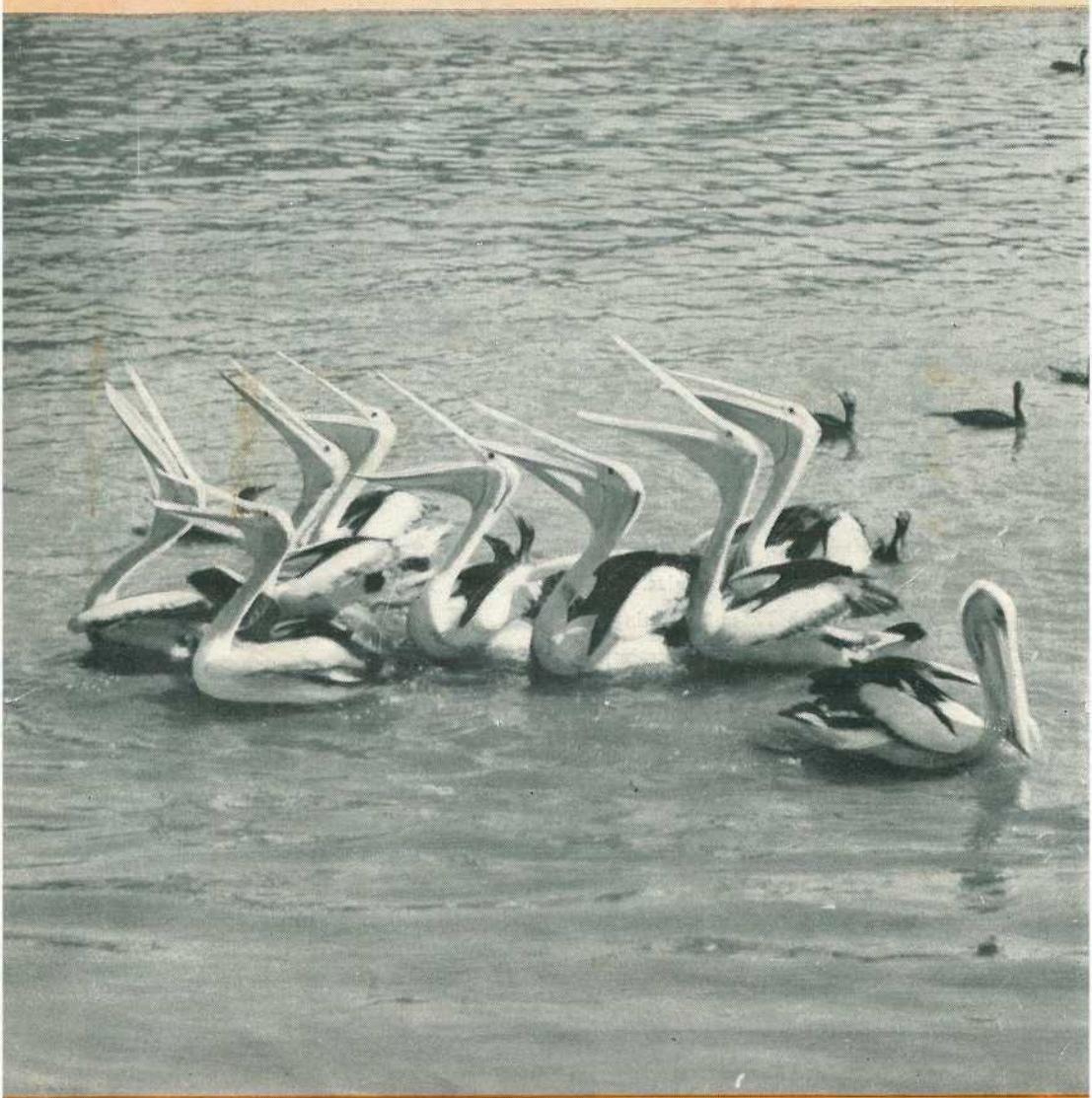
Queensland AGRICULTURAL JOURNAL



PELICANS IN THE BRISBANE RIVER SANCTUARY

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Native Pasture as Silage Can Be Made to Pay

By J. F. KENNEDY, Officer in Charge, National Cattle Breeding Station, Belmont, and T. G. GRAHAM, Agrostologist, Queensland Department of Agriculture and Stock

From experience over two summers, it is considered that the conservation of native pasture as silage is practical and highly economic.

The beef cattle industry in tropical Queensland, both breeding and fattening, is confined mainly to a belt of country approximately 100 miles wide, from Rockhampton north along the coast-line to the Northern Territory border.

Annual rainfall of this belt ranges from 20 in. in the inland sections to over 100 in. in the north-east section. The distribution of the rainfall is typically tropical, the wet season occurring from November to March. In the more southern and western parts, winter rainfall, although of low reliability, may be of importance.

Native pasturage is restricted to summer-growing grass species but in the inland a wide range of useful herbaceous types can result from effective winter rains. The rate of growth of grasses in the summer months is extremely rapid, maturity being reached by March-April. Normally there is no growth during the winter, but providing sufficient rain is received, fresh growth can be expected from August-September onwards.

The effect of this pattern of pasture growth on the growth and development of cattle is striking. Rate of growth is satisfactory through December to March. Stock then either lose weight or less frequently remain static until the August-November period when if rain falls they will regain lost weight or increase at a slow rate. If no winter rains fall, rate of growth and production fall even lower during this third quarter.

All classes of stock are affected by this annual variation in useful pasturage, weaners probably suffering the most serious check.

This annual fluctuation of pasture quality is of direct concern not only to producers but presents problems also to meet marketing organisations, beef production becoming a seasonal undertaking.

Obviously, supplementary feeding is one answer to this variation in production but for various reasons, mainly economic, no systematic attempt is made throughout this whole region to provide supplements in the lean periods of a normal year or even to consider hand-feeding in a drought year. To date little attention has been given to the clear-cut problem of conserving feed from flush periods to carry over the lean ones. The failure to tackle this question is more difficult to understand when the staggering drought mortalities are considered. In the 11 years, 1944-55, the number of cattle lost

in Queensland through drought was 4·5 million (Queensland Government Statistician).

BELMONT TRIALS

Conditions for making grass silage existed on the National Cattle Breeding Station, "Belmont," near Rockhampton, where agricultural officers of the State Department of Agriculture are consulted in an advisory capacity in matters concerning forage production.

Partly because of the lack of information on the conservation of grass silage, and partly because of the unique value of the experimental stock on Belmont, it was decided to investigate the practicability and economics of conserving native pasture as it is rarely possible to purchase the more orthodox conserved fodders for less than £25 to £35 a ton. Considerable experience has now been gained in the conservation of native pasture as silage and hay, although so far only silage has been fed to cattle.

Material conserved — In the the initial work, no great effort was made to select high quality pastures but rather to investigate the mechanics of the whole operation. The selected area normally carried poplar gum, bloodwood, and some ironbark. The soil was a light sandy loam and grassed mainly with bunch spear (*Heteropogon contortus*), red Natal (*Rhynchelytrum repens*), forest blue (*Bothriochloa intermedia*), and kangaroo grasses (*Themeda* spp.); less dominant were several *Panicum* spp. and *Chloris* spp. Of the herbs the most common were *Glycine* spp. and several *Sidas*.

In order that the harvested fodder should be as free as possible from dry material from the previous season's growth, the area was burned in mid-November, 1956. Good rains amounting to 11 inches were received during December, but the early part of January, 1957, was hot and dry and by that time the earlier maturing species—particularly red Natal grass—were in full flower. Cutting commenced immediately and at this stage bunch spear grass had commenced to flower while Queensland blue grass was still in the vegetative state.

Equipment—The equipment used consisted of a Ferguson tractor with a 6 ft. mower and a Massey Harris twinetying engine-functioned pick-up baler towed by either a tractor or a Land Rover. The baler was adjusted to deliver bales 2 ft. in length. It was not necessary to rake the cut material since the baler was able to lift a complete swath. Bales were pressed as tightly as the tying mechanism of the machine would permit and weighed 55 lb. green.

Method of Ensiling—The baled material was ensiled in a pit of dimensions 50 ft. x 10 ft. x 9 ft., the far end sloping back 2 ft. in 9 ft. while the near end was graded at 1 in 3.

It was clear early in the operations that, if bale temperatures were to be kept to a safe minimum, it would be necessary to cart in and pack into the pit with a minimum of delay. Temperature of bales lying in the paddock for one hour would rise to 105 deg. F.

The pattern of bale packing in the pit called for some care. Not only had there to be a minimum of air space but the removal of the bales as silage had to be facilitated. To this end, the first layer was packed 5 bales wide the length of the pit, the second layer was edged forward half a bale on the bottom layer, the third layer edged forward a further half bale and so on.

Bales were packed with ties running across the pit and all spaces between bales or at the ends were packed tightly with loose, fresh-cut

material. In order to press out as much air as possible, after the first two layers and after every subsequent layer the ensiled material was rolled with a heavy crawler tractor.

By constant attention to rolling, the temperature of the bales could be reduced from 120 deg. F. to the safer level of 105 deg. F.

Although a wheel tractor has been recommended for rolling it was found to be most unsatisfactory. The 4-ton crawler tractor did a satisfactory job although some twine ties were broken. The pit was filled with the top layer 1 ft. above ground level and sealed with 2 ft. of rolled soil (Plate 1).

Yield—The yield of the 1957 crop was at the very low level of 35 cwt. green fodder to the acre, but on this occasion no great attention was devoted to either yield or composition. The same area in January, 1958, yielded 3·27 tons of green material to the acre while a selected area of 20 acres of forest blue grass in March, 1958, yielded 5·6 tons to the acre of a fodder vastly superior to that harvested in 1957.

Costs—It was possible to assess costs fairly reliably in 1957 since the baler was hired at the rate of 1s. 6d. per bale plus twine and fuel.

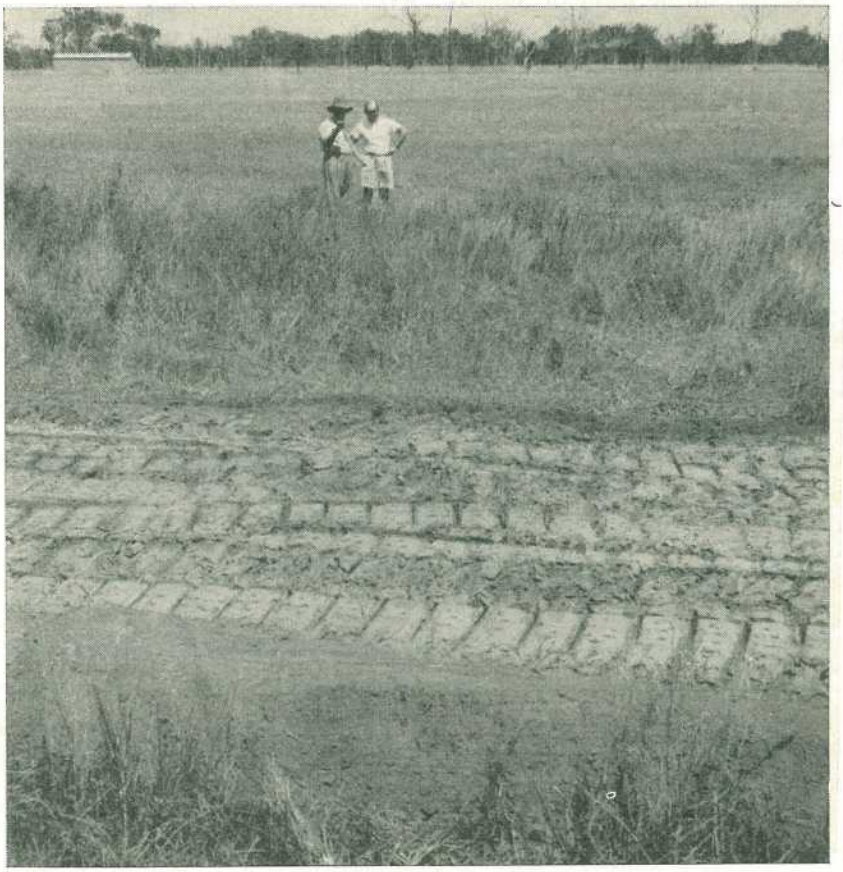


Plate 1

Sealed Trench with Harvested Area in Background.

Including this figure with others the final "into pit" cost was £6 17s. per ton. By virtue of the increased yield in 1958 cost was reduced to £3 17s. per ton, while on the selected area cost was assessed at £2 18s. per ton.

Method of Feeding Out—Near drought conditions prevailed in August, 1957, and the pit was opened, sufficient soil being bulldozed off to expose about two days' feed requirements. The aroma of the silage was excellent and the regular pattern made it possible to remove the bales with a minimum of effort, the binder twine ties being unrotted and strong (Plate 2).

Wastage, in the form of mouldy bales, was estimated at 10 per cent., most of the spoilage occurring at the sides where bales were in contact with soil. It was possible for one man to load a lorry backed into the the pit with one ton of silage and feed out in troughs in two and a half hours.

The Agricultural Chemist of the State Department analysed samples of the silage at the time of feeding out. The results are as follows:

TABLE 1

COMPOSITION OF PASTURE SILAGE MADE AT BELMONT

—	As Removed from Pit	On Moisture-Free Basis
	%	%
Moisture ..	67·9	..
Protein	2·27	7·1
Fibre	11·89	37·0
Ash	2·66	8·3
CaO	0·47	1·47
PrOr	0·24	0·74

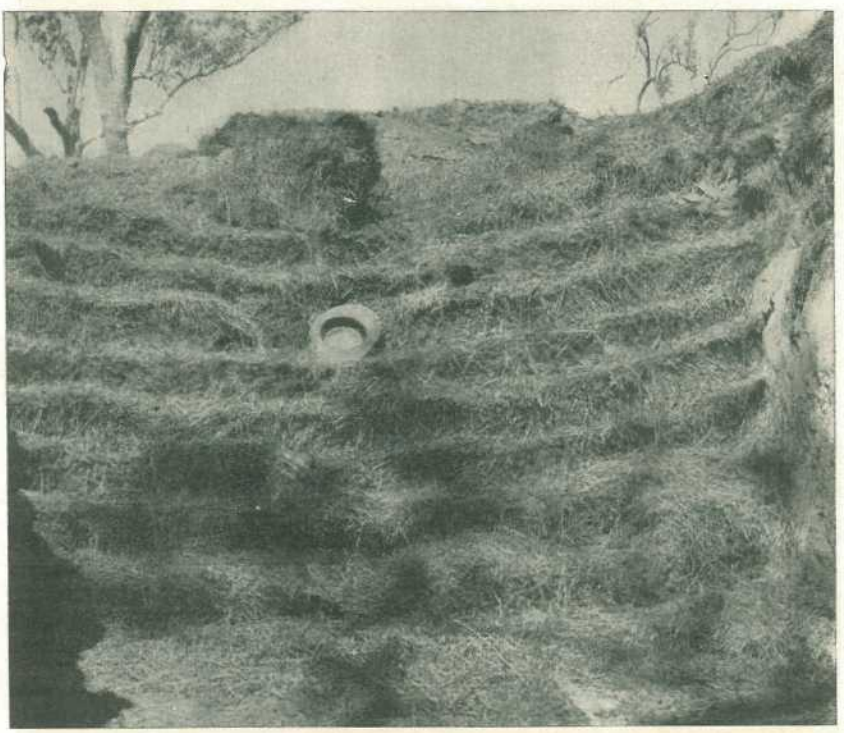


Plate 2

Baled Silage Being Opened Up after 6 months in Trench at Belmont.

Temporary troughs were constructed with 6 in. x 1 in. rough hardwood and steel fencing pickets. Two lines of pickets were driven into the ground, the lines being 2 ft. apart. Two sets of 6 in. x 1 in. hardwood were wired to the pickets at ground level, thus creating a shallow trough.

To prevent the animals stepping into the trough and fouling it, a rail of 6 in. x 1 in. hardwood was wired to the pickets at a height of 18 in., the cattle feeding over the top of this.

Opposite pairs of pickets were wired together at the top to prevent spreading.

The allowance of feeding footage for each animal was 2 ft.

The 44 ft. of troughing was erected by two men in a half day, and in due course all material was demolished undamaged in one hour (Plate 3).

Plate 3

Showing Simply Constructed Feeding Trough Described in Text.

The palatability of the silage was obviously high and all species were readily consumed. It was striking to observe the attraction of several herbaceous species, including *Sida* spp., which as a component of pasture is not grazed at all. *Glycine* spp. as silage was particularly attractive and stock sought it out from the mixture.

Performance of Stock Fed—220 eight-month-old mixed weaners constituted the trial herd. They were run in an 80-acre paddock containing very little grass, which was

completely dry and very fibrous (Plate 4). The herd had not been hand-fed before, and were introduced to the silage immediately they were weaned. The initial ration was 10 lb. a head which was later increased to 15 lb. a head. The overall mean bodyweight at the commencement of feeding was 350 lb., and after the first month the figure had risen to 362 lb.

This was the first occasion at Belmont on which weaners gained weight during the first month off their mothers, although on all other occasions good native pasturage was available to them. The silage proved palatable to all but two or three weaners, the "shy feeders" usually associated with drought or supplementary feeding not being so evident.

What Is The Verdict?

From field experience over two summers, it is considered that the conservation of native pasture as silage is practical and highly economic. Wet weather during operations is not a serious bar as it is in haymaking, the full programme being continued on a day upon which 120 points of rain fell; the material was handled by the baler rather better when wet with rain.

Baled silage, although requiring rather more labour than most private owners have available, possesses the enormous advantage over other forms of silage, when being fed to the larger numbers of beef herds, of ease in feeding out.

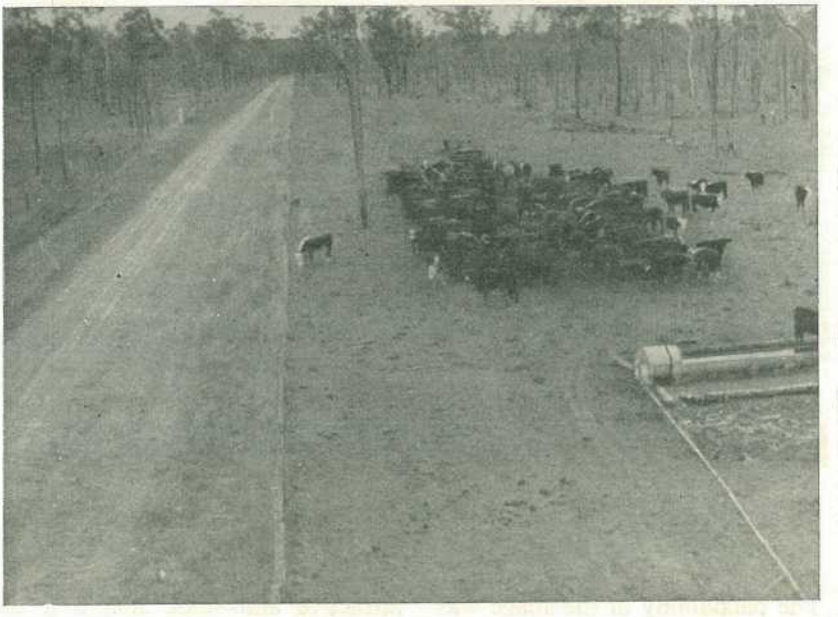


Plate 4

General View of Feeding in August, 1957. Note that grass is eaten out around feeding area. Animals which are obviously not weaners are cows put in as coaches (8 in all).

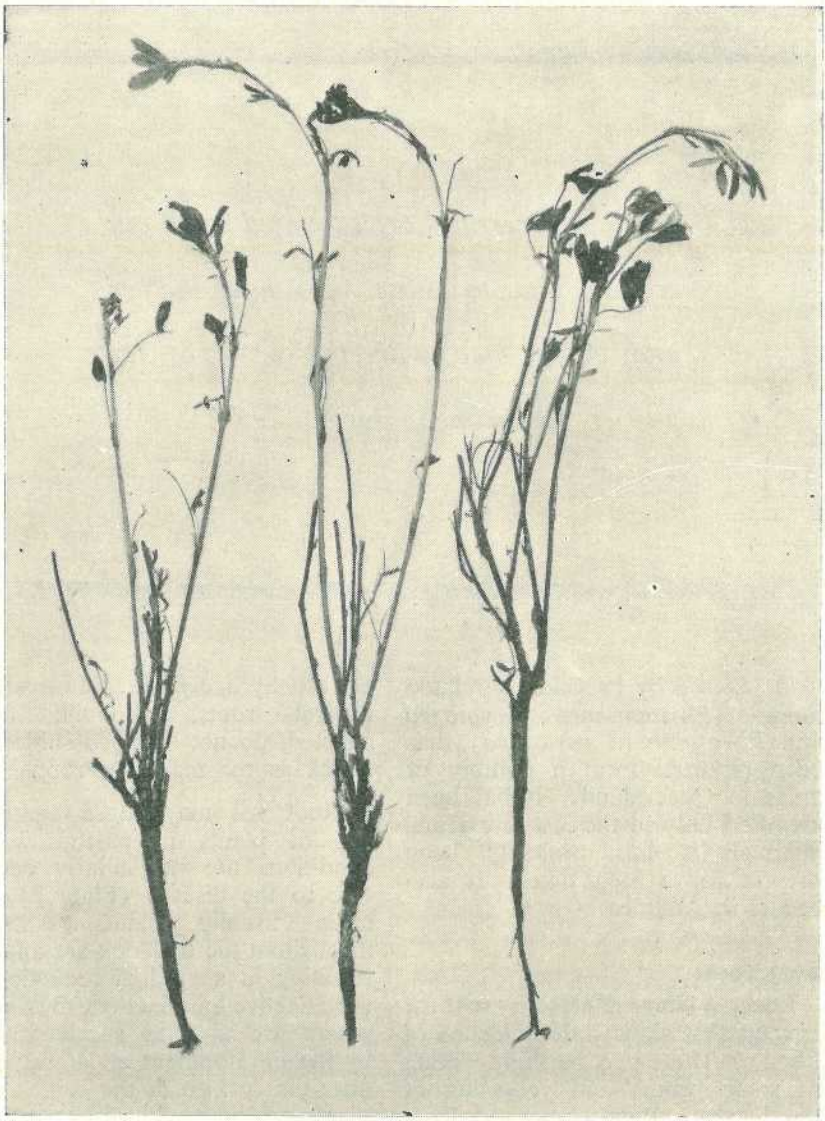


Plate 1
Root Rot Affected Plants Showing Decay of the Tap Roots.

Root Rot of Lucerne

By G. S. PURSS, Pathologist.

The symptoms, some characteristics, and the control of root rot of lucerne, are discussed:

Root rot of lucerne commonly causes a premature thinning out of plants, often leading to a considerable shortening of the economic life of the stand. The disease, known

Seasonal Greetings are extended to all our readers and to those who have helped and co-operated with the work of the Department during 1959

to be caused by two closely related fungi (*Phytophthora cryptogea* and *Phytophthora parasitica*), has been reported from a number of areas in Queensland. It has been recorded only in the last few years, although it has probably been present for a long time. It also occurs in America.

Symptoms

Lucerne plants affected by root rot may at first show little evidence of disease. There may be slight wilting of some shoots and yellowing of the leaves. Plants removed from the soil in the early stages of infection show a light-brown discoloured area on the tap root up to 1 in. in length and situated from 2 to 5 in. below the surface of the soil. Internally this discoloured area extends up to half an inch in advance of the external discoloration. As the disease progresses, the bottom portion of the root system rots away leaving only the upper stub of the tap root which is often covered by a mat of fungal growth (Plate 1). At this stage, the plants are usually badly wilted and yellow. Lateral roots, although often affected, do not seem so subject to attack as the main tap root.

Root rot may cause complete loss of plants in patches where conditions are particularly conducive to the disease (Plate 2), but more usually plants scattered throughout the paddock are affected resulting in a gradual reduction of the effective stand (Plate 3). Some plants are able to survive attack by the development of lateral roots near the surface of the soil. Such plants are, however, subject to moisture stresses in dry spells and are easily pulled out during renovation operations.

Generally plants less than a year old are more subject to attack but plants much older than this have been affected.

Factors Affecting Its Severity

Like most diseases caused by this type of fungus, wet soil conditions are important in the development and spread of root rot. It is

commonly found on the lower sections of a paddock during periods of high rainfall.

Water flowing over the soil surface plays an important part in the spread of the root rot. In Plate 4, the disease can be seen following the path where free water had recently flowed. Again it often occurs after periods of light flooding. In irrigated stands, it is common to find root rot affected plants at the bottom end of bays where drainage is likely to be impeded.

Soil type has a very great bearing on the severity of the disease. It has usually been associated with areas of heavy soil, which possess an impervious clay layer near the surface. Such soils stay wet for long periods. Root rot often starts on the tap root at the top of the impervious layer a few inches below the surface. While lucerne can be grown successfully on this type of soil during drier years, the advent of excessively wet weather usually results in heavy losses in the stand.

When lucerne is planted immediately after a defective stand has been ploughed in, root rot often follows. This can be explained by a build-up in the soil of the organism that causes the disease.

Control

This type of disease is always difficult to control. The provision of adequate surface drainage helps to minimize damage. Where irrigation is practised it should be carried out carefully to avoid prolonged over-wetting of the soil.

On soils with impervious layers close to the surface, the growing of lucerne will always remain a calculated risk. Growers must be prepared to have relatively short-lived stands on such soils.

Replanting of lucerne after a thin stand has been ploughed in should be avoided.

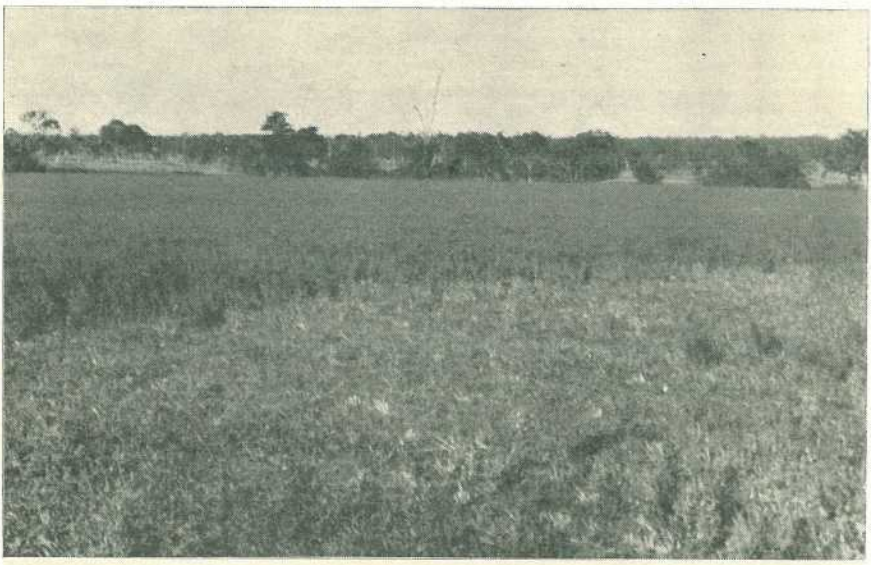


Plate 2

Root Rot Killing Lucerne over a Large Area.

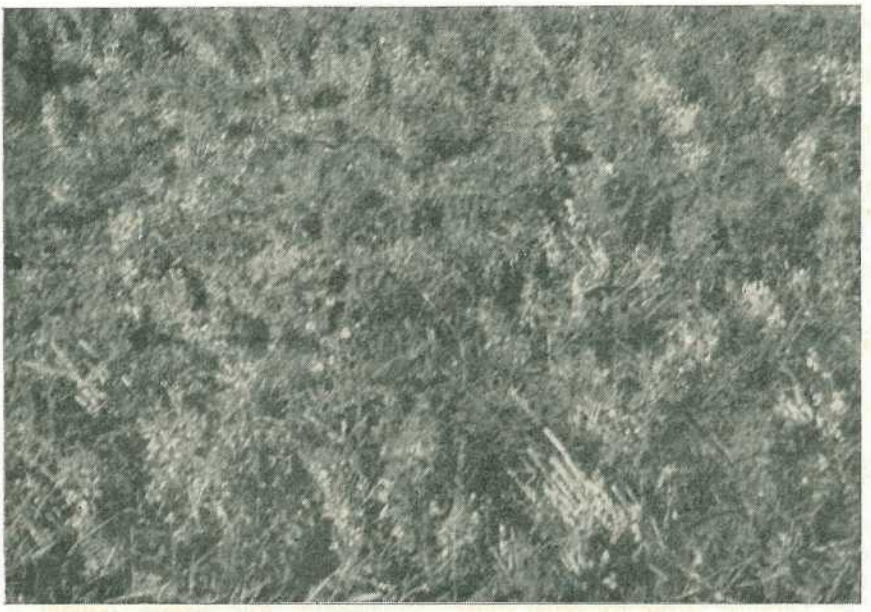


Plate 3

Scattered Plants Dying Out in a Lucerne Stand Affected with Root Rot.

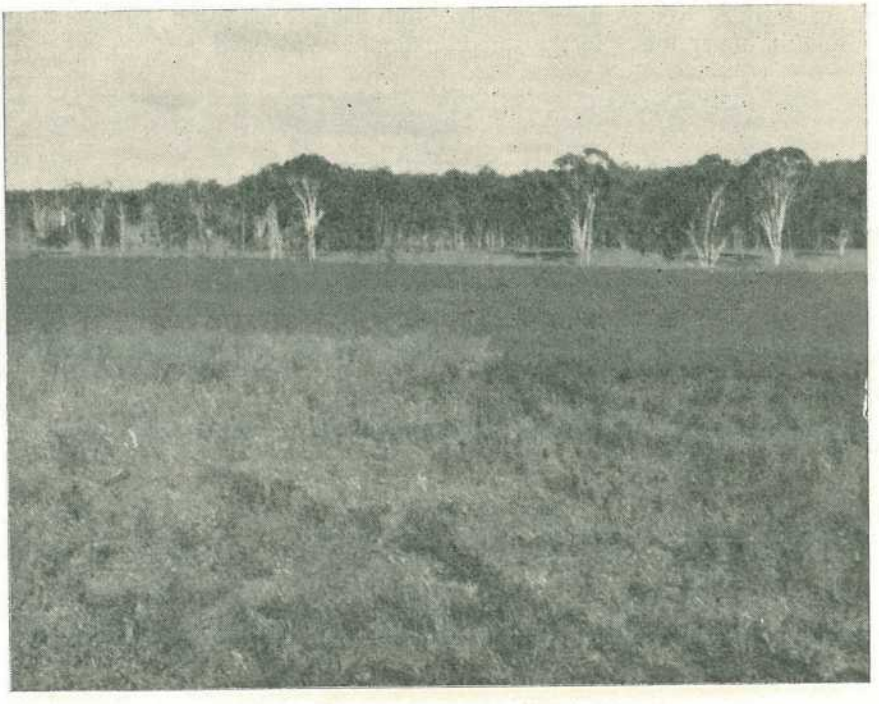


Plate 4

Root Rot in Lucerne Following the Path Traced by Free Water.

Pasture and Crop

Eliminate Gaps in Cotton Row. An uneven stand of cotton can mean reduced returns. The cotton plant can adjust itself to small differences in plant population but it can't compensate for large gaps in the rows. Poor seedbed preparation, low seeding rates, and insect attack are some of the causes of gappy stands. Most of these conditions can be controlled by the grower.

It's easier to thin out a heavy stand than build up a poor one. Filling in the gaps is rarely successful as the latecomers can't catch up with the original planting.

The size of seed may vary with the variety and some seeds carry more fuzz than others. It's a good idea to adjust the planting rate accordingly.

On well-prepared soils, a planting rate of 10 lb. to the acre may be suitable but 15 lb. to the acre is advisable as a general rule.

—W. G. STEELE,
Senior Adviser in Agriculture.

Making the Best Use of Rain. Rain is worth so much to us that we must make the best possible use of it, when it falls.

For the stockowner, this means using contour cultivation practices to overcome surface packing and to increase intake, maybe pasture furrows to hold the rain till it can sink in, and grazing practices which retain at least a thin cover on the ground surface to keep the sun off the soil and to absorb the force of the falling raindrops.

It means using perennial fodder crops wherever possible for these are able to make better use of scattered falls of rain than can be made by annual crops.

For the crop grower, it means the use of contour farming practices combined with a mixed farming rotation which relieves the soil of the exhausting effects of annual cultivation.

Our restricted rainfall is too precious—any rain allowed to run to waste might just be that little bit extra which makes the difference between profit and loss.

—J. L. GROOM, Senior Agronomist.

Grazing Care by Irrigated Pastures. Grazing at the correct stage of growth will help you get the best out of irrigated pastures. If resting periods between grazings are too short, the pasture will be overgrazed. Depletion of the stand and lower yields are almost certain to follow.

There's a most suitable time to harvest every crop. Care should be taken to manage pasture as carefully as you'd manage any other crop.

Pastures in flush growth can be grazed every three weeks. But in periods of slow growth, intervals of four to six weeks between grazings may be necessary. Grazing no shorter than three to four inches encourages grass growth; closer grazing stimulates clover growth and leads to clover dominance. Regulate the interval between grazings and the length of the pasture remaining after grazing to meet the seasonal growth rate of all the species in the sward.

—A. NAGLE, Irrigationist.

Cannibalism and Feather-Eating in Poultry

By P. D. RANBY, Veterinary Officer
and H. W. BURTON, Poultry Adviser

Forms of cannibalism in poultry are outlined and their possible remedies described.

Cannibalism and feather-eating are vices that are fairly common in Queensland poultry flocks. In some cases most of the chickens in the flock have a cannibalistic tendency, in which case attacks are frequent and deaths many. At other times a few individuals start attacks but the exposed flesh attracts other members of the flock. The habit may thus spread.

With recent trends in the industry towards intensified methods of housing and the use of high protein-energy diets, an increase in cannibalism can be expected.

Forms of Cannibalism

The more common forms of cannibalism are as follow:—

(1) *Feather-Eating*

Feather-eating is quite prevalent in some flocks, including laying fowls. The denuded backs of laying birds may become reddened by sunburn if they are running in the open. In chickens, feather-eating may lead to cannibalism (see Plate 1).

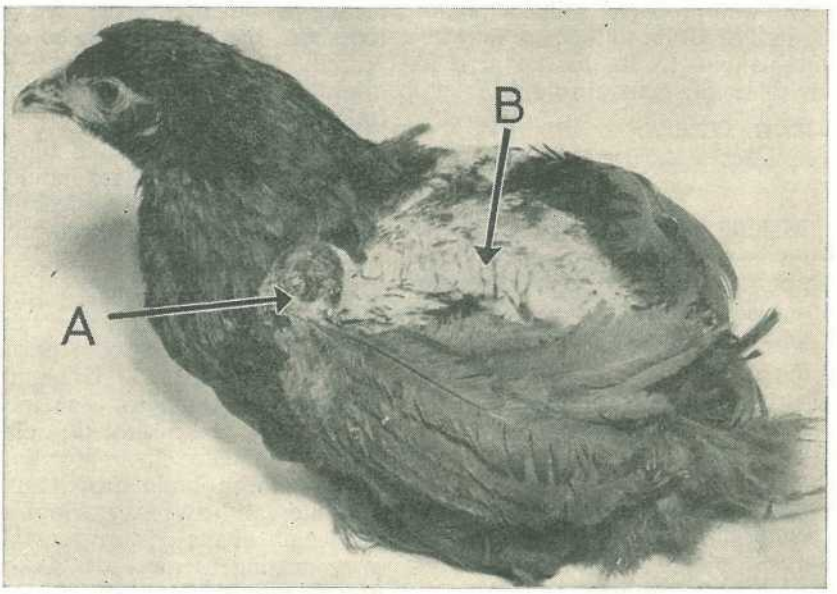


Plate 1

This Australorp Chicken has been the Victim of Feather-Eating and Cannibalism. Its back is featherless (arrow B) and there is a large, granulating wound on the "elbow" of its wing (arrow A). This is a fairly common form of cannibalism and probably started as a result of feather-eating.

In ducklings, attacks of feather-eating tend to be more brutal than in fowls. Ducklings driven by the craving will persistently pursue their flock-mates.

(2) *Toe-Pecking*

Toe-pecking is usually seen only in young chickens. It often occurs when baby chickens are not fed until as late as the third or fourth day after hatching. Delayed feeding is not uncommon where newly hatched chickens are transported long distances or where their dispatch from the hatchery has been delayed.

(3) *Wing and Tail Pecking*

The larger feathers on the wing and tail are "juicier" and may invite attention from chickens with cannibalistic tendencies. When the feather follicles are exposed, the flesh is attacked in turn. The elbow joint of the wing is a favourite spot. Large, raw wounds penetrating to the wing-bones often result, as seen in Plate 1.

(4) *"Rips" in Colony Cages*

Chickens reared in colony cages are often "ripped" by the claws of other chickens that scramble over their backs (see Plate 2). The claws of such birds reared on wire-mesh floors become long and sharp. "Rips" become more prevalent in chickens over, say, 7 weeks old, especially if the cage is over-crowded. On one poultry farm at Aspley this year, 9 out of 250 cockerel chickens, 7 weeks old, that were housed in two colony cages, were found to be severely ripped.

Such "rips" invite pecks from nearby chickens, which then deepen the wounds.

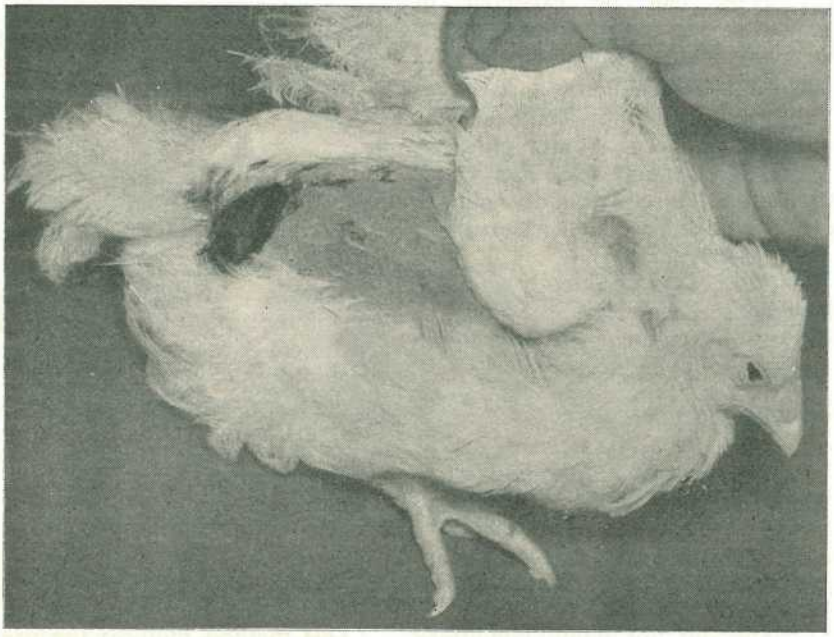


Plate 2

An Example of a "Rip" in a Cross-Bred Chicken from a Colony Cage. This wound has been made by the sharp claws of another chicken as it scrambled over its back. Note the two claw marks on the skin just above the "rip". Such wounds are pecked at by the other chickens although this particular case has been little attacked as yet.

(5) *Vent-Pecking and "Pick-Outs"*

Vent-pecking and "pick-outs" are the usual forms of cannibalism in adult fowls but may also occur in younger birds. Victims are constantly worried by attacks from other birds or become "pick-outs" in which case they are disembowelled.

Vent-pecking often starts in the vicinity of laying nests, particularly if the nests are rather exposed to light. Having laid an egg, the hen momentarily everts the end of the oviduct (egg-tube), which is then pecked at by a nearby hen. Some hens even develop the habit of waiting for their would-be victims to lay their eggs.

A Costly Vice

Death-losses from cannibalism are probably greater than many poultry farmers realise. Where records are kept, deaths of about 4 per cent. can be expected in ground-reared chickens and higher in colony cages. Similar deaths may occur in laying fowls.

"Explosive" outbreaks occasionally occur among young chickens which may literally peck each other to death. A reduction to half the chicken flock has been observed in extreme cases.

In the case of feather-eating, bare-back hens tend to bring a lower price for meat purposes at the end of the laying season.

Multiple Causes?

There is no single cause of cannibalism and feather-eating. The vice is more prevalent under certain conditions. White Leghorns and their crosses show a somewhat greater tendency to cannibalism than the heavy breeds. Overcrowding, boredom, hot, humid conditions and unbalanced diets all play a role. The vice is probably more prevalent where high protein diets are fed.

On one farm seen in the Rockhampton area, almost all of the laying fowls were completely bare-backed, while half-grown chickens adjacent to them were engaging in both feather-eating and cannibalism. The intensive pens were overcrowded, the ventilation poor and the roof low, with the result that hot, humid conditions prevailed. These vices continued despite the feeding of fair-quality lucerne chaff and milk products.

It has long been known that some fibre in the ration tends to avert cannibalism and the feeding of oats or a similar fibrous foodstuff has been recommended. More recently overseas, the addition of the aminoacid methionine to the diet has been found to prevent cannibalism. This work suggested that a lack of methionine could cause the vice.

In the case of feather-eating, the addition to the diet of good leafy lucerne chaff and liver meal has often been very beneficial, suggesting that group B vitmains may be involved.

Debeaking Is Effective Control

Cannibalism can be considerably reduced or even prevented by debeaking. In this operation, the end of the upper beak is removed. To be effective, debeaking must be done properly. Remember, debeaking not only combats cannibalism, but also reduces wastage of mash from the trough. Its value is thus twofold.

Two methods of debeaking are available, as follows:

1. *Electrical or "Hot" Debeaking*

This method requires the use of a special electric debeaker. Cost of the apparatus (price at 1-10-59) is £17. A number of the larger poultry farms have installed them.

The upper beak is cut through at a distance of one third to half the distance from the tip towards the nostrils. The blood vessels are quickly sealed by the heat of the blade. The beak grows only slightly after the operation, as shown in Plate 3. Birds of any age may be done, but the operation is most conveniently carried out from 1 to 3 weeks of age.

Chickens may be debeaked by this method at the rate of about 300 an hour. They do not show any ill effects and will start eating within minutes after being debeaked.

2. *Mechanical or "Cold" Debeaking*

This method requires only a pair of nail secateurs, short scissors or similar instrument to cut through the upper beak as described. It is

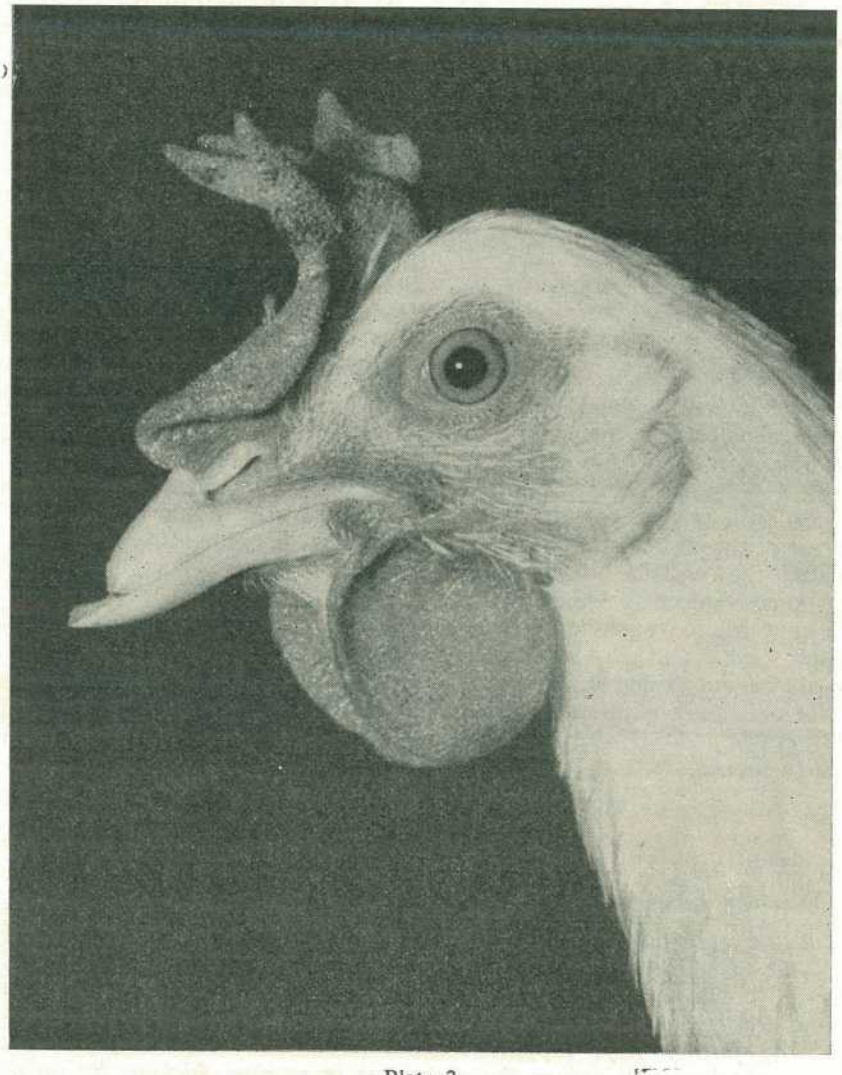


Plate 3

A debeaked W.L. Laying Pullet from the Animal Husbandry Research Farm (Poultry Section), Rocklea. This bird was debeaked by an electrical debeaker when one week old.

faster than the electrical method. However, the method should only be applied to chickens one or two days old. In the case of older chickens, there is always a risk of excessive bleeding. Death rates of 10 to 15 per cent. have been encountered when chickens 3 to 6 weeks old have been mechanically debeaked. Deaths continued for about one hour after these flocks were debeaked.

Several large broiler farms in the Brisbane area successfully debeaked day-old cross-bred chickens mechanically. Even where day-old chickens are done, it is wise to include a vitamin K rich foodstuff in the breeder's ration. This is to ensure that the blood of their chicks clots quickly after the beak is severed. Livermeal and lucerne are rich in this vitamin.

Beak-Tipping

"Tipping" of the beak refers to the mechanical removal of the bloodless portion of the end of the beak. The line of demarcation can be seen with the eye, at about one quarter of the distance from the tip towards the nostrils. "Tipping" may be convenient as an emergency measure where cannibalism has broken out and an electrical debeaker is not available. However, its value is only temporary as the beak grows to full size again in about a month.

Removing the Centre Toe

Where "rips" are troublesome in colony cages, portion of the centre toe may be removed with the electrical debeaker about one-tenth of an inch above the toe-nail. This operation may be carried out at the same time as debeaking.

Other Control Measures

1. Avoid overcrowding.

2. Ensure ample ventilation.

3. Remove any cannibalised birds and place them separately.

4. Ensure a balanced diet. Where cannibalism or feather-eating is prevalent, add 4 per cent. livermeal and 4 or 5 per cent. good quality lucerne chaff or meal to the diet if these are not already present. Wongbok may be used as an alternative to lucerne. Increase the common salt to 1 per cent. of the mash. Add a small proportion of crushed oats.

5. Place all nests above floor level and keep them fairly dark. These measures should reduce vent-pecking of hens that have just laid.

6. It is wise to debeak pullet chickens intended later for laying cages and also, any birds that are to be housed intensively.

7. Don't delay in feeding newly hatched chickens beyond two days or toe-pecking may result.

MILLET FEEDING FOR CHICKENS: *The birdseed grain, white French millet has shown distinct promise of being a suitable food for chickens from day-old onwards. Agriculture Department officers describe the results of a pilot trial just completed at the poultry section of the Rocklea Animal Husbandry Research Farm as "very encouraging." If further tests support millet's initial promise, use of millet instead of wheat will reduce the grain cost in rearing chickens by up to 25 per cent. Chickens fed a ration containing millet as the grain portion weighed 26·6 oz. at eight weeks. Chickens fed a ration based on wheat as the grain weighed 28·3 oz. Although the wheat-fed group was slightly heavier than the millet-fed group at eight weeks, conversion of food into liveweight was slightly better with millet.*

100 Years of Queensland Dairying—IV

When Milk Was ½d. a Gallon

By E. B. RICE, Director, Division of Dairying

The first condensed milk factory was established in Queensland in 1904 and there were six condenseries in 1908. Records indicate that some earlier butter factories had equipment and made small quantities of condensed milk. A condensed milk factory at Toogoolawah continued operations until 1930, but condensed milk has not since then been produced in this State.

The South Coast Co-operative Dairy Company, Southport, made roller process skim-milk powder in 1947. Pauls Milk and Ice Cream Company, Brisbane, commenced to manufacture spray-process skim-milk powder in 1953.

A factory considered to be the most modern in design and equipment in the southern hemisphere erected by Nestles at Gympie commenced to manufacture spray-process wholemilk powder in 1955. By 1958, the number of factories which had equipment for roller drying of buttermilk was 10. The powder is sold mainly for stock feeding purposes, but two factories manufacture buttermilk powder which is sold for use in various food industries.

Farmers' Returns

In 1892, the prices paid to suppliers to a factory at Lanefield fluctuated from ½d. to 4d. for a gallon of milk. The Maleny factory which was opened in December, 1904, paid farmers 3½d. a lb. for cream of 40 per cent. fat test, with slight differentials for cream of higher or lower test. From 1900 to 1914 the price paid to farmers for cream supplies was about 9d. a lb. commercial butter and then from 1915 to 1930 the price was fairly constant from 1s. 1½d. to 1s. 3d., though in some years it rose to 1s. 5d. and in 1920 to 1s. 10d. During the depression years from 1933 to 1936 it fell as low as 8½d. During 1938 to 1942 it was fairly stable at about 1s. 2d.

The outbreak of war in 1939 marked the beginning of changes in relation to marketing and prices of dairy products. The Commonwealth and British Governments entered into a contract for the sale to Britain from November, 1939, of the exportable surplus of Australian butter and cheese. An equalisation price of 72s. 6d. a cwt. received by butter factories during 1939-40 was the highest received for 10 years, and the average payout to suppliers to butter factories for cream was 1s. 1½d. a lb. commercial butter.

In 1942, a Dairy Industry Assistance Act was passed by the Commonwealth Government under which subsidies were paid for the first time, commencing on October 1, 1942. In 1942-43 the Commonwealth contributed £604,433 as subsidy and the average payout to suppliers to butter factories in Queensland was 1s. 4d. a lb. commercial butter. The subsidy was altered from April 1, 1944, to

provide a higher differential of 2d. a lb. commercial butter as an incentive for farmers to increase cream production in the eight non-flush season months. This system continued to June 30, 1946, after which the subsidy reverted to a flat monthly rate.

By 1945-46, the payouts to butter factory suppliers had risen to 1s. 8d. a lb. commercial butter.

In 1946-47, a Joint Industry Investigation Committee appointed by the Commonwealth Government ascertained the cost of farm production based on 1,050 random-chosen farms in Australia, including 375 in Queensland. Of the total, costs of 692 farms were finally taken to determine the average cost of production, which was estimated to be 1s. 7½d. a lb. commercial butter.

In 1947, the Commonwealth Government agreed to a five years guaranteed price scheme. All suppliers of milk or cream for manufactured dairy products were guaranteed a price equivalent to 2s. a lb. commercial butter from April 1, 1947, and the price was to be reviewed annually according to movement in cost factors. Returns to farmers rose steadily from 2s. 1½d. in 1948 to 3s. 6d. a lb. commercial butter in 1951-52.

In 1952, a new five years guaranted prices scheme was approved. Variations from the previous scheme were that it was limited to efficient cost of production for supplies of milk and cream for butter or cheese manufacture, the subsidy would be a fixed amount determined each year and the guaranteed price related only to butter and cheese consumed within Australia, plus not more than one-fifth thereof. For 1952-53 the price of efficient production was fixed at 4s. 1.29d. a lb. commercial butter, but due to exports exceeding one-fifth of Australian domestic consumption, farmers' prices averaged 3s. 11d. a lb. commercial butter.

Price control and rationing of dairy produce was abolished in Britain on May 8, 1954, after 15 years of such controls.

Average payouts per lb. commercial butter to Queensland suppliers reached the highest level of 4s. 1d. in 1953-54, declining to 3s. 9d. in 1956-57 and in July, 1958, due to a sharp decline in butter prices on a heavily oversupplied British market, the interim equalised price was 3s. 1d. However, realisations in London soon improved and the average payout to farmers for 1957-58 was 3s. 7½d. a lb. commercial butter.

The Commonwealth's stabilization scheme was renewed for five years from July 1, 1957, only minor changes being made to the conditions provided in the preceding scheme.

Acknowledgments: In the preparation of this article the writer has obtained information from various reports and data in the Division of Dairying, the annual reports of the Department, "Dairying in Australia," published by the *Queenslander* in 1902, and the report of the Committee appointed in 1923 by the Queensland Council of Agriculture to examine the position of the dairy industry. His own knowledge of developments over the past 25 years has also been included.

[CONCLUDED]

Bucket and Bail

Tower Coolers for Cream. For an outlay of about £30, a handy dairy farmer can build himself a tower cooler for cream. Use of this cooler will help him keep his cream quality up to choice grade.

A tower cooler is a good substitute for a refrigerator. Their low cost should put tower coolers within the reach of all. Plans of a tower cooling layout are available from district dairy advisers.

In the tower method of cooling cream, cool water from a concrete pit in the separator room is circulated through a tubular cream cooler. The water is then pumped to the top of a 9 ft. wooden, box-like tower, and is dropped down, over baffles, to the bottom of the tower. As it falls, the water is cooled by evaporation. The cooled water is ready for re-circulation through the cream cooler.

—A. O. EVANS, Dairy Adviser.

Identifying Heifer Calves. Know your heifer calves and you'll put your herd improvement plan on a sound footing. When your heifers come into the maternity paddock, mistaken identity can set your plan back by years.

Progressive farmers now use a breeding plan based on production records. For its success, you must be able to identify your heifers. A heifer calf identification service is given to the 1,100 Queensland farmers who are production-recording their herds. It's part of herd recording and there's no extra charge for it. In this scheme, identifying numbers and letters are tattooed in a calf's ears, and information on its breeding and age are recorded and filed away.

Farmers who are not members of herd-recording groups should have some method of calf identification. They could tattoo identifying marks in their calves' ears and keep a record sheet.

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

Get the Best Out of Your Separator. Unless your dairy separator is in perfect mechanical condition, you can expect losses in both butterfat and cream grades. As well as this, a separator that's not properly maintained can be extremely dangerous.

The bowl nut should be replaced at the first sign of wear in the threads. If the threads on this part become worn, the nut can be forced off the spindle and the bowl will blow up.

Check the mounting occasionally to make sure that it's dead level. A faulty mounting causes vibration that re-mixes the butterfat and skim milk, increasing fat losses. See that the separator is driven at the correct speed, that the bowl is not slipping and that the engine or electric motor is turning at the manufacturer's rated speed. Occasionally adjust the bowl height following the directions in the instruction manual.

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

Are You Losing Production? Some farmers stimulate milk let-down in their cows by washing and massaging of the udder. Others do not seem to worry so much about it and pay little attention to it. Ruakura in New Zealand have carried out some interesting work on stimulation. Identical twins were

used and no washing was compared with 30 seconds of stimulation before putting on the cups. They found that there was a difference of 16 per cent. production in favour of stimulation.

These experiments were later repeated and a 30 per cent. difference in fat production was obtained.

—*"Recording Notes."*

Check Milking Machine Efficiency. Milking machines on many Queensland farms need overhauling. A high incidence of mechanical faults in milking machines has been brought to notice by district Dairy Officers who test the machines as part of their duties.

Of the 881 milking machines tested last year, only 8 per cent. were free from all faults. But many of the faults were minor and could be corrected on the farms. Major faults were excessively worn vacuum pumps which were detected in 34 per cent. of the machines, and faulty pulsators which were found in nearly half of the machines.

Major faults in milking machines slow down the rate of milking and possibly increase the amount of udder troubles in a herd. Regular checks on milking machine efficiency will detect faults before they become serious.

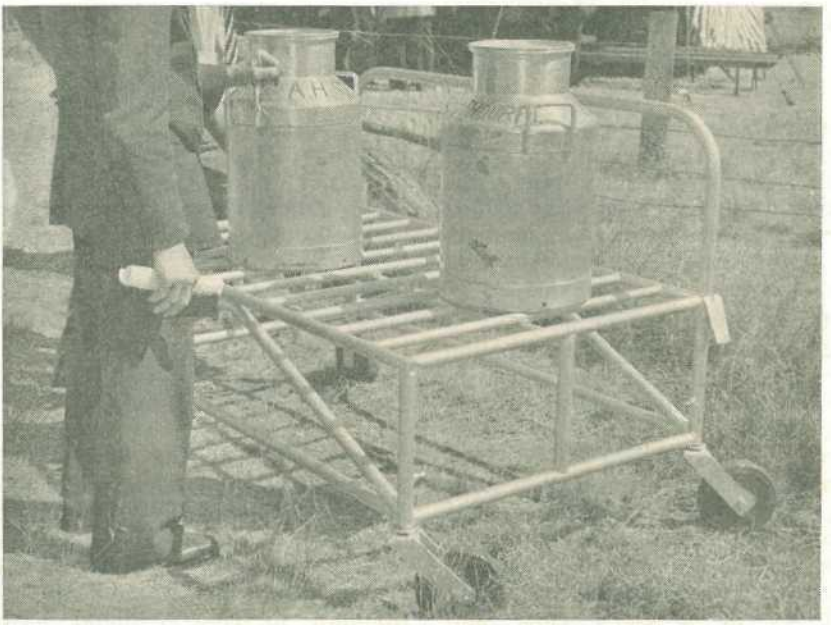
—*J. D. ELRINGTON,*
Senior Dairy Machinery Adviser.

Plan Now For January

Repair roofs and tanks to catch all available rainwater for cleaning operations.

Destroy flies and breeding grounds and protect milk quality.

Keep all dairy equipment clean and sterile.



Toowoomba Farmers' Festival Entry. Trolley constructed by Mr. R. J. Northdurft, of Yalangur, from galvanised iron piping. This is used for transporting cans of milk from the milk room to the carrier's truck. It can also be used for the storage of empty milk cans.

The Fight Against Disease—IV.

Use These Disinfectants To Kill Germs

By G. C. SIMMONS
Senior Bacteriologist

Nowadays, every home almost certainly possesses a preparation classed as a disinfectant. This has resulted from an understanding of the part played by micro-organisms as a cause of disease, for a disinfectant is used to kill harmful micro-organisms, or pathogenic bacteria and viruses, so that man and animals are no longer exposed to them.

There is often confusion between "disinfectant" and "antiseptic". The term *antiseptic* is applied to those substances which may be used on living tissues and which may not kill the germs but only stop them from multiplying. A *disinfectant* is applied to non-living objects and usually aims to kill all micro-organisms on those objects. Sometimes the one compound may be used either as a disinfectant or an antiseptic.

Obviously a disinfectant will kill non-dangerous as well as dangerous micro-organisms but in prevention of disease the death of the non-pathogens is of no consequence.

There is one fact fundamental to efficient disinfection. The process is a chemical reaction between the disinfectant and micro-organism. *The disinfectant must therefore touch the living organism.*

This means that the micro-organism on the surface or in the material should be accessible to the disinfectant used. If dirt and organic matter are present, the disinfectant is rapidly put out of action and does not reach bacteria below the surface. Mud, dirt and heaps of excreta and rubbish cannot be penetrated by disinfectants.

Not so commonly realised is that cracks in surfaces such as joins in boards or metals are just as impervious once they have been filled with dirt and organic matter such as milk, excreta or bacterial growth.

Planning for effective disinfection starts with the provision of smooth surfaces where disinfection is likely to be required. Shiny, well-fabricated, stainless steel units not only look efficient but *are* efficient in this respect. Stainless steel is expensive, and for many purposes not desirable, but the principle of smooth surfaces can be applied to all finishes.

Concrete floors and walls of pens, cowsheds and other yards should have surfaces which are easily cleaned. Inadequate reinforcing or poor concrete mixes quickly result in cracks and wear which makes proper disinfection impossible.

Wood surfaces may be coated with a variety of paints which will produce a smooth, waterproof surface.

Smooth surfaces are easily cleaned and if this is done regularly micro-organisms are kept to a minimum. Clean surfaces rapidly

dry, resulting in a considerable reduction of micro-organisms on the surface. Sunlight is also more effective on clean surfaces.

Two Stages of Disinfection

The process of disinfection consists of two stages. First, the surface must be cleaned thoroughly so that all dirt and organic matter are removed and the disinfectant can contact the remaining germs. Secondly, an effective disinfectant must be properly applied.

The first step is to remove all gross waste such as manure and bedding. This waste should be effectively disposed of by burning or burying.

Cleaning dirt from the surfaces is next. This cannot be done by hosing. The surfaces should be scrubbed with a brush using a detergent solution.

The detergent may be soap, caustic soda or one of the newer detergents sold commercially for dish-washing. It is a good idea to cover the area with the detergent and allow it to soften and penetrate the dirt before scrubbing. This cleaning process is also enhanced if the water is warm. The surface is then hosed with copious amounts of clean water. Treatment is repeated on areas still dirty

Caution is necessary if caustic soda is used. This chemical should be handled carefully and should not be allowed to come into contact with skin (rubber boots and other protective clothing should be worn). Also caustic soda will corrode many metals and therefore cannot be used as a general disinfectant.

Once the surface is clean and the disinfectant is able to reach the micro-organisms, the efficacy of the process will depend on these factors:—

(1) Efficacy of the chosen disinfectant;

(2) Concentration of disinfectant;

(3) Period of exposure to disinfectant;

(4) Temperature of application. Disinfectants are more effective at high temperatures.

There are many different disinfectants:

Hypochlorites

The most common disinfectants are those depending on their chlorine content for their activity. Hypochlorites are sold commercially either as liquids or solids. The manufacturer's instructions should be closely followed. If the amount of chlorine is too low, time and labour as well as disinfectant is wasted.

Hypochlorites kill bacteria rapidly on clean surfaces but are rapidly put out of action by organic material. They are extensively used on dairy equipment and in dairy factories. They are generally non-irritant to the skin. As a solution of hypochlorites readily deteriorates, fresh preparations should be made frequently. Hypochlorites are usually diluted so that the solution contains not less than 100 parts per million of available chlorine. They are slightly corrosive on tinned utensils.

Phenolic Disinfectants

Although the germ-killing power of phenol (carbolic acid) has been used as a standard for other disinfectants, it is not used much in practice. More common is another coal tar derivative, cresol, which when combined with soap gives the disinfectant known as lysol. This is a good disinfectant for general use. It should be used as a 5 per cent. solution, that is, approximately 1 part to 2½ gal. of water. In handling the undiluted disinfectant, take care not to allow any to touch the skin.

This type of disinfectant has a strong odour which milk readily absorbs.

It is best applied by flushing or spraying over the surfaces or, if only a small article, by immersion. Compared with the hypochlorites, lysol is slow-acting and at least 5 minutes' contact should be allowed.

Caustic Soda

Providing care is taken in handling this chemical, a 2 per cent. solution of caustic soda is a very good disinfectant. The surface to be treated may be scrubbed with 2 per cent. caustic soda to get rid of the organic matter. It is not very effective against tubercle bacilli.

Formaldehyde

Formaldehyde can be used either as a gas or as a solution. The gas is a very effective disinfectant and is used where a room or container can be sealed for a period. It is particularly useful for disinfecting hatchery incubators.

The gas is produced by mixing formalin with potassium permanganate (Condy's crystals).

Formalin sold commercially is a solution containing approximately 40 per cent. formaldehyde. Formalin may be used as 5 per cent. solution made by adding 1 pint of formalin to 2½ gal. of water. Formaldehyde given off by the solution is rather irritating to the eyes.

Oxidising Agents

Hydrogen peroxide and potassium permanganate are examples of the oxidising agent type of disinfectant. They are readily put out of action by organic matter and are relatively expensive so are not recommended for general use.

Quaternary ammonium compounds

Quaternary ammonium compounds are relatively new synthetically-produced disinfectants. Because they act quickly, are non-irritating, non-corrosive and relatively odourless, they have been used extensively in recent years. They are also detergents and therefore will penetrate more readily than most disinfectants. Hard waters slow down their action so it is preferable to use soft water (rain water) to dilute them. Usually they are sold as liquids. They are useful for dairy utensils.

Chlorhexedine

Chlorhexedine is a new type of chemical compound which may become more prominent in dairy hygiene, as preliminary reports indicate that spread of mastitis is prevented to some extent by its use. It is non-irritant.

Each of these disinfectants has its own advantages and disadvantages. In application, each should be used as directed by the manufacturer, making sure that the concentration is correct and that period of contact is sufficient. Prior cleaning of the surface is an essential prerequisite and if not done, the disinfectant is wasted.

When and How To Use

Disinfectants should be used only when it is impossible to use heat sterilization. Contaminated bedding, hay or bags and carcasses should be burnt if possible. Barns, sheds, poultry houses and dairies may become contaminated from infected discharges such as urine, faeces and milk.

In dairies, regular use of a disinfectant is essential to keep mastitis to a minimum. Omitting the procedure at only one milking may

allow infected milk to spread by way of teatcups and hands to several other animals in the herd.

Whenever cows abort, the discharges from the vagina as well as the foetal discharges may contain millions of pathogenic bacteria or protozoa. The membranes should be burnt and the surface covered with discharge should be disinfected. When the discharges are spread on the ground, the only effective way to kill the germs is to pour petrol, kerosene or oil on the contaminated area and set it alight.

Particular care should be taken to disinfect surrounding surfaces when minor operations such as opening of abscesses is done and the purulent material is distributed.

Disinfectants should also be used for instruments such as knives for docking and paring before and during use. The best disinfectants for this purpose are those belonging to the phenolic types such as lysol and the quaternary ammonium types.

Hatching hygiene should include regular disinfection of incubators. Formaldehyde is the disinfectant recommended for this purpose and full details of the process may be obtained from the Department of Agriculture and Stock, Brisbane.

A final warning—all disinfectants should be kept in a safe place away from children!

Stock and Station

DDT Dips Need Good Management. Its ability to kill cattle ticks with safety has won DDT a place in many dips in Queensland. The big advantage of DDT over related dip preparations is that ticks do not readily develop resistance to it at the strength usually used.

But results are likely to be poor unless you follow the manufacturer's directions carefully and stir the vat thoroughly before dipping.

The vat should be hand-stirred with a wooden or metal stirrer for 15 minutes before the stirrer cattle are run through. Use of stirrer cattle is an addition to, not a substitute for, hand stirring. Samples of dipping fluid should be taken immediately after each dipping and sent to the Animal Research Institute at Yeerongpilly for analysis. From the analysis you can work out the correct amount of DDT you should add to bring the dip up to strength.

—C. R. MULHEARN,
Director of Veterinary Services.

Cost of Hand Feeding Sheep. Wool prices, although improved, are far from permitting the elasticity in regard to capital outlay for sheep husbandry that was enjoyed by sheepmen in earlier, high-price years.

As a case in point, very careful consideration is now needed before a decision is reached on the commencement of supplementary or handfeeding of sheep. The decision once made can commit a sheepman to monetary outlay, and he can only guess when the drought will terminate. Remember that agistment or scrub feeding is generally much cheaper than artificial feeding. Before making a decision regarding supplementary or handfeeding, go carefully into the following considerations:

1. What part, if any, of the flock, should I feed?

2. What is likely to be the market value of sheep at the end of the drought?

3. For how long is it probable the feeding would have to continue?

4. What is the present availability and cost of foodstuffs?

5. What will feeding cost me?

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

Vaccinating Chickens. Vaccinating chickens at day-old or when they are still very young is gaining in popularity particularly now that coccidiosis is being effectively controlled. This early vaccination is to be encouraged, because it ensures that the practice is carried out, especially where chickens are being hatched throughout the year.

However, one big drawback to early vaccination is the fact that chickens huddle close together in chick boxes or battery brooders. Conditions of warmth and humidity are most conducive to the spread and multiplication of the virus, so that here we want to issue a word of warning. Do not contaminate the feathers or fluff of chickens with surplus vaccine, or touch the head of the chicken with contaminated hands. The vaccinator should handle only the vaccine and needle and leave all the holding to the catcher.

Vaccinate day-olds with a needle, and any chicken over a fortnight old in the usual place on the leg. A brush tends to leave too much vaccine on small chickens, resulting in infection in the brooder.

—C. MANNING,
Senior Adviser, Poultry Branch.

Drugs for Coccidiosis. Standards Branch has accepted for registration preparations which control the poultry disease, coccidiosis. They all give some measure of control against this disease.

Sulphamerazine and sulphadimidine, two of the early drugs, are administered in the drinking water after symptoms appear.

As a preventive measure or for treating outbreaks, sulphaquinoxaline and nitrofurazone are available. Preparations containing these drugs may be used either in the feed or in the drinking water.

Nicarbazin is a comparatively new drug, administered continuously in the feed as a preventative only but it should not be fed to laying stock.

The recently introduced drug, zoalene, can be mixed with the feed or water for either the prevention or treatment of outbreaks.

When using these drugs, the manufacturers' directions should be followed in detail as these have been closely scrutinised by qualified Departmental officers.

—A. R. HUGHES, Registration Officer, Standards Branch.

Timely Tips for January

January may be the month to look to drainage and sanitation of calf pens, pig pens, and bails.

Clean, well-drained pens will help control worms and diseases in pigs and calves. In and around the bails, good drainage will help you beat footrot and mastitis.

You may have to treat for worms if the season and the condition of the animals warrant it. This is in addition to your routine treatments through the year.

Watch for ticks—even on young calves.

This might be the time to get together with your neighbours to arrange with your local vet. for group Strain 19 inoculation later in the year (maybe about April).

Make a new year resolution to keep breeding records of your cows. Control the bull and hand mate. If five out of the first 10 cows mated return to the bull, get veterinary advice immediately. Infertility may be starting in your herd. Early action will save a lot of trouble later.

Book on Livestock Diseases

DISEASES OF LIVESTOCK by T. G. HUNGERFORD, B.V.Sc., H.D.A.
A fourth edition of this well-known and highly informative book has been published by Angus & Robertson Ltd. As stated in the introduction to the book, the subject matter was compiled originally as lecture material for students at Hawkesbury Agricultural College. In book form the earlier editions were intended for the use of farmers, graziers, agricultural college students and non-graduate extension workers. The last two editions and particularly the fourth, have been more technical in scope. This appears to have been done with the view to making the book useful for veterinary surgeons as well as the other classes of readers mentioned. As a result the book now tends to fall between two stools. Nevertheless it remains an astonishing compilation of knowledge which will no doubt be eagerly sought after by all who wish to become well informed on livestock diseases. There are 602 pages in the text and an index of 21 pages. The price is 80s. (It should be pointed out that diseases of poultry are not dealt with in this book. Mr. Hungerford is the author of a separate work in that field.)

Keeping Hens In Laying Cages—II

By R. V. BYRNES, Poultry Branch

One of the chief advantages of the cage system is the fact that an accurate record can be kept of each hen's performance.

This is a very important factor from the point of view of culling unproductive birds. However, the keeping of complete records for every layer on a large egg-producing farm can be a time-consuming job. For this reason it is common to find farmers keeping records only on those hens that do not appear to be laying. With two birds to a cage, it is only possible to record cage production, and to use this as a guide for visual culling. Accurate production records are of great value in a breeding programme where production testing of individual birds is necessary.

Various devices can be used to keep records of production, for example, chalk marks on feed troughs, weekly egg counters and detailed individual production cards.

Production cards can be damaged easily by insects or by the birds. One way of overcoming this is to tack the cards to a length of pine board and have a second length of pine board hinged to the first so that it closes over the cards like a lid. (See Plate 2).

Grace Period

Whichever culling system is used, the farmer can make one of two mistakes. He can cull the pullet too early before her potential production is reached or he may cull too late, thus wasting food and cage space.

For this reason, it is essential to delay culling for a certain period after the pullets are placed in the cages. This grace period can be anything from one to two months. If pullets are placed in cages at four and a half months, as is normal in Queensland, first culling should take place at five and a half months, and certainly no later than six and a half months. Of course, this doesn't include birds which are diseased or obviously unfit as these should always be removed as soon as they are noticed.

It is necessary to vary the length of the grace period with the hatching date, that is, pullets hatched during September or later should be given a longer grace period than pullets hatched from May to August, as the late hatched pullets will take up to a month longer to come into production.

CULLING

Basically there are three main schemes that can be used by the cage farmer. These are: (*a*) culling on physical appearance; (*b*) culling on records, and (*c*) a combination of visual and record culling.

(a) Physical Appearance

Culling on physical appearance is based on comb condition, beak and shank pigmentation, early moulting and general appearance and handling of the bird.

The system may increase returns by up to 40 per cent. as compared to no-culling but the effectiveness of the system depends entirely on the experience and skill of the farmer.

(b) **Culling on Records**

If culling on records is too severe, it defeats its own purpose by increasing the number of replacements required until the process becomes uneconomical. Culling systems based on records are most effective when used in conjunction with single bird cages, where records of individual production can be kept accurately. Where two-bird cages are being used, *cage* production only can be recorded, and once this drops below a predetermined level for a certain period, the farmer has to cull the unproductive bird on appearance.

Where a scheme of continuous record culling is being used and pauses are used as a basis for culling, best results will be obtained by using the first nine to 12 day pause. This system is reported to increase returns by up to 60 per cent., as compared to no-culling and it has an advantage in that its effectiveness does not depend on the experience of the farmer.

Recently, poultry research workers in California evaluated the methods of recording used in cage plants in that State. They found that the recording of all eggs laid in one week in every four gave a very good guide to the total performance of the flock.

A high degree of accuracy in culling could be gained if it was based on non-laying over four consecutive days or alternatively a bird laying less than three eggs a week.

(c) **Combination Culling**

The "combination" system combines visual and record culling, and its effectiveness will depend to some extent on the ability of the farmer to cull visually. Most farmers use this system automatically, as unfit or diseased birds are culled as soon as they are noticed regardless of the system of culling being used.

REPLACEMENTS

In Queensland, the rearing of replacement stock should be confined to March to October. Chickens hatched during the summer months do not rear so well and are slower maturing than chickens hatched at other times of the year.

At least six batches of pullet chickens should be reared during this period to provide a reasonably constant rate of production per cage during the year. Also, by doing this, brooding equipment can be used to the best advantage. As hatching date must be taken into consideration when culling, each hatch should be grouped together in certain rows or sections of rows within the shed. The number of replacements required will depend on the severity of the culling system which is being used. Also, the number required will vary from month to month as the number of culls will increase after the birds pass their peak of production.

Experience will be the best guide when estimating the number of replacements required. Even though no replacements are reared from October through to March, it doesn't follow that culling should be curtailed in the corresponding months of February to June. The normal culling programme should

be continued throughout this period as it costs more to feed an unproductive bird than to maintain an empty cage.

DEBEAKING

All birds destined for laying cages should be de-beaked. Debeaking will prevent vices such as feather picking and cannibalism. It assists also in reducing food wastage, particularly where pelleted feeds are being used. Birds of any age can be de-beaked, but best results will be obtained if it is done at seven days of age. At this age, it is necessary to remove from one-third to half of the top beak.

LICE CONTROL

As birds in cages don't have a chance to rid themselves of lice by natural means such as dust bathing, they are particularly susceptible to lice infestation. It is therefore necessary for the cage farmer to adopt a regular programme aimed at lice control. Before pullets are placed in the laying cages they should be dusted, dipped or sprayed thoroughly with either a ·5 per cent. BHC or a 1·5 per cent. DDT insecticide. This ensures that the pullets are lice-free when they enter the cages.

At regular intervals, a number of the caged birds should be selected at random and examined to see if lice are present. If an infestation of lice is detected, control measures as described previously will have to be used. However, dusting and dipping are both time-consuming and laborious and for these reason, cage farmers prefer to spray the birds with a 1·5 per cent. DDT or a ·5 per cent. BHC solution.

Recently the use of a ·5 per cent. Malathion spray has proved very effective in controlling lice and tropical fowl mite infestations. High pressure sprayers are the most suitable for this purpose as it is necessary to wet the birds thoroughly. The spray should be directed onto the birds both from above and below the cage to ensure "all over" wetting. Knapsack type sprays are quite suitable for applying the spray. If a BHC spray is used, feed troughs should be covered to stop the spray getting onto the feed, otherwise the BHC will cause objectionable flavours in the eggs. Strips of plastic or some other waterproof material are suitable for covering the feed troughs.

Be careful not to "overspray," as this will cause undue wetting of the droppings.

FLY CONTROL

Moisture and warmth make poultry manure an ideal breeding ground for flies. Without moisture, flies cannot breed. It is obvious that any control measures should be aimed firstly at the condition of the droppings. The cage shed should have ample overhang (at least 3 ft. to stop rain blowing in and wetting the droppings. The floor should be constructed to allow drainage of moisture away from the droppings to the outside of the shed. The condition of the droppings when voided by the birds should be watched closely and if too moist, attention should be paid to the salt content and/or fibre level of the ration as outlined previously. If the water supply is other than "town," a check on the mineral content should be arranged with the Agricultural Chemist of this Department.

Drip trays and water pipes should be inspected for leaks, and repaired where necessary.

In the cooler months of the year, there is no need to remove droppings as frequently as during hot weather, when conditions for a fly

build-up are ideal. In summer, it may be necessary to clean out droppings as often as once a week.

As an additional fly control measure, droppings could be sprayed with a solution of Dieldrin at intervals of one to two weeks.

COOLING DEVICES

Layers kept on wire are more susceptible to heat stroke than others, because they are surrounded on all sides by hot air and are subject to heat radiation from the roof and reflected heat from the ground. Caged layers can't lose heat by dust bathing and stretching themselves on cool floor litter as is the case with floor layers.

Layers in cages begin to show discomfort once the temperature goes above 90 deg. F. and deaths will occur if it goes above 100 deg. F. for any length of time. Heat waves will adversely affect egg production, egg size and shell thickness.

The use of insulated roofing materials such as asbestos-cement will assist in reducing heat radiation from the roof. Where a drip nipple system is in use, an extra supply of water can be provided by allowing water to flow down the drip trough.

The quickest and most effective method of cooling birds in cages is to wet them lightly with a fine mist or spray of water. As an emergency measure, a hose may be used, but a more efficient and permanent system is to have overhead water pipes fitted with nozzles which give a very fine mist spray. For efficient operation of these nozzles, the water pressure should not be below 25 lb. a square inch. A fine mesh strainer stops particles of rust, dirt, and so on, from clogging the nozzles. The nozzles used should give a wide angle spray that is, 120 deg., and should not use more than 3 gal. of water an hour each.

Mist spraying for 10 to 15 min. in every hour should be sufficient to keep the birds comfortable, while at the same time, droppings have a chance to dry out between sprayings. The nozzles should be mounted at an angle of 45 deg. to stop dripping after spraying is stopped.

In a single aisle shed, one $\frac{1}{2}$ in. spray line with nozzles spaced at intervals of 5 ft. will give sufficient coverage. In a wider shed, it will be necessary to have two or more lines to give complete coverage.

Spraying water on top of the roof is not a very effective method of cooling a shed and, besides, it requires much more water than does a fogging system.

Painting the roofs of the cage sheds with a light coloured paint, for example, white or silver, will result in some of the sun's heat being reflected and will assist in reducing the internal temperature of the shed.

WIND BREAKS

Cold prevailing winds will cause a drop in egg production from caged layers, unless provision is made for some sort of windbreak. The ideal windbreak should be so constructed that it can be removed or adjusted in summer to allow breezes to enter the shed to cool the birds and dry out the droppings.

Windbreaks can be divided into two types, natural and artificial. Natural windbreaks include belts of trees left standing, or planted on the windward side of the cage sheds, or any natural feature such as a hill or ridge which may give some shelter from prevailing winds.

Artificial windbreaks include constructed wooden, metal or fibro windbreaks either attached to the shed, or placed at a distance from it. Whatever the situation, it is always a sound plan to have a windbreak of trees on the windward side of the cage sheds. Make sure, however, that the positioning of the windbreak does not restrict future expansion.

In addition to a natural windbreak, it is necessary to provide some type of artificial windbreak. Where sheds are placed side by side, it will only be necessary to provide windbreaks on the end of each shed and on the side of the shed furthermost exposed to the prevailing wind. Provided that the sheds are not more than 25 ft. apart, each shed acts as a windbreak for the next. The maximum distance that a windbreak should be placed from the sheds can be estimated by multiplying its height by three. In Queensland, it is common to see sheets of flat asbestos-cement attached directly to the outside of the studs on the side of the cage shep with ventilation spaces of 1 ft. allowed above the cages and 2 to 3 ft. below. This type of windbreak is very effective in winter but is not particularly adaptable to summer conditions when extra ventilation is needed.

One type of windbreak which should suit Queensland conditions is one made of 4 in. by 1 in. wooden slats spaced three-quarters of an inch apart, and placed at a distance from the cage shed (see Plate 6). This type is effective at a distance of up to three times its height from the shed. The height of the windbreak can be from 6 to 8 ft., but it should be 6 in. to a foot higher than the eaves of the cage shed. Posts supporting the windbreak should be sunk 3 ft. in the ground and stayed on the leeward side. The lower section of this windbreak can be hinged to allow increased air circulation at ground level.

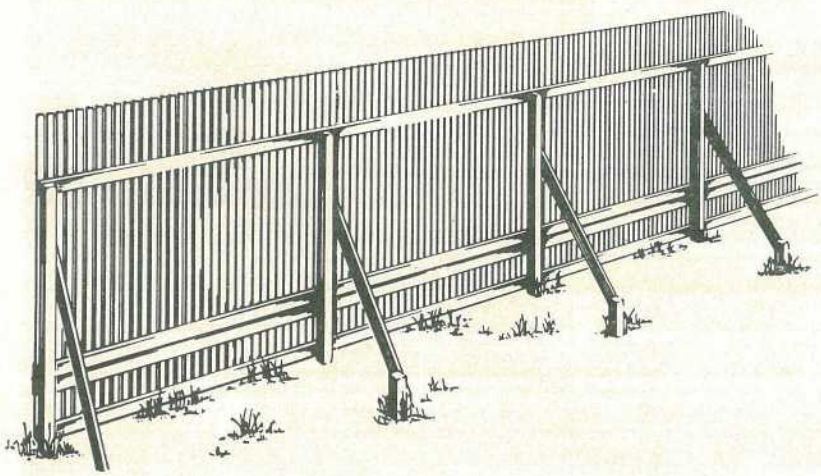


Plate 6

The Leeward Side of a Windbreak Made of 4-in. by 1-in. Wooden Slats Spaced Three-quarters of an Inch Apart. The lower section of this windbreak is hinged and can be folded up in hot weather.

PRODUCING CLEAN EGGS

Dirty eggs are not normally a problem with cages. After the egg is laid, it rolls out onto the egg tray in front of the cage out of reach of the hen. However, it will often be found that the wire floors of the cages slightly mark the eggs. These marks are caused by particles of manure, dust or rust, which adhere to the wire floor of the cage. Wire marked eggs will be more numerous if the bird's droppings are too moist. Cage floors should be brushed clean with a stiff brush whenever an increase in the number of wire marked eggs is noticed.

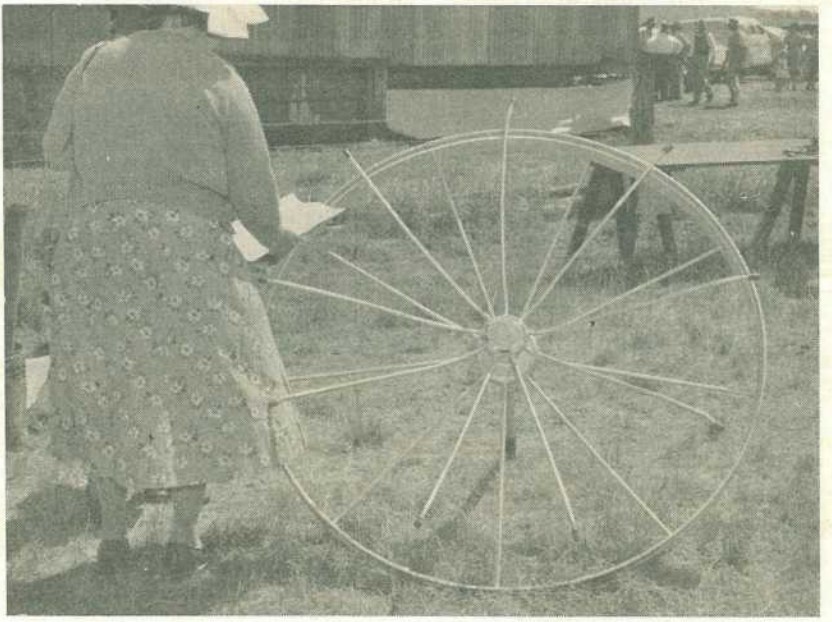
ARTIFICIAL LIGHTING

Cage layers respond equally as well to artificial lighting as do layers in deep litter sheds. The lights should be situated so as to give an even distribution of light throughout the shed. When calculating the number of lights and sizes of globes required, allow one watt to every 4 to 5 sq. ft. of shed area.

BREEDING IN CAGES

With the development of a suitable artificial insemination technique for poultry, breeding from caged layers is now possible. This is extremely important in breeding schemes such as the Full Sister or Dam Family System of breeding where it is necessary to record individual production of dams and to have positive identification of the progeny from each dam. Previously this would have entailed the use of trap nests or single test pens both of which require considerable time and labour.

Farm Gadget



Can Rack made by Mr. H. A. Beasley, of Chinchilla, is a Combine Wheel with Every Second Spoke Cut at Rim and Turned Up to Hold Cans. This is set on part of the axle embedded in the ground.

Protect Chickens And Poults Against Fowl Pox

By P. D. RANBY, Veterinary Officer

Vaccinating the new season's chickens against fowl pox is good management. Turkey poults should also be protected. The cost is only ¾d. to 1d. per bird for the vaccine. Although fowl pox is not a killer, it causes some setback in the affected birds. The disease is serious in laying flocks, where egg production is adversely affected.

Fowl pox is a virus disease of the fowl, pheasant and turkey. The disease can be spread from farm to farm by virus-carrying mosquitos which have fed from pox-affected birds. Such mosquitos remain infective for several months.

Note these Signs

Fowl pox has several forms, the most common in outbreaks on the farm being the presence of wart-like skin nodules on the unfeathered parts of the head—that is, the comb, wattles and eyelids of fowls (see Plate 1). Each skin nodule represents the bite of an infected mosquito. These nodules shrivel up after two weeks to form a scab which drops off. The scab material

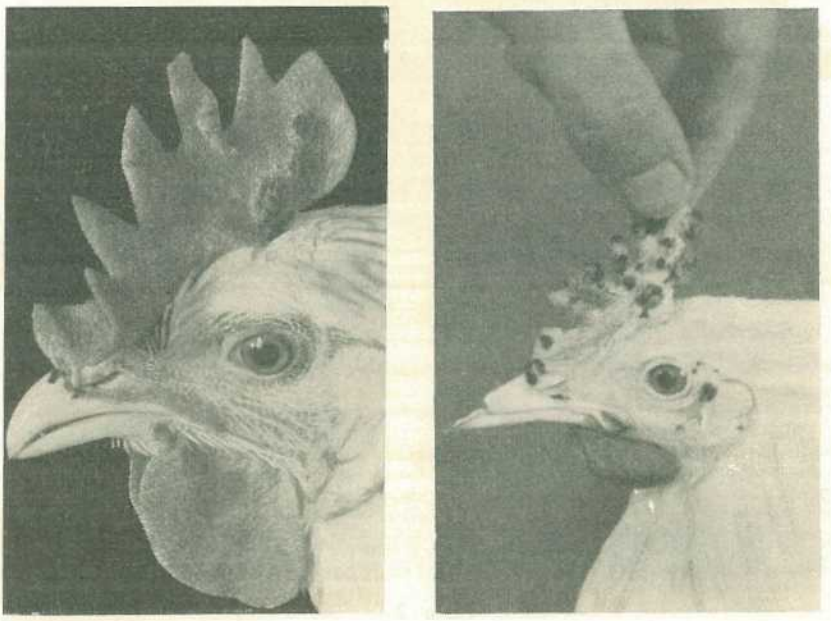


Plate 1

Left: **A Hen Showing Fowl Pox Lesions on the Comb.** The disease is more serious in laying fowls as egg production become affected.

Right: **A Debeaked Pullet Showing Numerous Fowl Pox Lesions on the Comb, Corner of the Mouth and Behind the Eye.** In both these cases, virus has entered the skin through the bites of infective mosquitoes.

contains the virus, which may then contaminate the birds' surroundings. The virus occasionally enters abrasions of the skin or mouth from the litter. When the virus penetrates the lining of the mouth, cheese-like "cankers" develop. Such "canker" cases suffer a severe setback and need to be destroyed.

Where many birds in an affected flock have developed pox lesions on the head, one may find an occasional bird showing respiratory distress, as evidenced by coughing and gasping for air. On examining such a case, a cheesy plug will be found in the top of the windpipe. This represents the respiratory form of fowl-pox. The incidence of this form is always small but it leads to confusion with other respiratory diseases.

Brooder fowl pox is a special form of the disease seen occasionally where chickens are kept in wire-framed brooders (see Plate 3). The virus enters the brooder in the first place by mosquitos. Virus contamination of the wire frame and other fittings on the brooder follows when affected chickens rub or bump the pox lesions against them. The next batch of chickens placed in the brooder are then exposed to the virus.

Since brooder chickens are rather prone to small scratches, the fowl pox virus enters these abrasions to produce large scabs. These scabs may be found all over the body in brooder fowl pox cases. In addition, fowl pox scabs have even been seen in debeaking wounds in battery brooded chickens.

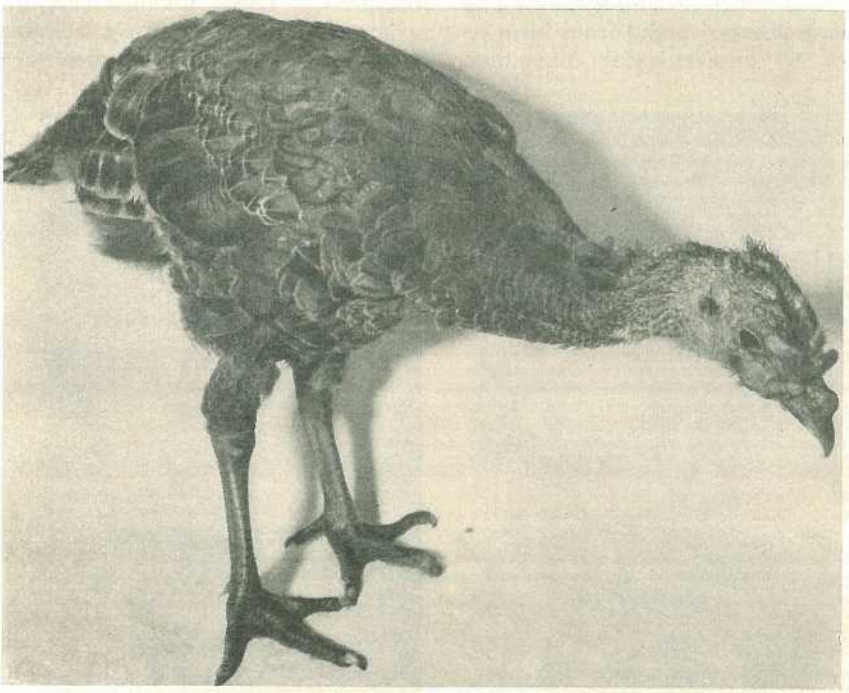


Plate 2

A Turkey Poult Affected by Turkey Pox. Note the pox nodules on the face and base of the beak. One nodule is also present on the left hock joint but is not so easily seen. Turkey pox is caused by the same virus as fowl pox.

Turkey pox in turkeys is caused by the same virus as fowl pox. (see Plate 2). However, the disease tends to be more severe in turkeys than fowls.

Two Vaccines Available

The two vaccines available for fowl pox vaccination of chickens are:

(*a*) Pigeon pox vaccine.

(*b*) Fowl pox vaccine.

These are supplied in 100 and 300 dose bottles. Remember, both pigeon pox and fowl pox vaccines contain living viruses and should be stored in a cool place, preferably in the refrigerator. The choice between them depends on certain factors which are outlined as follows:

(1) Fowl pox vaccine produces a life-long immunity following vaccination, whereas pigeon pox vaccine (C.S.L.) gives a temporary immunity lasting 4-6 months. Hence, other things being equal, fowl pox vaccine is preferred.

(2) Fowl pox vaccine is preferably used between 6 and 12 weeks of age; if done outside this age range some temporary upset is likely. However, older fowls may be done but not if they are laying or close to lay.

Pigeon pox vaccine may be used at any age and does not upset the birds in any way.

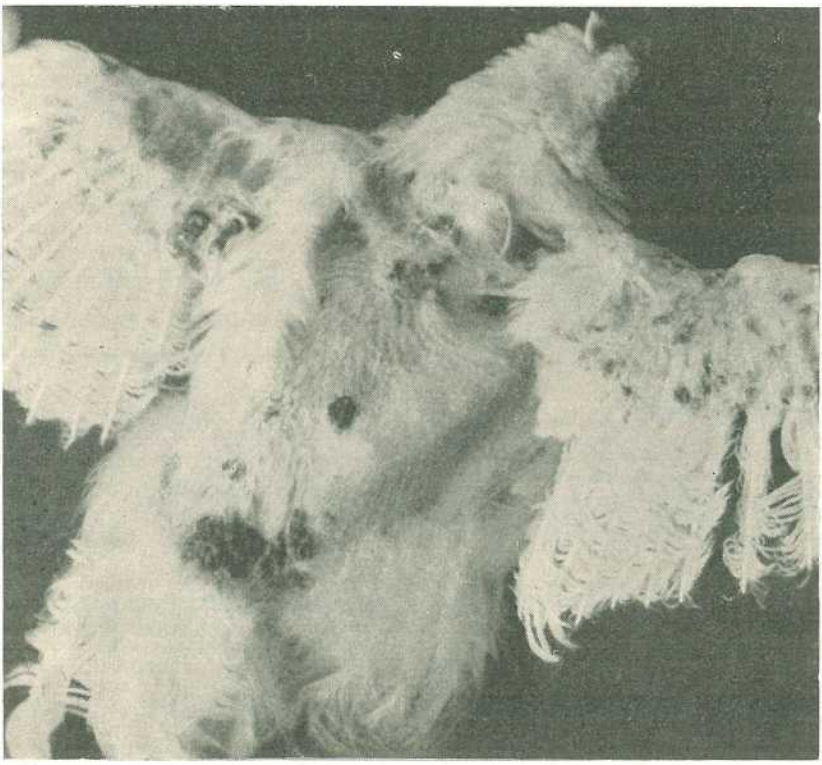


Plate 3

A Case of Brooder Fowl Pox in a Chicken Showing Numerous Large Scabs Distributed Over the Body. The virus in this case has entered small skin scratches from the virus-contaminated wire brooder.

(3) Fowl pox vaccine should not be used for unthrifty chickens such as chickens recovering from an attack of coccidiosis. Either use pigeon pox vaccine or postpone the use of fowl pox vaccine until later.

(4) Fowl pox vaccine should be used with caution if chronic respiratory disease (C.R.D.) is likely soon after vaccination. In any case, *never use fowl pox vaccine on chickens affected by "colds."* Use pigeon pox instead.

(5) Experience with pigeon pox vaccine is that it gives its best results in areas where mosquitos are prevalent. The reasons for this are not clear but it may be a consequence of what amounts to revaccination of the birds with fowl pox virus by infective mosquitos.

Thus it may be a good plan to use fowl pox vaccine in the cooler months and pigeon pox in the warmer months.

(6) In the case of chickens to be slaughtered for meat purposes, use pigeon pox vaccine, as a long-lasting immunity is not necessary.

(7) In the case of turkey poults, use only fowl pox vaccine, as pigeon pox fails to "take" in this species.

Age to Vaccinate

As pointed out earlier, this partly depends on the vaccine to be used. In general, fowl pox vaccine is recommended to be used on chickens 6-12 weeks old while pigeon pox may be used at any age.

A few farmers prefer to vaccinate day-old chickens with pigeon pox vaccine immediately after chick sexing and before placing them back in the brooder. Vaccination at day-old with pigeon virus is satisfactory although the immunity would probably be stronger if the vaccination were caried out some weeks later.

In the case of turkey poults, vaccinate at 1-2 months with fowl pox vaccine. If turkey pox occurs rather early, vaccination may be necessary as early as 2 weeks.

These Methods May be Used

Having selected a vaccine, the following methods of innoculating may be used:

(*a*) *For Pigeon Pox Vaccine*—Only the follicle method is suitable for pigeon pox vaccine.

(*b*) *For Fowl Pox Vaccine*—There are several methods available for innoculating fowl pox vaccines:

1. The follicle method using a special brush.

2. The stab method using a special two-pronged needle.

Thus two basic methods of fowl pox vaccination are in use, the follicle method and the stab method. Use a team of at least three where possible—a catcher, holder and vaccinator—in order to maintain speed. For the beginner, these methods will be described briefly:

The Follicle Method—The follicle method of vaccination is the one most commonly practised in Queensland, partly because it was used for mixed virus vaccines containing one of the pox vaccines with the virus of infectious laryngotracheitis (I.L.T.).

For the follicle method, one requires a special fowl pox brush as in Plate 4 (obtainable at the price of 6d each in Brisbane).

Make up the vaccine as directed or at the rate of 4 ml. (cc) for every 100 doses of vaccine. Where fowl pox vaccine is supplied for use by the stab method, extra liquid must be added if it is to be used for the follicle method. Use a liquid containing approximately 1 part of glycerine to 4 parts of clean water.

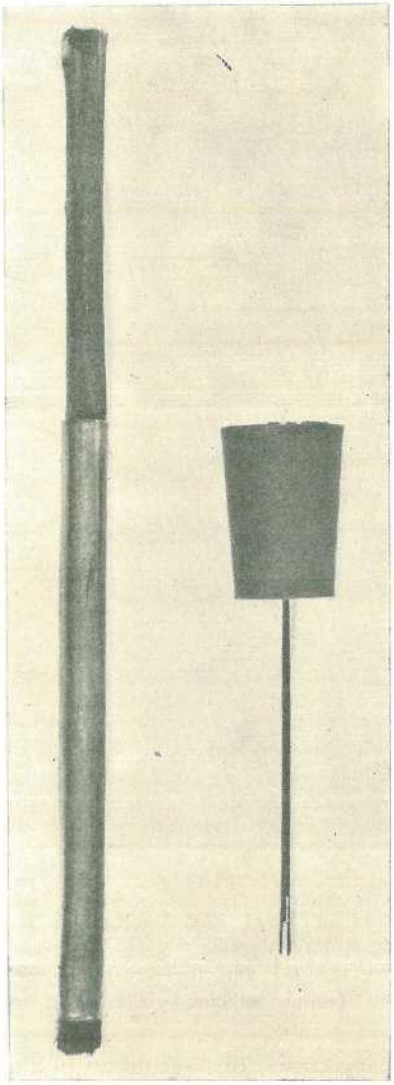


Plate 4

Fowl Pox Vaccinating Brush (Left) and Vaccinating Needle (Right). This vaccinating needle was made from an ordinary darning needle. Note the bevelled edges on the two prongs. The needle is used for the stab method of vaccination and the brush for the feather follicle method.

The holder grasps one or two chickens (upside down) and removes the feathers from an area of the outside of the leg just above the hock joint (the joint just above the shank). The vaccinator dips the brush in the vaccine bottle and wipes it lightly on the neck of the bottle to remove excess liquid. The brush is then rubbed several times on the exposed feather follicles, so that at least six follicles are thus inoculated. (see Plate 5). No hard rubbing is necessary.

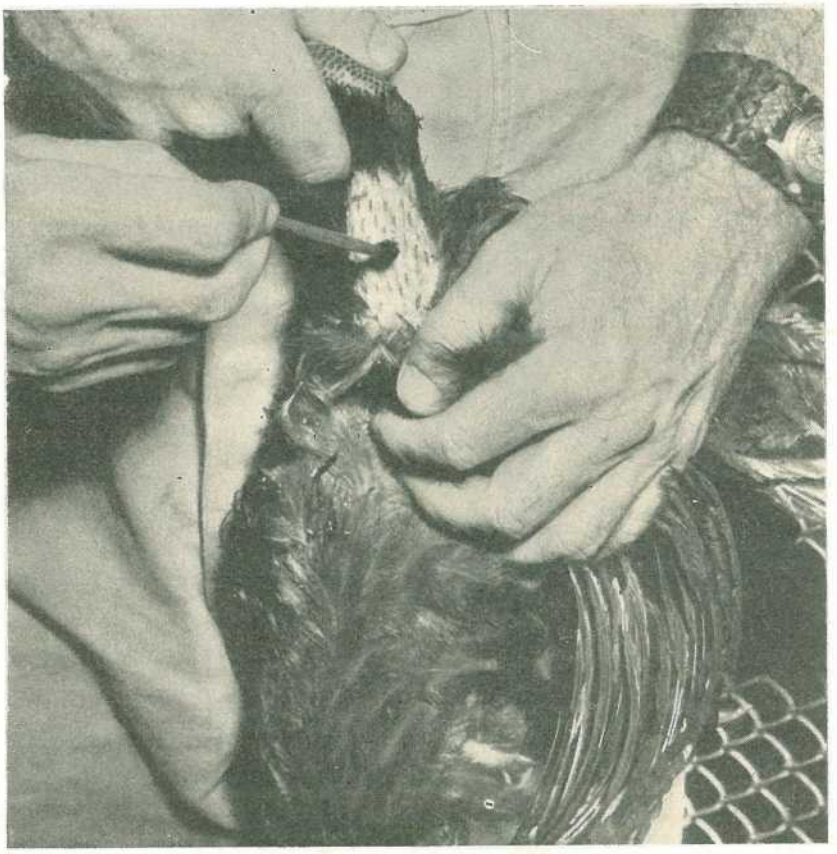


Plate 5

The Follicle Method of Fowl Pox Vaccination is Suitable for both Pigeon Pox and Fowl Pox Vaccine. Note that plenty of feathers have been removed from the leg and the vaccine is being applied to the feather follicles by the brush.

As the vaccination proceeds, the vaccinator will find that small feathers tend to collect on the brush. These should be removed, otherwise excess vaccine will be picked up by the brush, with the result that vaccine will be wasted.

The Stab Method—The stab method is faster than the follicle method provided that a team of three or more persons is used. The method requires the use of a two-pronged vaccinating needle (see Plate 6) which may be easily made from an ordinary darning needle as follows:

Select a darning needle 2-3 in. long. Cut through the eye of the needle so that two prongs of about $\frac{1}{8}$ of an inch are left. Push the other end of the needle (the pointed end into a cork or rubber stopper which now acts as the handle of the needle. The vaccinating needle now requires its two prongs to be sharpened and it is ready for use. Bevel each prong in turn (from the direction of one prong to the other.)

The site used for the stab method is usually a skin fold in the thigh of the leg as shown in Plate 6. Some vaccinators prefer the wing-web stab, which is quite suitable for chickens 4-6 weeks old. If much older than this, the wing web becomes rather thick and is more difficult to puncture.

Where the leg fold site is used (see Plate 6), the holder grasps 4 to 6 chickens upside down by the right leg and faces the birds' breasts to the vaccinator. A row of feathers

Plate 6

The Stab Method of Fowl Pox Vaccination Suitable for Fowl Pox Vaccination Only. Note the vaccinating needle poised ready to stab the fold of skin drawn away from the bird's thigh by the vaccinator.

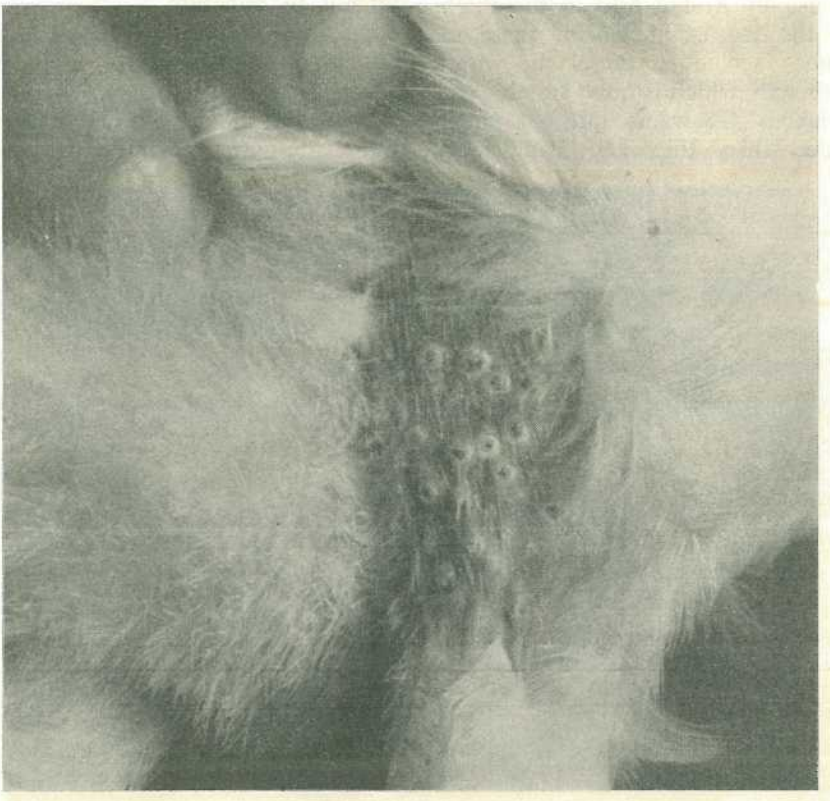


Plate 7

A Local Reaction or "Take" Following Pigeon Pox Vaccination. The swollen feather follicles are just starting to subside.

on the outside of the thigh is grasped by the vaccinator, pulling a fold of skin outwards with them (the vaccinating bottle is also held in this hand). Using the other hand, a dose of vaccine is picked up by the vaccinating needle which is then stabbed into the fold of skin. This is repeated, so that two stabs are used for each bird. As each chicken is vaccinated, it is released by the holder.

In the case of the wing-web site, the chicken is held upright and the needle is pushed right through the wing-web from the top surface to the bottom.

Reactions Following Vaccination

Following fowl pox vaccination, the feather follicles start to swell on about the fourth day and reach their maximum size from the sixth to tenth day. After this, the follicle swellings gradually subside. This reaction is referred to as a local reaction or "take" and indicates that the bird will develop immunity as a result of the reaction (see Plate 7). In the case of fowl pox vaccine, a crust or scab will be present on the top of each reacting follicule this being absent in the case of pigeon pox vaccine.

A systemic or general reaction follows the use of fowl pox vaccine, occuring on about the eighteenth day following vaccination. If the chickens eat a little less at this time and appear slightly dull, the effect is of little consequence as it passes off in a day or two. Pigeon pox vaccine does not produce this effect.

Check For "Takes"

The local reactions as described on the site of vaccination should be checked about a week after vaccination to make sure that the vaccine has "taken." This tells us that the vaccine was potent and the technique of applying it was successful.

Summing Up

- Fowl pox vaccination should be standard procedure for chickens and turkey poults, costing not more than 1d. a bird.
- Two vaccines, fowl pox and pigeon pox vaccine are available for chickens and the merits of each are described.
- Only fowl pox vaccine should be used for turkeys.
- The feather follicle method of vaccination is used in the case of pigeon pox vaccine.
- Fowl pox vaccine may be used by the follicle method or the stab method.
- Check for "takes" one week later.

"Beef Cattle Husbandry"

On three separate counts, use of hormones in beef production seems a definite advantage. Treated steers develop more beef and leaner beef on the same amount of food.

But this is only one side of the story. The use and possible abuse of hormones in beef production is still the subject of lively scientific debate.

Hormones cannot improve poor quality beef, but may, on occasions, make it worse. Then, apart from the question of human health, the risk to breeding cows from contaminated pastures or soil cannot be ignored. This question is, in fact, at present under urgent investigation.

A discussion on the use of hormones in the beef industry is given by Dr. Allan Fraser, Lecturer in Animal and Dairy Husbandry, University of Aberdeen, in the second edition of his *"Beef Cattle Husbandry."* In this edition, Dr. Fraser has added a completely new chapter on recent scientific developments. This chapter is devoted to discussion on performance testing, dwarfism, blood grouping and the use of hormones.

Dr. Fraser points out that research into beef cattle husbandry has come late on the scientific scene. In the past, agricultural scientists have given far more attention to dairy cattle, pigs and poultry. But, he hastens to add, it is possible to exaggerate the importance of this apparent neglect. For example, it is questionable whether performance and progeny testing are as novel in practice as they are in scientific research.

Another new chapter that will interest Australian readers deals with Indian cattle and their crosses. Here, the significance of Dr. Fraser's remarks on the Zebu's heat tolerance should be fully appreciated.

But rich as it is in beef cattle history, the book is directed mainly at the British cattleman.

Tuberculosis-Free Cattle Herds (As at 1st December, 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., "Morden", M. S. 755 Toogoolawah
Moore, S. R., "Sunnyside", West Wooroolin
Neale, D. G., "Groveley", Greenmount
O'Sullivan, Con., "Navillus", Greenmount
Phillips J. & Sons, "Sunny View", Benair, Kingaroy
Power, M. F., "Barfield", Kapaldo
Queensland Agricultural High School & College, Lawes
Radel, R. R. & Sons, "Happy Valley", Coalstoun Lakes
Roche, C. K., Freestone, Warwick
Sanderson, W. H., "Sunlit Farm", Mulgildie
Schloss, C. J., "Shady Glen", Rocky Ck., Yarraman
Scott, M. E. & E., "Wattlebrae", A.I.S., Stud, Kingaroy
Scott, W. & A. G., "Walena", A.I.S. Stud, Blackbutt
Shelton, R. A. & N. K., "Vuegon" A.I.S. Stud, Hivesville, Murgon
Sokoll, A. H., "Sunny Crest", Wondai
Sperling, G., "Kooravale", Kooralgin, Cooyar
Sullivan Bros. "Valera", Pittsworth
Sullivan, D. "Bantry", Pittsworth
Sullivan, F. B., "Fermanagh", Pittsworth
Thompson, W. H. "Alfavale", Nanango
Webster, A. H., "Millievale", Sabine, via Oakey
Wieland, A. W., "Milhaven", A.I.S. Stud, Milford, via Boonah

Ayrshire

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

Friesian

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

Guernsey

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

Jersey

Beckingham, C. Trout's Rd., Everton Park
Birt, W. C. M., Pine Hill Jersey Stud, Gundiah
Borchert, Mrs. I. L. M., "Willowbank" Jersey Stud, Kingaroy
Burrows, R. N., 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

Important Uses Of Vegetable Oils

By M. J. PRICE, Agricultural Chemist Laboratory

Many industries are dependent on a continuous supply of vegetable oils; here is an outline of a few of the more important applications of these oils.

Vegetable oils are widely distributed in nature. In plants they are found chiefly in the seeds and fruit but they occur also in the leaves, roots and other vegetative organs.

Oils and fats (solid oils) have served the human race as food for centuries and besides being an essential part of the diet of man they also play an important role in many industries. Although the tropical inhabitant who first collected the oil exuding from sun-heated coconut kernel is regarded as the pioneer manufacturer of vegetable oils, there is little doubt that the first useful quantities of vegetable oil were obtained from the fruits of the olive tree.

The culture of the olive tree in Tunis dates from about the first century B.C. and although a great number of the original olive groves were destroyed by invading Arabs during the sixth century, the groves continued to develop and at the beginning of the twentieth century approximately 11,000,000 olive trees were growing in Tunis.

In Australia, at this time, 67,000 olive trees were growing and the fruit of these trees yielded almost 11,000 gal. of oil. A recent estimate gives the quantity of olive oil produced in Australia as 30,000 gal. valued at about £57,000.

Another important oil-bearing crop grown in Australia is the flax plant (*Linum usitatissimum*), a native of Central Asia. The gross value of the linseed crop in Queensland for the year 1958-1959 was about £500,000. Seven thousand tons of seed were harvested from 30,000 acres. The extracted oil is of great importance in the paint and varnish industry.

In Queensland the flax plant is grown to produce oil-bearing seeds, whereas in some areas of the world it is cultivated for flax fibre alone.

Although oils are found in nearly every type of plant, usually only those plants yielding commercially useful oils in sufficiently high quantities are of any economic importance. In certain instances, the oil obtained from a crop is of secondary importance; cottonseed oil is an example of this.

It has been said that the life and progress of a nation depend in no small measure on its supply of vegetable oils and fats. This statement rings very true when we consider that almost every home has a film of linseed oil in the form of paint on some area of its walls, either internally or externally or both.

Another instance is the widespread use of lubricating greases in motor vehicles. These lubricants are prepared in many ways but the general method is to dissolve vegetable oils in mineral oils and boil while adding a solution of an alkali such as caustic soda.

Three Groups of Vegetable Oils

The vegetable oils have been classified into three broad groups according to certain chemical and physical properties. They are: (1) The drying oils group, (2) The semi-drying oils group, and (3) The non-drying oils group.

The oils are arranged in these groups according to their ability to dry when exposed to the atmosphere, consequently we have the well-known drying oil, linseed oil, in group (1). Olive oil, a non-drying oil, is in group (3), while cottonseed oil, a semi-drying oil, is placed in group (2).

Of the chemical and physical properties used for classification purposes, the most important is the iodine value. This is a measure of the oil's ability to absorb iodine quantitatively and is determined by chemical treatment of the oil with an iodine compound. It is a most useful value because it gives an accurate measure of the oil's drying potential. The higher the iodine value the better are the drying properties of the oil, and it follows then that linseed oil, a group (1) oil, will have a higher iodine value than a group (3) oil such as olive oil. The approximate iodine values for three common oils of different groups are as follows:—

	Iodine value approx.
Linseed oil—group (1)	190
Cottonseed oil—group (2)	120
Olive oil—group (3)	80

In addition to its use as a classification criterion, the iodine value also gives an indication of the maturity of the seeds from which the oil was extracted and because of this it is extensively used for quality control.

Extraction and Refining

Since oils are obtained in all countries of the world, it will be readily understood that even the crudest methods of extraction and refining are still in existence. In the progressive areas, modern processing factories have been constructed containing efficient machinery and the bulk of the world's vegetable oil supply is obtained by using improved extraction techniques. The machinery required for the preliminary treatment of the fruit or seed must naturally vary with each particular variety. Therefore the preparatory operations for the removal of the coconut kernel will be entirely different from that necessary in the case of flax seed.

The following is a brief outline of the steps involved in the manufacture of raw linseed oil.

The first operation is the removal of any foreign material; this may include plant trash, sand and pieces of metal. The first two are generally removed by screening equipment while the latter may be removed by the use of magnets.

The cleaned seeds are then passed through a series of grooved rollers rotating at about 150 revolutions a minute, which crush the seeds and reduce them to the desired degree of fineness.

The ground seed or meal as it is generally termed is transferred to the cookers where it is moistened and steam-heated. This is a very important step and its main purpose is to soften the seed tissues and so facilitate the extraction of the oil at the pressing stage.

The cooked meal is finally subjected to high pressures in hydraulic presses and the expelled oil is led away to settling tanks.

The next step in the manufacture of raw linseed oil is the refining

process which, like most oil treatment methods, has been subject to improvement over the years. As the oil user demands a higher quality product, so the manufacturer must improve his techniques in order to meet this demand.

The earliest methods employed for improving the oil consisted simply of storing it for a few years to allow the impurities to coagulate and settle. This way was too slow to meet the ever increasing demand, and a much more rapid method was developed.

This is known as acid refining and consists of treating the oil with sulphuric acid followed by the addition of large quantities of water.

The main drawback with this method is that it tends to increase the free acid content of the oil and this acid oil can have deleterious effects on the keeping qualities of prepared paints. Acid-refined oil is now considered inferior to that refined by the newer alkali technique.

The proportion of linseed oil in the seed varies with the variety of seed and with the climatic conditions prevailing during the growth of the crop. A yield of about 35 per cent. oil is regarded as average.

Plate 1

Examining a Linseed Crop at Yarranlea.

Edible Oils

The industries associated with the treatment and use of vegetable oils are so numerous and varied that this account can only serve to acquaint the reader with the more important products obtained from these oils. It is of interest to note that a high proportion of the vegetable oils is suitable for edible purposes provided they are prepared from fresh, undamaged seeds which have not been heated during the extraction process. In India, cold-pressed linseed oil is used extensively as a table or salad oil whereas in many other countries this is replaced by peanut oil, cottonseed oil and olive oil. Olive oil is also of importance in the tinned fish industry.

Vegetable oils play an important role in the production of butter substitutes and in the early years of margarine manufacture, coconut oil was extensively used. In addition, cottonseed oil, peanut oil, sunflower seed oil and sesame oil have all been used in margarine.

The oils chosen should be completely neutral in flavour and odour and this is usually accomplished by careful deodorization.

The chief raw material used in the manufacture of margarine is "oleo oil," a low-melting-point animal fat, and this is blended with the vegetable oils in the ratio of approximately 3:1. The blend is heated to the desired temperature in a vessel equipped with an agitator and a previously treated volume of milk is added to form a water in oil emulsion.

This mixture is allowed to cool and is passed through various solidifying processes in order to produce a plastic fat having similar physical properties to butter.

Plate 2

A Crop of Safflower of the Horowitz Variety at Bowenville.

Plate 3

Harvesting Linseed at Yarranlea.

Paint and Varnish

Perhaps the most important outlet for vegetable oils in Queensland is the paint and varnish industry in which linseed oil is used. Linseed oil can be treated in a variety of ways to enhance its value as a paint medium, and the paint technologist takes into account the different properties of each type of oil when formulating a paint. The oil may be polymerised (thickened), boiled or blown, it may also be reacted with other chemicals to produce a variety of varnishes which are widely used in enamelised coatings.

Linseed oil is not the only oil capable of thickening; such oils as safflower, tung, castor and sterculia have been successfully treated.

Thickened oil is used in the manufacture of printer's inks, lithographic varnishes, plastic wood and linoleum; only a small amount is used in the manufacture of paints.

Raw linseed oil takes about three days to dry when exposed to the atmosphere. However, this period can be shortened to 6 to 8 hours by the addition of small amounts of accelerating substances known as driers. These driers are usually mixtures of cobalt, manganese and lead compounds and when added to the linseed oil during heat treatment of the oil, the so-called boiled oils are produced. The types of driers used and their concentrations play a very important part in the durability of the coating; excess manganese can cause film embrittlement while excess cobalt can cause the paint film to wrinkle.

The manufacture of alkyd resin varnishes based on linseed oil is a comparatively new industry and the varnishes produced are the ultimate where high gloss retention and quick drying are desired features. Large reacting vessels capable of producing thousand gallon batches

of synthetic varnish per cycle are in use in a few factories in Australia. By reacting different organic chemicals with linseed oil under controlled conditions, a wide variety of varnishes may be produced.

The particular feature desired in the finish can be tailor-made into the varnish and by this method varnishes can be prepared for flat enamels, full gloss exterior and interior finishes, alkali resistant finishes and thixotropic coatings.

Small quantities of other high iodine value oils such as tung oil and safflower seed oil are incorporated into varnishes to impart special properties to the finished coating. However, the use of drying oils other than linseed oil is limited and linseed oil will remain the major paint and varnish medium for many years hence.

Many Kinds of Soap

Vegetable oils are also used in the manufacture of soaps. These may be prepared from almost any oil and consequently a large variety of soaps are available for both domestic and industrial use.

The general method of preparation is to introduce an excess of dilute caustic solution into a heated volume of oil. Salt is then added and two layers are obtained; the lower aqueous layer contains salt, glycerine and any excess caustic. The upper layer consists of a curdy mass of soap containing about 30 per cent. moisture.

The curdy mass is mixed with water and boiled and separation into two layers is again effected.

The process is repeated and the soap curd is then transferred to mixing machines where any necessary additions are made.

Finally the mixture is poured into soap frames where it is allowed to cool for a few days before it is cut and packed for sale.

Included in the variety of soaps available are soft soap, hard soap, liquid soap, medicated soap, floating soap, disinfectant soap, sand soap, powdered soap and transparent soap.

Coconut oil soaps have the property of lathering in "salty water" and this oil is used in enormous quantities in the preparation of good quality shampoos and soaps.

The few industries mentioned will serve to convey to the reader the versatility of vegetable oils and their value to a modern community. The lesser known vegetable oils such as those obtained from the seed of the raspberry, the pumpkin and the grape could all be processed and used if the need ever arose. In fact, grape seed oil is used as a table oil in some Mediterranean countries.

Sometimes two oils have such similar properties that they may be interchangeable in a particular industrial process; when this occurs the oil available at the lowest price will be sought and used.

The vegetable oil industry of today is an enormous concern and its position in the industrial world is a credit to the skill and achievements of its technologists.

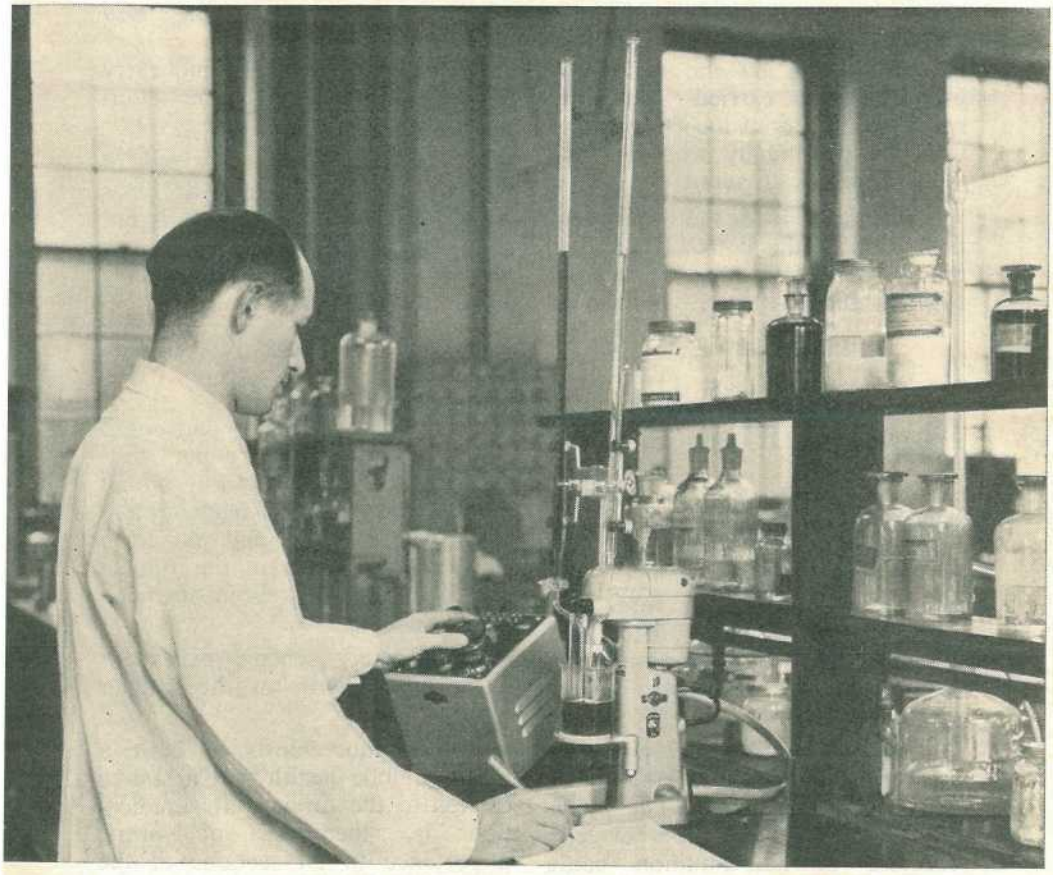


Plate 1: **Analytical Checking in the Laboratory.**

Check on Agricultural Chemicals

By N. D. IRWIN, Registration Officer, Standards Branch.

All pest destroyers offered for sale in Queensland must be registered with the Department of Agriculture and Stock; State law thus enables a check to be kept on the quality and directions for use of all agricultural chemicals.

This check includes evaluation of the formula in relation to its suitability for the purpose for which it is advocated and the subsequent analyses of samples obtained from retail stores to ensure that the material being sold is manufactured in accordance with the registered formula.

The directions and claims set out on the labels are carefully scrutinized by the Agricultural Requirements Board, which makes recommendations on each application for registration. This Board is guided

in its decision by the results of investigations carried out by specialist officers of the Department who are continually working with modern pest destroyers.

Registration is for the benefit and protection of the user. If you use these materials either as a farmer or a household gardener, you should read the labels carefully and carry out the instructions to the letter, using the correct dose rates.

Do not think that the use of excessively strong sprays or dusts gives any better control. It is not economic, the residue is more toxic and the excessive concentration may destroy beneficial insects.

Fight Against T.B.

Veterinary science is winning hands down a fight to eradicate tuberculosis from dairy herds supplying milk to Queensland's cities and towns. Records from the State's compulsory tuberculosis testing scheme show a progressive decline in the incidence of the disease.

There were only 0·12 per cent. reactors among the 300,000 dairy cattle tested last year. The previous year, there were 0·25 per cent. reactors in half-a-million cattle and in 1953-54, 0·75 per cent. reactors in 380,000 cattle.

Although 800,000 head are covered by the scheme, most cattle are tested only once every two years owing to the satisfactory eradication position.

These figures show that the incidence of tuberculosis in dairy herds is one-sixth of that four years ago and one-half of that one year ago. Further progress will probably be shown as complete eradication approaches and some testing will have to be continued to maintain freedom.

A compulsory testing scheme for dairy cattle was introduced in the Brisbane area some 12 years ago. Since then, almost all the dairy cattle between the border and Bundaberg, including the Darling Downs, Brisbane Valley and South Burnett have come under test. Testing is also carried out on all dairy cattle in the Rockhampton, Townsville, Cairns and Atherton districts. All cattle in the Biloela area have recently been included in the scheme.

A voluntary scheme exists for milk supply herds of the smaller towns.

Bovine tuberculosis is both a risk to public health and a source of loss to the farmer. Its eradication is, therefore, of prime importance to all sections of the community.

Fortunately, veterinary officers have a very efficient test to detect carriers of tuberculosis. It is applied regularly to all herds under compulsory testing and all reactors are slaughtered. By means of this test, the disease can be readily eradicated from a herd. But if herds are not tested, the disease can remain undetected for long periods.

Eradication by regular testing is the complete answer to bovine tuberculosis. The progress already achieved makes it clear that the disease is fast being cleaned out of Queensland dairy herds.

Continued testing will keep it on the run.

—K. M. GRANT,
Assistant Director of Veterinary Services.

Bean Seed Production In The Burdekin Valley

By E. P. WILLIAMS, Senior Adviser in Horticulture

Bean seed production in the Burdekin Valley is a relatively new industry. For several years past, the crop has been grown at the Ayr Regional Experiment Station, where methods of land preparation, crop management and harvesting are more or less standardised. However, commercial production in the district began only in 1957 when an acute shortage of good quality seed in Australia focussed attention on the need for production in areas where climatic hazards were low and the risks of disease outbreaks were less than in established producing areas.

What has the Burdekin to offer? The soil is fertile, ample water is available for irrigation, and the winter climate is invariably favourable for growth in temperate vegetables. In addition, little or no rain falls during the May-November period. Outbreaks of disease such as anthracnose and the bacterial blights, which are normally associated with moist, humid weather, are therefore rare. There is the further fact that the crop matures in spring and is harvested in fine weather with little or no prospect of rain damage.

In 1958, 749 acres were planted by 89 growers in the Burdekin Valley. Yields varied from farm to farm but were generally high and averaged about 24 bushels to the acre of uncleaned seed which graded out extremely well.

Crop Management

Several growers have now had experience in handling the crop and some of the earlier faults in crop management noted in 1957—poor land preparation, ineffective weed control and inadequate fertilizer applications—give little trouble.

Planting begins in early April and continues until the end of June. Crops which are planted at a later date usually mature in relatively hot, dry weather when the seed is very susceptible to mechanical damage during normal threshing operations.

Where necessary, irrigation precedes planting to that the soil is wetted to a depth of about 2 feet before the seed is sown. Single row and double row planters with fertilizer attachments are used to to establish the crop and do a remarkably good job, provided the seed is clean and reasonably uniform in size.

Plate 1

Bean Plants in the Full Pod Stage with Leaves Pulled Aside to Show the Pods. Yields in the Burdekin average more than 20 bushels of seed to the acre.

Planting rates vary considerably from 25 lb. to 60 lb. to the acre, but the general trend is towards the lighter rates of sowing. Initially, row spacings and plant spacings in the row showed a similar diversity. It would appear, however, that a 3-ft. spacing between rows and a 4-in. spacing between plants in the row will become standard practice in future. Cultivation problems are negligible in crops established at these spacings.

Fertilizer schedules now follow closely normal practice in southern Queensland, with minor modifications suggested by the known characteristics of the alluvial soils in the Burdekin Delta. Typically a 4-15-2 basal mixture is applied at a rate of 300-450 lb., to the acre, but, on some soil types, this amount could be increased substantially with advantage. Sulphate of potash, however, replaces the muriate of potash in the conventional mixture of this type as a precaution against possible chlorine toxicity, which has been recorded in crops such as tobacco when grown in the area. Sulphate of ammonia is used as a side dressing at the rate of about 100 lb. to the acre applied some two or three weeks after germination in the field.

In some seasons, molybdenum sprays are beneficial. Reserves of this element in the soil are marginal, and quick responses to treatment have been obtained in bean crops where deficiency symptoms were reported.

All crops are furrow-irrigated as and when necessary at a rate of about 2 in. at each application. Waterings however, vary with the soil type and the incidence of rain (if any) during the growing period.

Pests and Diseases

Insect pests such as bean fly, corn ear worm and pod borer are sometimes active but cause little damage when DDT sprays are applied regularly to the growing crop. Substantial losses may occur, however, when, for any reason, control measures are not carried out systematically.

Diseases are not troublesome. Pythium, rhizoctonia and sclerotina have caused some pod damage but this seldom reaches commercial proportions. No outbreaks of anthracnose, halo blight or common bacterial blight have been reported from the district since the inception of commercial bean seed production.

For the Future

The results achieved to date by commercial growers confirm the view held by well-informed observers that the Burdekin Valley has all the essentials—a well-drained soil, a dry winter climate and ample water—for the production of bean seed with the specifications required by the green bean industry. The more important of these are freedom from diseases such as halo blight, common bacterial blight, and anthracnose, which are seedborne, and high percentage germination The Burdekin Valley lends itself to volume production of seed at competitive cost in a climate where outbreaks of the mors important diseases are unlikely to occur. In this respect, the area is almost unique.

Given reliable sources of mother seed, the Burdekin in particular, and the dry tropics in general, could become increasingly important as sources of seed supplies for the Australian green bean industry.

Plate 2

Bean Seed Crop. Note the wide spacing between rows which is a normal precaution against the spread of disease.

Propagating Tropical Fruit Trees

Normal budding and grafting are not usually successful on tropical fruit trees like the litchi. But marcotting, or gooteeing as it is sometimes called, gives satisfactory results.

Marcotting involves treating a branch of a selected tree in such a way that it grows its own root system. The rooted branch is then cut off and planted as a separate tree.

On a straight 12 in. section of a vigorous branch, a 2 in. strip of bark is cut away around the branch. A piece of plastic about 2 ft. by 1 ft. is lapped loosely around the branch to form a cylinder 4 in. to 6 in. in diameter. This is tied tightly around the branch just below the rung section, packed with thoroughly wetted and squeezed out peat moss, and tied off at the other end. Roots will grow from above the rung section in eight to 12 weeks.

—S. E. STEPHENS, Horticulturist.

Orchard and Garden

Get Healthy Banana Plants. Sound, healthy planting material is the foundation of a successful banana plantation. You can't afford to risk introducing diseases like bunchy top into a new area.

Several months may elapse after a plant is initially infected before obvious symptoms of bunchy top appear. For this reason you can't be sure your planting material is safe unless you know the disease history of the plantation over at least two years.

If you're planning to plant bananas, consult your local banana inspector before lodging an application for permission to plant. He not only knows the present planting policy, but he can also list sources of supply in order of merit for efficient management, plant vigour and freedom from disease. All of these points are important to you, but none more so than an assurance that your plants will be free from bunchy top.

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

Grey Mould of Strawberries. Grey mould disease of strawberries has caused severe losses this season. Fruit rotting has been common both on the farm and in the canneries.

Intermittent showers and humid weather have favoured the development of the disease. It is a fungus infection that causes a light brown, soft rot of strawberry fruit, and a grey fuzz of spores usually appears on the diseased parts.

In experiments, regular spraying with captan has given promising control. Captan is used at a concentration of 2 lb. to 100 gallons of water, or 1 oz. to a knapsack spray. Plants should be sprayed thoroughly at intervals of 10 to 14 days while weather conditions favour the spread of the disease. Rotting fruit should be removed from the plants and the patch during picking. Berries showing early signs of rotting should be discarded during packing operations.

—B. L. OXENHAM,
Senior Pathologist.

Plant Grafted Passion Vines High. Grafted passion vines must be planted with the stock-scion union well above ground level. If the union is below the surface of the soil, the benefits derived from the Fusarium-resistant stock may be lost completely.

Deep planting can shorten the life of grafted passion vines. The purple passion vine is grafted onto the golden passion vine to lessen the risk of losses from Fusarium wilt. When planted with the union below the ground, the purple passion scion may develop its own root system which is susceptible to disease.

If you use a surface mulch to conserve soil moisture keep it well away from the base of the vine. A rotting mulch provides ideal conditions for the entry of root rot organisms. Once this happens, it's only a question of time before the vine dies.

—R. L. PREST,
Senior Adviser in Horticulture.

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

Berkshire

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

Large White

Assenbruck, C., Mundubbera
Barron Bros., "Chiltern Hill", Cooyar
Bell & Son, E. J., "Dorne", Chinchilla
Butcher, Dr. B. J. & Parnwell, A. J. Plunkett, via Tamborine
Clark, L. D., Greens Creek, Gympie
Duncan, C. P., "Hillview", Flagstone Creek
Fowler, S., "Kenstan", Pittsworth
Franke, H. J., "Delvue" Stud, Cawdor
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

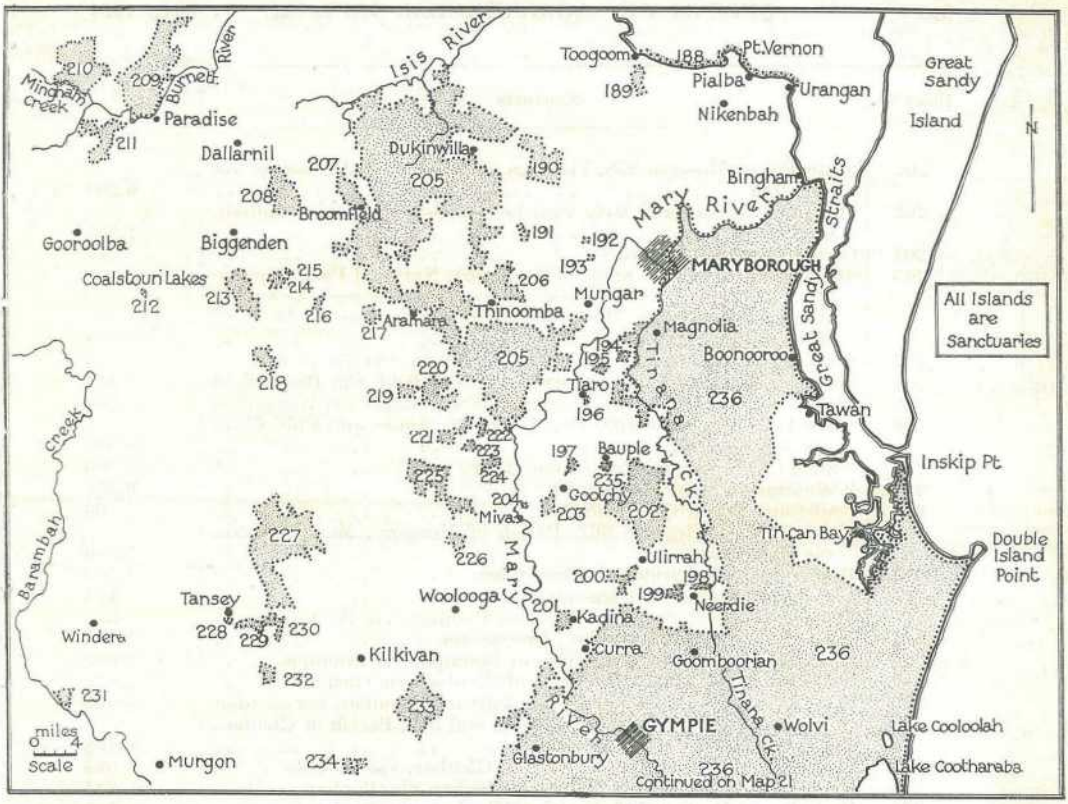
Ashwell, J., "Green Hill", Felton South
Cooper, G. J., Neumgua
Douglas, W., "Greylight" Stud, Goombungee
Dunlop, J. B., "Kunawyn", Acacia Road, Kuraby
Kruger & Sons, "Greyhurst" Stud, Goombungee
Law, D. T., "Rossvill" Stud, Aspley
Mack, A. J., Mundubbera
Scott, A., Wanstead Stud, Grantham
Smith, C. R.,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

Large Black

Pointon, E., Goomburra

Landrace

D. G. Grayson, Killarney



Map 20—Sanctuaries in Part of Fauna District No. 1.

Queensland Fauna Sanctuaries

By C. ROFF, Fauna Officer

(Continued from August, 1958)

The following is an index of the sanctuaries outlined in Map 20:—

Index No.	Sanctuary	Area in Acres
188	Foreshores of Hervey Bay, Parishes of Vernon and Urangan ..	375
189	State Forest Reserve 682, Parish of Vernon, via Toogoom ..	2,230
190	State Forest Reserve 1, Parishes of Warrah and Ferguson, via Howard	8,000
191	State Forest Reserve 576, Parish of Dunmora, via Oakhurst ..	480
192	State Forest Reserve, 563, Parish of Ferguson, via Oakhurst ..	278
193	State Forest Reserve 574, Parish of Ferguson, via Oakhurst ..	493
194	State Forest Reserve 990, Parish of Young, via Owanyilla ..	401
195	State Forest Reserve 965, Parishes of Young and Tiaro, via Tiaro	505
196	Tiaro Swamp, Tiaro	119
197	National Park Reserve 453, Parish of Gundiah, Mount Bauple, via Bauple	640
198	State Forest Reserve 944, Parish of Neerdie, via Neerdie	595
199	State Forest Reserve 904, Parish of Neerdie, via Neerdie	1,080
200	State Forest Reserve 906, Parishes of Curra and Gootchy, via Gunalda	2,306
201	"Durramboi," via Kadina	957

Index No.	Sanctuary	Area in Acres
202	State Forest Reserve 958, Parishes of Gundiah and Neerdie, via Gundiah	6,200
203	State Forest Reserve 940, Parishes of Gootchy and Gundiah, via Miva	1,565
204	Carswell's Lagoon, Miva	11
205	State Forest Reserves 8, 57, 676 and 864, National Park Reserve 336, Parishes of St. Mary, Woocoo, Gungloon, Doongul, Warrah, Dunmora, Kolbore, Kullogum, Broomfield, and Boompa, via Aramara	159,380
206	State Forest Reserve 12, Parish of Gungloon, via Thinoomba	5,445
207	State Forest Reserve 830, Parish of Broomfield, via Broomfield	3,451
208	State Forest Reserve 287, Parish of Woowoonga, via Biggenden	5,600
209	State Forest Reserve 169, Parishes of St. Agnes and Chin Chin, via Mount Perry	19,915
210	"Swindon Mountain," via Mount Perry	12,106
211	"Wateranga," via Brynestown	6,265
212	Coalstoun Lakes, via Biggenden	65
213	National Park Reserve 862, Parish of Mungore, Mount Walsh, via Biggenden	7,380
214	Properties at Lakeside, via Biggenden	1,500
215	Lakeside Lagoon, via Biggenden	115
216	State Forest Reserve 550, Parish of Boompa, via Boompa	337
217	Property of A. H. J. Raddon, Brooweena	1,166
218	State Forest Reserve 25, Parish of Boompa, via Boompa	2,000
219	State Forest Reserve 543, Parish of Glenbar, via Glenbar	1,078
220	State Forest Reserve 518 and 536, Parish of Glenbar, via Glenbar	4,973
221	State Forest Reserves 206, 528, 531, and 535, Parish of Glenbar, via Glenbar	6,108
222	State Forest Reserve 580, Parish of Glenbar, via Glenbar	563
223	State Forest Reserve 525, Parish of Glenbar, via Glenbar	611
224	State Forest Reserve 523, Parish of Glenbar, via Glenbar	545
225	State Forest Reserves 50 and 301, Parishes of Glenbar and Miva, via Miva	9,695
226	State Forest Reserve 420, Parish of Miva, via Miva	795
227	State Forest Reserve 67, Parish of Grongah, via Tansey	22,840
228	Tansey Reserve, via Goomeri	95
229	Boonara Creek, via Goomeri	1,383
230	Boonara Run, via Goomeri	1,071
231	Barambah Creek, via Murgon	660
232	State Forest Reserve 355, Parish of Kilkivan, via Kilkivan	960
233	State Forest Reserve 220, Parishes of Kilkivan and Brooyar, via Kilkivan	9,700
234	"Kabunga," via Kinbombi	761
235	Sugar Mill Swamp, Bauple	643
236	Area within the original boundaries of the abolished Shire of Granville Waterworks Reserves 151 and 426, Teddington Shire of Maroochy Shire of Noosa Shire of Widgee City of Gympie Miners' Homestead Lease No. 5533, Tamaree Lake Doonella, Tewantin Town of Tewantin, Tewantin Mount Cooroy Reserve 585, Parish of Tewantin Noosa River Inlet Railway Reserve, Palmwoods Properties of A. J. Thynne, A. Marshall, and A. W. Thompson, Maleny Obi Obi Creek, Maleny (This area includes a number of State Forest and National Park Reserves) (Balance in Map 21)	1,915,520

Plate 8

Lake Cootharaba Fauna Sanctuary, via Tewantin. Photograph by Queensland Railways Department.

Seasonal Calving For Dairy Cows

The results obtained from herd recording show that cows which calve at certain times of the year give greater quantities of milk and fat than those which calve at other periods.

Although the most favourable period varies slightly for different districts, the third quarter of the year is the most conducive to higher yields.

Many farmers have taken advantage of this information to increase the returns from dairying at no additional cost. They calve all their cows in the third quarter. By so doing, their herds dry off in May and the farmer has two months in which no cows are milked. This enables the farmer and his family to take a well-earned holiday, or to concenrtate on other farm activities.

Anyone who desires to practise seasonal calving requires a strong paddock in which to keep his bull. Matings should be confined to October and November. Although it may take some years before it is possible to have all cows calving in the third quarter of the year, the results more than compensate for the extra trouble.

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

Save Lives With These Swimming Rules

In one year in Queensland, 17 children up to the age of 14 were drowned. Each year these tragedies continue to happen.

The water safety of the children in your care depends on YOU—and there is much you can do about it. So refard these safety rules as a matter of LIFE and DEATH, as they could well be.

1.—*Parental Supervision.* Case histories of drownings show without a doubt that more of these tragedies could have been prevented by this than any other precaution. So make this your No. 1 water safety rule. Always supervise children all the time they are in the water, whether they can swim or not.

2.—*Learning to Swim.* Eight years is a good age for the average child to start learning to swim. When children do start they should be taken to baths often enough to make this learning effective. **But your part does not end here. This alone does not make your child safe in the water.** Do not be misled by the abilities of a few young champions. Few children under the age of puberty can swim strongly. They still need parental supervision all the time they are in the water.

3. *Water Holes.* Forbid diving into water holes unless you personally make certain there are no "snags," and that the water is deep enough for diving.

4. *Fitness for Swimming.* Make sure children are quite well before you allow them in the water.

5. *Times of Swimming.* Always insist on the lapse of at least an hour after a meal before allowing children in the water.

6. *Control of "Fooling."* Always keep a sharp eye out for dangerous horseplay in the water and around the edges of swimming baths.

7. *Helping Others.* Teach your children to be ever ready to help others in the water. Point out that the better they can swim the more it is up to them to keep a protective eye on those less able to take care of themselves.

8. *Insist on All the Rules of Safe Surfing.* Forbid children the water unless they can be relied on to observe all the rules of water safety.

Best Recipe of the Month

Dry Bean Dishes: Possibly the best way to use dry beans is as an addition to soup and stew dishes, at the same time adding to the nutrient quality of the diet. The dry beans are soaked overnight and then added to other ingredients when cooking begins. Dry beans may be used in special meatless dishes such as—

Bean and Tomato Pie: 2 cups of Cooked Beans, 2 pints of Tomato Pulp, small amount of Butter, 1 large Onion, Bread Crumbs.

Method: Cover the base of a casserole with the cooked beans, followed by a thin layer of finely sliced onion, then a layer of tomato pulp. Repeat until the dish is almost full, finish with a layer of tomato sprinkled thickly with bread crumbs and dot with butter. Place in a moderate oven and bake gently for 2 to 3 hours.

Requirements of a club secretary—II

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

IT is the secretary's responsibility to send notices of meetings to all those entitled to attend. Members of the club advisory committee should receive copies of all notices sent out. It is most desirable that the secretary contact the "back sliders," and encourage them to attend meetings once again. Very often, special efforts will have to be made to encourage the regular attendance of shy members or members who have long distances to travel. A telephone call, as well as the routine meeting notice, will make these members feel that they are really wanted. Make sure that the "notice of meeting" cards are being sent out in sufficient time to ensure delivery well in advance of the meeting date. This is particularly important in the case of special meetings or when the regular night has to be changed. The notice of meeting should also include details of the important business to be dealt with.

Before the Meeting

In addition to notifying everyone of the date, time and place of the meeting, the secretary will need to make sure that the meeting place has been booked and that an agenda has been drawn up. The agenda is a list of things to be dealt with at the meeting, and it should be gone through with the chairman or club leader before the meeting takes place. It will help the chairman if notes and reminders are written on his copy. After having conferred with the chairman, the secretary should advise members of any special duties they may be asked to perform. Those who have to propose and second a vote of thanks should receive, in writing, the name and title of the person to be thanked. When reports have to be submitted, it is the secretary's job to see that the persons responsible for these reports have prepared them, and that they are ready to present them at the appropriate time.

Following is a specimen agenda, which may be useful to chairmen and secretaries:

1. Chairman declares meeting open; gives special welcome to any guests, visitors and advisers present.

2. Chairman calls for and accepts apologies for absence from the meeting.

3. Secretary reads minutes of previous meeting; chairman asks for motion to confirm.

4. Chairman calls for business arising out of minutes. (Secretary lists all items.)

5. Secretary reads inward and outward correspondence; lists the letters. Letters need not always be read in full. The importance of their contents will determine this.

Letters containing urgent or important matters should be listed separately.

6. Chairman calls for business arising out of correspondence.

7. Treasurer reads the financial report and presents accounts for payment.

8. Chairman calls for other reports.

9. Chairman introduces new members.

10. Chairman calls for notices of motion.

11. General Business: Chairman deals with items listed and asks for any further items.

12. Chairman announces guest speaker, discussion, or whatever has been arranged.

13. Chairman calls for vote of thanks.

14. Chairman announces date and place of next meeting.

15. Chairman closes meeting.

During the meeting

The secretary or the assistant secretary will call the roll or make sure that the names of those attending the meeting have been recorded. The secretary must next ensure that a quorum is present. This is the minimum number of members who must be present before business can be done. (A quorum at any regular meeting of a Junior Farmer Club shall be one quarter of the members entitled to vote or a minimum of five members in those clubs with a membership of less than 20.)

It is customary for the secretary to sit on the left of the chairman. The chairman may look for and expect information and assistance from the secretary at all stages of the meeting. The secretary "takes" the minutes of each meeting. The minutes are a written record of what takes place. Where there is much buisness conducted at a meeting, the full details are taken by the assistant-secretary, who writes up the minutes in the minute book. The Secretary makes a note of the action which he or she is required to take as a result of decisions made at the meeting. The secretary will obtain the minute book as soon as it has been written up and confirm that all the necessary action has been taken. Minutes must be accurate. The exact words used in motions should be recorded, and the names of proposers and seconders noted. It is desirable that the main arguments for or against important motions should be briefly recorded.

Care Of Your Battery

Just a few minutes' attention once or twice a month will protect your battery and keep it functioning at its best.

It is most important that the batteries should be kept "topped-up" and clean. Merely squirting a little distilled water in the battery is no longer regarded as modern battery servicing.

For the few minutes periodic servicing it is advisable to adopt the following routine:—

1. Clean top of battery—washing with soda solution if necessary.
2. Inspect battery cables—undersized, frayed or corroded cables prevent easy starting.
3. Clean and grease battery terminals.
4. Test specific gravity of cells.
5. Add pure water only if necessary. Water level in cells should be approximately $\frac{3}{8}$ in. above plates.
6. Do not over-fill. It can result in dilution of the electrolyte and may also spill, resulting in corrosion.

—C. G. WRAGGE,
Agricultural Engineer.