give at least 12 in. in 100 ft. fall from end to end. The 12 in. in 100 ft. fall is necessary to keep the water in the drip trough flowing freely. Where insufficient fall is allowed, drip troughs often become clogged with deposits of mash, dust or feathers.

Adequate drains should be provided around each shed, with all drains leading into one or two larger drains serving the whole farm. The height of the side walls of the shed should not be less than 7 ft. otherwise the birds in the outside rows of cages may be affected by heat radiation from the roof. Allow approximately 3 ft. between the floor of the shed and the bottom of the cages to ensure that egg trays and feed troughs are at a convenient working height. This will allow plenty of room for cleaning out droppings (see Plate 5).

When siting the sheds, leave a space of at least 10ft. between eaves to allow air circulation, access of sunlight, and passage of vehicles

during litter removal operations (see Plate 4 for a suggested cage farm layout).

Feeding

Although the feeding requirements for caged layers are similar to those for layers housed intensively, it must be remembered that under this system the birds are entirely dependant on the feed to supply all their requirements. A caged layers' all mash ration should contain a minimum of 15 per cent. protein, supplemented with adequate levels of vitamins A and D3, additional calcium and the trace element manganese sulphate. Low fibre mashes, that is, those containing less than 5 per cent. fibre should be used in cage plants as they tend to produce drier droppings than high fibre rations and so reduce the likelihood of a fly build up in the droppings. Excess salt in the ration is also a cause of over moist droppings so if this condition is noticed, steps should be taken to reduce the salt content immediately. Even though ground limestone or shell grit flour may be included in the ration, it is a good idea to give extra shell grit each week. This can be sprinkled on top of the mash or pellets.

Pelleted mashes are quite commonly used in cage plants, but owing to the bird's habit of picking up pellets in the beak and flicking them out of the feed trough, wastage with this type of feed may be greater than with an all-mash. On the other hand there is less fouling of the drinking trough by mash particles where pellets are used.

The metal feed troughs which are supplied with the cages have ½ in. lip on one or both sides to prevent birds' raking mash out with their beaks. However, this lip is effective only if the troughs are not filled more than two-thirds full and the birds are de-beaked.

In Queensland, "feeding up" on cage plants is usually done twice weekly. The feed is usually carried in a rubber-tyred push cart and ladled into the feed trough by means of a hand scoop. On cage farms in America, the use of battery-powered or engine-driven carts for feeding and egg collecting is common. To allow the person feeding up or collecting eggs to

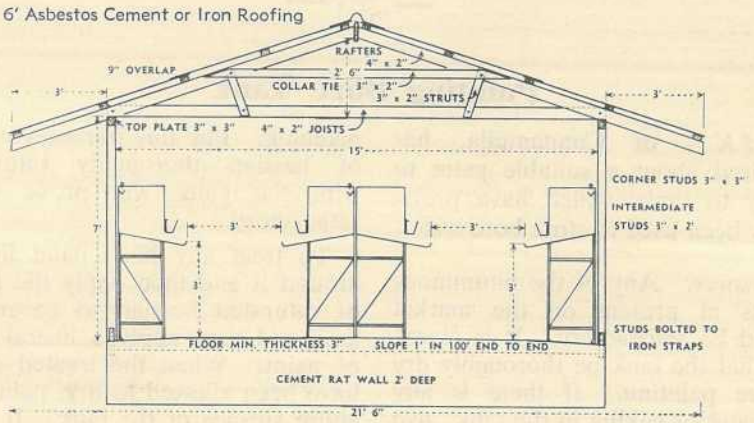


Plate 5

A Sectional View of One of the Cage Sheds Shown in Plate 4.

have both hands free, wooden or iron tracks or even grooves in the cement are used to guide the wheels of the cart.

Watering System

The most common type of watering system used in cages in Queensland is the nipple system. A ½ in. water pipe fitted with brass drinking nipples spaced at intervals to coincide with every second cage division is fixed to the front of the cage above the feed trough, or alternatively on top of the cage. Two cages are served by each nipple. Where single tier cages are placed back to back, one water pipe is placed between the two rows of cages so that it serves both rows.

As the nipples are inclined to leak, it is necessary to have a small V shaped drip trough fitted below the water pipe to stop water getting into feed troughs and spoiling mash, or onto droppings where it will favour a fly build-up. As mentioned in the section on housing, drip troughs should be given at least 12 in. fall in 100 ft., to prevent clogging. If a tap is provided at the end of each line of troughing, it can be used to fulfil a second purpose by enabling the birds to get extra water during a heat wave.

The supply of water to the nipples is regulated by a reservoir fitted with a float valve or by a pressure reducing device which is fitted directly to the water main. One reservoir should be provided at the end of each pipeline. The outlet to the pipeline should be fitted with a strainer to prevent foreign matter entering the line and clogging the nipples. A piece of clear plastic piping fitted vertically into an elbow at the end of the pipeline will indicate the level of the water in the reservoir and is an easy means of checking the water supply.

An alternative watering system is one whereby a continuous flow of water is run through a V shaped trough similar to the one mentioned previously. This ensures a continuous flow of cool water to the birds at all times.

[TO BE CONTINUED]

Painting Bore Tank

"M.K.", of Cunnamulla, has inquired about a suitable paint to apply to tanks which have previously been used to store bore water.

Answer: Any of the bituminous paints at present on the market would be satisfactory. It is essential that the tank be thoroughly dry before painting. If there is any sediment or caking in the tank, give the caked surfaces a thorough brushing with a wire brush to remove the sediment. Any holes that may be found will require patching. For this purpose, pieces of hessian thoroughly saturated with the paint will prove quite satisfactory.

To treat any hole, paint lightly around it and then apply the piece of saturated hessian to cover the area and then apply a liberal coat of paint. When the treated areas have been allowed to dry, paint the entire surface of the tank. It cannot be too strongly stressed that the success of the operation depends on having the tank clean and thoroughly dry before painting.

The Kensington Mango

By E. F. TREE, Adviser in Horticulture.

"An ever-green shade tree, which thrives in coastal Queensland on almost any type of soil. The fruit has a distinctive flavour which makes a fruit salad but the fibre is a nuisance. During the mango season, the crop is eaten by the neighbours' kids and flying foxes while the house cow mops up the fallen fruit."

That would be a fair description of the common mango but the Kensington mango is a different thing entirely. The Kensington mango is, literally, a beautiful fruit. When ripe, the skin shows a tinge of green, shading to a bright yellow with a blush of red where it has been exposed to the sun. A noticeable fleck in the skin together with the bright colour encourages some people to call it the "apple or strawberry mango" as distinct from the common variety. The flesh is free from fibre, thick, juicy and has a very rich flavour. It can be sliced from the seed and eaten with a spoon.

The actual origin of the Kensington mango is obscure. It was probably introduced by horse traders who were shipping remounts from Bowen to India. Commercial production of the variety began at Bowen and is credited to a Mr. Lott who named the variety after the property on which it was grown.

Propagation

Unlike many other varieties of mango, the Kensington breeds true from seed and this makes its propagation relatively simple. Three to six shoots develop from each seed and the accepted practice of pinching out all but the strongest shoot from each seed results in a very uniform line of trees.

Removal of the husk before planting the seed permits the kernel to be checked for weevil damage before planting and encourages the formation of a tap root in the seedbed. Fibrous root development will be improved if the tap root is cut some months before transplanting into the orchard.

However, it is better practice to plant the seeds in tins which are punctured at the bottom and lower sides and contain a few inches of coarse sand or gravel at the bottom. The tins are filled with a sandy loam and the seeds, dorsal side uppermost are pushed into the loose soil leaving the top exposed. A layer of partly decayed leaves or grass is used to top off the container. Frequent watering is necessary in dry weather to maintain growth in the seedlings.

The seed should be planted before the wet season, preferably in November. An occasional sprinkling of sulphate of ammonia around the edges of the tin will maintain the growth of the young trees.

Spacing and Pruning

Trees grown on a fertile soil will ultimately cover a large area but widely spaced trees give little return when young and, by the time they fill the spaces, much of the fruit is out of reach. A 35 x 35 ft. spacing is quite adequate on most of the lighter soils.

Early pruning should be restricted to pinching back the initial stem to form a head about

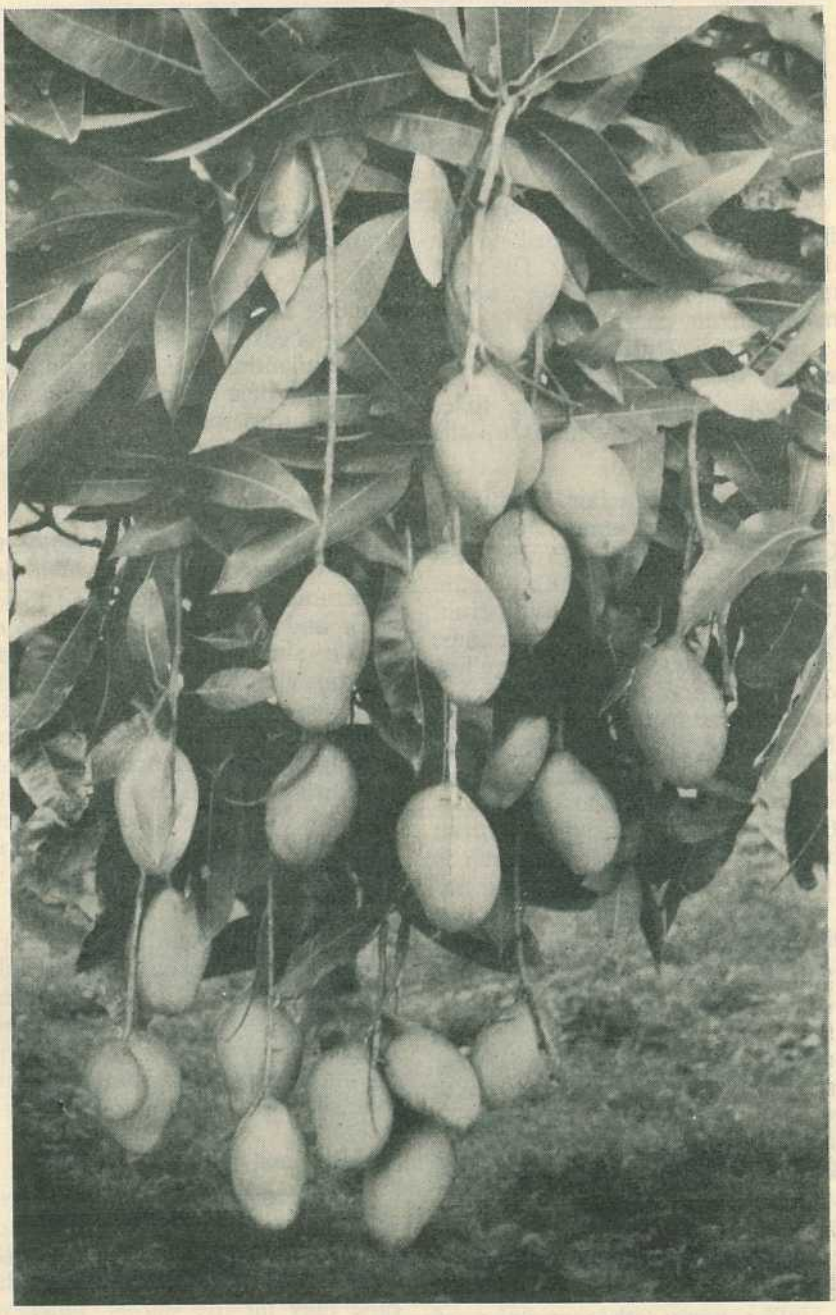


Plate 1

Mango Fruit Cluster. In the Dry Tropics, the Kensington bears heavy crops of large, highly-coloured fruit.

2½ ft. from the ground and then shortening back any branches which are over-vigorous.

Soil and Climate

Kensington mangoes are often planted on shallow, infertile soil. Although these conditions do not produce vigorous trees, the somewhat sparse foliage allows the sun to penetrate to the fruit and promotes early cropping. Early fruit with an attractive blush usually brings better prices than the larger, better-quality fruit harvested in mid-season.

It is not by chance that commercial production of Kensington mangoes is located in the Dry Tropics. Here 75 per cent. of the average annual rainfall of 40 in. falls in the first three months of the year. The hot dry period from August to December allows the crop to set and develop reasonably free from diseases which are troublesome in the wetter parts of the coastal belt.

Management

The alluvial soils of the Don and Burdekin rivers are well-drained clay loams. Water-bearing sands are normally encountered at a depth of 14-20 ft. below the surface. As the mango is known to be a deep-rooted tree, is is commonly believed that irrigation is unnecessary. This is quite wrong. The bulk of the feeding roots are located within 3 ft. of the surface and a marked response is obtained when the orchard is irrigated in July and again at three-week intervals after the crop has set.

Many young trees at Bowen show symptoms of nitrogen deficiency. Unless ample supplies of organic manure rich in nitrogen are available, sulphate of ammonia at a rate of 1 lb. per year—age of the tree should be applied in two dressings, half in December and the balance in March.

Bearing trees should receive a 4:12:12 or similar complete mixture, but the vigour of the tree should be taken into account in deciding the amount to use. Excess nitrogen will delay maturity of the fruit, induce vigorous leaf growth and prevent colour from developing in the skin.

Harvesting

The mango fruit has a caustic sap which causes discomfort to the pickers and blemishes the fruit. Washing the fruit in modern detergents, followed by a rinse in running water, quickly removes the congealed sap together with the natural bloom on the fruit.

Mature fruit which has not commenced to ripen is still firmly attached to the stalk and can be picked with the stalk attached. The fruit can later be de-stalked and placed stalk end downward in the shade to drain.

Prospects

Present production varies between 40,000 and 70,000 half-bushel cases, the bulk of which arrives on southern markets over a period of 6-8 weeks. The outlet has been broadened to some extent by the introduction of a private order trade which has gained ground in recent years.

Most people have to acquire a taste for tropical fruits and an increased demand for mangoes will depend on efforts made to introduce the fruit to new consumers. Better presentation on the market is urgently needed. Variable sized trays, strawboard liners and printed wraps instead of wood wool, and clean cases with attractive labels are all worth consideration.

The Kensington mango is a beautiful fruit; it should be efficiently handled, packed and presented to the consumer.

Brucellosis-Tested Swine Herds (As at 1st November, 1959)

Berkshire

Astbury, "Rangvilla", Pechey
Clarke, E. J., Mt. Alford, via Boonah
Cochrane, S., "Stanroy", Felton
Cook, F. R. J., Middle Creek, Pomona
Crawley, R. A., Rockthorpe, Linthorpe
Edwards, C. E., "Spring Valley" Stud, Kingaroy
Farm Home For Boys, Westbrook
Fletcher, A. C., "Myola" Stud, Jimbour
French, A., "Wilson Park", Pittsworth
H. M. State Farm, Numinbah
H. M. State Farm, "Palen" Stud, Palen Creek
Handley, J. L., "Meadow Vale", Lockyer
James, I. M. (Mrs.) "Kenmore" Stud, Cambooya
Kimber, E. R., Block 11, Mundubbera
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View" Stud, Yandina
Ludwig & Sons, A. R., "Beau View" Stud, Beaudesert
O'Brien & Hichey, J., "Kildurham" Stud Jandowae East
Orange, L. P., "Hillview", Flagstone Creek
Pfrunder, P. L., Pozieres
Potter, A. J., "Woodlands", Inglewood
Puschmann, L., "Tayfield" Stud, Taylor
Q.A.H.S. & College, Lawes
Regional Experiment Station, Hermitage
Rosenberger, N., "Nevrose", Wyreema
Schellback, B. A., "Redvilla" Stud, Kingaroy
Smythe, E. F., "Grandmere" Stud, Manyung, Murgon
Stark, H. L., "Florinda" 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
Garrawin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield
Gibbons, A. E. H., Mt. Glorious
Gibson, H., "Thistleton" Stud, Maleny
H. M. State Farm, Numinbah
Hall, M., "Milena" Stud, D'Aguilar
Heading, J. A., "Highfields", Murgon
Horton, C. J., "Mannuem Brae" Stud, Mannuem, Kingaroy
Hutton, G., "Grajea" Stud, Cabarlah
Jensen, S., Rosevale, via Rosewood
Jones, K. B., "Cefn" Stud, Clifton
Kahler, J. & S., East Nanango
Kanowski, A., "Exton", Pechey
Kennard, R. B., "Collar" Stud, Warwick
Larsen, H. L., "Oakway" Stud, Kingaroy
Law, D. T., "Rossvill" Stud, Aspley
Lees, J. C., "Bridge View", Yandina
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood
Mack, A. J., Mundubbera
Palmer, A., "Remlap", Greenmount
Pampling, G., Watch Box Road, Goomeri
Postle, R., "Yaralla" Stud, Pittsworth
Powell, R. S., "Kybong", Gympie
Q.A.H.S. & College, Lawes
Radel, V. V., Coalstoun Lakes
Regional Experiment Station, Biloela
Robinson, O. R., & O. J., "Linvale", Argoon, Biloela
Skyring, G. I., "Bellwood" Stud, via Goomeri
Stanton, H. R., "Tansey" Stud, via Goomeri
Stewart, L., Mulgowie, via Laidley
Stumer, K. F., French's Creek, Boonah
Wharton, C. A., "Central Burnett" Stud, Gayndah
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah
Zahnow, W., Rosevale, via Rosewood

Tamworth

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

Wessex Saddleback

Ashwell, J., "Green Hill", Felton South
Cooper, G. J., Neumgua
Douglas, W., "Greylight" Stud, Goombungee
Dunlop, J. B., "Kunawyn", Acacia Road, 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 Road, Sunnybank

Large Black

Pointon, E., Goomburra

Landrace

D. G. Grayson, Killarney

Orchard and Garden

Puffiness in the Tomato. Puffy fruit consigned to market can spoil your reputation as a tomato grower. It indicates an urgent need for better production methods with particular emphasis on the choice of varieties for planting and efficient irrigation.

Puffiness may be due to several causes, and is most troublesome during the winter months. Fruit with this defect is of inferior quality. Buyers do not like it and, on a competitive market, the pack sells at a discount.

Typically, the fruit is angular in shape, contains less than the normal number of seeds, is deficient in pulp, soft to the touch and light in weight. To a large extent, puffiness is associated with faulty pollination, which is aggravated by low temperatures at the time of flowering, and unbalanced nutrition.

Varieties differ in their ability to set and mature fruit during cool weather which is frequently encountered in plantings made during April and May in southern coastal Queensland. Grosse Lisse and its strains are, for example, less satisfactory at this time of the year than cluster varieties such as Potentate and Salads Special. If, however, you don't like cluster tomatoes, try Ace—a globe variety which has performed reasonably well in the winter crop and produces an attractive line of fruit.

No matter what variety you grow, watch your fertilizer programme. Heavily fertilized winter crops are very subject to puffiness in the harvested fruit. Reducing the amount of applied nitrogen and increasing the amount of applied superphosphate tends to reduce losses.

Finally, check your irrigation programmes. Puffiness can be induced by either too much or too little water. Only sufficient water is needed to keep the crop growing steadily from transplanting to harvesting.

—V. N. MEURANT,
Redlands Experiment Station.

Weed Control in Bananas. It's difficult enough, goodness knows, to keep weeds down in small crops planted on fairly even ground. But at least you can cultivate when the weather's suitable, and even hand-weed to get some measure of control. On the sloping, uneven difficult ground often planted to bananas, however, the problem of seasonal weed growth is a big one which needs careful and prompt attention.

There should be *two* main objectives—

(1) To prevent the weeds going to seed and so reduce future populations.

(2) At the same time to provide a soil cover to prevent run-off and erosion and protect the soil surface.

You can periodically brush down the weeds before they flower by using a sickle or slash-hook. The brushed weeds will form a good protective soil mulch.

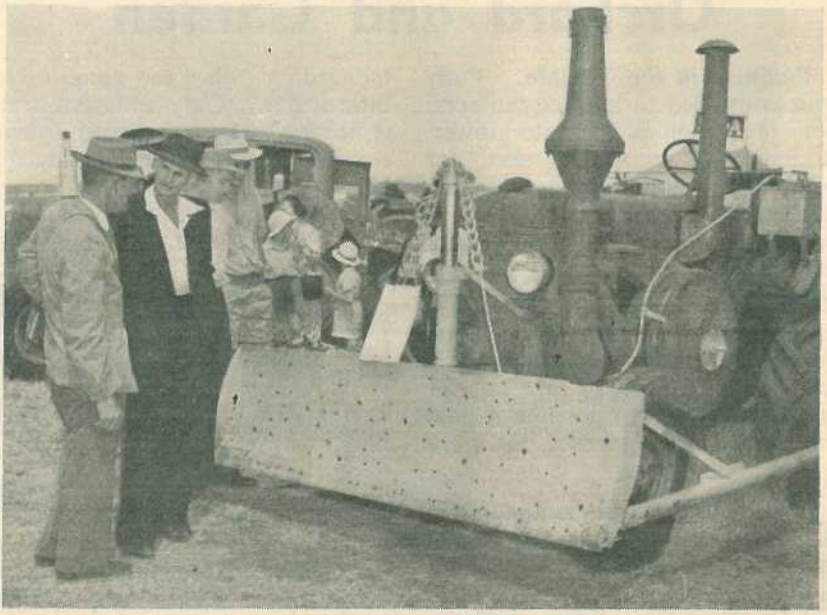
Any remaining weeds can be rapidly killed with arsenical sprays. Do not, in any circumstances, use hormone sprays. Most of these are harmful to bananas.

You can't afford to neglect weeds among bananas of any age and particularly in very young stands.

Once let the weeds get the upper hand in a young plantation, and lack of sunlight—plus competition for moisture and food—will quickly set them back.

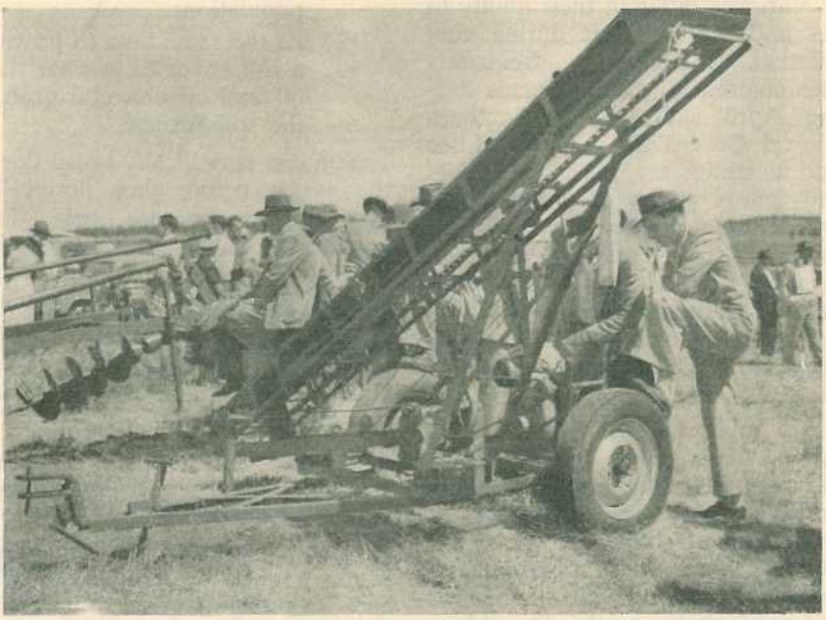
—D. DOWDLES,
Adviser in Horticulture.

Home-made Dozer Blade



Blade on "Bulldog" Tractor Equipped with Hydraulic Control. This Was Made by Mr. N. J. Rosenberger, of Wyreema, and Exhibited at the Toowoomba Farmers' Festival.

Mobile Bag Loader



A Mobile Bag Loading Elevator Made from Disused Truck Elevator, Front Wheels and Axle from Scrapped Motor Car, and a Spray Trailer Made from Chassis, Axle, Springs and Wheels from Scrapped Motor Truck. Mr. R. F. Hudson, of Southbrook, was the Maker.

For Country Cooks

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

Though very fruity, this cake has a light texture; its colour is rich. It cuts into neat, even slices.

Christmas in the Kitchen

The Christmas tradition is so strong and the sentiment so beautiful that anything less than the age-old customs would verge on sacrilege. Let us then try to embody the true spirit of Christmas in our parties for the Festive season; let's have candles, snowflakes, holly, reindeer, sleighs, Christmas trees, Santa Claus and Christmas bells and let us have the good, old, seasonal recipes, even if we modify those same recipes to suit our climatic conditions. The basic ingredients can be the same as those used by our ancestors in older countries but a touch of Queensland can be introduced to help our native-born people feel that they too can still enter into the spirit of the old-style Christmas feast time.

RICH CHRISTMAS CAKE: 12 oz. (¾ lb.) butter, 12 oz. (¾ lb.) brown sugar, 8 eggs, 1 lb. plain flour, ½ teaspoon baking soda, ½ teaspoon salt, 1 tablespoon mixed spice, 1 lb. seeded raisins, 1 lb. cleaned currants, ½ lb. sultanas, ¼ lb. mixed sliced peel, 4 oz. glace cherries, 2 oz. blanched and chopped almonds, 1 tablespoon treacle, ¼ cup rum, brandy or sherry (optional).

Note: If a very dark-coloured cake is preferred add 1 tablespoon Parisian essence (caramel colouring).

Prepare cake pan, 9 in. by 3½ in., by lining with three layers of unglazed brown paper and brush the paper that will be next to the cake with melted butter. If making up half the quantities, use a 7 in. round cake pan.

Sift the plain flour, soda, salt and spice. Blanch and chop the almonds and add them to the flour mixture—this keeps them crisp. Place the raisins, currants, sultanas and mixed peel in a basin, slice the cherries and add them; stir to blend evenly then pour over the brandy, rum or sherry. Orange juice can be used in place of the spirits.

Beat butter and sugar to a cream and if making a dark cake add the Parisian essence while creaming the butter and sugar.

Add each egg separately and beat until mixture is thick and fluffy. If eggs are added too quickly, the mixture will curdle.

Blend in the treacle. Add the sifted dry ingredients and beat quickly till smooth. Lastly blend in the prepared fruits and stir with wooden spoon until evenly distributed. Pack into prepared pan.

Bake in moderate to slow oven for about 4 hours. If making up just half the quantities, about 2½ hours baking will be sufficient.

Cool cake in the pan on a rack and do not remove paper wrappings until ready to ice or cut.

A rich fruit cake should be wrapped and stored from 2 to 3 weeks before icing and decorating for Christmas. The cake is usually covered with almond paste about ½-inch thick. When the paste is set, cover the cake with royal icing. Decorate after the icing is set.

★ ★ ★ ★

Your Christmas cake will be greatly improved in flavour and will cut into neater slices if you pour a little brandy or rum over the top, then lift the wrapping paper carefully from the bottom and add more brandy, and do the same to the sides, replacing the original wrappings as neatly as possible. Allow about 4 tablespoons brandy or rum for a large cake. Wrap the cake securely in two layers of greaseproof paper or one layer of aluminium foil and store in a sealed cake tin until ready to ice.

★ ★ ★ ★

SHORTBREAD: 4 oz. butter, 6 oz. plain flour and 2 oz. fine castor sugar. Sift the flour into a bowl and add the butter (which should be softened to room temperature). Rub the butter in finely. Add the sugar and knead thoroughly with the hands until the mixture binds together. Turn on to a board (do not dust the board with extra flour, it would make the shortbread hard and dry), and knead lightly. Press into a round cake about 7 in. in diameter then

lift on to a buttered scone tray, prick well and crimp up the edges, using finger and thumb. Bake in a slow oven until firm and a pale straw colour, do not over-cook. As soon as taken from the oven, mark into sections and dust with castor sugar while still hot.

Ayrshire Shortbread is made by beating 1 egg yolk into the sugar before adding to the butter and flour.

CHRISTMAS PUDDING: 4 oz. (¼ lb.) butter, 1 cup brown sugar, 1 teaspoon Parisian essence (caramel colouring), 3 eggs, grated rind 1 orange or lemon, 1 medium-size apple (chopped or grated), few drops almond essence, ½ teaspoon vanilla essence, 6 oz. plain flour, ½ teaspoon baking soda, 1 teaspoon mixed spice, ½ teaspoon salt, 1 cup soft white breadcrumbs, 1½ lb. mixed dried fruits, 2 oz. blanched and chopped almonds, ½ cup milk to mix with a good dash of rum or brandy if you like the flavour.

Note: Have ready washed some lucky coins and Christmas trinkets to add during the final stirring.

Sift the flour, soda, salt and spice together; add chopped almonds. Cream butter, sugar and colouring well; then beat in the eggs, one at a time. Beat well. Blend in the flavourings, orange rind and chopped apple. Stir in the breadcrumbs. Add flour mixture alternately with milk and beat smooth. Blend in the fruits.

Three-quarters fill a large buttered pudding basin (use aluminium or enamel for quicker cooking), or use two small ones, cover closely with buttered paper or aluminium foil.

Steam for about 5 hours. Remove cover and allow pudding to cool in the basin standing on a cake cooler. Re-cover and store in refrigerator until ready to re-heat at serving time. Serve with brandy butter and pouring cream.

BRANDY BUTTER (Hard Sauce): Cream together 2 oz. fresh butter (the unsalted kind if you have it), and 1 oz. castor sugar. Beat until very light-coloured and creamy. Then stir in 1 oz. ground almonds (almond meal). Keep the "butter" in a cool place until just before serving then add 1 dessertspoon of sweet sherry and 1 teaspoon brandy, blending them in a little at a time. Pack into a dainty glass dish and mark into small squares. Place 1 small square on each serving of pudding and allow it to melt slowly. Serve with thin pouring cream or a brandy-flavoured custard sauce.

FRUIT MINCEMEAT (for little Christmas mince pies, patties or turnovers): 2 large cooking apples (cut into quarters and cores removed, but do not peel), ½ lb. seeded raisins, ½ lb. currants, the juice ½ lemon and the grated rind 1 lemon, 2 tablespoons sugar, 1 teaspoon mixed spice, 1 tablespoon treacle, 2 oz. softened butter and ¼ cup rum or brandy (optional), blanched and chopped almonds to taste if you wish. Put the apples, raisins and currants through the mincing machine using the large cutter; place all ingredients in a bowl and stir well. If the fruit mince is not to be used immediately, pack it into a screw top jar and store in refrigerator. Use as required.

Hand Washing of Woollen Garments

By M. D. RICHARDS, Assistant Wool Technologist

THE first essential in washing woollen garments is an ample supply of softened water. A number of country bores conveniently supply it. By soft, we mean that it does not contain calcium or magnesium salts. These salts combine with the ordinary soaps to form insoluble metallic soaps which float on the water as a scum.

If a garment is immersed in water having this scum, it will absorb some into the weave and hinder effective washing. The scum is often the cause of white woollens becoming yellow.

Should your water supply be hard, there are proprietary water softening agents on the market which can be used with safety.

Pick a Good Soap

The type of soap is another important item; only good quality mild soaps should be used. These are usually sold in flake form. Quite a number of detergents are available; these can be used with confidence in place of soaps.

Squeeze lukewarm, soapy water through the garment for several minutes. Then rinse it in two changes of clear, lukewarm, soft water.

Remove excess water by squeezing the garment in a towel. Avoid wringing and twisting. Dry knitted garments by laying them flat on a towel in the shade and not in strong sunlight.

Requirements of a club secretary

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

It may be appropriate to introduce this very important section with the oft-recorded "Secretary's Lament." Those readers who have suffered at the hands of an inexperienced or incompetent secretary will probably endorse some of the sentiments expressed, while the efficient secretaries, past and present, will simply accept the "leg-pull" in the same manner as they have accepted all such jibes since the first secretary recorded the first minutes on a slab of stone thousands of years ago.

"If the secretary writes a letter it's too long.

If he sends a telegram it's too short.

If he sends out notices he's a spendthrift. If he doesn't he's lazy.

If he attends a committee meeting he's butting in.

If he stays away he's a shirker.

If he offers a suggestion he's a know all.

If he says nothing he's a useless nincompoop.

If the attendance at a meeting is poor he should have whipped in a few more members.

If he goes round whipping in members he's a nuisance.

If he asks a member for his fees, he's insulting.

If he doesn't, he's falling down on the job.

If the function is a success, the committee takes the praise, but if it is a failure the secretary gets the blame.

If he asks for advice he's incompetent.

If he doesn't he's got a swelled head.

If he dies he was the best secretary they ever had.

If he lives they will go on grumbling about him until he does die."

The secretary has a key role to play in almost every activity, and if he (or she) is doing his job he will be in the centre of things. If he is a good secretary he will like being in everything, like making arrangements, and like to keep things tidy and in order. This liking must be genuine and enduring because the position of secretary is no easy one and is a very responsible one. No one expects the secretary to do everything himself, indeed it is most desirable that he should not, but the responsibility for getting things done will usually fall on his shoulders.

Must Be Reliable

Reliability is the quality most needed and sought after in a secretary, because we must be able to feel confident that when a job has been placed in the secretary's hands it will be done promptly and

well. This feeling of confidence will do much to preserve peace and create unity in the club. Not only must the secretary be good at doing things but he must be good at getting other people to do things. This will call for tact and a knowledge of the capabilities, real and apparent, of the other members.

The secretary acts as the connecting link between all sections of the club, and between the club and the community. Within the club it is his job to make sure that everyone knows what is going on, and what is planned to take place. So much confusion and discontent results when members are not told anything, and most frequently this is the secretary's fault. Full reports and announcements made at meetings; circulars, letters and notice-of-meeting-cards sent through the post, and messages given personally or over the phone are means of assuring that the rank and file members, as well as the members of the executive committee, are as it were, "kept in the picture."

Club Notice Board

Letters, circulars, newsletters and other papers addressed to the secretary are usually intended for the information of all the members. The secretary must, therefore, make known to the members the contents of these communications before or during the meeting. Letters and circulars are read aloud at the meeting, newsletters are distributed with the notice-of-meeeting cards, and any illustrated brochures or similar material can be pinned up on the club notice board. (Incidentally it is most desirable that the club should have a notice board.)

While it is most important that news coming into the club should be made known to the members promptly and effectively, it is equally important that news of the club's activities should be made known to those outside it. Copies of the club's minutes and reports of activities are required to be sent each month to the State Organiser; reports of all items of interest to the press and radio should be sent off as soon as possible. Naturally the reporter or the assistant secretary will compile these reports and make sure that they are despatched, but it is the secretary's responsibility to see that these officers are doing their job.

Farmers' Questions

"K.D.", of Charleville, has inquired about the growing of carob bean trees.

Answer: The carob bean originated in the Mediterranean region where it is grown extensively for its sweet pods.

Under favourable conditions, the carob will grow into a small spreading tree about 25 ft. high. It is a slow-growing plant but can live to lengthy periods, some trees are still productive when over 100 years old. Most carob trees will not produce any quantity of seed until 7 years old.

"R.O.", of Morayfield has inquired about the selection of a variety of potatoes for his district.

Answer: Probably the most suitable variety of potatoes to grow in the coastal areas of southern Queensland is Sebago. Sebago produces a high proportion of marketable tubers and yields well. It possesses resistance to Irish blight and is not prone to make second growth.